VOL. XXVI. N°6. JUNE 1941

MECCANO MAGAZINE

S.R. "CHANNEL PACKET"

(See page 183)

6D.

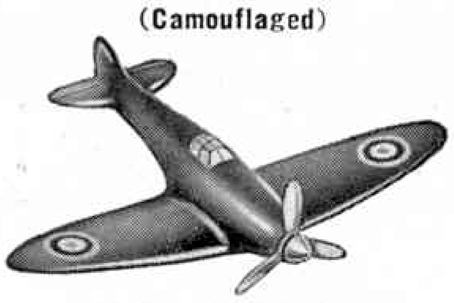
THE FASCINATING COLLECTING HOBBY

DINKY TOYS

PERFECT MINIATURES

Dinky Toys owe their popularity to their scale proportions, wealth of detail, and attractive finish. There are over 300 items now in the range. Ask your dealer for prices or write direct to Meccano Ltd., Binns Road, Liverpool 13, for a copy of the latest complete price list.

VICKERS-SUPERMARINE "SPITFIRE" FIGHTER (Camouflaged)

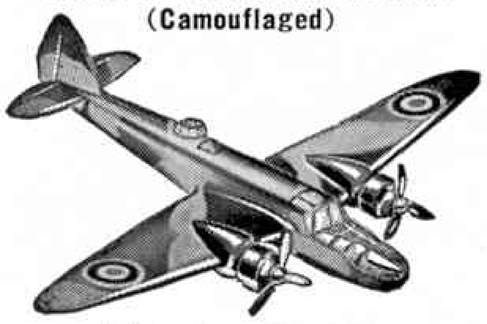


Dinky Toys No. 62e
Scale model of the Vickers-Supermarine "Spitfire," one of the fastest fighter aircraft used by the Royal Air Force.

No. 62e Camouflaged
Price **8d.** with Tax **10d.**

No. 62a Aluminium Finish
Price **8d.** with Tax **10d.**

"BRISTOL" BLENHEIM BOMBER (Camouflaged)



Dinky Toys No. 62d
Realistic model of the "Bristol" Blenheim Bomber extensively used by the Royal Air Force.

No. 62d Camouflaged
Price **1/0½** with Tax **1/3**

No. 62b Aluminium Finish
Price **1/0½** with Tax **1/3**

SHIPS OF THE BRITISH NAVY

50c

50e

Dinky Toys No. 50
No. 50a Battle Cruiser "Hood"; No. 50b Battleships, "Nelson" Class (2); No. 50c Cruiser; No. 50d Cruiser "York"; No. 50e Cruiser "Delhi"; No. 50f Destroyers, "Broke" Class (3); No. 50g Submarine, "K" Class; No. 50h Destroyers "Amazon" Class (3); No. 50k Submarine, "X" Class.

50a	Price	**10d.**	with Tax **1/-**	50f	Price	**1½d.**	with Tax **2d.**
50b	,,	**8d.**	,, **10d.**	50g	,,	**1½d.**	,, **2d.**
50c	,,	**7½d.**	,, **9d.**	50h	,,	**1½d.**	,, **2d.**
50d	,,	**7½d.**	,, **9d.**	50k	,,	**1½d.**	,, **2d.**
50e	,,	**5½d.**	,, **7d.**				

Complete Set Price **4/11** with Tax **6/-**

18-POUNDER QUICK-FIRING FIELD GUN UNIT

Dinky Toys No. 162
Comprises scale models of an 18-pounder Quick-Firing Field Gun, Trailer and "Light Dragon" Motor Tractor.

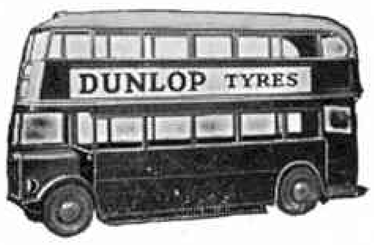
162a "Light Dragon" Tractor Price **2/8** with Tax **3/3**
162b Trailer Price **10d.** with Tax **1/-**
162c Gun ,, **10d.** ,, **1/-**

Complete Set Price **4/4** with Tax **5/3**

BOEING "FLYING FORTRESS" BOMBER

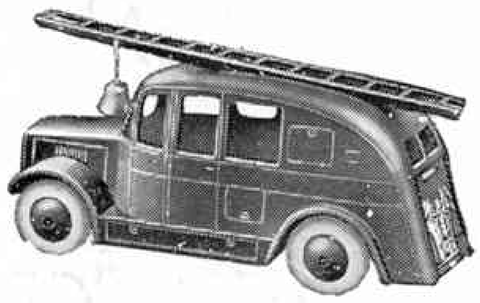
Dinky Toys No. 62g
Scale model of Boeing B-17 "Flying Fortress," one of the fastest bombers in the world, and extensively used by the United States Army Air Corps.
Price **1/10** with Tax **2/3**

DOUBLE DECKER BUS



Dinky Toys No. 29c
Assorted colours.
Fitted with detachable rubber tyres.
Price **2/1½** with Tax **2/7**

STREAMLINED FIRE ENGINE



Dinky Toys No. 25h
Price **1/3** with Tax **1/6**

ROBOT TRAFFIC SIGNAL

Dinky Toys No. 47a (Four face)
Price **3d.** with Tax **4d.**

No. 47b (Three face)
Price **3d.** with Tax **4d.**

No. 47c (Two face) Right-angle or back-to-back.
Price **3d.** with Tax **4d.**

BEACON

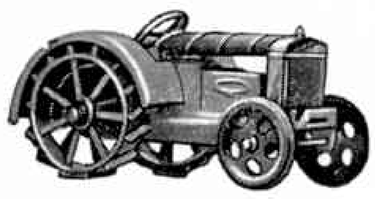
Dinky Toys No. 47d
Realistic model of the Belisha Safety Beacon.
Price **2d.** with Tax **2½d.**

MOTOR CYCLIST

POLICE

Dinky Toys No. 37b
Finished in correct colours. Fitted with solid rubber wheels.
Price **10d.** with Tax **1/-**

TRACTOR

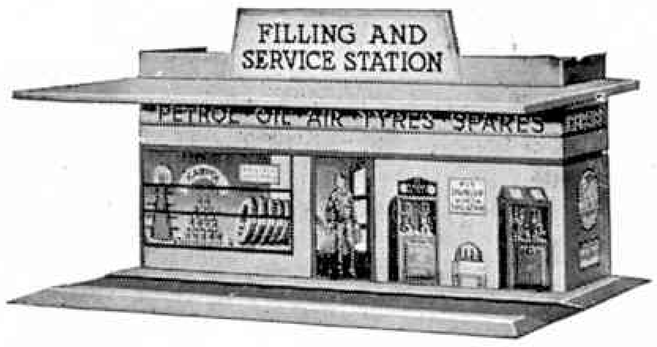


Dinky Toys No. 22e
Price **1/3** with Tax **1/6**

REFUELLING TENDER

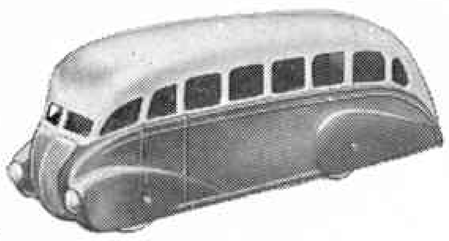
Dinky Toys No. 60y
Realistic model of Thompson Bros. Tender used for refuelling aeroplanes at aerodromes.
Price **1/3** with Tax **1/6**

PETROL STATION



Dinky Toys No. 48
Accurate reproduction of a filling station.
Price **2/0½** with Tax **2/6**

STREAMLINED BUS

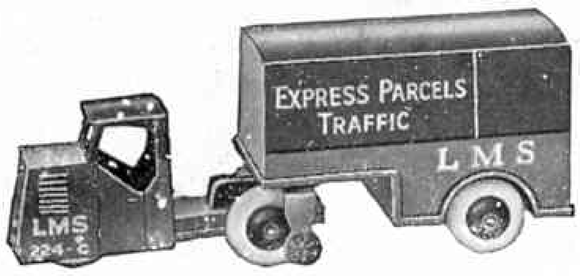


Dinky Toys No. 29b
Fitted with rubber tyres.
Price **10d.** with Tax **1/-**

TAXI, WITH DRIVER

Dinky Toys No. 36g
Fitted with detachable rubber tyres.
Price **1/5½** with Tax **1/9**

RAILWAY MECHANICAL HORSE AND TRAILER VAN

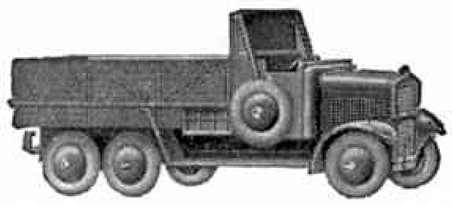


Dinky Toys No. 33R
No. 33Ra Railway Mechanical Horse.
Price **1/0½** with Tax **1/3**

No. 33Rd Trailer Van. Price **1/3** with Tax **1/6**

Complete Set, L.M.S., L.N.E.R., G.W.R., or S.R.
Price **2/3** with Tax **2/9**

SIX-WHEELED WAGON



Dinky Toys No. 25s
An interesting model of a modern three-ton wagon. In assorted colours.
Price **1/7½** with Tax **2/-**

"THUNDERBOLT" SPEED CAR

Dinky Toys No. 23m
A fine scale model of the car in which Capt. G. E. T. Eyston set up a world land speed record of 357·50 m.p.h. at Bonneville, Utah, U.S.A.
Price **1/5½** with Tax **1/9**

STREAMLINED RACING CAR

Dinky Toys No. 23s
Similar in type to the "Thunderbolt" speed car. Assorted colours.
Price **1/3½** with Tax **1/7**

DINKY TOYS ARE MANUFACTURED BY MECCANO LTD., LIVERPOOL

8 GOOD IDEAS *from* HAMLEYS for making the most of Summer

IT'S grand to live in the country but grander still if you possess a MICROSCOPE. Beetles, caterpillars, butterflies, grubs and plants are so much more interesting when you can see exactly how they are made. Hamleys sell a strongly magnifying MICROSCOPE at 21/-, complete with slides and packed in a strong wooden box. A larger size with better finish, 27/6.

For taking with you on country walks, Hamleys POCKET MICROSCOPE at 2/6 (post 4d.) is fine—it's no bigger than a fountain pen.

When planning a walk, or a bicycle ride, from a map it's as well to know exactly what you're letting yourself in for. A MAP MEASURE at 7/6 (post 4d.) runs its little wheel accurately over the lines on the map and tells you in statute miles, nautical miles and kilometres exactly how far you must go. It makes a grand present for elder brothers in the Forces.

Hamleys sell very good CATAPULTS at 3/6 (post 4d.) with strong aluminium handles and leather slings. Practice aiming with these, but *don't* aim at a rabbit or anything else *unless you're sure of killing it*. To hurt and leave alive is unsporting and cruel.

For small gardens, buy LA PELOTE at 6/6 (post 7d.). It's a very fast game for two players, very like squash. Or try ROLLO at 4/6 (post 7d.)—an amusing exercise which demands skill and balance.

For wet evenings you can't beat Hamleys *full-size* DART BOARD at 15/- (post 7d.)—a double-sided board, 18 inches, and very strong. Or JACKS at 2/3 (post 4d.)—a modern version of firestones, with 10 stars and a ball.

And of course—you won't forget that Hamleys always have in stock the finest possible selection of CRICKET BATS and LIGHTWEIGHT TENNIS RACKETS.

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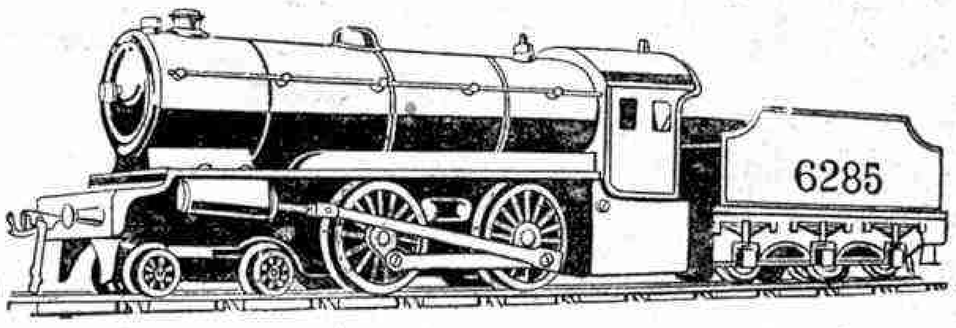
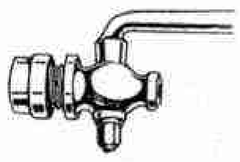


BASSETT-LOWKE LTD. are still carrying on, and with their huge and varied stock of model railway equipment, can still supply most of their standard lines in gauges "00", "0" and "1."

Here is their popular "ENTERPRISE" gauge "0" Steam Locomotive, which with Purchase Tax included, now costs £3 . 9 . 0 post free.



EVERYTHING for the gauge "0" Model Enthusiast is contained in GR.17, sent post free for 6d.

For the latest list of gauge "00" productions get TT.17, which costs 3d. post free.

The model builder interested in gauge "1" should write for AB.17, "Steam Locomotives, Stationary Engines and Everything for the Model Constructor," costing 8d. post free.

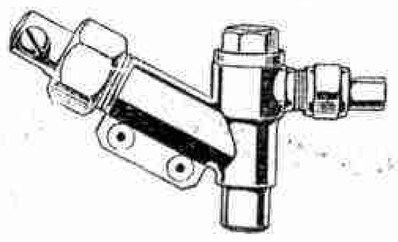
HERE are a few more Bargains left in Model Fittings and Parts at LESS THAN PRE-WAR PRICES.

Send a post-card for our SPECIAL SALE LIST SL/17.

Our illustrations show:

11/1 and 11/2 Straight Nose Blow-off Cock. 3/16 in. and ¼ in. male end. Price 10d. each.

724/5 Diagonal Pump with 7/16 in. plunger—wonderful value at 7/6.



The "MODEL RAILWAY HANDBOOK"—new 9th edition—price 3/6, postage 4d.—is still the most popular railway book produced since the outbreak of war. Have you had your copy?

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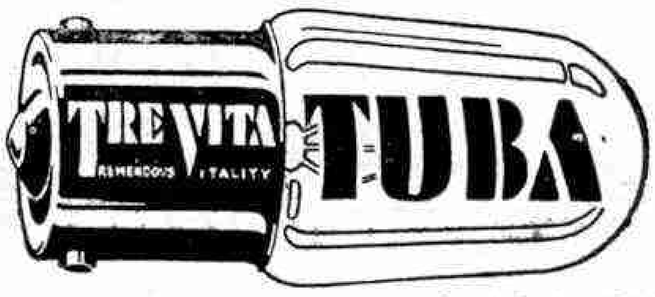

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Send for Price List. Individual Bulbs Supplied. No Charge for Postage.
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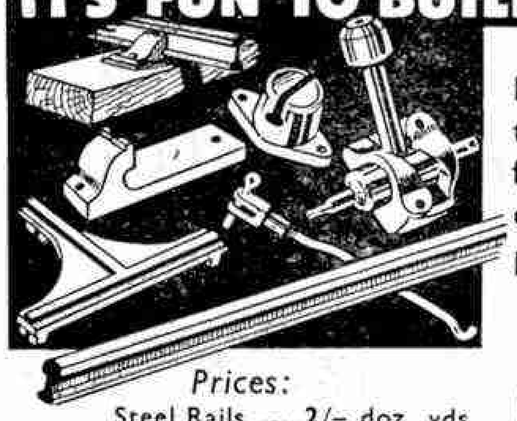
IT'S FUN TO BUILD YOUR OWN TRACK



Run your model railway on the right track—built yourself with MILBRO famous Track parts. Rails, sleepers, chairs, fishplates—all true-to-scale—perfect replicas of the real thing.

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A fascinating building hobby

FOR BOYS AND GIRLS

Dinky Builder Outfits are great favourites with boys and girls. Simplicity is the keynote of this building system, by means of which even the youngest children can construct an unlimited variety of models.

No. O DINKY BUILDER OUTFIT

From which 40 models, shown in the Instruction Folder, and many others, can be built.
Price **4/-** with Tax **5/-**

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Contains a larger selection of parts with which 56 models can be built, as shown in the Instructions Manual.
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With this Outfit all No. O and No. 1 models can be built, together with groups of model furniture, as shown in the Instructions Manual. Price **12/3** with Tax **15/-**

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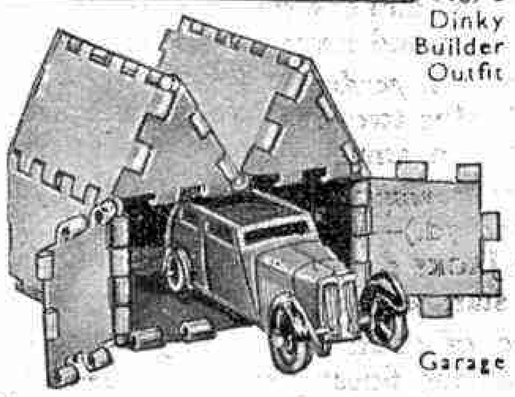
Contains a useful assortment of Dinky Builder Parts with which Outfits No. O, No. 1, No. 2 and No. 3 can be enlarged.
Price **1/6** with Tax **1/9**

No. 2 Dinky Builder Outfit



Garage

No. 3 DINKY BUILDER OUTFIT

The largest and best Outfit in the Series. The models that can be built with it are almost endless, and the Instructions Manual illustrates 92 splendid examples.
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Manufactured by Meccano Limited, Binns Road, Liverpool 13

MECCANO AEROPLANE CONSTRUCTOR OUTFITS

The parts in these Outfits are all interchangeable on the famous Meccano principle, and splendid miniature aircraft (non-flying) can be built with them. The Instruction Manuals included in the Outfits show clearly how to construct a number of interesting models.

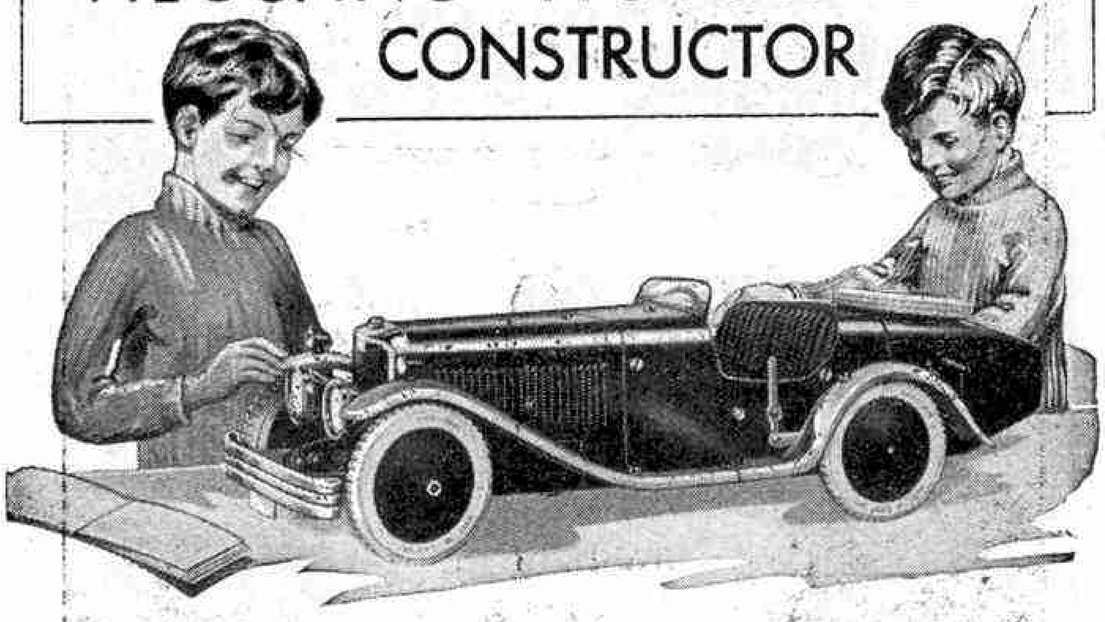
No. 0 Aeroplane Outfit

PRICES OF OUTFITS

No. 00	Outfit,	Blue and White	Price **6/-**,	with Tax	**7/3**
No. 00	,,	Camouflaged ...	,, **6/-**	,,	**7/3**
No. 0	,,	Red and Cream	,, **7/9**	,,	**9/6**
No. 0	,,	Service Grey ...	,, **7/9**	,,	**9/6**

MECCANO LTD. - BINNS ROAD - LIVERPOOL 13

MECCANO MOTOR CAR CONSTRUCTOR



MECCANO MOTOR CAR CONSTRUCTOR OUTFIT

Perfect miniature reproductions of different types of car can be built with this Outfit. All the models are driven by means of a powerful Clockwork Motor (included in the Outfit).

	Price	With Purchase Tax
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OBTAINABLE AT ALL GOOD TOY SHOPS AND STORES
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Learn to identify British and Foreign Aeroplanes.
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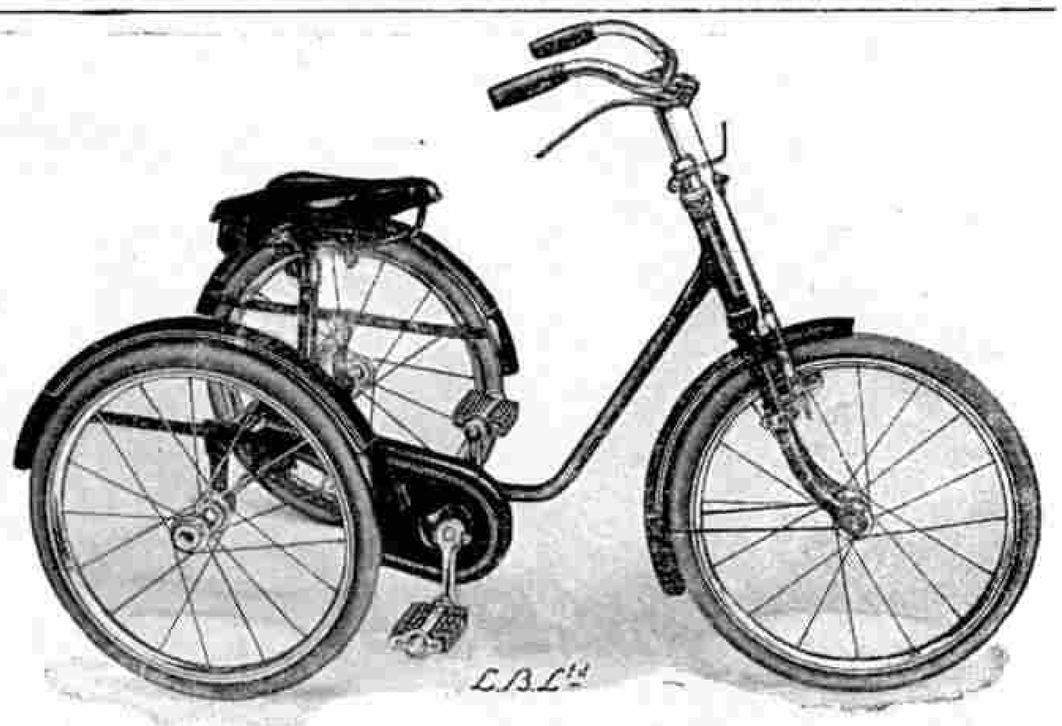
TRI-ANG

ALL BRITISH TOYS

STREAMLINE

Steel body with opening side door, upholstered seat. Adjustable wind screen and direction indicators. 9 in. new type easy-clean wheels with malleable hubs. ⅞ in. tyres. Hand brake. Length 44 ins. Suitable for ages 4 to 7.

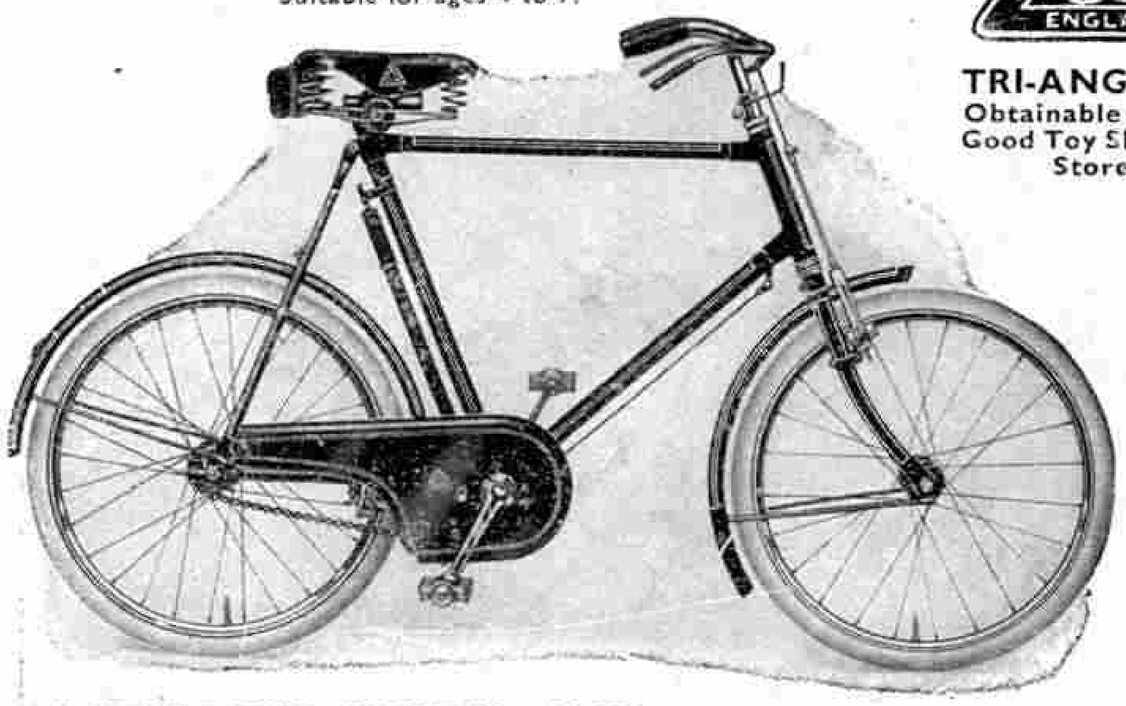


TRI-ANG TRICYCLE No. E2 (Regd. Trade Mark)

Cycle chain drive with free-wheel. Frame and forks best quality weldless cycle tubing. 16 in. front and rear wheels. 1⅛ in. jointless sponge-rubber tyres. Roller lever brake. Ball-bearings throughout. Coil spring saddle. CHROMIUM FITTINGS. Black, blue or maroon.

L. BROS. LTD. LONDON BROS ENGLAND

TRI-ANG TOYS
Obtainable from all Good Toy Shops and Stores.



"UNITY" BOY'S CYCLE No. 16 PB

16 in. frame. Finest quality British tube. Wheels 16 in. x 1⅜ in. CHROMIUM PLATED rims. Dunlop pneumatic tyres. Roller lever pattern brakes. Three-coil saddle. ½ in. x ⅛ in. roller chain. Ball-bearings throughout. Complete with equipment and finished in black, blue or maroon. All usual bright parts CHROMIUM-PLATED. Ages 7 to 11.

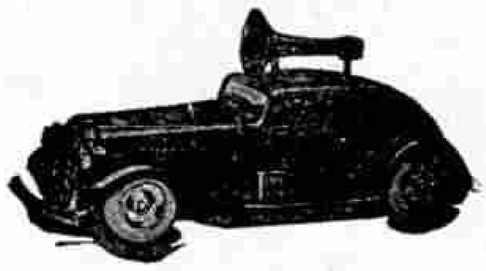
"FAIRYCYCLE" (Regd.) MODEL No. 2

Cycle tubular frame and forks, 14 in. wheels. 1⅛ in. jointless sponge-rubber tyres. Ball-bearing pedals. Roller lever brake. Two-coil saddle. Chain cover. Stand. CHROMIUM-PLATED FITTINGS. Black, blue or maroon.

MINIC

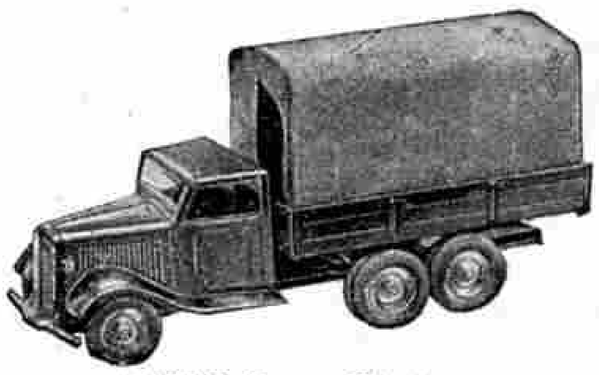
ALL TO SCALE CLOCKWORK TOYS

Almost every type of road transport is represented. Each model is strongly constructed and fitted with long-running mechanism and some are fitted with electric lights.

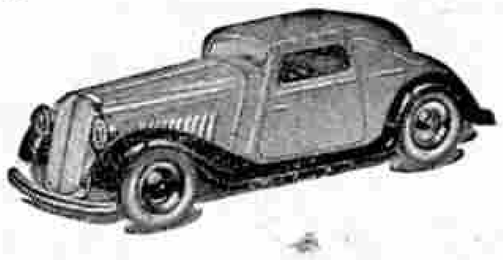


MINIC Traffic Control Car.

MINIC Mechanical Horse and Lorry with Barrels.



MINIC Canvas Tilt Lorry. Obtainable in camouflage colours.



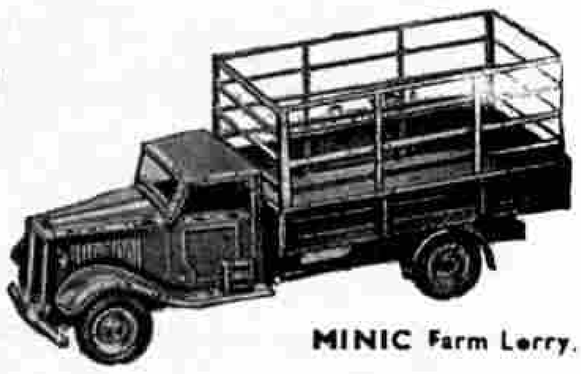
MINIC Vauxhall Cabriolet. Obtainable in camouflage colours.

MINIC Tank. Length 3¼ ins. Obtainable in camouflage colours.

MINIC Mechanical Horse and Milk Tanker

MINIC Transport Van.

MINIC Six Wheel Army Lorry.



MINIC Farm Lorry.

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MECCANO MAGAZINE

Editorial Office:
Binns Road, Liverpool 13
England

Vol. XXVI. No. 6
June 1941

With the Editor

The S.R. *"Channel Packet"*

Mr. Bulleid's new "Pacific" locomotive for the Southern Railway has aroused widespread interest, and readers will find a good description of it on page 183.

A correspondent points out that several features of construction in *"Channel Packet"* suggest motor car practice. This is distinctly the case in regard to the valve gear. The valves are not operated by either eccentrics or cams mounted on the crankshaft itself, or even on its crank webs, as with Walschaerts gear. Instead, the crank axle carries a sprocket, and this, by means of an inverted-tooth roller chain, drives a second small three-throw crankshaft which is located forward of the main crankshaft and between the frames. The cranks of the second shaft operate the valves. The assembly is strongly reminiscent of the chain driven camshaft familiar in modern petrol engines. A still further resemblance is to be found in the fact that the main crank axle and the valve gears are all enclosed in an oil bath, which is provided with oil-tight covers and so on, exactly as with a motor car engine crankcase. The valves are of the piston-valve type, two being on one side of the engine, and one on the other.

Welding is used to an enormous extent in the locomotive, and many of the parts for the brackets and so on are cut from sheet metal by the oxy-coalgas cutting machine, and afterwards welded up and ground off to get a smooth finish. Even the step plates are welded to the buffer casings!

The cab is the roomiest so far. It is built up of quite thin sheet, fitted and welded up. It is carried on a framework of light girders, and the absence of rivets is noticeable. The new type of pull-out regulator handles, duplicated on both sides of the cab, is very apparent, as also are the illuminated instruments and gauges.

A feature of the locomotive is its quite astonishing silence in action.

Leaders in the War

XIX.—Sir Arthur S. Barratt

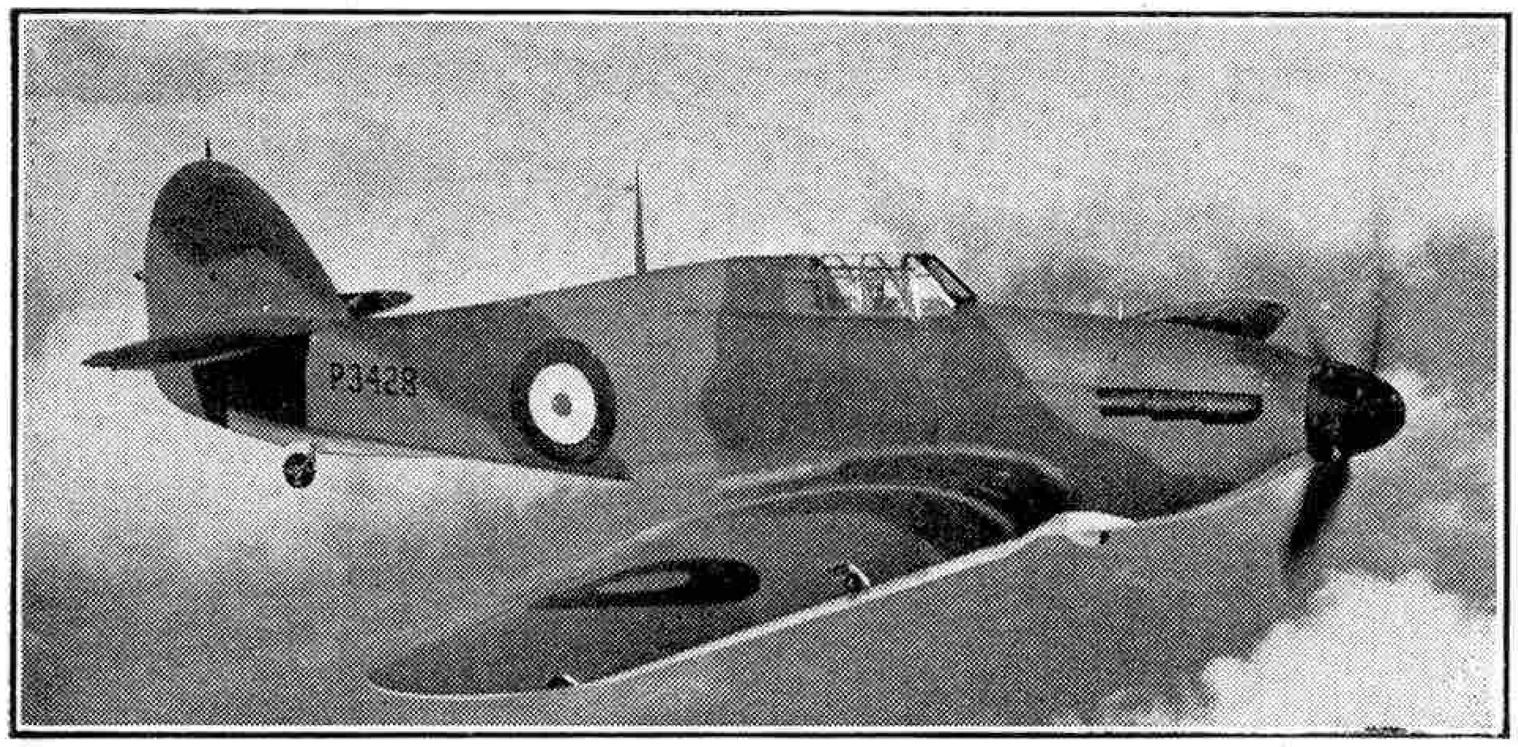
Sir Arthur Sheridan Barratt was born in India in 1891, and was educated at Eton and Woolwich. He began his military career in the Royal Artillery, but transferred to the Royal Flying Corps soon after the war of 1914-18 began, and was sent to France in command of No. 3 Squadron on Army Co-operation duties. There he won the Military Cross by brilliant "spotting" for his old regiment, the Royal Artillery. His services during the war also earned him the C.M.G., Croix de Guerre, and the Cross of the Order of the Crown (Belgium), and he was mentioned in dispatches four times.

Air Chief Marshal Sir Arthur Sheridan Barratt, K.C.B., C.B., C.M.G., M.C., Air Officer Commanding-in-Chief, Army Co-operation Command, Royal Air Force.

After the war he passed through the Army Staff College and became Commandant of the School of Army Co-operation, and later was for a time Chief Instructor at the Royal Air Force Staff College. Then he was sent overseas again. He was at Shanghai in 1927, and served in India from 1931 to 1934, first in command of No. 1 Indian Group at Peshawar, and from 1932 as Senior Staff Officer at the R.A.F. headquarters. Back in England in 1935 he was made Director of Staff Duties at the Air Ministry.

The present war brought him fresh opportunities. He was placed in supreme command of the Royal Air Force in France, combining in this command the Air Component of the B.E.F. and the Advanced Air Striking Force. In this high office he took his orders only from the Chief of the Air Staff and acted in consultation with the Commander-in-Chief of the Army. The collapse of France last June brought the campaign there to a close, and in October last he was appointed Air Officer Commanding-in-Chief of the new Army Co-operation Command, R.A.F.

Sir Arthur's thorough knowledge of the whole subject of Army and Air co-operation, together with his unflustered but determined way of getting things accomplished, make him the ideal man for this new Command.



"Hurricane" single-seater fighter, a type with which pilots of the Fighter Command, R.A.F., have achieved great things. This photograph and the upper one on the next page are by courtesy of "The Aeroplane."

The Jobs of the R.A.F. Commands

By C. G. Grey

(Founder of "The Aeroplane")

WE are always reading in the newspapers that the aircraft of the Coastal Command did this, or that a detachment of the Bomber Command did that, or that some formations of the Fighter Command did the other, but I wonder how many readers have a clear idea of what precisely are the jobs of the different Commands, and what the exalted personages known as the A.O.C.-in-C. (Air Officer Commanding-in-Chief) the various Commands do for their livings. Obviously the Fighter Command fight and the Bomber Command bomb, and the Coastal Command has something to do with the coast. But that is not all the story by a good deal.

To some extent the work of the different commands overlaps, in much the way that the work of the Navy and the Army and the Air Force overlaps. Every now and then the Navy lands detachments of the Fleet to deal with affairs on shore, and when, in the words of the Navy, "sailor-man go soldier-walkee," the Navy prides itself on being able to walk the Army off its feet. The Army has quite a lot of motorboats to look after harbour defences and mines, and for ferry work between one gun position and another gun position on some of our big estuaries. So the Army overlaps the Navy.

Then, the Navy has its own Fleet Air Arm, quite apart from the Royal Air Force; and although the Army has not a separate Flying Corps, as it hopes to have some day, a special detachment of the R.A.F. is allocated to Army Co-operation, and a number of Army officers have learned to fly and actually command Army Co-operation squadrons.

On top of that, the R.A.F. has quite a big fleet of motorboats to act as tenders to seaplanes, and to act as targets for bombers, and for rescue work when the R.A.F. are fighting over the sea. Moreover, every man in the R.A.F. has to know how to handle a rifle, and has to be quite an efficient infantryman. That is because men of the R.A.F. have to go out into hostile territory, or at any rate, within reach of enemy fire, to repair or to retrieve aeroplanes which have been brought down.

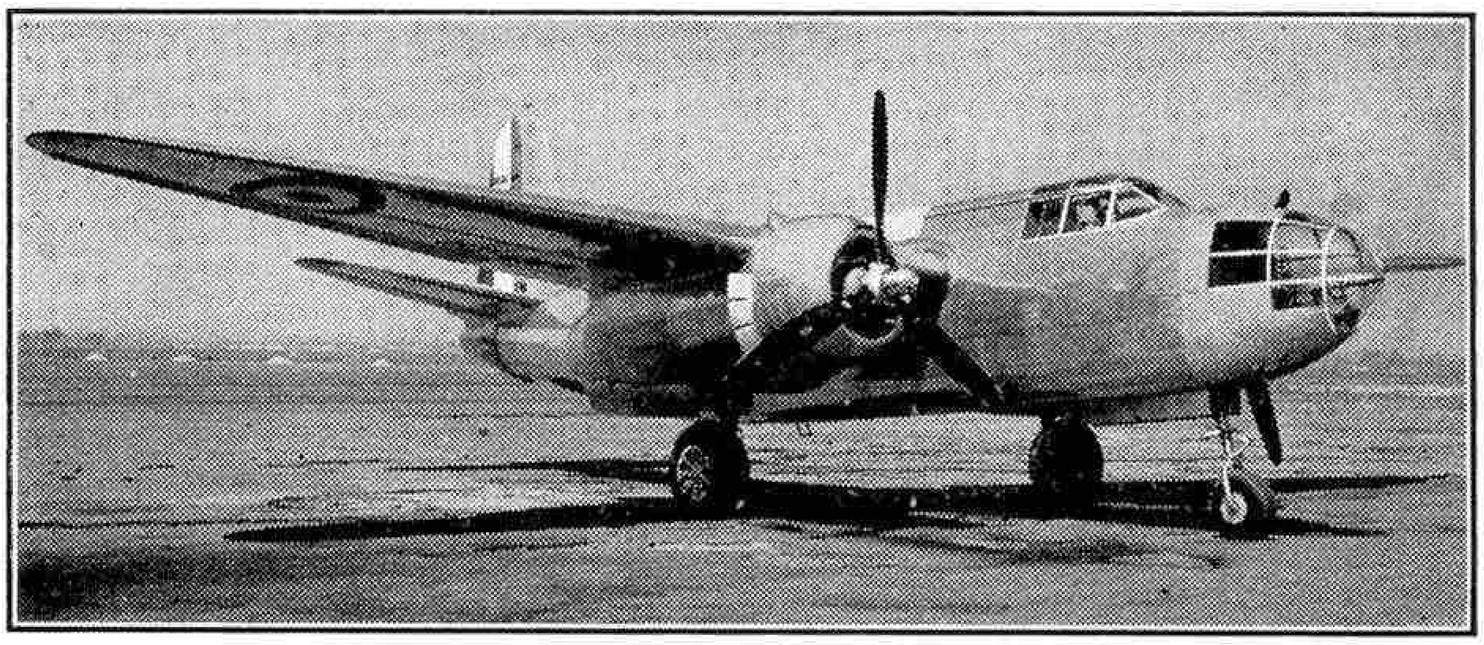
Now let us consider the various Commands of the R.A.F.

A. The Fighter Command, under Air Marshal W. Sholto Douglas, is obviously intended to fight. But there are many different kinds of fighting. And there are just so many different kinds of fighting machines. You have the famous "Hurricanes" and "Spitfires," which are single-seaters with Rolls-Royce engines, and they carry four guns in each wing. They are essentially the light cavalry of the air. Even their jobs are very varied. Their work is not by any means only finding enemy fighters or bombers and shooting them. They go in for ground-strafing. They go over to France and shoot up aerodromes occupied by the Germans. They fly along the coast and machine-gun convoys on the road and on the sea. They even go and shoot up harbours.

And then on top of that they have to do night fighting.

Then there are the two-seater fighters. There is the single-motor Boulton-Paul "Defiant" which did so well at Dunkirk. It carries four guns in a power-operated turret behind the pilot. Then there is the "Blenheim" twin-motor, which carries guns in a kind of coffin under the belly, besides the guns on the top and the guns shooting aft down below for self defence. And there are newer and more powerful fighters than these with single motors and twin motors. Of these we may only mention the single-engined "Tornado," which has a speed of 425 m.p.h.; the twin-engined "Whirlwind"; and the "Typhoon," which is fitted with a 2,400 h.p. "Sabre" engine, has a speed of 400 m.p.h., and is armed with mixed canons and machine guns.

One very successful night fighter is the Douglas B.7, which is known as the "Havoc" in the R.A.F. That has turned out very well because there is plenty of room in the nose between the motors for heavy armament, and there is plenty of room inside for the chap who works "the device," as the Air Ministry calls the apparatus which enables the night fighters to find the enemy in the



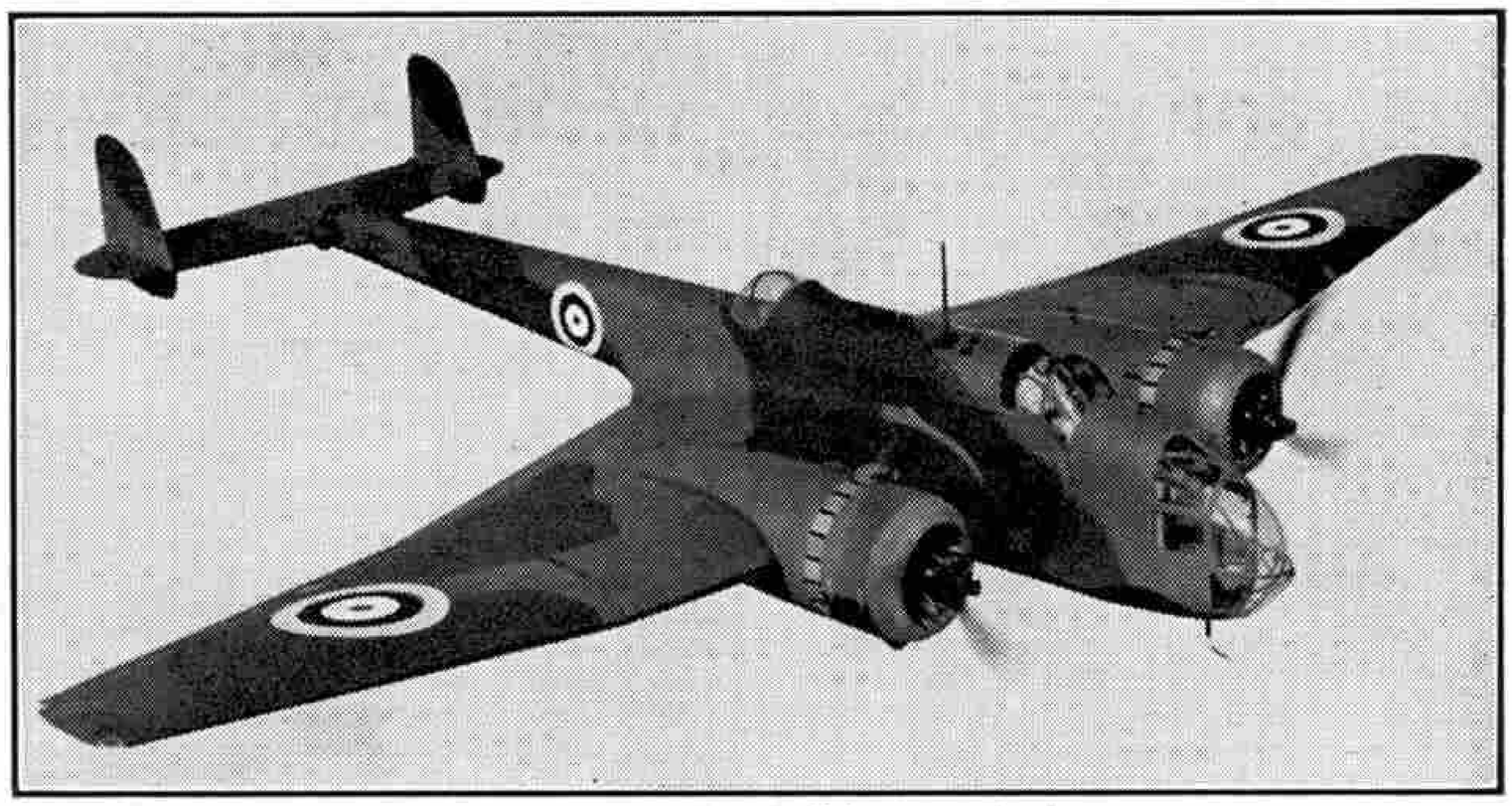
Douglas "Boston" twin-engined bomber, one of the American aircraft now in service with the Bomber Command. As the "Havoc" it is a night fighter. Photograph by courtesy of the Douglas Aircraft Company, U.S.A.

dark. But the "Blenheim" and the "Boston," and the "Beaufort," which is also used as a night fighter, are all bombers also, and can be used as such with very little alteration in their equipment.

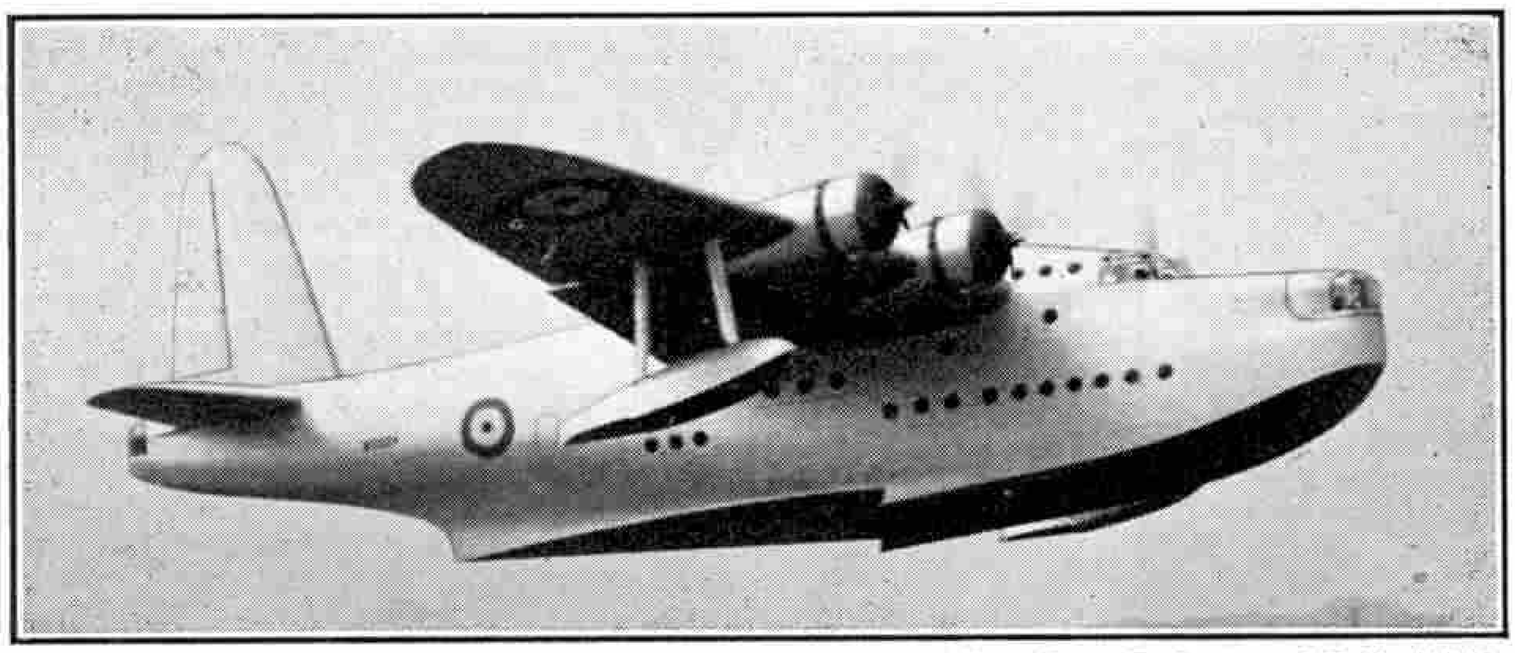
B. The job of the Bomber Command, under Air Marshal Sir R. E. C. Peirse, is perhaps more nearly tied down to its name than either of the others. It does stick primarily to bombing. And most of its jobs are done by those big heavy bombers, the Armstrong-Whitworth "Whitley," the Vickers "Wellington," and the still faster Handley-Page "Hampden."

But from about February of this year onwards, the Bomber Command has had still bigger bombers, some of them with four engines of normal size and some with two engines of abnormal size. These include the Short "Stirling" and the Handley Page "Halifax" and the Avro "Manchester." They carry enormous weight, and can carry single bombs which are so heavy that they would have constituted the whole bomb load of big bombers of the earlier type.

Even here we get overlapping duties, because in the Battle of Cape Matapan bombers of the R.A.F. Bomber Command were diverted from a job on which they had already started, and were told to go and bomb the Italian Fleet in mid-Mediterranean. Which they did with great success. That was properly a Fleet Air Arm job.



The Handley Page "Hampden" long-range bomber.



"Sunderland" flying boat, Coastal Command. Photograph by courtesy of Short Bros. (Rochester and Bedford) Ltd.

Much of the success of our big bombers is due to the Frazer Nash hydraulically-driven gun turret which carries two or four guns, either ordinary rifle-calibre or the 20 mm. canon-gun. And no doubt in due course we shall have these same turrets handling the long 1½ inch, or 37 mm. canon. But even then they will not be primarily fighting machines. And for some little time, until we have an absolutely overwhelming force of long range fighters to escort the bombers, most of the work of the Bomber Command will be done at night.

In spite of their powerful protection, these great big bombers, although they are fast, are still practically a sitting target for high-speed fighters if equally well armed. The Bomber Command to-day is very proud of the fact that the present Chief of the Air Staff, which means Officer Commanding in Chief the whole of the Royal Air Force, Air Chief Marshal Sir Charles Portal, was A.O.C.-in-C. Bomber Command before taking the still higher appointment.

C. The Coastal Command has in fact the most variegated job of the lot. There are those in the other commands who will tell you that the A.O.C.-in-C. Coastal Command, Air Chief Marshal Sir Frederick Bowhill, and his staff, are deep sea pirates. When they want anything they just go and take it!

Primarily, the job of the Coastal Command was to escort shipping within reasonable reach of land, to look out for and signal the presence of mines, and to bomb or shoot up submarines if any were seen. For that job the little Avro "Anson" was ideal. It is easy to fly and can turn on one wing-tip, which is very useful when dealing with submarines.

There came a time when our convoys were being attacked from the other side of the North Sea and later in the Channel; so the Coastal Command borrowed fighter squadrons from the Fighter Command to go out and chase away the people who were attacking the convoy lanes.

Later on its Coastal Reconnaissance machines went farther out to sea to the coast of Norway to look for things which were worth bombing. And as its own machines, even the newer Lockheed "Hudsons," did not carry big bombs, the Coastal Command borrowed Bomber squadrons from the Bomber Command.

The Coastal Command also has the big "Sunderland" flying boats which will go half-way to America and back in the course of a patrol, looking for submarines and enemy cruisers. The Coastal Command even borrows fighter and torpedo machines from the Fleet Air Arm, and it has torpedo-carrying Bristol "Beauforts" of its own with which to attack enemy ships along the enemy coast.

There is the Army Co-operation Command, under Air Chief Marshal Sir A. S. Barratt, which provides scouts for the Army when in action. And there is the Training Command, under Air Marshal A. G. R. Garrod, whose job is to train pilots to fly all classes of machines. The Training Command also trains mechanics and air crews. And even the trainers when they are out carry guns. Some of them have shot down enemy raiders. So there is some overlapping there.

I hope that this brief discourse has made it clear just what the different Commands do.

Singapore—Wonder City of the East

Scenes in Britain's Great Outpost

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

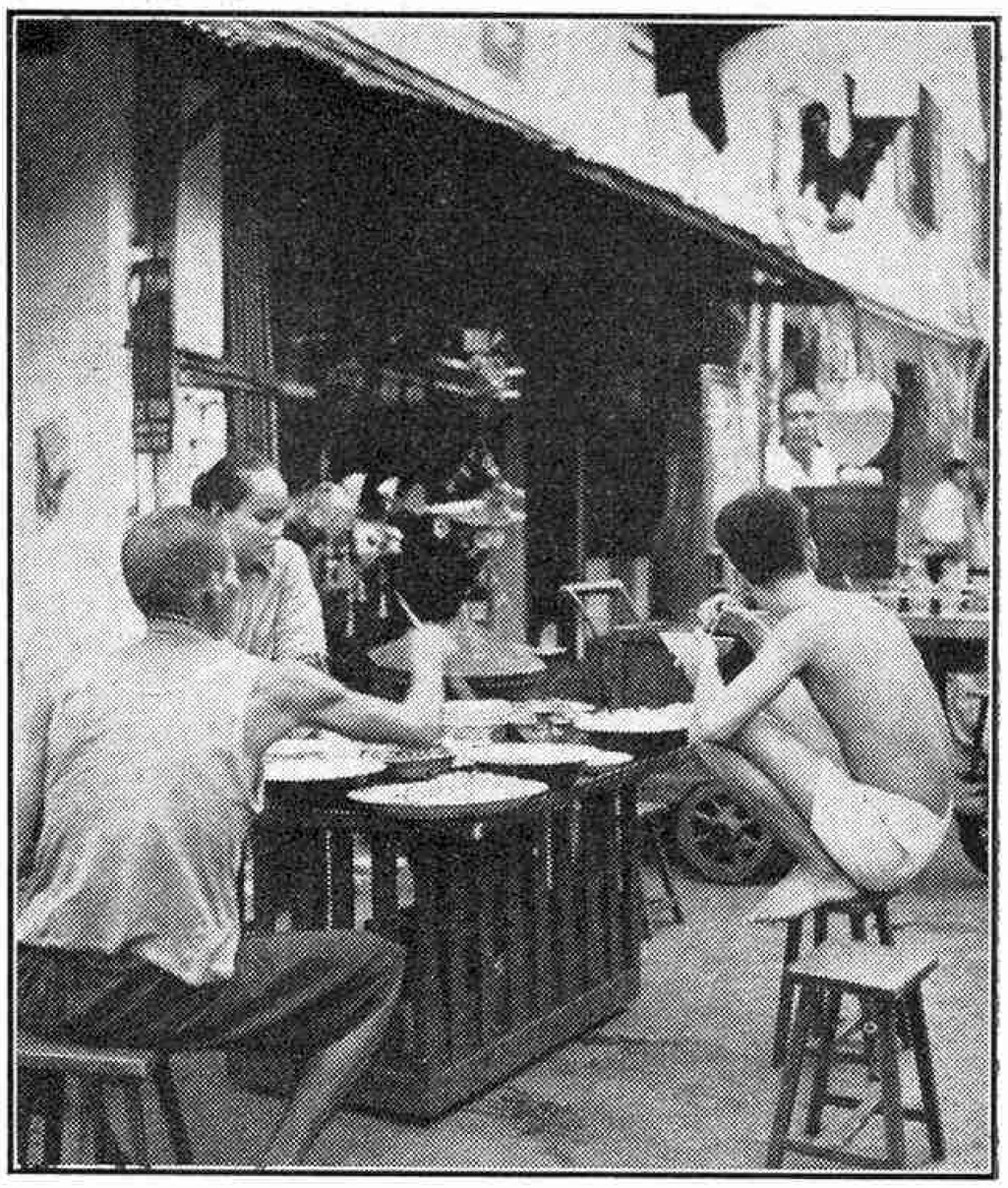
SINGAPORE, now so much to the fore, is the wonder city of the East. In all the swift, significant changes wrought by white men in the East, none stands out more conspicuously than the rapid rise of Singapore. From a jungle infested island to a magnificent city, tenth among the ports of the world, within a century—that, in brief, is the romantic story of Singapore. The name comes from two native terms meaning "Lion City."

Singapore stands on an island, 217 square miles in extent, about half as large again as the Isle of Wight, measuring some 27 miles in length and about 14 miles in breadth, lying at the southernmost tip of the Malay Peninsula. It is separated from the mainland by a strip of water less than a mile in width, spanned to-day by a causeway carrying road and railway track. The island was purchased by Sir Stamford Raffles, an adventurous Englishman, from the Sultan of Johore, for £12,500 and an annual annuity on his life of £5,000.

When Sir Stamford took over the island it was an unhealthy, fever-stricken tract, the haunt of pirates, the home of tigers, poisonous reptiles and giant pythons, inhabited by a few score of savage Malay fishermen. To-day it is covered with thriving plantations. Piracy has been put down; the tigers have gone; so have most of the reptiles, and the savage native has been tamed.

The story of those pioneering days has never been fully told. This is what one historian wrote of Singapore in pirate days! "All along the beach there were hundreds of human skulls, some of them old, some fresh with hair still remaining, some with teeth and some without." Pirates would go aboard a ship as passengers, with guns in their hand baggage, and then at an opportune moment shoot their way to the bridge and seize the ship. They would even report by wireless to company's agents, giving a false position and saying, "All's well!" Then, at a convenient place, they would run the ship ashore and loot her.

The man-eating tigers were for years a veritable curse; they often carried off as many as 250 to 300 natives in the course of a single twelve-month. It was quite an ordinary thing for a settler to return home and find his verandah and sometimes his bathroom in possession of some fierce, poisonous reptile. Even now pythons are being discovered in the city drains living on the rats and frogs. Sir Shenton Thomas, the present governor, records how his gardeners found a 20-ft. python in one of the drain pipes of Government House.



Typical Chinese open-air restaurant in Singapore.

Not only is Singapore a go-ahead city and a busy port, but it is the world's greatest mart for rubber and tin. Every time you open a tin you make business for Singapore. It boasts the biggest tin smelters in the world and three-fourths of our rubber comes from there. In normal times some 14,000 to 15,000 vessels, exclusive of native craft, make use of the port every year. It is the maritime junction for steamers going to and from the Far East and Australia. The average annual tonnage of shipping that enters and clears amounts approximately to 18,000,000 tons. In the harbour may be seen ships of every nationality, from the primitive dugout-catamaran and the clumsy Chinese junk to steam-driven freighters, oil tankers and palatial ocean liners.

The ornate Siong Lim See Temple, the most famous of the many Chinese temples in Singapore.

Singapore is also a great naval base. A large Australian Expeditionary Force recently landed there, and bombers have been flown there from the United States. When you step ashore, however, you see very little of this defensive preparation. True, there are more troops than usual about the city, and heavy-laden Army lorries are continually passing through the streets. There are A.R.P. demonstrations by which the native population are being taught how to black out their homes, what to do in case of air raids, and how to deal with incendiary and other bombs. The great guns that defend the port are cleverly hidden among palm and rubber trees in the surrounding hills, and also among trees in the innocent-looking islets that lie along the channel approaches to the city. Neither do you see Seletar, the mysterious naval base with its 1,000-ft. graving dock, and the monster floating dock towed out from England a few years ago. They are hidden away at the north-eastern corner of the island.

With its cosmopolitan population of some 600,000 souls Singapore is, perhaps, the most colourful city in the East. Down by the water's edge you have the native quarters and the business section; beyond are the beautiful residences of the officials and merchants, invariably surrounded by extensive grounds, gay with the growth of tropic flowers. Here, too, are the Botanical Gardens, one of the largest and

Raffles Place, the heart of Singapore's business district.

most representative institutions of its kind in the world. There are a couple of monkeys in the gardens who have been taught to pick mangoes and cocoanuts from the tall trees. Not only do they work high up in the tree-tops collecting and throwing down herbarium specimens, but they also understand and obey certain orders.

It is the native city with its Oriental life that appeals most to the ordinary visitor. For the most part the streets are narrow, bordered by semi-native houses, bazaars, Malay mosques, Hindu temples and Chinese joss-houses. The streets are gay with banners decorated with dragons, elephants and other weird signs. The native population represents many different races. The Chinese are the most numerous. Next comes the Indian population, chiefly Tamils and Sikhs. There are also Dyaks, Malays, Siamese, South Sea Islanders and other races.

The least active is the Malay. Although he is likeable enough he has little energy, and is not given to exertion. He lives for to-day, with little thought for to-morrow. He grows a little rice, a few cocoanuts, and nets the fish he needs. He is loyal to his friends, hospitable, with a passion for gambling. Though he loves things that money buys, he is no money-maker; so the rush of to-day passes him by. Rubber and tin booms in Malaya have made white men and the Chinese rich, but not the Malay. To him traders are tiresome people, with no sense of humour or love of adventure. It is the Chinese who is the worker. He is the tin miner, shop-keeper, artisan, contractor and financier. To-day representatives of the yellow race fulfil every conceivable post from the humble position of jinricksha coolie to banker and merchant prince.

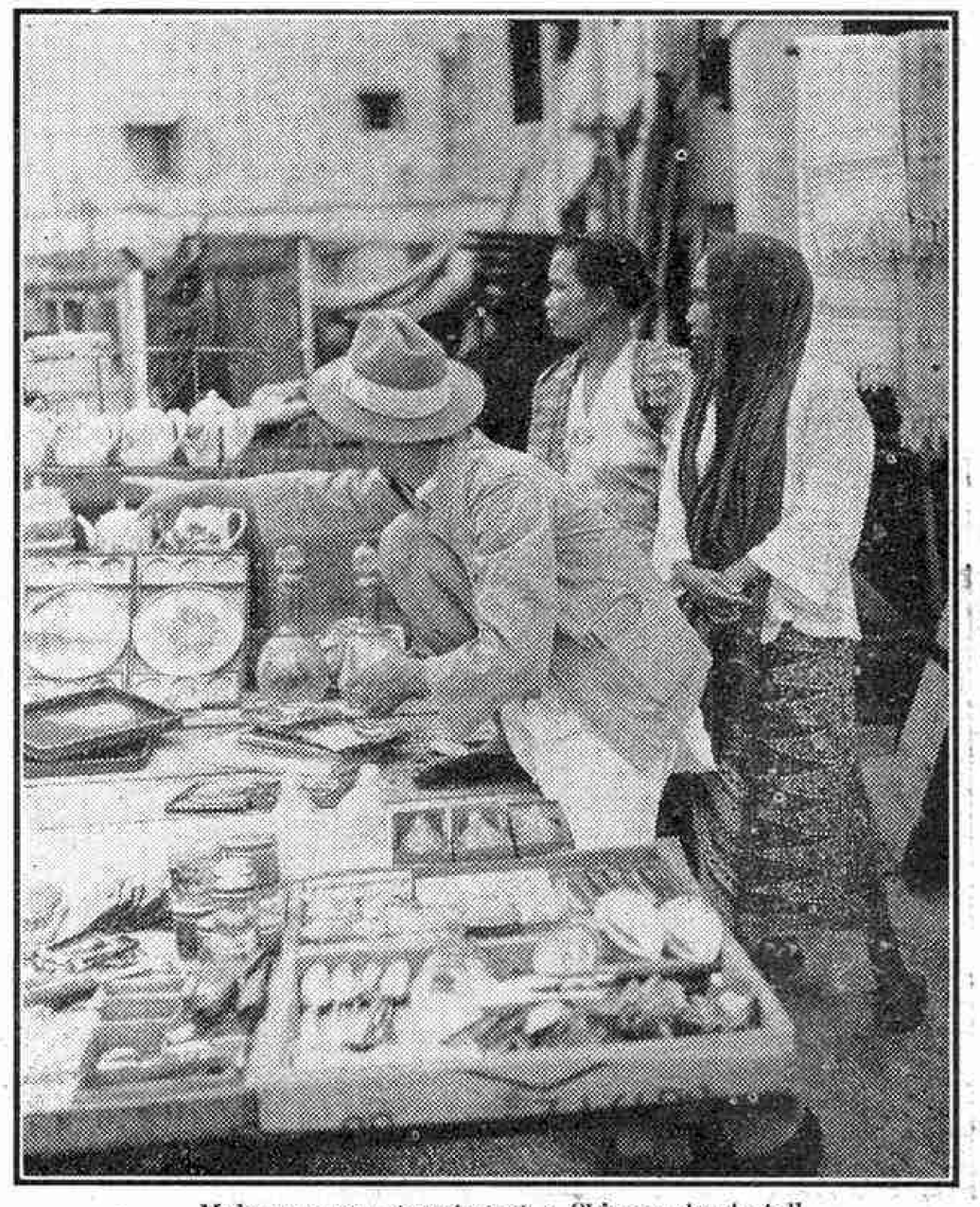
Each race keeps to its own particular section, or "kampong" as it is called. In the Kampong China silks are everywhere displayed in the stall-like shops, and the sandal-wood-perfumed atmosphere mingles pleasantly with the odour of burning joss-stick and rose-water. In the Indian section Benares brass work is conspicuous, while the Siamese shop-keepers exhibit pottery, ivory carvings, and curios innumerable. All the products of the East, from birds of bright plumage in wooden cages to dainty silver models, cloisonne work, stone Buddhas, coloured beetles, and the curious ornaments of Confucius, are all on show. Chinese signs, written on long boards and coloured banners, give a truly celestial picturesqueness to the native streets. Humorous announcements are by no means wanting. "Come to me, honest man"; "No swindle here"; "You can cheate me"; "I no spitee or clothes when washen," are specimens of the highly attractive advertisements of Kampong China, most frequented by curio hunters.

Singapore's Chinatown is a veritable slice of the "Flowery Kingdom," its occupants rigidly following the customs and manners of their forefathers—dressing, eating, sleeping and worshipping as do their brethren in China. In the streets are the open-air restaurants, an improvised table, and half a dozen stools on which the diners sit or squat on their haunches. On the table is an assortment of enamelled bowls or dishes filled with all sorts of concoctions that could appeal only to a Chinaman. The principal dishes are rice and dried fish. It is certainly surprising how fit a Chinaman keeps on such a meagre diet. But in addition to rice and fish there are all kinds of soups, preserved eggs, vegetables, and meats. It would hardly do to inquire into the composition of many of these dishes; all kinds of insects, including beetles and cockroaches, grasshoppers, and locusts, and such items as seaweed, do not come amiss to the Chinese cook. In the better-class Chinese restaurants wealthy Chinamen dine off birds'-nest soup, sharks' fins, soles of pigeons' feet, frogs, smoked duck, chicken, rice, and other curious dishes.

The Chinese theatres are decidedly quaint and even amusing. They all have special names, such as "The All-Ascending Luminous Dragon," and "The Dragon with the Lustrous Eye." The plays often last a week. There are no drop curtains or scenery, but little placards tell the audience that "this is a forest," etc. Should an actor be slain, he lies on the floor for a while, and then unconcernedly gets up and walks away. Indeed, one must be very imaginative to enjoy a genuine Chinese play thoroughly. In the temples or joss-houses are strange gods before which the Chinese burn paper money and offer food in the form of fruit and choice cakes and sweetmeats. At those temples where European visitors are received, the priests keep a book in which you are invited to write your name, and are politely reminded that a donation towards their upkeep is expected.

It is the Chinese 'ricksha men who convey you about the city; there are 10,000 of them. They wear but two garments—a straw hat, shaped like an inverted washpan and varnished with fish oil to make it waterproof, and a pair of knee-length blue cotton pants. They will trot their six miles an hour, drawing two passengers, from sunrise to sunset, with only brief rests, on their meagre diet of rice and dried fish.

Throughout the year it is warm enough in Singapore to carry on all kinds of work out-of-doors. That is one of the sights of the city—the native craftsmen toiling at their vocations on the street pavements. The articles made by these out-of-doors craftsmen include almost everything considered necessary by the dweller in the East. True, modern factories are rapidly rising, but your native workman simply ignores them, and apparently finds a ready market for his wares. He seems happy and contented enough.



Malay women shopping at a Chinese street stall.

A War Patrol in a Submarine

By Captain Bernard Acworth, D.S.O., R.N. (Retd.)

ON a cold blusterous afternoon in November, No. 1 of the British submarine *"Sea-Lark,"* wearing a duffle coat and sea-boots, entered the warm smoking-room of the Parent-ship which "mothers" about 12 submarines. Approaching the *"Sea-Lark's"* captain, curled up in a large ward-room chair, he reported "Ready for sea." The captain thanked him curtly, and added—"We slip at four."

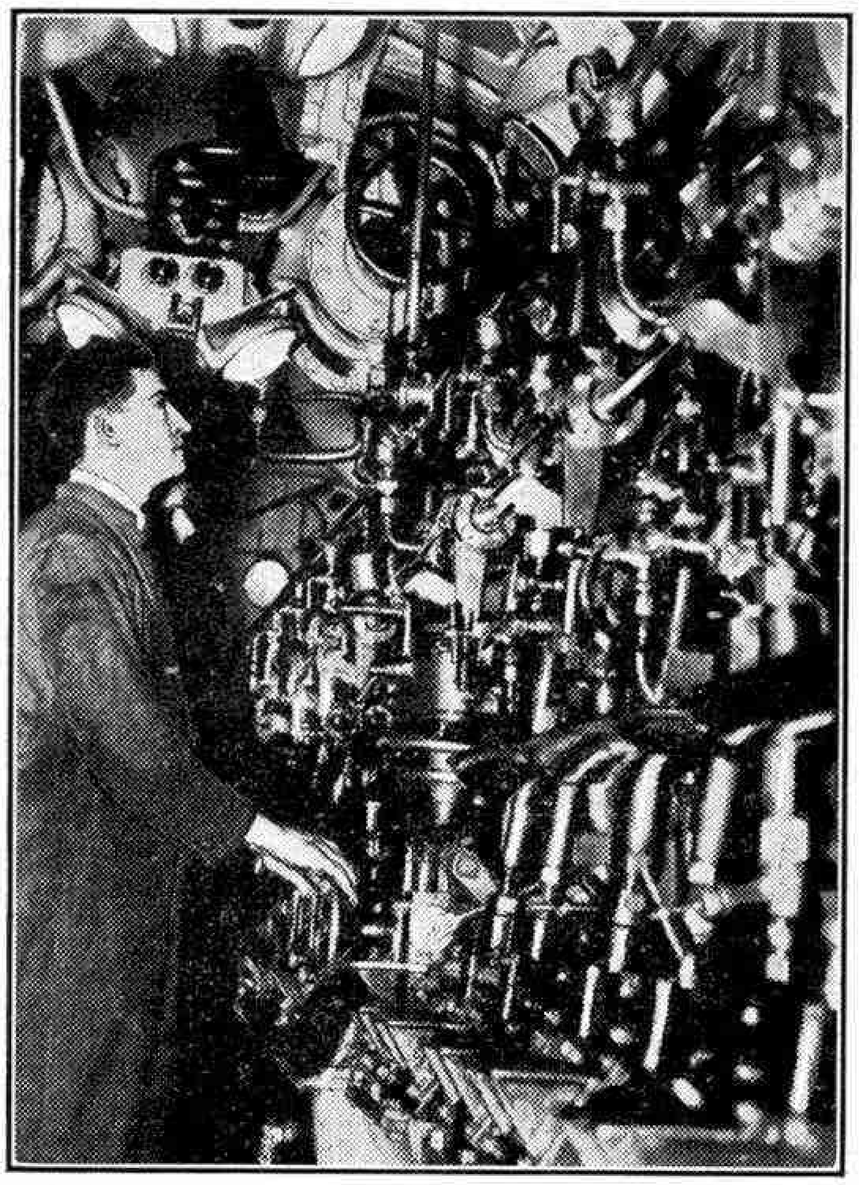
A few minutes later he went aft to "the Cuddy" for his sailing orders. These were handed to him by a weather-beaten "dug-out," a famous submarine captain of the last war who had done scores of trips such as the one upon which he was now dispatching *"Sea-Lark."*

The orders ran as follows: "Being in all respects ready for sea, proceed to a position 15 miles North-West of the Scaw. Keeping within 20 miles of this position, look out for a German cruiser expected back from an Atlantic raid within 14 days. Use the utmost care to avoid being sighted on passage to patrol. The latest mine-chart should be carefully studied."

After he had read his sailing orders, the "dug-out" wished him luck.

A few minutes later the Captain was on the bridge of the *"Sea-Lark,"* and the crew were at their stations ready to slip and proceed. "Let go forward and aft." The "springs" securing the *"Sea-Lark"* were slipped, and she glided down harbour under her main electric motors. When clear, the order was given: "Stop main motors, in engine clutches." The engine clutches, which lock the two propeller shafts to the Diesels, were thrust in and reported to the bridge.

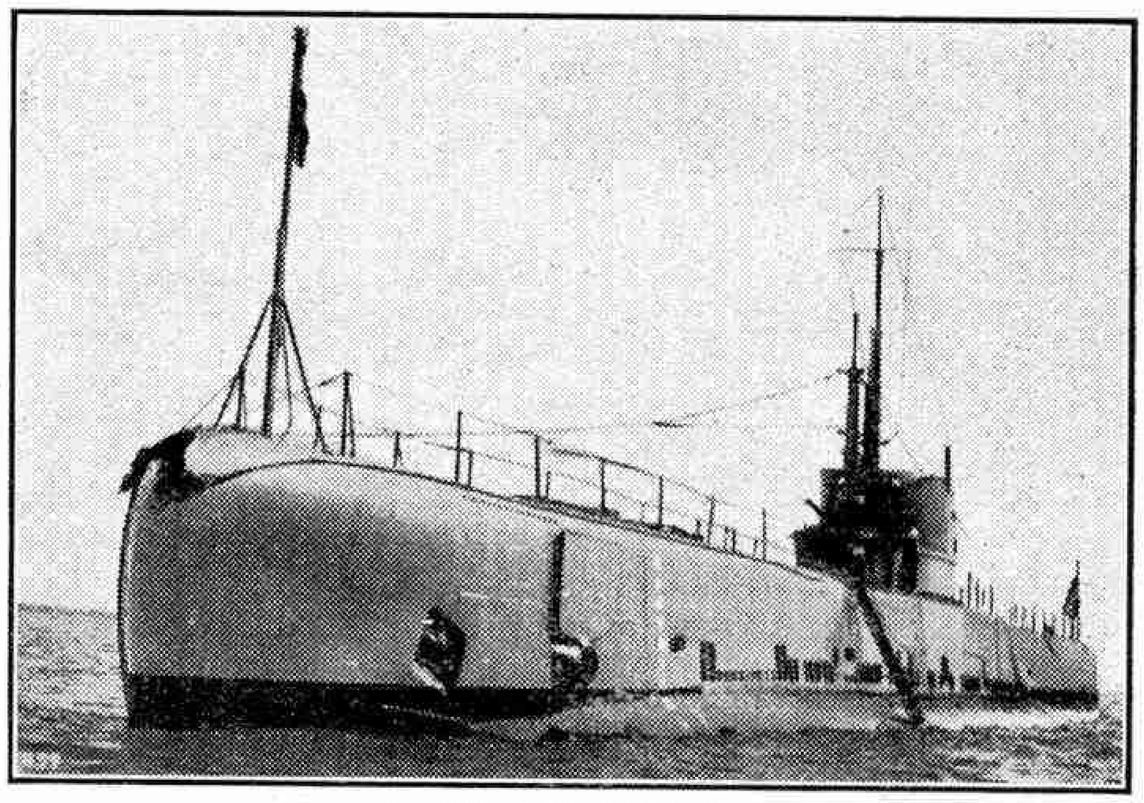
Half-speed ahead was rung down on the telegraph. The electric motors, keyed to the propeller shaft and now clutched to the Diesels, and supplied from the huge secondary batteries built into the midship portion of the submarine, were started. The Diesels began firing; the motor switches were then "broken," and the *"Sea-Lark"* was plugging through a heavy head sea, at 9 knots, for her 14 day patrol.



Inside a submarine. Watching the engine room telegraph.

Already she was "taking it green" over the bridge. The conning tower, the only means of access, had to be closed to prevent green seas down it, and thus the risk of chlorine gas being generated if salt-water penetrated into the electric storage batteries. The ventilators now provide the only lungs for the air-devouring Diesels, roaring at 300 r.p.m. Then started those bitter four-hour watches on the bridge, in heavy weather, shared by three officers and three helmsmen, lashed by blinding spray and with green water constantly trickling down inside their oil-skins. The remainder of the crew are snugly below, but wearing woollen comforters and stockings; the inside of a submarine is very cold in cold weather and very hot in hot weather.

During the next forenoon the officer of the watch reported to the Captain a suspicious-looking craft on the horizon. He sprang up the ladder



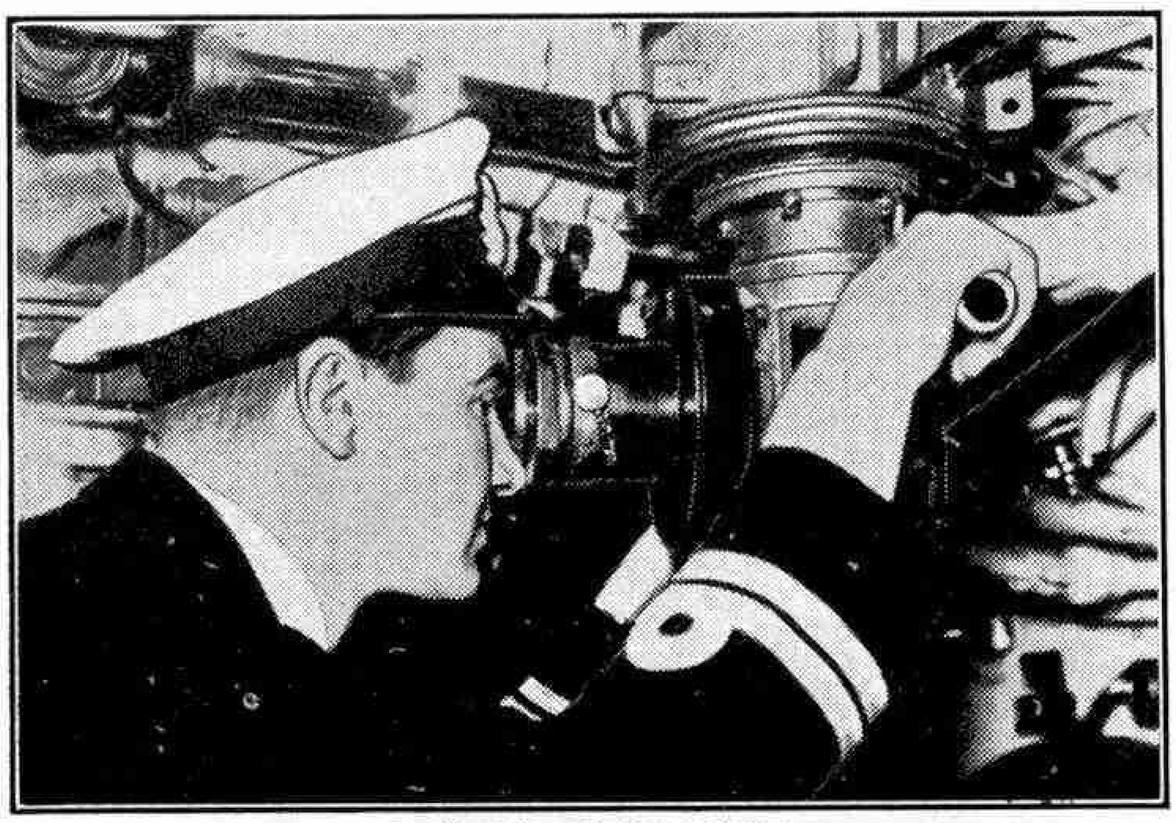
A typical British submarine.

of the conning-tower to the bridge, and uncertain as to the ship's identity pressed the Alarm. Within a few seconds a "crash-dive" was in progress. The crew, roused by the Klaxon horn, sprang to their "Diving Stations." Engines were stopped and clutches withdrawn; the electric motors were started at full speed; the main-ballast vents were opened, and as the air hissed out of the vents, several hundreds of tons of water rushed into the tanks. The coxswain and 2nd coxswain ran over to "dive" the hand-wheels that operate the electrically-driven diving-planes forward and aft. Within 30 seconds, and with a steep angle down by the bow, the *"Sea-Lark"* was slipping under as the Captain tumbled down the conning-tower, clipping down the hatch as it came almost awash. "20 feet-slow both," he ordered. The motors were put to slow and the diving-rudders were run back. The *"Sea-Lark"* now assumed an even keel, being "steered" in the vertical plane to the 20 ft. ordered.

The final touches are put to the trim by means of internal trimming water tanks. A perfect trim has now been reached, so that the submarine can be kept at any depth ordered with the minimum of diving-helm and of electrical energy. This is the secret of good diving, because the submarine submerged is dependent on the batteries. A finely trimmed

boat can dive for about 24 hours before battery exhaustion.

A minute ago all was pandemonium; now all is still except for the faint purr of the motors. The Captain puts his eye to the periscope,



Looking through the periscope.

turning it to a point on the bow where he sights the suspicious vessel. He can now recognise it as a British destroyer, but once down he decides to stay down to avoid one of those "misunderstandings" that sometimes occur between a British submarine and its friends. All submarines suddenly appearing, or located submerged, are apt to be taken for U boats.

The destroyer is soon out of sight astern. "Surface—blow main ballasts." The reverse procedure is now employed. The vents are closed and the "blows" opened. Air pressure from groups of high-pressure air-bottles, storing air at 3,000 lb. per sq. in., and fitted with reducing valves, is admitted to the main ballasts at a pressure a few pounds above that of the external sea-pressure. The water is blown from the tanks, and the submarine recovers her 300-400 tons of positive buoyancy.

The engines are restarted and the "*Sea-Lark*" proceeds to her patrol area without further alarm. She has been lucky not to have to repeat this operation many times on passage to avoid enemy patrols on the surface, or in the air.

On the morning of the second day out the Skaw is dimly sighted. The navigation, in spite of bad weather, has been good, and, this time in a more leisurely way, the "*Sea-Lark*" is dived to periscope depth, about 18 ft., and her first day of submerged patrol starts. Nothing but a waste of water is sighted during this first day, and seven subsequent days.

Each day is spent submerged at dead slow speed. Watches are kept at the periscope, which is periodically turned through 360 degrees to ensure that nothing on the horizon is missed. Those off watch sleep, eat, play cards or the communal gramophone. Twice a day, if the horizon is clear, the "*Sea-Lark*" surfaces to fix the position by the Sun, if visible. Each night, after dark, she "surfaces" and patrols slowly on the surface under the Diesels which, at the same time re-charge the batteries.

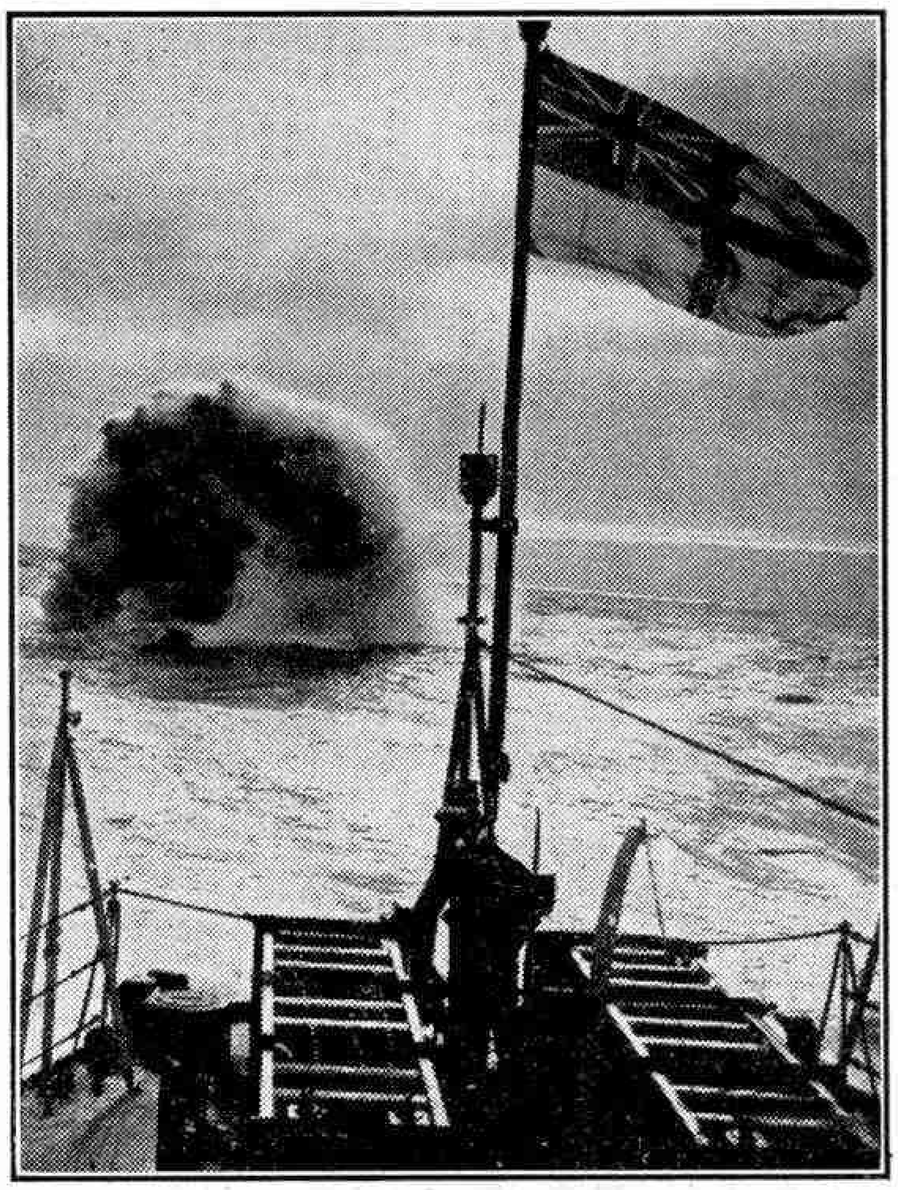
But on the eighth morning the monotony is broken. The masts of a cruiser steaming over the horizon from the West are sighted in the periscope. "Action Stations!" Here is one of the tense moments in submarine life in wartime. The Captain takes over the periscope; the first lieutenant stands by in the fore-end while the torpedo ratings flood the six torpedo tubes and charge up the firing reservoirs from the high-pressure air service.

Success or failure now depends almost entirely upon the Captain's "attack." Altering course to bring the enemy cruiser, for such she is, fine on the port bow, he "steadies" his course with the cruiser bearing about 60 degrees "red," as marked on the bearing-ring round the periscope. With half-speed on the motors, he watches the cruiser to see if she is drawing ahead or astern of the bearing, and he adjusts his speed and course to keep the bearing "steady." When steady, he lowers his periscope to avoid all risk of having it spotted. Raising and lowering the periscope for occasional observations, he is now within 3,000 yards, and the cruiser, screened by two destroyers, is crossing his course at an ideal angle, so that the torpedoes, when discharged, will run at right angles to the target's course. This gives the maximum chance of hitting. "Torpedoes stand by"—all six are ready, and two will be fired at intervals of a few seconds.

The cruiser is crossing the periscope sight—"FIRE." Within 20 seconds six torpedoes, with a slight spread, are speeding at 35 knots for the enemy. The "*Sea-Lark's*" bolt is shot, and her own safety is now the aim. She must expect a thorough basting from those escorting destroyers, whether the torpedoes hit or miss; "150 feet" is ordered to get below the probable destructive reach of the 600 lb. depth charges.

Down at a steep angle plunges the "*Sea-Lark*," and when at 90 ft. two heavy shocks are felt. "Two hits," shouts the Captain, and a rousing cheer from the crew follows. "Steady at 150 feet; stand by for depth-charges" quickly follows. Over go the diving wheels. "Steady Sir, 150 feet" sings out the coxswain, at the moment when the boat quivers and reels under the shock of 2,400 lb. of T.N.T. from four depth charges. But these are well astern. The next four are closer—the light-switches are broken with the shock, and trickles of water drip from glands. Another salvo, but less shock—another and still less.

A cheer from the crew—they have



A depth charge exploding.

eluded their pursuers. Very cautiously the "*Sea-Lark*" is brought up to 20 ft. When steady (Continued on page 202)

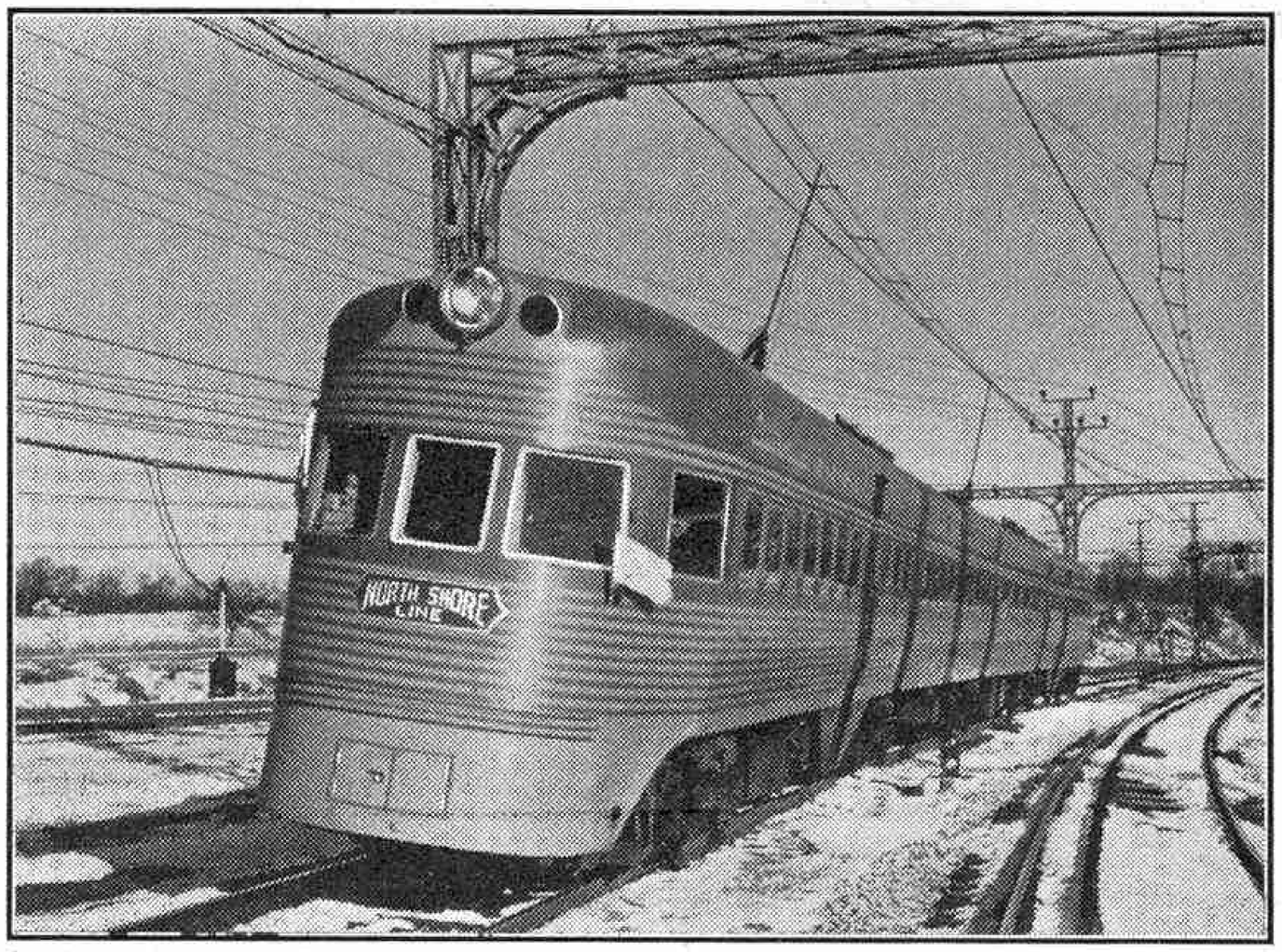
RAILWAY NEWS

New Electric Trains in the United States

The illustration on this page shows a new American streamlined electric train, introduced on the Chicago, North Shore and Milwaukee Railroad. Two of these "Electroliners," as they are called, are in use on that line for working fast services, involving point-to-point bookings up to 70 m.p.h. They are smooth running and economical, and have been so successful that further units are contemplated and older trains are being rebuilt to a similar design.

Each train consists of four coaches, articulated and mounted on five bogies, and has a total length of 155 ft. 4 in. and a tare weight of 89½ tons. The end vehicles are motor coaches, eight 125-h.p. motors being mounted on the outer bogies at each end. The motors are rigidly attached to the frames and the drive is transmitted to the axles through flexible connections. Direct current is supplied at 600 v. and, as will be seen from our illustration, overhead trolley collectors are used. Behind the grille on one side of the headlight is a horn, the grille on the other side being a dummy.

H. E. MEATS.



One of the "Electroliners" brought into service early this year on the Chicago and North Shore line in the United States. Speeds of over 100 m.p.h. have been reached in service. Photograph by C. E. Keevil, Chicago.

Mechanically Operated Shunting Yards

To speed up the marshalling of important goods traffic the G.W.R. recently brought into service at important points on their system two "hump" marshalling yards equipped with an electro-pneumatic system of point operation. Reception roads lead over a "hump" to the marshalling sidings spread out fanwise. By means of a thumb-switch panel in the control tower, each wagon or group of wagons can be diverted in quick succession to any of the siding roads in accordance with a list of "cuts" supplied by the Foreman Shunter, as is done at famous yards on the L.N.E.R. and elsewhere. In these G.W.R. installations there are no retarders to check the speed of wagons when necessary as they descend steeply from the "hump," as there are at other similar yards, but brakesmen are employed for this work.

Colour-light signals govern the approach to the "humps" as well as engine movements therein, interlocking being arranged with the main line signal boxes that control entrance to the reception lines.

"Spitfires" Presented by Railwaymen

All ranks of Southern railwaymen and women, from Directors to signal cabin lads, as well as members of associated companies, have subscribed a sum of £5,000 that has been sent to the Minister of Aircraft Production to defray the cost of a fighter aeroplane. This will carry the name "*Invicta*," symbolic of Kent. The pioneer engine of the Canterbury and Whitstable Railway of 1830, the oldest constituent line in the present Southern group, was named "*Invicta*," as cross-Channel steamers operating from Folkestone and Dover also have been.

The first of two "Spitfires" subscribed for by L.N.E.R. staff is appropriately named "*Flying Scotsman*." It is hoped that enough money will soon be available to pay for a second machine, which will be called "*West Riding*," indicative of the company's extensive interests in West Yorkshire, as well as of the enthusiasm of the staff in that area.

Facts About American Railways

More new freight cars were on order on 1st February 1941 than on any corresponding date in 15 years.

Approximately 80 per cent. of the road-railway accidents that occur in the United States involve motorists at crossings in the vicinity of their own homes.

The proportion of sleepers chemically treated to preserve them is 85 per cent., compared with about 43 per cent. in 1920.

2-6-2 Tank News

Outside cylindered 2–6–2 tank engines are prominent to-day on the G.W., L.M.S., and L.N.E.R. systems. Apart from those of some of the smaller branch and steep-grade classes on the G.W.R., they are all powerful modern general service engines, capable of semi-express work while displaying in addition those qualities of rapid acceleration that are so useful for the operation of stopping trains.

As new boilers are required for L.M.S. class 3P 2–6–2T they will be provided with larger ones, which greatly improve their appearance. Nos. 163 and 169 have already been so rebuilt, as explained in last month's "*Railway News*," in which an illustration of No. 163 appeared.

One of the latest L.N.E.R. "V3" express tank engines, with steam pressure of 200 lb. per sq. in. and 5 ft. 8 in. driving wheels, has recently been timed by a reader to attain 80 m.p.h. hauling a corridor train weighing 255 tons down a moderate gradient in Durham. This very high rate of travel was attained only 2½ miles after reducing to 46 m.p.h. for a service slack. The fine work of this class on Carlisle-Newcastle semi-expresses, a 60-mile journey, was described in the March 1941 "*M.M.*"

It is interesting to recall that as long ago as 1903 a class of large 2–6–2Ts was introduced on the former Lancashire and Yorkshire Railway, when town-to-town services were at their busiest. They were exceptional in having inside cylinders in accordance with Horwich practice of the period, but all have now been withdrawn from service.

Not the L.M.S. he Expected!

A railway enthusiast on his way home caught sight at a second-hand bookshop of a volume entitled "*Twenty-five Years with the L.M.S.*" Although under its present grouped title the L.M.S. is only 18 years old, he purchased the book for the few coppers demanded and hurried on to catch his train, hoping to be able to read on settling down in his usual smoking compartment a highly interesting survey of his favourite railway and one of its constituents. Sad disillusionment spread over his face, however, as a glance at the illustrations showed that L.M.S. referred to the London Missionary Society!

Australia's Largest Locomotive

A new 4–8–4 locomotive recently completed for the Victorian Government Railways is the largest in Australia. It is the first of a new class, known as Class "H," and is to haul the Melbourne-Adelaide overland express. This climbs Ingliston Bank, between Melbourne and Ballarat, which has a gradient of 1 in 48 for a distance of almost 10 miles.

The total weight of engine and tender is 260 tons 1 cwt., and the tractive effort is 55,000 lb. The overall length is 92 ft. 5¾ in.

S.R. locomotive No. 303, of the rebuilt T9 class, at the head of a Ramsgate express. These Drummond engines were formerly known popularly as "Greyhounds" because of their speed and free steaming. Photograph by H. C. Casserley.

Southern Railway Drummond 4-4-0 Classes

All the standard 4–4–0 express and mixed traffic engines designed by the late Mr. Dugald Drummond for the former London and South Western Railway between the years 1899 and 1912 are still in service.

Of the express classes, with 6 ft. 7 in. driving wheels, the newest and biggest are the 10 "D15s," numbered 463-72, with 20 in. cylinders and large boilers. Immediately before them came the 20 "L12s," numbered 415-34, having 19 in. cylinders. They are all now provided with superheater boilers. The most numerous and perhaps the best known, however, are the old warriors turned out between 1899 and 1902 and now forming S.R. class "T9." For many years they were popularly known as the "Greyhounds," from their good reputation for speed as well as free steaming. They did much excellent work, notwithstanding their modest size, in days of increasing loads and booked speeds, being frequently seen on express work long after 4–6–0 types had been introduced on the "South Western," which afterwards became the Western Division of the S.R. All have been rebuilt, and as now running are considerably more powerful than they were originally. The cylinder diameter has been increased from 18½ in. to 19 in., and the new boiler provides 1,063 sq. ft. of evaporative heating surface together with 213 sq. ft. superheater area.

These modernised little "Greyhounds" were seen in recent years to a considerable extent on the Eastern section as well as on their native system and its connections. Our illustration shows No. 303 of the series, having thicker running plate and splashers wider apart, at the head of a Ramsgate Pullman-car express. Engines of the class have often hauled Royal trains between London and Portsmouth or elsewhere. For instance, No. 119, was kept in especially clean condition for this purpose, and is fitted with telephone equipment between footplate and train.

The 66 engines of the "T9" class are numbered 113-22; 280-9, 300-5, 307, 310-14, 336-8, 702-19 and 721-33.

The mixed traffic 4–4–0 engines, much used for goods work in the West country, consist at the present time of the 10 of the "S11" class, with the same superheater, boiler and general dimensions as the "L12s" mentioned above, though having 6 ft. 1 in. driving wheels. Their numbers are 395-404. Then there are 40 each of the older classes "L11" and "K10," with 5 ft. 7 in. driving wheels and cylinders 18½ in. by 26 in. These are variously numbered between 134 and 442, and are nicknamed the large and small "Grasshoppers" respectively.

In their earlier days of service many of the Drummond engines had sections of water tubes in proximity to the outer fire-box, but these were all removed many years ago. The curious uncoupled 4–2–2–0 locomotives, with boilers similar to the original "T9" and four cylinders, constituted a small non-standard class and have been scrapped. The inside cylinders drove one pair of driving wheels and the outside cylinders the other, but they were not a success as they had far too much cylinder volume in relation to boiler power.

London Transport's New Electric Locomotives

Electric locomotives deriving power either from a Diesel engine or from the third rail are to be introduced on the surface lines of the London Passenger Transport Board for ballast and material trains. They are to replace the steam locomotives now used as these are withdrawn, and the first has just been completed. It may be controlled from either end and can haul a train of 600 tons on the level.

AMERICAN RAILS FOR GREAT BRITAIN

As part of their great material contribution to our war effort, steelworks in the United States are to roll and supply 100,000 tons of rails for British railways. They are to be of high grade steel, and production has already begun. Weighing 95 lb. to the yard, they will be delivered in lengths of 39 ft., which is the American standard; the British standards are 45 ft. and 60 ft., the latter being more usual now on main lines. Rails have been purchased in the United States for British railways on a number of occasions, and many can still be seen at various points. An interesting instance is the stretch near Essendine, on the East Coast main line of the former G.N.R., over which the L.N.E.R. British and world speed records for steam traction were achieved. Those particular rails are of the comparatively short length of 36 ft. each.

FESTINIOG LIGHT RAILWAY FORTUNES

The Festiniog Light Railway in North Wales is of great historic interest and considerable importance. The line is of 1 ft. 11½ in. gauge, and was constructed more than 100 years ago for conveying slates from the mountain quarries to the sea at Portmadoc. Horses were then used for hauling the wagons. It has many steep gradients and sharp curves, and its Blaenau Festiniog terminus is alongside G.W. and L.M.S. branches. It is in a somewhat wild, mountainous region, with slate workings at many heights on the grey hillsides.

Passenger traffic began in 1864-5, nearly 80 years ago, so that by a small margin the Festiniog is the world's oldest narrow gauge public railway. It proved very popular with visitors to North Wales coastal and scenic resorts for many years. Owing to financial difficulties, and to the general falling off in tourist business, no passenger traffic was operated last summer, the first time for 75 years. It is to be hoped that it may be possible to resume such running in happier times, for much of the scenery traversed is exceedingly fine.

Interesting features of the line include the gravity operation of loaded wagons of slates accompanied by brakesmen, who show great skill in their work; Fairlie double-boiler bogie tank locomotives of the 0–4–4–0 wheel arrangement; and smooth riding little eight-wheeled coaches, all dating from the 1870's. In its heyday 100,000 tons of slate and minerals were carried annually in diminutive wagons, and the number of passengers conveyed was 90,000 a year. In recent times, however, owing to road competition and the fall in demand for slate, these totals declined to about half and expenses were barely met.

TRAVELLING BUFFET CAR AND CANTEEN DEVELOPMENTS

Modern buffet cars exclusively for Service men and Mercantile Marine personnel are now operating on the mid-day expresses between King's Cross and Edinburgh (Waverley). The staffing and provisioning are undertaken alternately by the Salvation Army and the Y.M.C.A., their canteen prices being charged. This enterprise is supplementary to the regular restaurant car services of the trains, and of course adds considerably to the weight of these already heavy expresses.

During February 23 more buffet car services were added to regular L.N.E.R. public trains. There cars operate to and from such far-flung points as Aberdeen, Carlisle, Manchester, Grimsby, London, Yarmouth and Ashford (Kent) in the new through daily service from Newcastle via Leicester, Banbury and Guildford.

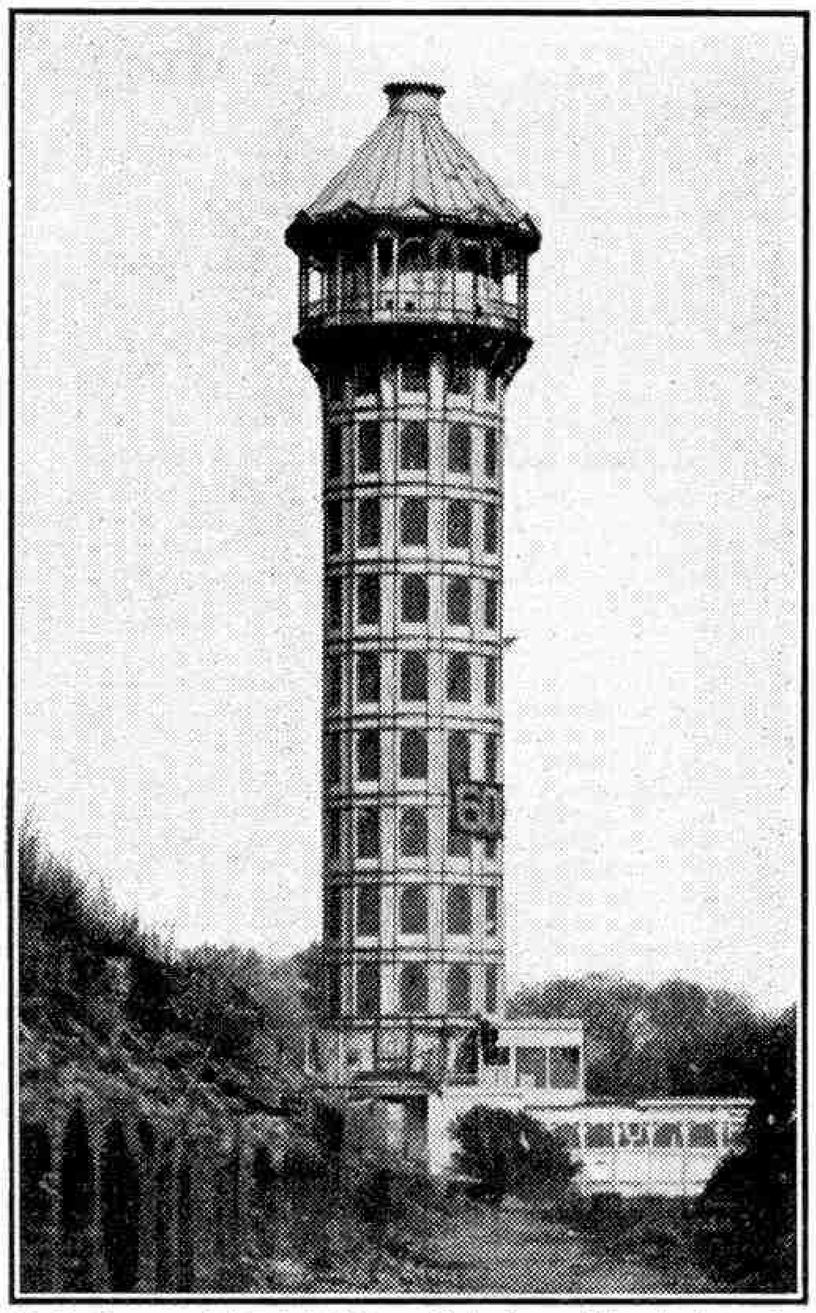
Experimental Services' canteens fitted up in ordinary compartments, operated by welfare organisations, have recently been provided in Euston-Glasgow expresses.

It is interesting to note that during the last great war buffet cars were almost unknown, while after 1916 restaurant cars were entirely withdrawn from most long-distance routes until after the cessation of hostilities.

One of the veteran Dean 0-6-0 goods engines of the G.W.R. at the head of a mixed freight train. The enormous dome is typical of many of the older G.W.R. locomotives. Prize-winning photograph by J. C. Button, Crewe.

Crystal Palace Passes

Demolition of the North Tower



North Tower of Crystal Palace, Sydenham. The photographs to this article are reproduced by courtesy of George Cohen, Sons and Co. Ltd., London W.12.

THE demolition of the North Tower of the Crystal Palace marks the end of one of London's most famous landmarks. The Palace, a huge structure of glass and iron, was built in Hyde Park to house the Great Exhibition in 1851. In the following year it was taken down and re-erected at Sydenham, where it was opened in 1854 by Queen Victoria. During its life the Palace was the scene of many and varied activities on a large scale, including the Handel Festivals and the great brass band contests; and, in the grounds, which covered about 200 acres, association football cup finals, motor racing and sensational firework displays.

Most of the Crystal Palace was destroyed by fire in November 1936, and in the early part of last year the trustees decided to dispose of the two towers which, contrary to general opinion, did not form part of the original design. The Palace was built without any provision for heating, and Brunel, the famous engineer, was asked to design chimneys to carry off the smoke from the furnaces needed to heat the vast structure. While he was considering his plans for these additions, the suggestion was made that the chimneys might be used also to carry water tanks to feed the various fountains in the grounds. So skilful was Brunel in combining his provision for water and for flues that, as already said, most people think the towers form part of the original design.

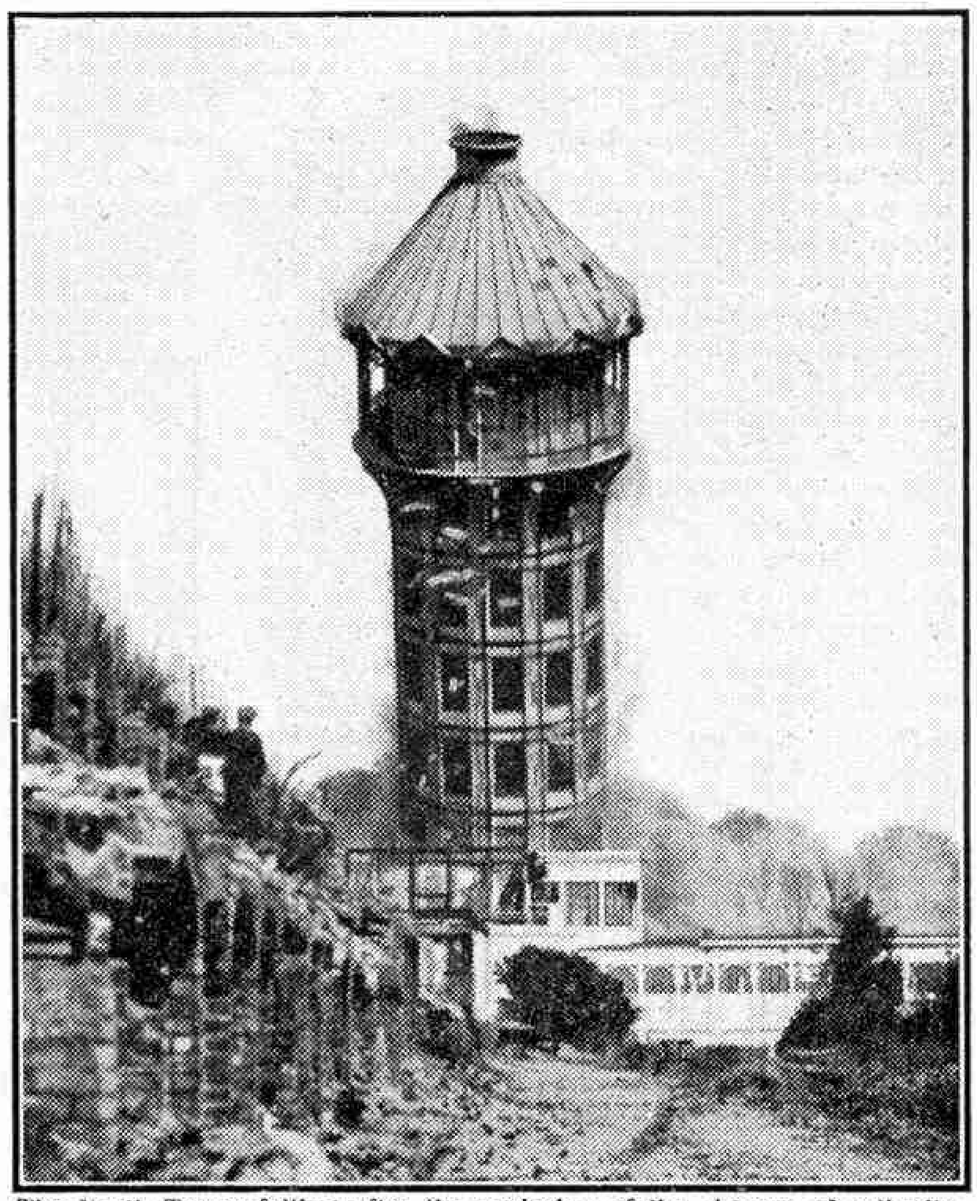
These structures, known as the North and the South Towers respectively, were about 280 ft. high and 40 ft. in diameter. They were constructed of cast-iron sections, 12 to each floor, braced together by wrought-iron tie-bars. A cast-iron spiral staircase attached to a brick flue running up the centre of the tower extended from ground level to the top, where was situated a large wrought-iron water tank. The brick flue served as a chimney to the steam boiler situated near the base of each tower. Each tower contained about 840 tons of iron, 570 tons of brick work, 74 tons of wood forming the floors and the dome, and some 5 tons of glass.

In June last year the contract for the removal of the towers was placed with the Dismantling Department of George Cohen, Sons and Co. Ltd., who have carried out the demolition of many large exhibition structures, including the Big Wheel at Earls Court, many buildings at Wembley and, more recently, the Empire Tower at the Glasgow Exhibition.

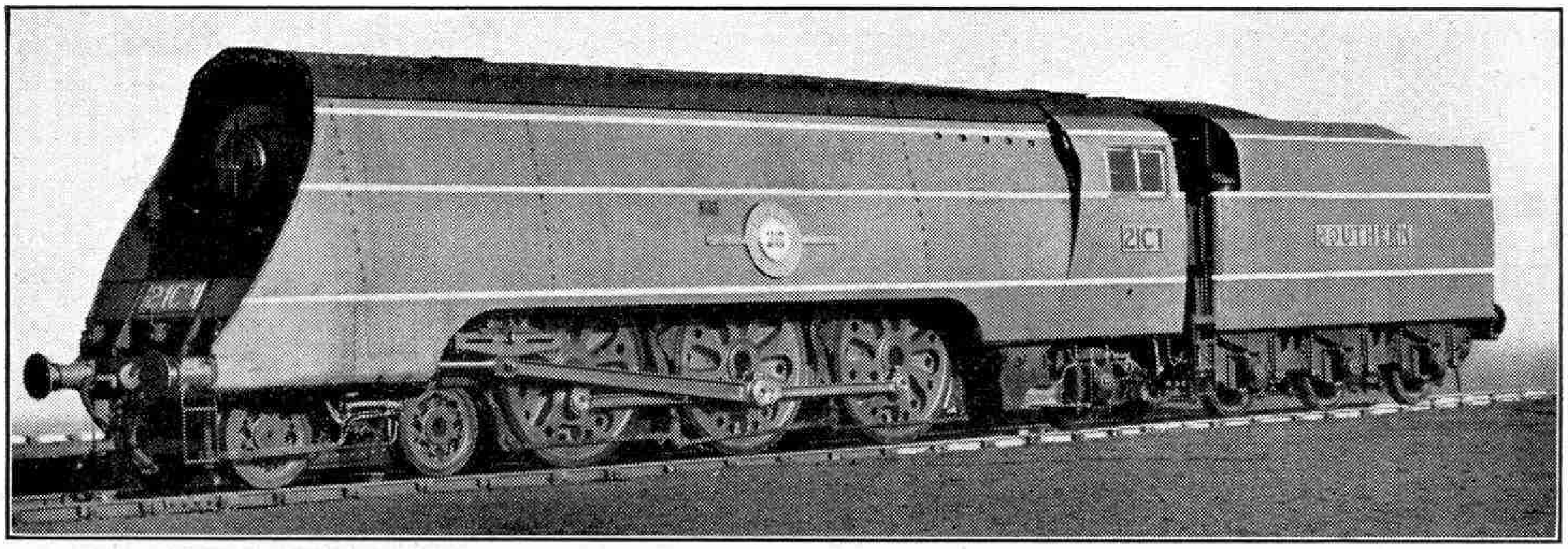
The South Tower was the first to be dismantled. Owing to its closeness to the main thoroughfare it could not be felled, but had to be dismantled bit by bit. In order to prevent fragments from falling on the traffic along the road during the operations, a protective fan, or apron, was erected, supported on a steel trellis arrangement. After the removal of the wooden dome of the tower the wrought-iron tank at the top was cut away in large pieces, and lowered to the ground by an electric winch. Then the cast-iron sections, each weighing about $4\frac{3}{4}$ tons, were dealt with by means of a specially-designed jib.

In practice it took longer to deal with the brick flues and the timber floors than it did to handle the 12 sections forming the structure of each floor; and as the tower was situated so near the main road, and the greater part of the work was carried out during the winter months, extreme caution was necessary in the dismantling. It is interesting to note that during the whole of the operations traffic was not held up for a second.

The North Tower was felled by blasting away with gelignite six of the cast-iron columns that formed the bottom floor, together with the front portion of the brick flue and four of the small cast-iron columns forming the support for the wooden floors. It was arranged for all the charges to be fired simultaneously. Elaborate precautions were taken to prevent danger in case the tower should fall in an unexpected line, but actually the felling took place with perfect success, the tower falling along the trellis as had been planned.



The North Tower falling after the explosion of the charges of gelignite.



"*Channel Packet*," the New S.R. "Pacific" Locomotive

As announced in the "*Meccano Magazine*" last month, the "Pacific," or 4–6–2 type of locomotive, has now made its appearance on the S.R. The splendid cover to this month's issue, which is based on a photograph kindly supplied by the Southern Railway, gives a good idea of the general appearance of the design. The new engine has been built at Eastleigh Works of the S.R. to the designs of Mr. O. V. S. Bulleid, Chief Mechanical Engineer, and it incorporates many striking features.

It is rather interesting to recall that when in the early years of the century Mr. D. Earle Marsh was appointed from Doncaster to the management of locomotive affairs on the former L.B. and S.C.R., he immediately introduced the "Atlantic" type, and the Brighton engines of this wheel arrangement were a close reproduction of the large-boilered "Atlantics" developed on the G.N.R. So now Mr. Bulleid, who was appointed to his present position from the L.N.E.R., has seen fit to introduce on the S.R. that L.N.E.R. speciality, the 4–6–2 type of engine with three-cylinder propulsion. Here the parallel ends, however. The S.R. "Pacific" is not in any way a close reproduction of the Gresley design, but is an entirely original machine, and is perhaps one of the most novel designs that have been introduced into British practice during recent years.

We have already mentioned that the design is referred to officially as "air-smoothed" in preference to the usual "streamlined." The casing enclosing the engine is carried on the main frame instead of on the boiler. It is thus quite independent of the movement of the boiler, and it has been possible to arrange the position of many details inside the casing in the most useful positions, rather than in places where they would look least unsightly, as would be the case if there were no external covering.

The casing is built of rolled sections and steel plating assembled by electric welding. The casing projects forward of the smoke-box door plate to act as an air collector. Above the smoke-box door there is a large opening that tapers upward to the front of the chimney. This forms a funnel by which the air taken in by the casing projection is discharged in a rapid stream to act as suction to the exhaust from the chimney. The exhaust is comparatively soft because of the incorporation of a multiple-jet blast pipe. In this connection the experiments carried out by the designer with the blast arrangements on the "Lord Nelson" and other classes of engine on the S.R. must have yielded useful information towards the preparation of this detail of the "Pacific" design.

There are three cylinders of 18 in. diameter and 24 in. stroke, and piston valves with the unusually large diameter of 11 in. are operated by valve gear designed and patented by Mr. Bulleid. The valve gear is driven by chains of Morse pattern, and the three sets are enclosed in an oil-tight casing inside the frame, in which are also the inside connecting rod, crosshead and crank. All bearings within the casing are lubricated by a continuous stream of oil distributed by geared pumps from a sump. The connecting rods of all three cylinders drive on the middle pair of coupled wheels, and to make this possible the inside cylinder has been placed at a pronounced angle.

Another interesting feature of the new engine is the use of double-disc cast steel wheels for the engine and tender. These are of a type known in America as the "Boxpok" pattern, in which the balance weights are placed between the two discs. The coupled wheels are 6 ft. 2 in. in diameter, smaller than has been usual for S.R. "first line" express engines, but probably large enough for the general run of duties that the class will undertake. The tractive effort at 85 per cent. boiler pressure is 37,500 lb.

A steam pressure of 280 lb. per sq. in. is used, the highest yet employed on British railways with a normal type of boiler and fire-box. Another interesting feature of the boiler is the fitting in the welded steel fire-box of two Nicholson thermic syphons. These are flattened tubes communicating at one end with the lowest part of the boiler space and at the other with the portion above the crown of the fire-box. As they are actually in the fire-box the water in them is strongly heated and there is a constant flow upward through them, the effect being to improve the steaming capacity of the locomotive.

A point of interest about the boiler is that the three safety valves fitted are set at an angle instead of on the top and are placed on the forward portion of the boiler barrel. Heating surfaces and grate area are of ample proportions, the total heating surface being 3,272.9 sq. ft., and the grate area 48.5 sq. ft., ensuring rapid and efficient generation of high-pressure steam.

The cab, like the boiler casing, is built up by welding, and its external contour follows that used for S.R. coaches. The footplate fittings are conveniently arranged for the driver to handle when he is sitting in his adjustable bucket seat on the left-hand side of the cab. Steam-operated reversing gear is provided, and the fire-hole door also is a steam-operated one worked by a treadle on the floor of the cab. This is the first time that such an accessory has been used on a British railway. A padded tip-up seat is provided for the fireman on the right-hand side, and both injectors are on this side also. The cab is electrically-lit, a turbo-generator being fitted in the enclosed space between the frames in the front of the smoke-box. The head signal lights, which are permanently attached to the front of the engine and the tender, are also illuminated from this generator. For daylight use lamp brackets are fitted for the usual discs.

Steam brakes are provided on the engine and the clasp type of brake has been adopted, which involves the provision of a brake block to the front and the back of each wheel. This is a further novelty in British practice.

An unusual numbering system is being adopted. Thus "*Channel Packet*" carries the number "21C1." Of the three digits in this number the first refers to the two axles of the bogie and the second to the trailing axle, while the third is the number of the engine in the class. The letter C is used to denote that there are three coupled axles, a method that is employed on the Continent for this purpose.

The engine and tender are painted light green with horizontal yellow lines running throughout their length. Nameplates, number plates and the "Southern" plates on the tender sides and smoke-box front are all brass with polished letters on a red background. The nameplate includes a reproduction of the house flag of the S.R. that is flown by the company's steamers.

The tender has a capacity of 5 tons of coal and 5,000 gallons of water, and the total weight of engine and tender in working order is 142 tons 10 cwt. The profile of the tender is similar to that of the engine cab.

AIR NEWS

Raider "Knocked Out" in Fifth Round

A raider that showed itself to an anti-aircraft battery in the far north of Britain was shot down by a direct hit with the fifth round fired, although the machine, a Messerschmitt "Me.110" fighter-bomber, was flying at over 300 m.p.h.

Just how good this shooting was only gunners can appreciate. The course of the machine was not known to the battery until the target came into sight. It was then at about 4,000 ft., and it would have remained in view for less than a minute. Height, course, and speed of the raider, the force of the wind and its direction, which may not be the same at different heights, all these had to be calculated after the machine was sighted, and the gun and shell fuse set accordingly.

This scoring of a direct hit at a fifth attempt, with a target altering its position substantially between each loading and firing, illustrates the high degree of skill which the "Ac-Ac-curacy" men of Britain are acquiring. During the War of 1914-18 it cost us some thousands of rounds for every enemy machine shot down by anti-aircraft fire. On the known enemy losses the figure in this war is very much less. It can safely be assumed that for every raider shot down several are damaged, and some may never get home, which gives a still better cost-in-shells average.

"Airgraph" Air Mail Service

A new and experimental air mail service to and from British Forces in the Middle East has been introduced. It is called an "Airgraph" service, and is the first of its kind in the world. In this system of communication the sender writes his message on a special form 11 in. by 8 in., and prints his address in block letters in a panel at the foot. The form is then photographed on to a small film which is despatched to its destination by aeroplane. On arrival there a 5 in. × 4 in. enlargement of the film is made, and is inserted in an envelope so that the address shows through a transparent panel, and the communication is then posted.

The immense saving in weight of air mail achieved by the new method is indicated by the fact that 4,500 of the film negatives total only 1 lb. in weight as compared with 1½ cwt. for the same number of letters. Letters forwarded by this service cost 3d. each.

Good Progress of Air Training Corps

In the first three months since the Air Training Corps was launched on 1st February the scheme made as much progress as was originally hoped for in 18 months. More than 900 local squadrons and 400 school units had been formed by the end of April. This represents a total membership of over 150,000, and a potential strength approaching 200,000.

Volunteers to officer the Corps have come forward in excess of immediate requirements, and over 3,000 have already passed the selection boards. Several hundred officers have attended short courses of instruction on attachment to R.A.F. establishments.

Great progress has already been achieved with the training of the vast number of new members. The R.A.F. is lending a strong hand in this work also, and over 500 Air Training Corps units have been affiliated to R.A.F. stations. Visits to the stations will help to train and interest the cadets.

Work will shortly begin on a film of the A.T.C., the first to be produced. It will be made jointly by the Air Ministry and the Crown Film Unit, and will be distributed by the Ministry of Information.

New British High-Powered Aero Engine

In Mr. Grey's article on the R.A.F. Commands, on pages 174-5 of this issue, mention is made of the 2,400 h.p. "Sabre" engine fitted in the Hawker "Typhoon" Fighter. The Napier "Sabre" is one of the new types of British aero engines, and, according to the Ministry of Aircraft Production, for its size and weight it develops the highest power of any British type that has passed the official type trials.

It is understood that in design the "Sabre" follows to some extent the lines of the well-known Napier "Dagger" and "Rapier" engines, which are air-cooled, in-line types. Although the new engine is less than 6 ft. long it can develop as much power as a "Royal Scot" locomotive, and its small frontal area and reduced drag are other features that make it ideal for high-performance fighter aircraft.

More Lockheed "Lodestar" Transports

Delivery of the 14 Lockheed "Lodestar" transports ordered by South African Airways is in progress, and the first machines received are now operating a weekly service between Capetown and Leopoldville, in the Belgian Congo.

Eight Lockheed "Lodestars" have been ordered by British Airways for service on trans-African air routes. These machines will be known as the "L" class in British Airways' fleet, and will have names beginning with that letter.

"Lodestars" have also been ordered by Pacific Alaska Airways, and are to be employed on an air service between Seattle and Juneau, Alaska.

An illustrated description of this Lockheed transport monoplane will be given in an early issue.

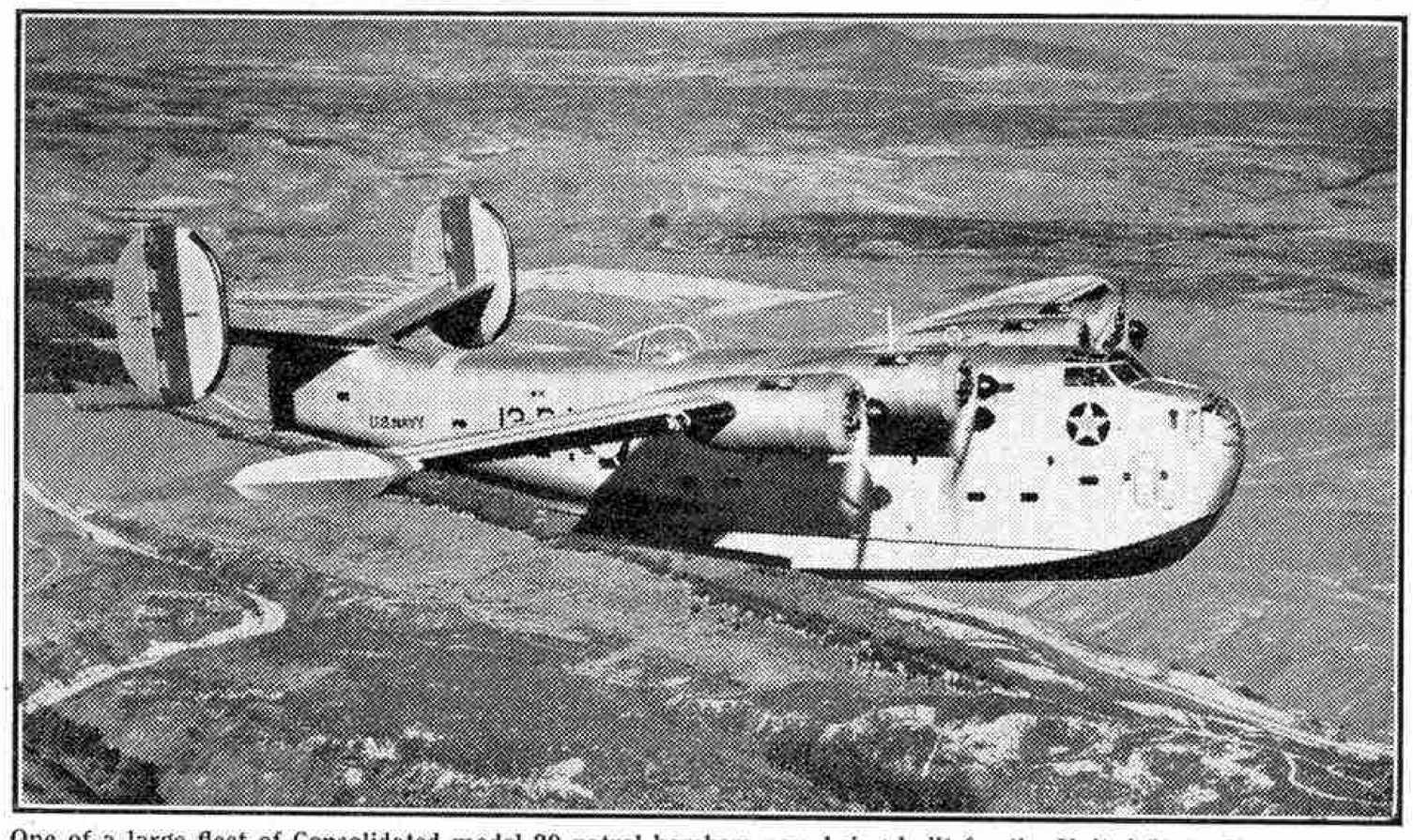
Night Fighter Gunner Scores in First Combat

A Heinkel "He.111" was destroyed one night recently by a "Defiant" air gunner in his first night combat. The gunner, who was with his Squadron commander, has described his thrilling experience.

"We picked up the enemy at about 10 o'clock," he said. "The Squadron Leader manœuvred the aircraft into a perfect position, and I gave 'Jerry' a burst. I caught him amidships, probably killing his gunner. Whether it damaged the bomber I don't know, but it certainly tickled his pants.

"The Heinkel then levelled out and flew away, but we very soon picked him up again and I let him have another burst. This must have set him on fire almost at once, for he went down like a meteor, turning the clouds a bright red.

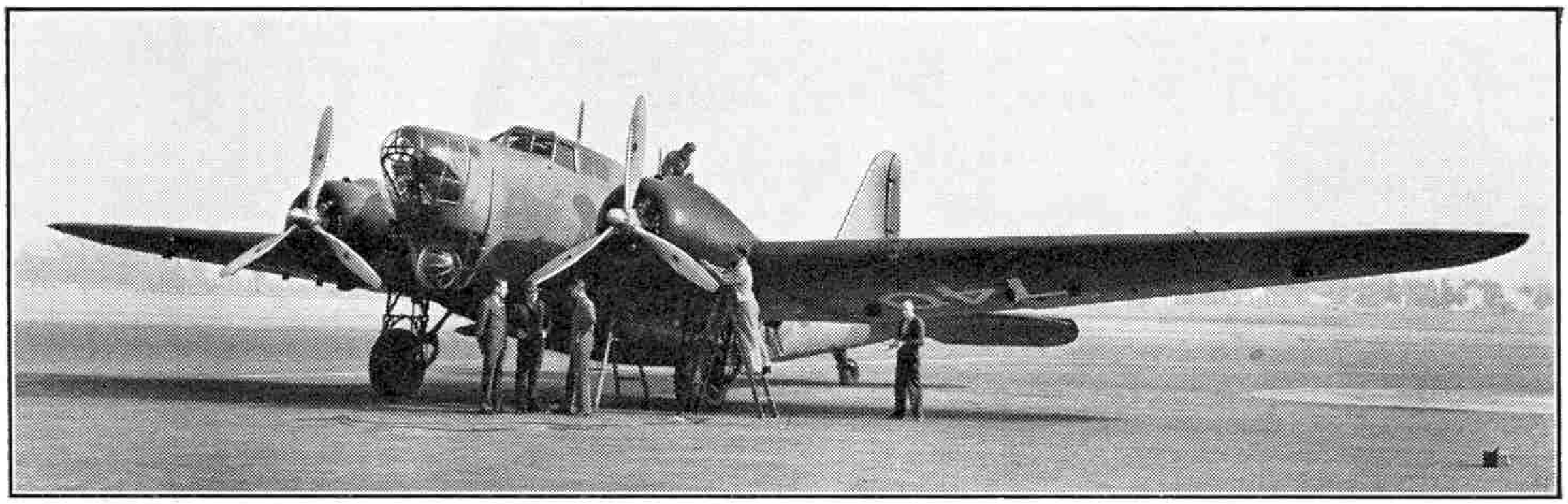
"Not once did we experience any return fire."



One of a large fleet of Consolidated model 29 patrol bombers now being built for the United States Navy, in which the type is known as the "PB2Y-2." They are the largest and most powerful flying boats in Naval Service. Photograph by courtesy of Consolidated Aircraft Corporation, U.S.A.

United States Army Air Corps Chief Visits England

Major-Gen. Henry H. Arnold, a pioneer of American aviation, and head of the United States Army Air Corps and Deputy Chief of Staff of the Army for Air, recently paid a short visit to Britain in connection with the speeding-up of U.S. armament deliveries to this country. A portrait of Major-Gen. Arnold was reproduced on page 526 of the December 1940 "*M.M.*"



Putting the finishing touches to a Douglas "Digby" twin-engined bomber. Twenty of these machines have been delivered to the Royal Canadian Air Force. Photograph by courtesy of the Douglas Aircraft Company, Inc., U.S.A.

Testing Flying Boat Engines

When flying boat engines have been overhauled in the Qantas Empire Airways' workshops at Mascot, Sydney, Australia, they undergo extremely rigid tests. Up-to-the-minute equipment has been installed which indicates, as far as is humanly possible, the future performance of the engine while on service.

At the completion of the overhaul, when the serviced engine has been electrically and mechanically timed, it is "motored-in" on a specially constructed and locally designed stand, in which a variable speed drive is taken through a powerful belt system from a 30 h.p. electric motor. The drive is coupled through a universal joint to the airscrew boss of the engine, which is mounted on bearers similar to those in the engine nacelle on the flying boat. Pipes that carry artificially heated oils at correct pressures lead to the engine from a special heater. When the assembly is set in motion, the oil passes through the engine and returns to the heater via a separator, which removes any impurities.

During the "motoring-in" period the fuel and ignition systems are not connected up, the "motoring-in" being primarily to get as smooth a surface as possible on any bearings or moving parts which may have been newly fitted, before the engine is tested under its own power.

The testing takes place after the "motoring-in" period, in a Test House in which flying conditions are artificially created. Here the engine is fitted with a special heavy test fan that supplies the load and is run up at varying speeds for specified periods. A complete set of flying boat engine controls are duplicated on a panel in the glassed-in observation chamber off the Test House. Fuel for consumption during the test is measured, lubricating oil weighed, and the ignition system thoroughly checked and tested. Only then is the starter button pressed. The heavy blades turn over slowly, and with a spluttering cough the engine bursts into life for the first time since it left its bed in the wing of the flying boat nearly 500 man-hours earlier.

After the engine has been run for certain specified periods at set throttle speeds the final test takes place. This consists of an hour's running at full throttle, and during it the oil and petrol consumption, pressures, cylinder head temperatures, and revolutions are checked and re-checked over ¼-hr. periods. At the conclusion of the hour the engine is again examined, and when finally passed it is shipped to the Flying Boat Base at Rose Bay, ready for service when needed.

An Improved "Flying Fortress"

The Boeing Aircraft Company have completed their contract for Boeing B-17C "Flying Fortress" bombers about seven months ahead of schedule, an indication of how greatly production has been speeded up. Work is well advanced on production of a further improved model, the B-17D "Flying Fortress," and the first of these machines has been undergoing severe tests by the United States Army Air Corps. The Boeing B-17D is equipped with armour plate and has leak-proof fuel tanks. It has four 1,200 h.p. Wright "Cyclone" engines and its top speed is said to be well over 300 m.p.h.

Research to increase still further the high efficiency of the "Flying Fortress" continues unceasingly, and the Boeing Company announce that a 1,000,000 sq. ft. extension to their No. 2 plant at Seattle will be used for rapid quantity production of a new version of the "Flying Fortress," which will be known as the B-17E type.

New American Trainer

The North American NA-35, a new low wing, two-seater monoplane, is to be made by the Vega Airplane Company, which is associated with the Lockheed Aircraft Corporation, U.S.A. The aim of the designer of the new machine has been to produce a trainer possessing the flying characteristics of a fighter machine. The NA-35 is built entirely of duralumin, and either a radial or in-line type engine of 125 to 175 h.p. can be fitted. The machine has a top speed of about 140 m.p.h. and cruises at 125 m.p.h. It is an open cockpit machine, and is classed as a "primary-secondary" trainer.

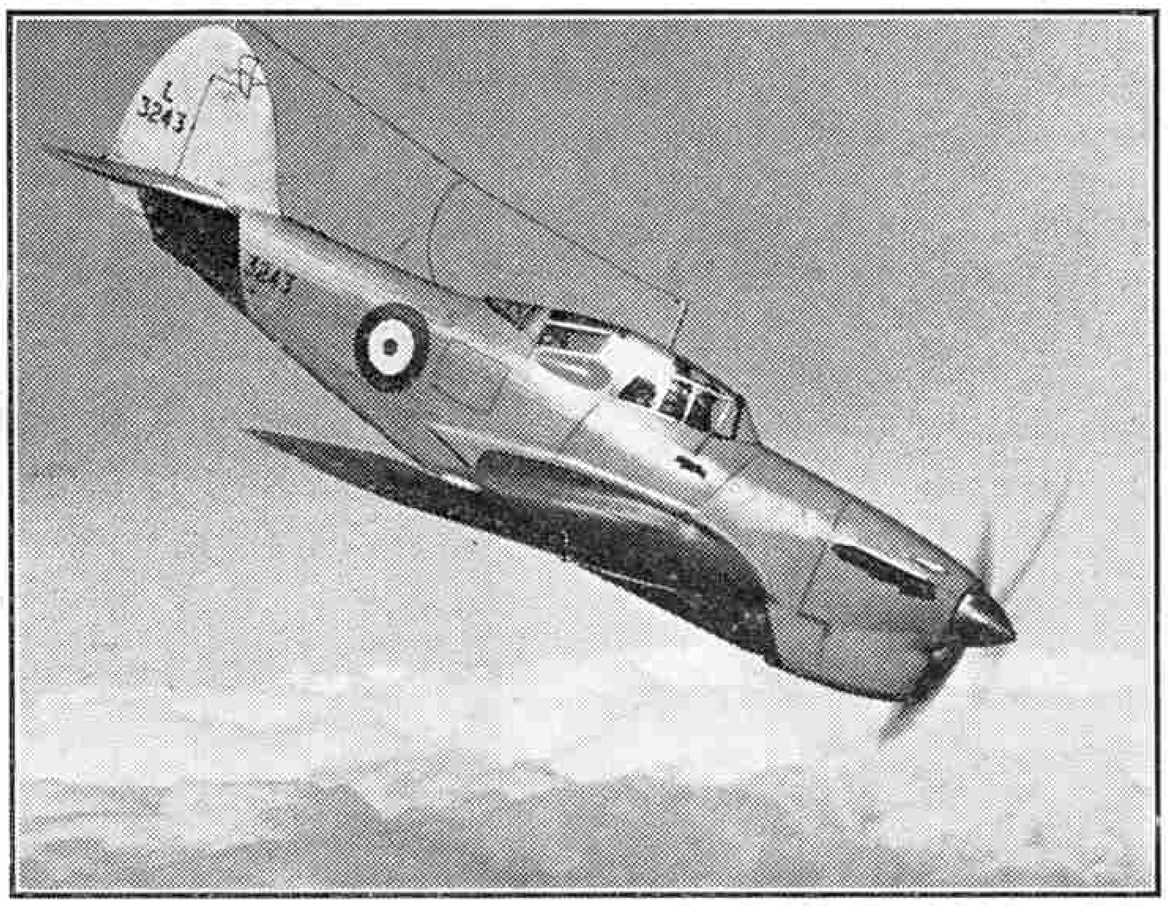
Maps in their Minds

When aircraft of the R.A.F. Coastal Command squadrons have finished their patrols they often "have a crack" at aerodromes, docks, military camps, shipping, factories, or other objectives in enemy territory. In fact, the pilots and navigators always go out with a mental picture of the targets which may present themselves at the end of patrol.

It is often impossible to look at a map or chart when they reach "the other side" because of lack of time and the danger of showing lights. But the crews who can translate the bit of coast near which they are flying into the terms of annotated charts and photographs in the Intelligence Office back home have no need to refresh their memories. They know that on the Intelligence Officer's chart there are red ink marks around a promontory just coming into view which mean A.A. batteries, that in the next estuary is a town with docks and railway station conveniently adjacent, and that further up the river is an aerodrome.

Next day the official communique reads: "Aircraft of Coastal Command also bombed targets in . . . . ."

Some striking successes have been scored in these "end of patrol" attacks upon enemy territory.



A fine view of a Hawker "Henley" monoplane of the R.A.F. The chief duty of this machine is the high-speed towing of drogue targets. Photograph by courtesy of "Flight."

Practising Morse by Yourself

By Edward Richardson

EVERY boy to-day should have a competent knowledge of the Morse code. This is easy enough to learn, but not too easy to practise unless you have a companion who will signal to you. The practice cards described below overcome this difficulty and help you to develop great speed and accuracy not only in sending, but also in receiving.

To learn the alphabet, divide it into the following groups:

GROUP 1. ALL DASHES.

T —
M — —
O — — —

Remember these by the sentence: Too Much Oil.

GROUP 2. ALL DOTS.

E -
I - -
S - - -
H - - - -

Remember these by: Every Indomitable Spitfire Helps.

GROUP 3. BEGIN WITH ONE DASH AND END WITH A DOT.

N — -
D — - -
B — - - -

Remember by: Nazis Dislike Blenheims.

GROUP 4. BEGIN WITH TWO DASHES AND END WITH A DOT.

G — — -
Z — — - -

Remember by: Good Zooming.

GROUP 5. BEGIN WITH ONE DOT AND END WITH A DASH.

A - —
W - — —
J - — — —

Remember by: Annoying Wireless Jams.

GROUP 6. BEGIN WITH TWO OR THREE DOTS AND END WITH A DASH.

U - - —
V - - - —

Remember by: Ultra Violet.

GROUP 7. BEGIN WITH ONE OR MORE DASHES AND END WITH A DASH.

K — - —
Y — - — —
X — - - —
Q — — - —

Remember by: Keep Your Experiments Quiet.

GROUP 8. BEGIN WITH ONE OR MORE DOTS AND END WITH A DOT.

R - — -
L - — - -
P - — — -
F - - — -

Remember by: RAF Like Provoking Fascists.

GROUP 9.

C — - — -

Remember by: Conclusion.

Learn one group a day, by means of the sentences given below the group, until you know the whole alphabet.

Now cut 26 cards about 2 in. by 1 in. The exact size does not matter, and postcard thickness will do. On one side of each card write a Morse signal, and on the other side, the letter to which it corresponds. Make the writing bold, in ink, so that you can read it at a glance.

Practising the recognition of Morse code signals with the cards described in this article.

When you have written out the whole alphabet, arrange the cards with the letter sides upwards and shuffle them. Place them in a pile on the table. Look at the first letter, and at once call out, aloud, the Morse signal for it. If, for example, the letter is D, say "**Dash, dot, dot.**" Speak it aloud, so that you cannot cheat yourself. Once you have said it, there is no going back on your words. Now turn the card over and, from what is written on the other side, see if you are right. If so, repeat with the next card and continue until you have gone through the whole pack. If you are wrong, put the card on one side, and when you have finished the pack, go again and again through those you have got wrong until you know them.

Next take the pack, reshuffle it, and place the cards in a pile with the Morse signals upwards. Immediately you see the top card, say the letter to which it corresponds. Turn it over and see if you are right. As before, go through the whole pack, setting on one side for extra practice cards with the signals that you failed to get right.

Practise for a few minutes every day, or several times a day, with these cards, and you will soon be able to rattle through them at a good pace without a mistake. In this way you will get practice in both sending and reading Morse.

If you now make or buy a tapper, you can practise sending, and if you have two and wire them to buzzers or lamps, you can send messages to a friend and read his replies. At first, a dash should last three seconds and a dot one second, with an interval of one second between each letter and three seconds between each word. As you gain speed, you will shorten these times, but the dash should always be three times as long as the dot, and the pause between words three times as long as between letters.

The working up of speed in Morse signalling is not specially difficult, but requires constant practice. Readers who are really keen to acquire Morse speed will find great help from a set of four records recently introduced by the Columbia Company. The eight parts constituting these records range from the alphabet to simple messages, and from these to longer messages at gradually increasing speeds up to 18 words per minute. These records have been prepared with the co-operation of Royal Air Force signallers, and working with them is extraordinarily fascinating.

ENGINEERING NEWS

A Giant 11,000-Volt Electric Motor

The lower illustration on this page shows two huge slow speed electric motors, part of a large number supplied by Bruce Peebles and Co. Ltd., Edinburgh, for use in various factories throughout the country. The overall length of each is 16 ft. and its height 14 ft., while its total weight is nearly 40 tons. It will exert a starting power of 4,000 h.p. and operates at 11,000 volts. Its speed is 250 r.p.m.

The fabricated method of construction has been adopted in building the motors. Briefly this means that the various parts were constructed of steel plates cut to shape and welded, in this instance by means of the electric arc. In effect this method dispenses with the use of castings and riveted construction, and results in a great saving in weight, while giving increased strength.

The stator frame consists of two end pieces and a centre rib of heavy-section steel frame held together on an inner periphery by steel tie-bars and on the outer periphery by a stout steel plate forming the outer surface of the frame. The feet are formed from a steel bar and the whole construction is built to jigs and gauges with a view to accurate alignment.

At the end of the insulated high-alloy steel core are teeth rigidly supported by heavy-section mild-steel fingers, which extend over the whole depth of the core and well back on the frame end plates. These fingers transmit the pressure exerted by the clamps to the extreme edge of the teeth tips, thus maintaining uniform pressure throughout the core.

The windings consist of coils wound on formers and laid in open slots mechanically protected by leatheroid troughs. They are retained by special wedges driven into grooves in the teeth tips. Mica forms the main insulation, and the coils are sealed with insulating enamel and rendered waterproof.

Golden Gate Bridge Net

The great safety net made of manila rope, which was first used successfully under the Golden Gate Bridge, San Francisco, during its construction, is now hired out to jobs where special safeguards are desired for steel erectors. Parts of it are once again in service. This time they are being used in connection with a very high trestle that is being built for concrete-placing equipment in the construction of one of the many dams now being erected in the United States.

Red Sea Tin

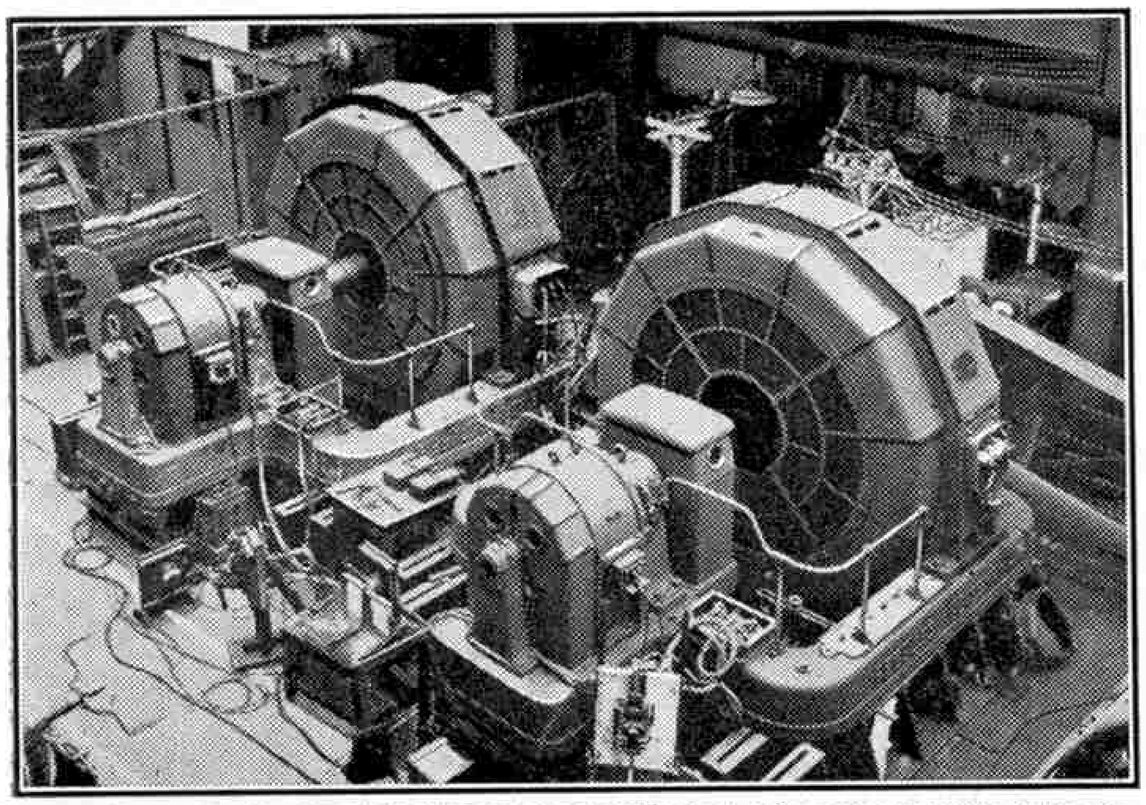
After four months' prospecting large tin deposits, estimated by Egyptian experts at 500,000 tons, have been discovered in the neighbourhood of Kosseir, on the Red Sea coast. The deposits were found in the Wadi el Agala, and the veins, which are rich in tin, cover an area of several miles. It is estimated that these Egyptian deposits would produce about 15,000 tons of pure tin annually.

America's Greatest Dam

The Grand Coulee Dam, on the Columbia River in the United States, is now nearly ready for service. The Dam has taken 7½ years to build. It is the largest concrete structure yet erected, and indeed is three times the size of the Great Pyramid of Egypt. The lake that will form behind it will be the longest of its kind in the world, extending to a distance of 151 miles, and when the spillway is passing its maximum flow the energy of the falling water will be about 32,000,000 h.p.

Excavation on a colossal scale had to be carried out during work on the Dam, nearly 20 million cu. yds. of material being removed from the site.

Articles describing this dam appeared in the issues of the "*M.M.*" for November and December 1927.

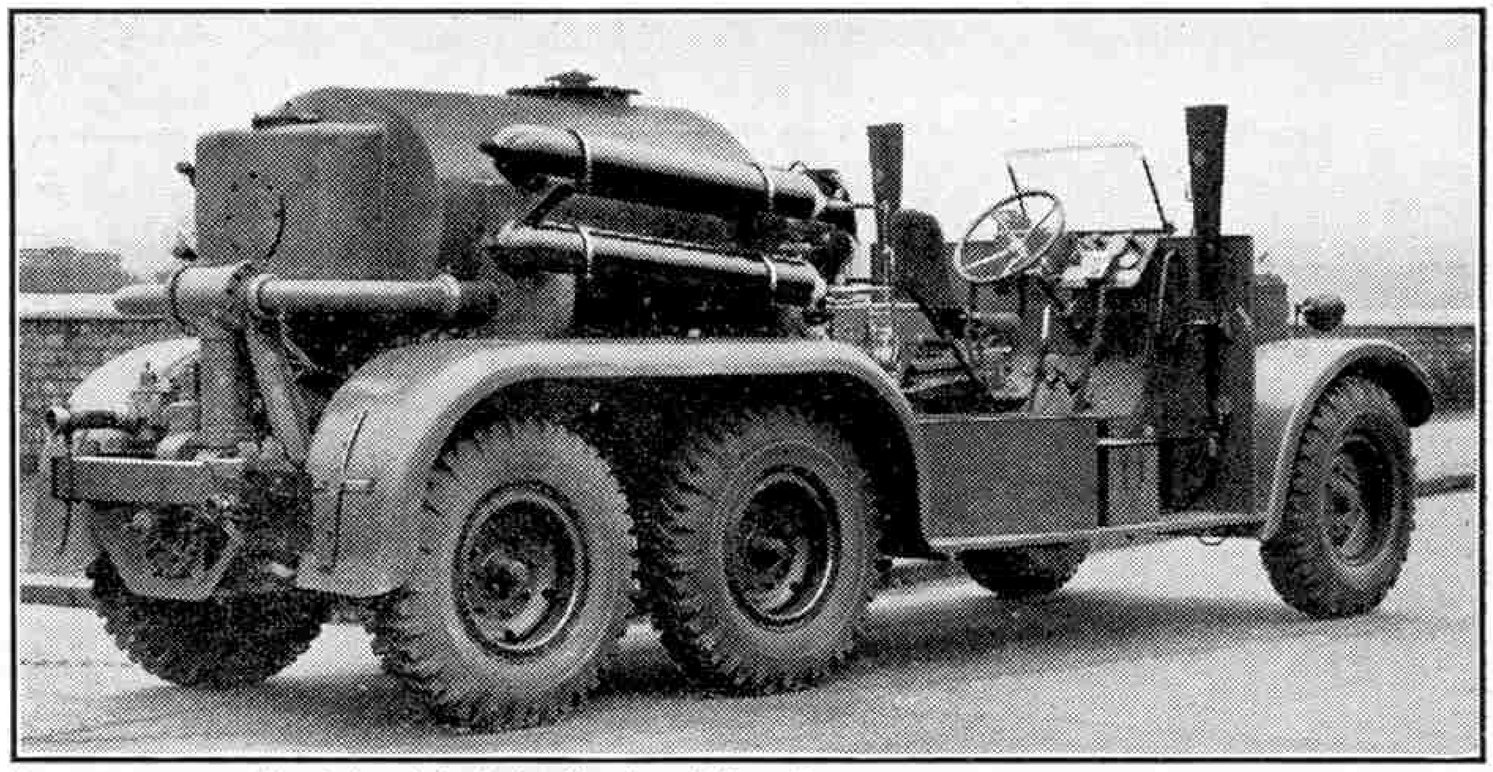


Two of the large all-welded electric motors described on this page undergoing tests in the makers' works. Photograph by courtesy of Bruce Peebles and Co. Ltd. Edinburgh.

Crossley Aerodrome Fire Tender

The upper illustration on this page shows an aerodrome crash fire tender built by Crossley Motors Ltd. A number of these vehicles have been supplied to the Air Ministry. Each is fully equipped to deal with fires that may result from an accident or bad landing, and to rescue the personnel involved, and also is ready for use in dealing with any outbreak that may occur in hangars and workshops, etc.

The chassis is a Crossley 30/100 h.p. six-wheeler specially designed for the work, and is speedy with exceptionally good acceleration. The engine is a Crossley four-cylinder petrol unit of 4 $\frac{5}{16}$ in. bore and 5½ in. stroke. It is rated at 29.8 h.p. and actually develops 100 b.h.p. There is an auxiliary gearbox, giving altogether a range of eight forward speeds for use under extreme conditions, and the tender performs well across country.



A fire tender specially designed to deal with aircraft fires that may result from an accident or a bad landing. Photograph by courtesy of Crossley Motors Ltd.

An airfoam pump mounted in the chassis driven by a power take-off from the gearbox, is capable of delivering upward of 1,000 gallons of airfoam per minute. A composite tank containing 300 gallons of water and 30 gallons of foam solution is provided to feed the pump, which will give a minimum of four minutes' running. To the two pump outlets are connected copper pipes conveying the foam to the centre of the crew's quarters and a dividing breaching is attached to the end of each pipe, thus providing a total of four deliveries. For each of these permanent outlets there is a length of 65 ft. of specially treated unlined canvas hose and a branchpipe, together with a special spreader nozzle.

The tender has space for a crew of six, comprising driver, four hose men, and one rescue man. Included in the auxiliary equipment are asbestos suits, felling axes, salvage hooks and flameproof gloves.

Floating Power Plant

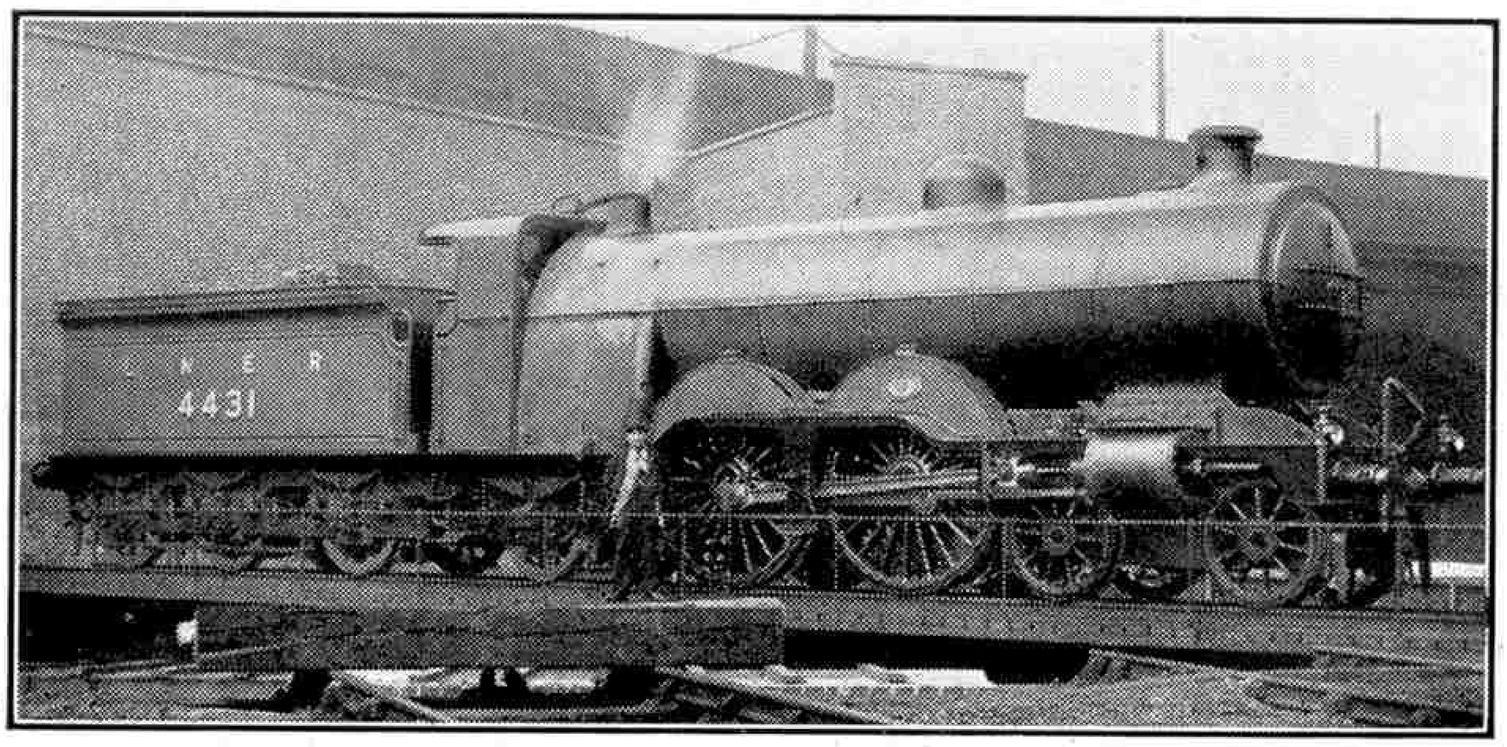
Mr. A. P. Kellogg, an American turbine engineer, recently produced designs for a floating power station capable of generating 50,000 kW., which may be constructed as part of the national defence programme of the United States. In the event of the generating facilities of a city of 150,000 to 200,000 inhabitants being seriously damaged by air attack this power plant would, in a short time, be towed to a nearby spot and connected up with the town's electrical distribution system to provide a temporary supply.

A Fine L.N.E.R. "Atlantic" Performance

Interesting Results of Rebuilding

By "A Railway Engineer"

IN one's few moments of leisure in these strenuous days a great deal of interest and pleasure is to be derived from the recalling of happenings in more normal times—turning up old photographs, re-reading favourite books, and generally getting away for an hour or so from the war and all it has brought into our lives. In this way I was recently looking through the notes of some of my numerous journeys by rail when I came upon one of the old 9.35 a.m. L.N.E.R. express from Sheffield to Marylebone; I had ridden on the footplate as far south as Leicester, and the occasion came back very vividly. Our engine was one of the famous Great Northern "Atlantics," the story of which Mr. R. A. H. Weight told in the "*M.M.*" for April 1941, and perusal of those old notes of mine seemed to open up a very interesting subject. It has little to do with present traffic conditions, but belongs to the days when express passenger trains were given first priority, loads were moderate, and speeds were exhilaratingly high.



One of the superheated "Atlantics" that retains the slide valves and 18¾ in. cylinders. Photograph by W. J. Reynolds.

Our engine on that 1936 journey had been many times rebuilt. Many famous locomotive classes have undergone during their careers considerable changes, in the layout of their machinery, in their steam-raising plant, and in their external appearance. Locomotives such as the "Claughton" class 4–6–0s of the former L. and N.W.R. have been provided with larger boilers; others, like the "400" class 4–6–0s of the Great Southern of Eire, have had drastic changes made to their cylinder arrangements. These alterations are in all cases obvious. What is exceedingly rare is the instance of a locomotive class that has undergone the most radical improvement with hardly any sign of change externally. That is the kind of "rebuilding" that Sir Nigel Gresley applied to the large-boilered "Atlantics" designed nearly 40 years ago for the Great Northern Railway by Mr. H. A. Ivatt.

The particular point of interest in this pre-war journey is that the engine concerned was then in what might be termed an intermediate stage of rebuilding; and so that readers may appreciate the true significance of the running we made on that occasion it will be of interest if I enlarge a little upon some of the successive steps referred to in Mr. Weight's article by which the original engines were brought to their present extraordinarily high degree of efficiency. Much of the story is bound up with the root principles on which the steam locomotive works.

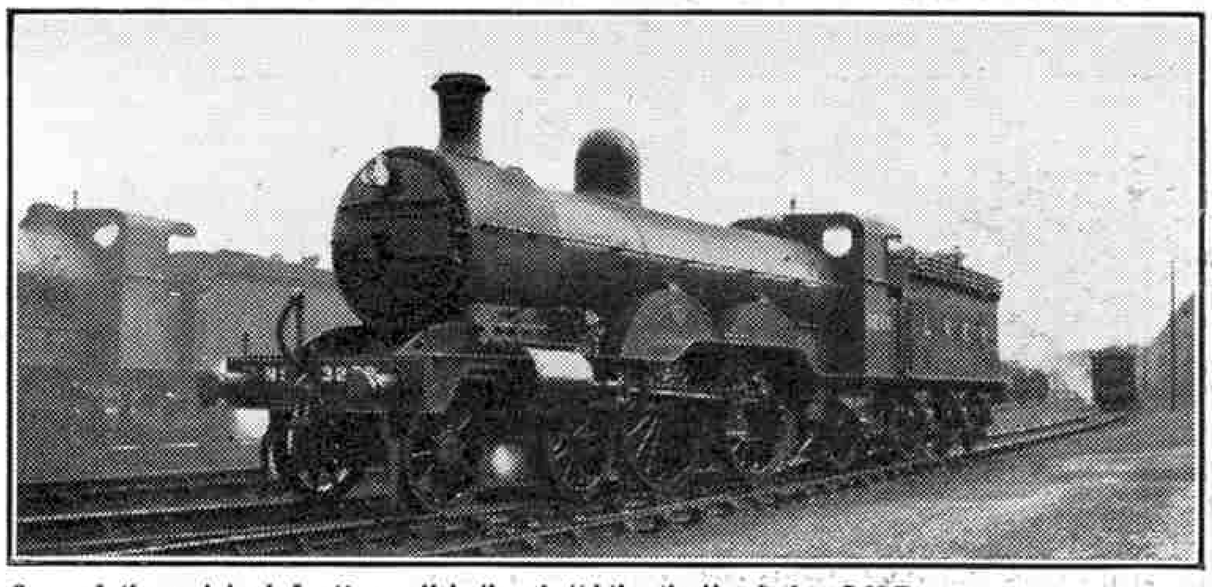
The original Ivatt "Atlantics," the "Klondykes," were a beautifully proportioned job; but to me it has always seemed a little curious that having decided upon so vast an enlargement of the boiler for the later ones Mr. Ivatt should have kept the cylinders the same. In any case it appeared at times as though the large "Atlantics" were unable to use the great amount of steam that their boilers could make, and it was not until they were superheated that the class really came into the limelight.

Ivatt himself turned out a superheated version of the class shortly before his retirement.

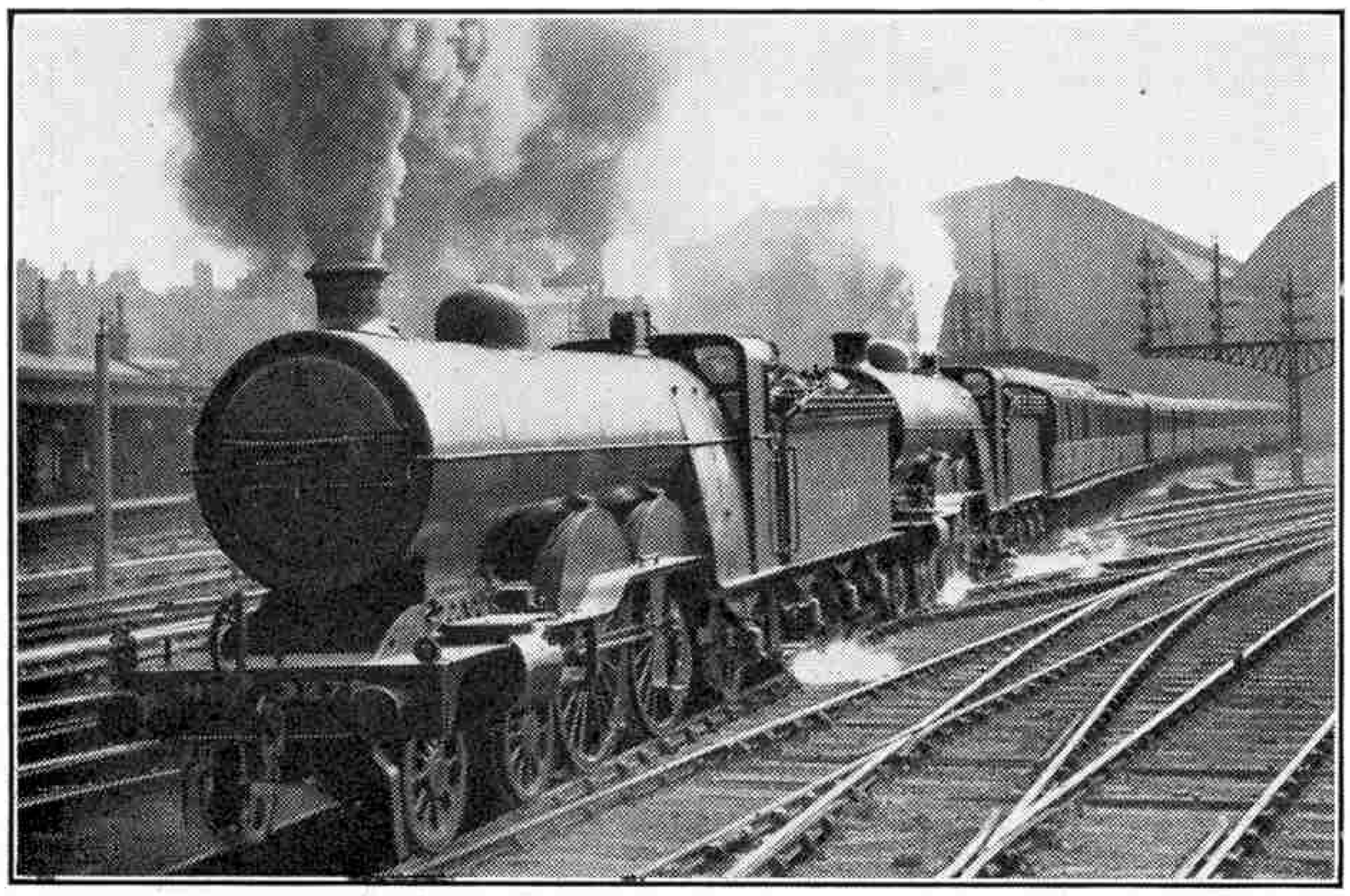
Now in the years 1910-1912 locomotive engineers, realising some of the advantages to be gained, were carrying out many experiments with superheating. One of the greatest of these advantages is that steam, when superheated, increases its volume, and it is thus not necessary to make so much steam in the boiler in order to fill the cylinders. Ivatt, no doubt with an eye on the boiler-maintenance bill, decided to use a lower steam pressure—150 lb. per sq. in., against 180 lb. in the original engines; this, in combination with slightly larger cylinders, kept the tractive effort of the first superheated "Atlantics" almost exactly the same as that of the original engines. But even so the new engines were far better from the traffic point of view, and could be extended to an infinitely greater degree when loads were heavy.

Then Sir Nigel Gresley began fitting the original saturated engines with superheater boilers. These were the same as the last Ivatt design but using a higher working pressure, 175 lb. against 150 lb. per sq. in., and this naturally gave the engines a valuable increase in tractive power. At the same time some of these rebuilds had their front-ends altered, by the enlargement of the cylinders from 18¾ in. to 20 in. in diameter, and the substitution of piston valves for the previous slide valves. Others were superheated without any change at the front-end. The success of these rebuildings led to a further advance, when a boiler having a much larger superheater was tried out. The original superheater engines had 24 elements; but this latest version had no less than 32, and provided a heating surface in the superheater actually greater than that of the first "Pacifics." It is these engines with 32 element superheaters that have won such laurels, on runs like that of the "*Queen of Scots*" express.

It is evident that the high degree of superheat reached in these engines is of more value than an improved front-end; for whereas the whole class have now been fitted with boilers having 32-element superheaters, there are still many that retain their original slide valves and their 18¾ in. cylinders. Our engine on the Sheffield-Leicester run about to be described was one of these, and at first sight it seems almost incredible that the use of superheated instead of saturated steam could make so revolutionary an improvement in the performance, over that of the



One of the original Ivatt small-boilered "Atlantics" of the G.N.R. as now running in L.N.E.R. colours.



Superheated "Atlantic" No. 3276, on which the author travelled, piloting a sister engine on an extremely heavy train. It will be seen that the outward appearance of the engine is almost indistinguishable from the non-superheated No. 1400. Photograph by H. Gordon Tidey.

original Ivatt engines. It must be remembered that no increase in pressure is available, and even in the saturated engines there was never any *shortage* of steam. How is it, then, that the change has come about?

The secret lies in the nature of the steam itself. Saturated steam carries with it quite an amount of water in suspension, and expansion of the steam in the cylinders is liable to cause condensation; this wet stuff does not flow very easily and the exhaust would not be particularly free. Superheated steam, on the other hand, is free of moisture, and behaves more like an ordinary gas; moreover, with the high temperatures reached in these large superheaters there is no condensation, and the exhaust is much easier. The slide-valve engines have proved remarkably useful in traffic, and it is only with very heavy loads, or at the highest speeds, that the 20-in. cylinder, piston-valve engines appear to have any advantage.

Most of the slide-valve engines, prior to the outbreak of war, had been drafted to the Great Central section, and those stationed at Sheffield had some particularly interesting turns to work. They hauled the London expresses as far south as Leicester, worked over the veritable mountain route through the Pennines to Manchester and Liverpool, and also took a share in the running of the cross-country trains such as the Barry-Newcastle and the Penzance-Aberdeen services. On this last they had one turn as far south and west as Swindon, working over Great Western metals from Banbury onward; while at the other end of their beat they went northward from Sheffield to York, over that extraordinarily complex route through Mexborough and Pontefract. In contrast to this my own run was on a fairly straightforward job, though the route itself is not by any means an easy one.

Our engine was No. 3276—an engine with something of a history, for many years ago she was concerned in an almost unexplained disaster at Grantham, wherein a night Scotch express left the rails at high speed. Curiously enough, when working on the Great Northern this engine never seemed to do well, and no crew seemed happy with her; it was as though the ill-fortune at Grantham left a vague feeling of superstition about her, just as sea-faring men regard an unlucky ship. I have heard of it with other engines that have been concerned in accidents. But usually such doubtful reputations are quite without reason and due to local prejudice; and it certainly proved so in this case. These Great Central men probably knew nothing of her past history; they just treated her on her present merits, and found her very much to their liking. Her driver spoke of her as a "lovely engine," and we had not travelled far before I was in full and enthusiastic agreement with him.

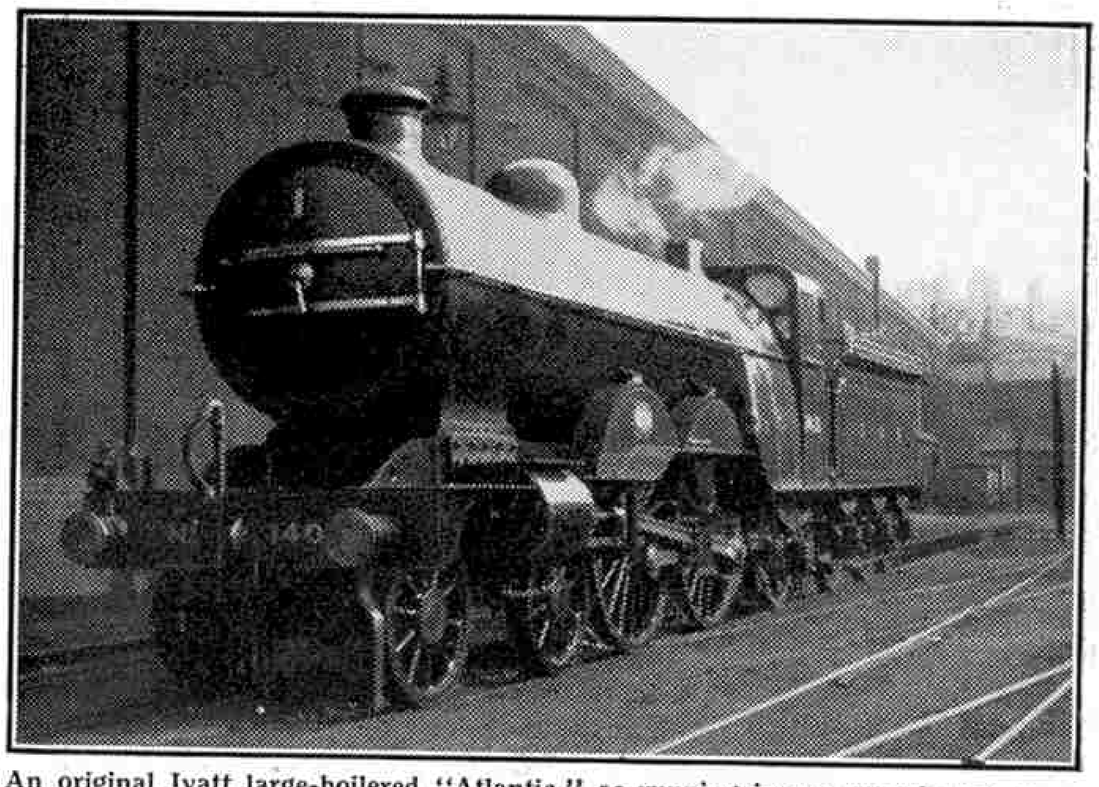
The load was one of eight coaches, 280 tons loaded, behind the tender, and away we went, dead on time. For the first 20 miles out of Sheffield the going is pretty hard. On the uphill start, at 1 in 144, to Darnall, No. 3276 fairly barked as she got her train under way, and I was interested to watch how Driver Lee set his reversing gear; these engines have a rack like a fine comb, and the lever was moved backward and forward a little till the sound of the exhaust was to the driver's liking. Once the beat was crisp and free the gear was set and left alone, and Lee then drove entirely by adjusting the regulator.

We went spinning down to Woodhouse at 60 m.p.h., eased carefully over the junction, and then went hard up the broken rise to Eckington water troughs; there was a slack for relaying here, in a most awkward place, for just ahead of us was the Duckmanton bank. We had a short rise and half a mile of level road to cover before the climb began, and directly we passed the "T" sign, denoting the termination of the slack, Lee opened No. 3276 right out. She responded grandly; we swung through Stavely at 50 m.p.h., and as we did so I was thrilled to see the driver put the lever well forward, increasing cut-off from 40 to no less than 50 per cent. The bank is nearly 6 miles long, mostly at 1 in 100, but we went thundering up in great style, only once dropping as low as 37 m.p.h., and recovering to 41 before the summit was passed.

In their old non-superheated days these engines would often fall almost as low as this on the 1 in 200 banks of the Great Northern main line; but now—what a difference! In spite of the nasty check we covered the 20.3 miles from Sheffield to Pilsley in 29¾ minutes, and now it was easy running down to Nottingham. No high speed is possible on this length, and there were several slacks for colliery workings; a worse hindrance was a second and still more severe relaying check, at Bulwell, one of the few places where we might have indulged in a bit of speeding. Our maximum before this was 68 m.p.h., but in spite of the delays we dropped only a single minute to Nottingham, doing the 38.2 miles from Sheffield in just 51 minutes.

There are no hindrances on the next stage, however, and Driver Lee and Fireman Dalton proceeded to show me how brilliantly No. 3276 would run. Run indeed she had to, for the schedule allows only 26 minutes for the 23.4 miles to Leicester, and the road is, on the whole, against the collar. On level track at first Lee got his engine off the mark very smartly, and with the regulator less than half open she worked rapidly up to 65 m.p.h. Then came the 4-mile rise to Barnston tunnel, nearly all at 1 in 176. Shades of the old G.N.R.! There was no falling off to 45, or even lower; without any change in the controls No. 3276 settled down to a steady 55 m.p.h., and cleared the summit, 10.6 miles from Nottingham, in 12½ minutes.

Directly we began the ensuing descent Lee almost closed the regulator, but the engine romped away and a moment or so later we were racing through Loughborough at 71 m.p.h. It is collar work again up past Quorn, and with the regulator opened out a bit I could just catch the crisp tattoo-ing sound of the exhaust. Things were well in hand now, and we ran into Leicester just five seconds inside schedule time—a beautifully judged piece of work.



An original Ivatt large-boilered "Atlantic," as running in non-superheated days.

A New Meccano Model

Light Tractor Driven by a Clockwork Motor

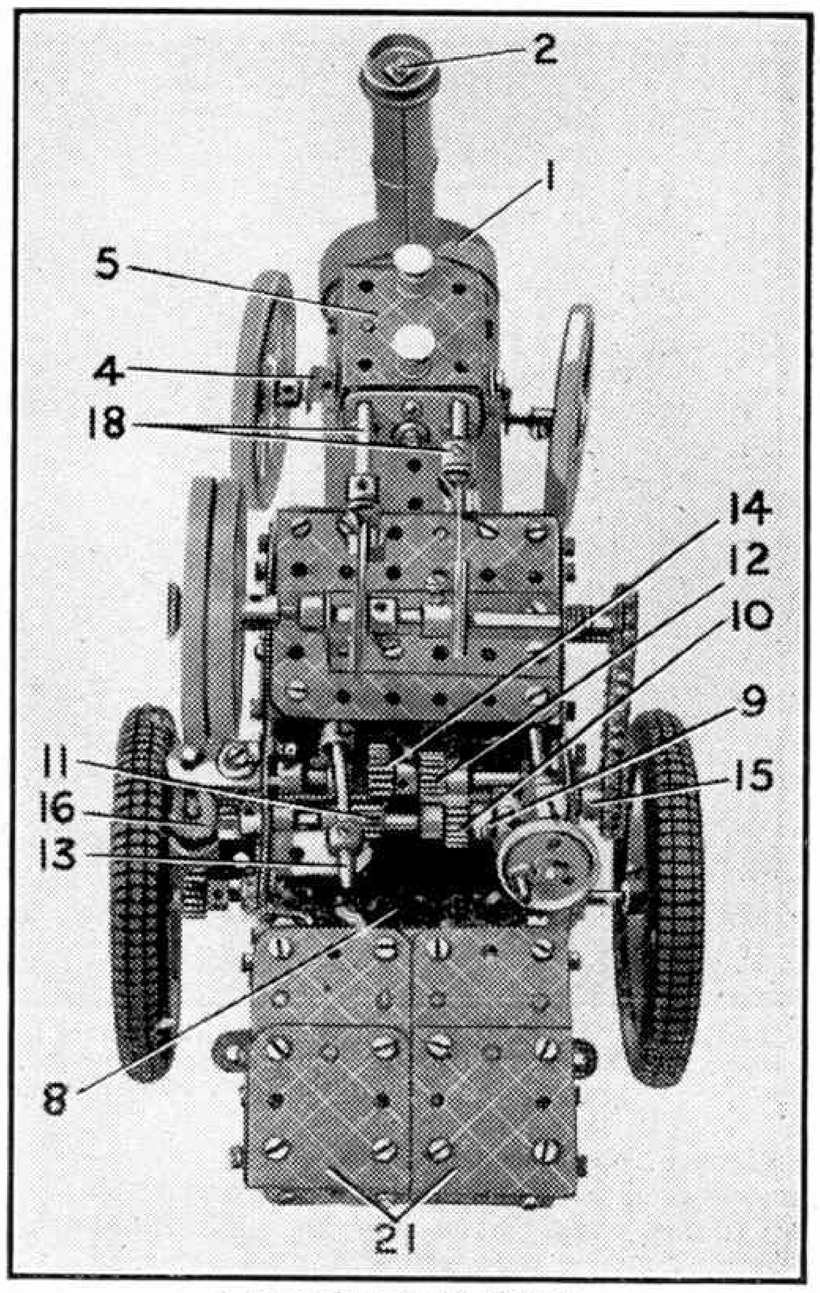
IN the illustrations on this page is shown a model of a light tractor that forms a splendid subject for enthusiastic model-builders. It is driven by a No. 1 Clockwork Motor and is capable of hauling considerable loads.

Construction of the model should be commenced by assembling the boiler and the front wheel unit. A Boiler End 1 is secured to one end of a Boiler by means of a 3½″ Screwed Rod 2, and the chimney, which consists of two Sleeve Pieces, is secured to this Screwed Rod by a ¾″ Disc, a ¾″ Flanged Wheel and a Nut. A Crank is bolted to the inside of the lower half of the Boiler, and in its boss is held a 1½″ Rod that carries a 2″ diam. Sprocket 3. The Rod is held in place by a Collar. The Sprocket is secured to a 2½″×½″ Double Angle Strip 4, but is spaced from it by two Washers, and it is also attached to a Boiler End by two 1⅛″ Bolts and Nuts. The front axle is a 3½″ Rod, and is passed through the ends of the Double Angle Strip and through opposite holes in the Boiler End. It carries two 3″ diam. Wheels.

The cylinder block and valve chest 5 consists of two 1½″ Flat Girders secured to the ends of a 1½″×½″ Double Angle Strip bolted down the centre top of the Boiler, and two 2½″×1½″ Flexible Plates are joined to the Girders by 1½″×½″ Double Angle Strips. Two Spring Buffers are attached to the top of the block.. The valve and connection rods pass through the rear Flat Girders and through two ½″×½″ Angle Brackets bolted to the Flexible Plates. At its rear end the Boiler carries two 3″ Angle Girders 6, which in turn are bolted at their lower ends to a 3″ Cranked Curved Strip. The Boiler is attached to the latter by an Angle Bracket. A 4½″×2½″ Flat Plate 7 and a 4½″ Strip are joined at each end to the 3″ Angle Girders, and form the sides of the body. A No. 1 Clockwork Motor 8 is supported on, but spaced by a Washer, from two 4½″ Angle Girders bolted to the Flat Plates. The tractor is provided with two speeds, and the gearing by which these are produced is as follows. A ½″ Pinion on the driving shaft of the Motor meshes with a ¾″ Contrate 9 fixed on a 3½″ Rod, which also carries a ½″ Pinion 10, a No. 1 Clockwork Motor Pinion and two Collars secured in the positions shown. The layshaft is a 4″ Rod that is slideable in its bearings, and it is controlled by a selector consisting of a 2″ Rod 13 that is pivoted by means of a Collar on a Bolt journalled in a 1″×1″ Angle Bracket. A ⅜″ Bolt screwed into the tapped bore of a Collar fixed on the forward end of the selector engages between two Collars on the layshaft, which also carries a ½″ Pinion 12 and a ¾″ Pinion 14. The ½″ Pinion 12 is in constant mesh with a ½″ diam. ½″ face Pinion, which is mounted on a 4″ Rod that also carries a ¾″ Sprocket 15 and a ¾″ Pinion on its other end outside the body. The ¾″ Pinion transmits the drive to the rear axle through a ¾″ Contrate 16, which is mounted on a 3″ Rod journalled vertically in a 2½″×1″ Double Angle Strip bolted to the side of the body. This Rod also carries a Worm that meshes with a ½″ Pinion mounted on the rear axle. The latter is a compound rod consisting of a 2″ and a 3½″ Rod joined by a Coupling.

On moving the layshaft over to the left the drive is led through the Clockwork Motor pinion 11 and the Pinion 14. Movement of the layshaft hard over to the right disengages the Pinion 11 and the Pinion 14, and the ½″ Pinion then meshes with Pinion 12.

The steering column is a 6½″ Rod that is journalled in a 1″×½″ Angle Bracket, bolted to the right-hand side of the main frame and coal bunker and in the 3″ Angle Girder at the front of the main frame. A handle is formed by a 1″ Pulley without boss fixed to a Rod Socket, a ½″ 6 B.A. Bolt being held in one of the outer holes of the Pulley by a 6 B.A. Nut. Two Collars are held on the Rod to prevent longitudinal motion and a Worm is mounted at its lower end. This Worm meshes with a ½″ Pinion that is fixed on a 3½″ Rod journalled in two 1½″ Strips bolted to 1″ Corner Brackets 17.

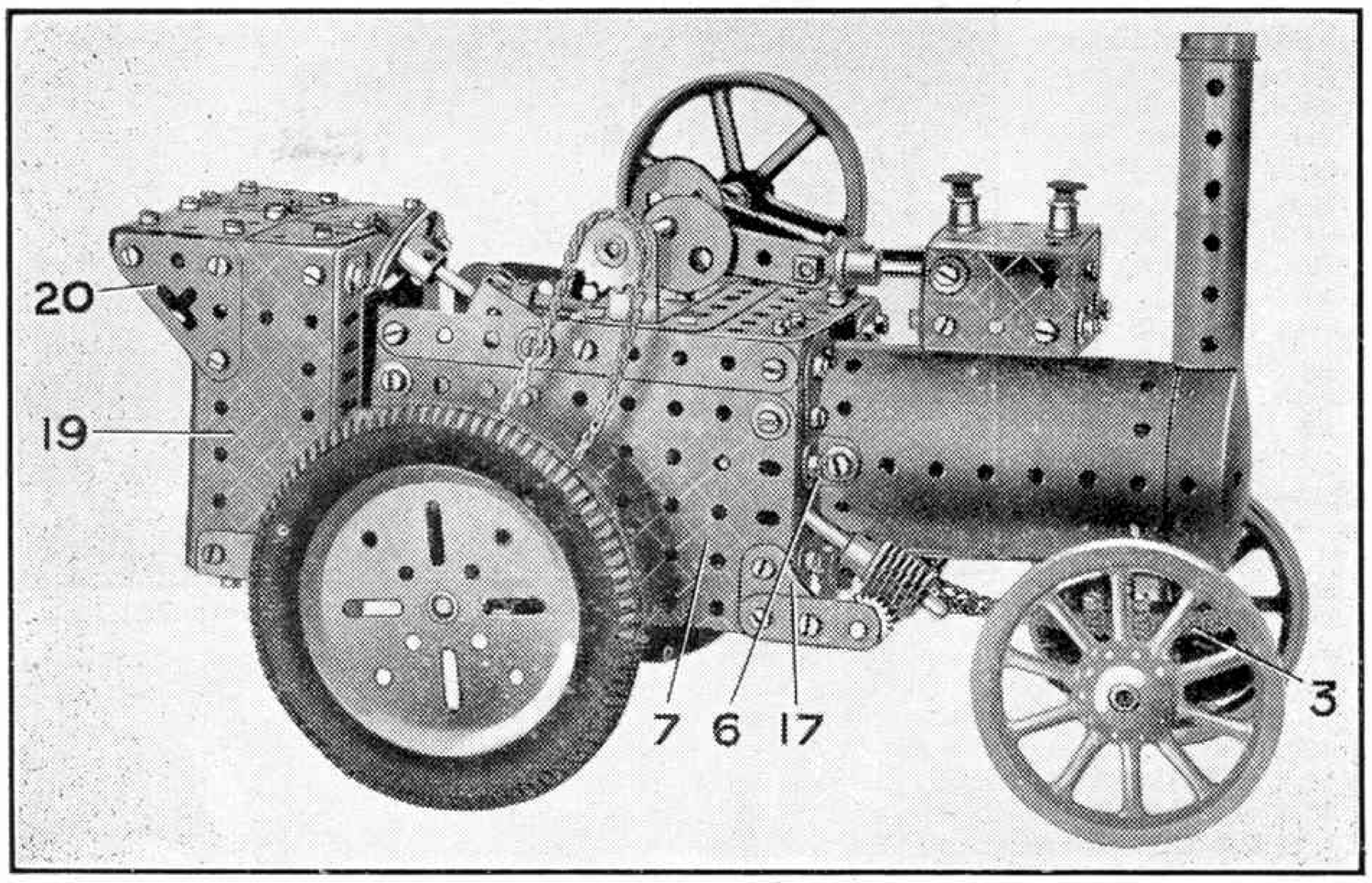


A plan view of the tractor.

The 3½″ Rod carries three Couplings. A length of Sprocket Chain is wrapped two or three times round these and the ends are then passed round the 2″ Sprocket attached to the front axle and there joined. Grub Screws in the Couplings provide a rough surface to grip the Chain.

The engine flywheel is mounted on a 4½″ Rod journalled in the ends of a 2½″×1″ Double Angle Strip bolted to two 3″×1½″ Flat Plates that form the top of the fire-box. This Rod carries also two Single Throw Eccentrics and, at the end opposite to the Flywheel, a ¾″ Sprocket that is connected by Chain to the Sprocket 15. The Eccentrics are pivotally joined to the piston and valve rods 18 by End Bearings and lock-nutted bolts. The valve and piston Rods are each 2″ long. The water tank at the rear of the bunker is supported on two 3½″ Angle Girders that form entensions to the sidemembers. The bottom of the tank consists of a 3″ Angle Girder and a 3″×1½″ Flat Plate. Two further 3½″ Angle Girders are bolted vertically to each of the 3½″ Angle Girders secured to the sidemembers.

List of Parts required to make model tractor: 2 of No. 2a; 2 of No. 4; 2 of No. 6a; 2 of No. 9a; 6 of No. 9b; 7 of No. 9c; 14 of No. 12; 1 of No. 12a; 1 of No. 12b; 1 of No. 14; 1 of No. 15a; 2 of No. 15b; 4 of No. 16; 1 of No. 16b; 4 of No. 17; 1 of No. 18a; 2 of No. 19a; 2 of No. 19b; 1 of No. 20b; 1 of No. 22a; 2 of No. 25; 5 of No. 26; 1 of No. 26a; 2 of No. 29; 2 of No. 32; 120 of No. 37af; 106 of No. 37bf; 40 of No. 38; 2 of No. 46; 4 of No. 48; 1 of No. 48a; 2 of No. 53a; 14 of No. 59; 1 of No. 62; 4 of No. 63; 3 of No. 73; 1 of No. 80a; 1 of No. 89a; 1 of No. 94; 1 of No. 95; 2 of No. 96a; 2 of No. 103h; 3 of No. 111c; 2 of No. 111d; 2 of No. 120a; 2 of No. 125; 1 of No. 132; 2 of No. 133; 4 of No. 133a; 2 of No. 142b; 1 of No. 162; 2 of No. 162a; 2 of No. 163; 2 of No. 166; 2 of No. 170; 1 of No. 179; 4 of No. 188; 4 of No. 189; 1 of No. 217b. 1 No. 1 Clockwork Motor and 1 No. 1 Clockwork Motor Pinion.



A powerful model tractor driven by a No. 1 Clockwork Motor.

Suggestions Section

By "Spanner"

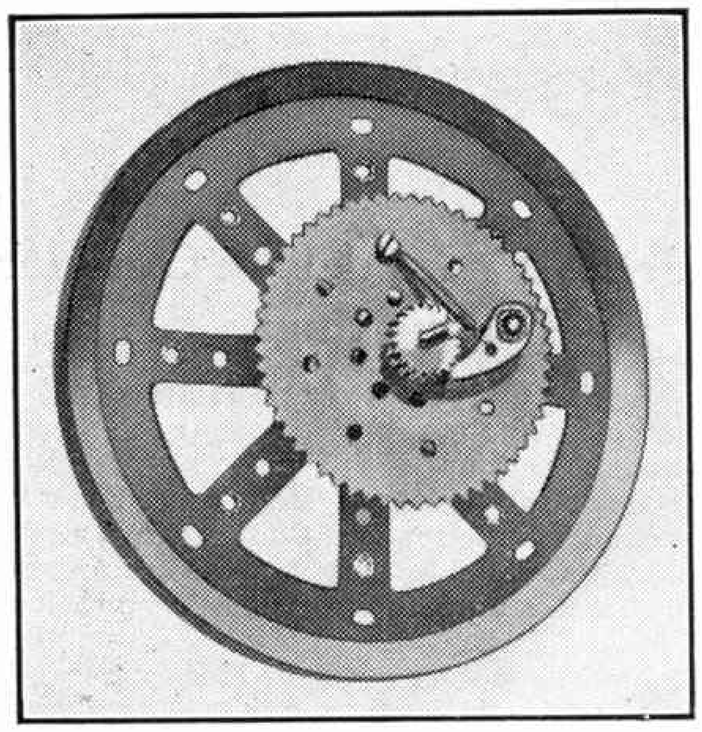


Fig. 508.

(508) A Pawl and Ratchet Wheel

(L. Masters, Bletchley)

The simply-constructed but ingenious wheel mechanism shown in Fig. 508 can be applied to many different types of models in which it is required to transmit the drive in only one direction. It consists of a 3″ Sprocket Wheel mounted freely on a 3″ Rod, but retained between a Ratchet Wheel and a Collar fixed to the Rod. A Pawl is mounted pivotally on a Threaded Pin fixed to the Sprocket and a length of Spring Cord attached at one end to the Pawl and at the other to the Sprocket holds it in engagement with the teeth of the Ratchet. A 6″ Pulley Wheel is then secured to the opposite end of the Rod.

(509) Variable Rotary Drive

Fig. 509 illustrates a method by which the length of a driven shaft may be varied while it is in motion. The illustration shows the gear incorporated in a model drilling machine. It will be noticed that the vertical drill shaft is in two sections, the upper portion 10 being connected to the lower by means of a Bush Wheel 1 that engages two short Rods 2 mounted in another Bush Wheel 3, which is secured to the lower portion 4. The drilling tool carried on the latter is applied to the work on pressing a lever 5, and on releasing the lever is returned to its former position by the spring 7, which is a portion of part No. 43. The spring is mounted on the shaft between a Collar 6 and the Double Angle Strip that forms the bearing 8. The spring should be slightly stretched and cut to size before being used. It will be noticed that the short Rods 2 adjust themselves to the movement of the drill by sliding in the holes of the Bush Wheel 1.

The lever 5 is pivotally mounted by means of a Bolt and lock nuts, and engages with the Eye Piece connected to a Double Bracket 9 mounted on the drill shaft.

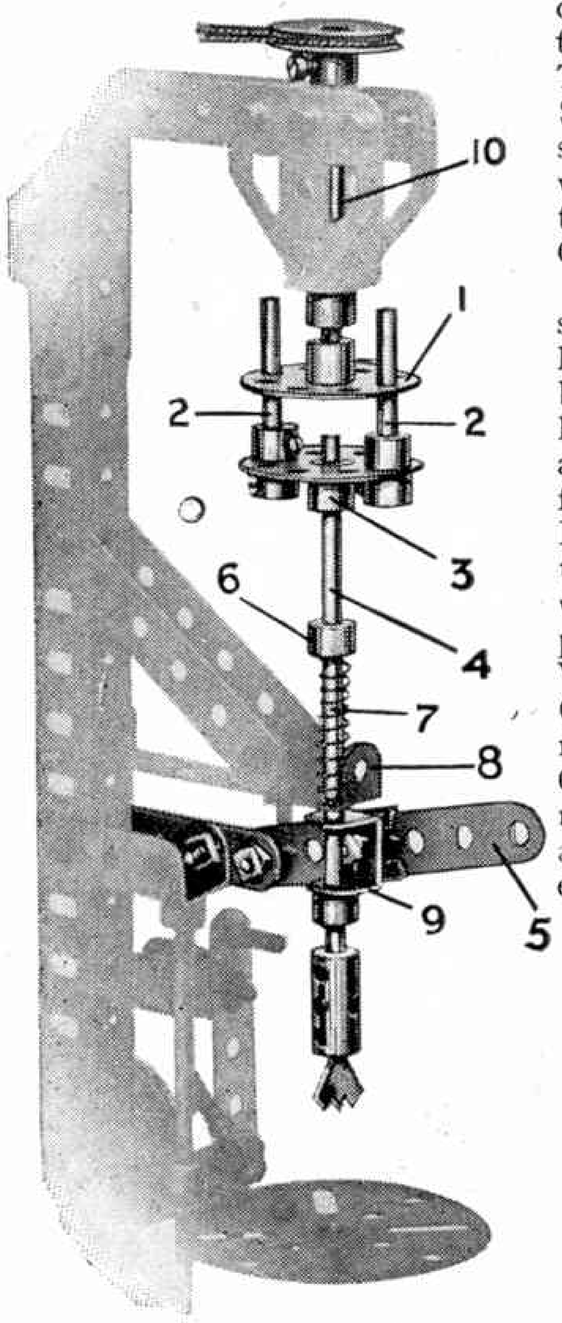


Fig. 509.

(510) Auto-Release Hoisting Drum

("Spanner")

The main function of the mechanism shown in Fig. 510 is to give a continuous hoisting and releasing of a drophammer or similar Meccano model. It is shown compressed into a very small space for fitting into a small forging hammer, but it can be modified to fit any model for which it is suitable.

The base is a $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, which is fitted on each flange with a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plate braced at one side by a $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. The driven Rod, fitted outside the framework with a 1″ Sprocket Wheel, carries a Worm 1, and a $\frac{3}{4}''$ diam. $\frac{1}{2}''$ face Pinion. The Worm is in constant engagement with a $\frac{1}{2}''$ Pinion that is secured on a Rod journalled in the upper holes of two Trunnions bolted to the base of the mechanism. The Rod carries a Handrail Support, and this in turning strikes a $\frac{1}{2}''$ loose Pulley 3, which is free to rotate on the Rod 4 between two Collars.

The Rod 4 is capable of sliding in its bearings, but is held in its normal position by a Compression Spring kept in place by a Collar and spaced away from the framework by one Washer. In addition to the $\frac{1}{2}''$ Pulley the sliding Rod is fitted with a hoisting barrel composed of two $1\frac{1}{8}''$ Flanged Wheels and also a 50-teeth Gear. The $\frac{3}{4}''$ Pinion already mentioned, meshes with this Gear except when the Handrail Support 2 is pressing against the Pulley 3, disengaging the hoisting drum.

(511) Electric Control for Creeper Tractors

(H. S. Everett, Linden Wood)

The mechanism shown in Fig. 511 can be used in electrically-operated tractors or trucks and it consists chiefly of two solenoids 1 and 2, which are energised in turn by rotating the steering wheel of the tractor. These solenoids are made up from Bobbins, Part No. 181, fully wound with 26 S.W.G. Wire, and they are secured to the sideplates of the model by $1\frac{1}{2}''$ Strips and 1″ Screwed Rods. The cores of the solenoids are $1\frac{1}{2}''$ Rods, and at their upper ends $4\frac{1}{2}''$ Strips 3 and 4 are pivoted to them on Bolts screwed in the tapped bores of Collars.

The $4\frac{1}{2}''$ Strips are also pivoted to $2\frac{1}{2}''$ Triangular Plates bolted to Double Brackets, which are secured to a $5\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 5 bolted between the sideplates of the model. The other ends of the $4\frac{1}{2}''$ Strips are attached to Springs, which are held between two Collars and Washers on $3\frac{1}{2}''$ Rods. The Rods are journalled in the $5\frac{1}{2}''$ Double Angle Strip and the floor of the model, and each carries a $\frac{1}{2}''$ Pinion. The Pinions move in and out of mesh with a Worm 6 fixed on a Rod 7, which takes the drive from the Electric Motor. This Rod is journalled in Flat Trunnions secured to the chassis. When in mesh with the Worm the Pinions also engage $1\frac{1}{2}''$ Contrate Wheels fixed on half axles that carry the driving sprockets for the creeper track.

Each $\frac{1}{2}''$ Pinion remains in mesh with its Worm and Contrate until its solenoid is energised, and then it is disengaged. The result is that the half axle carrying the Contrate rotates idly, and a brake is applied to the idler shaft.

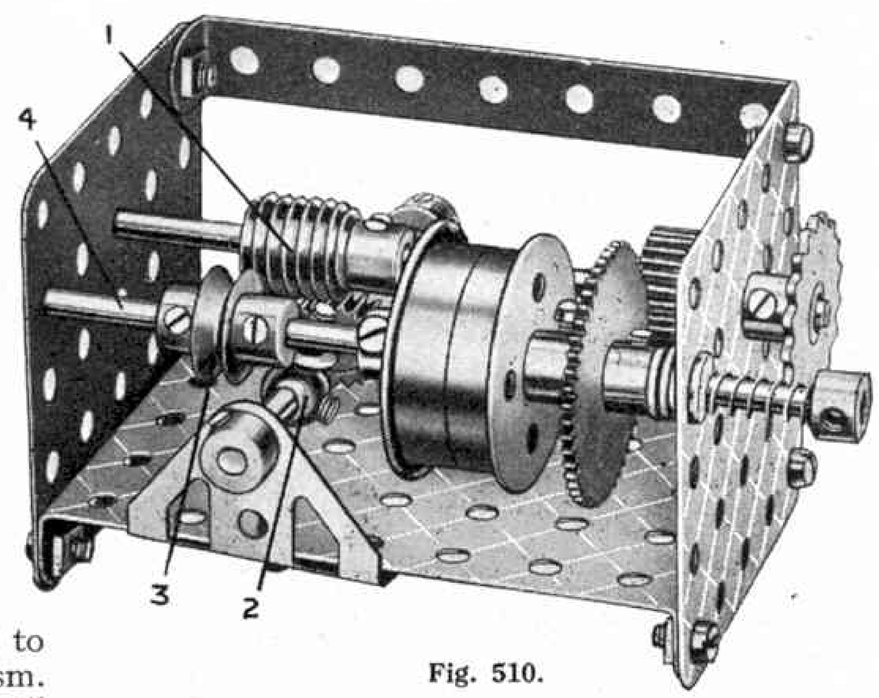


Fig. 510.

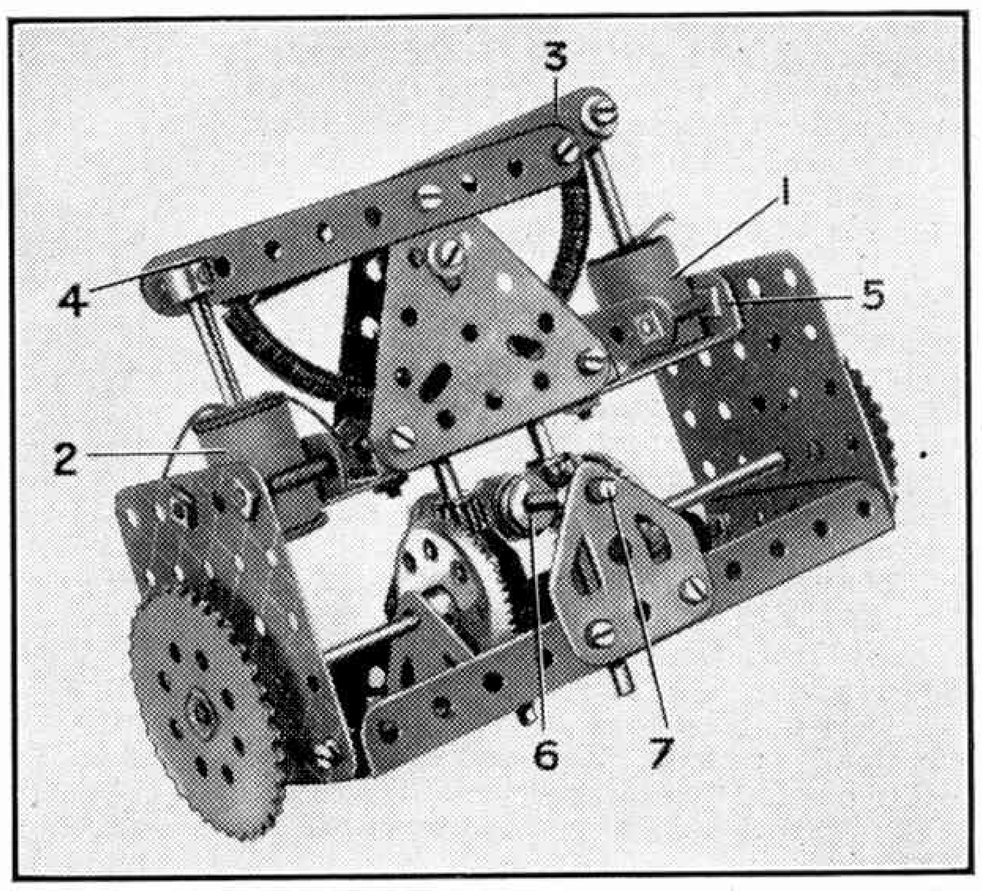


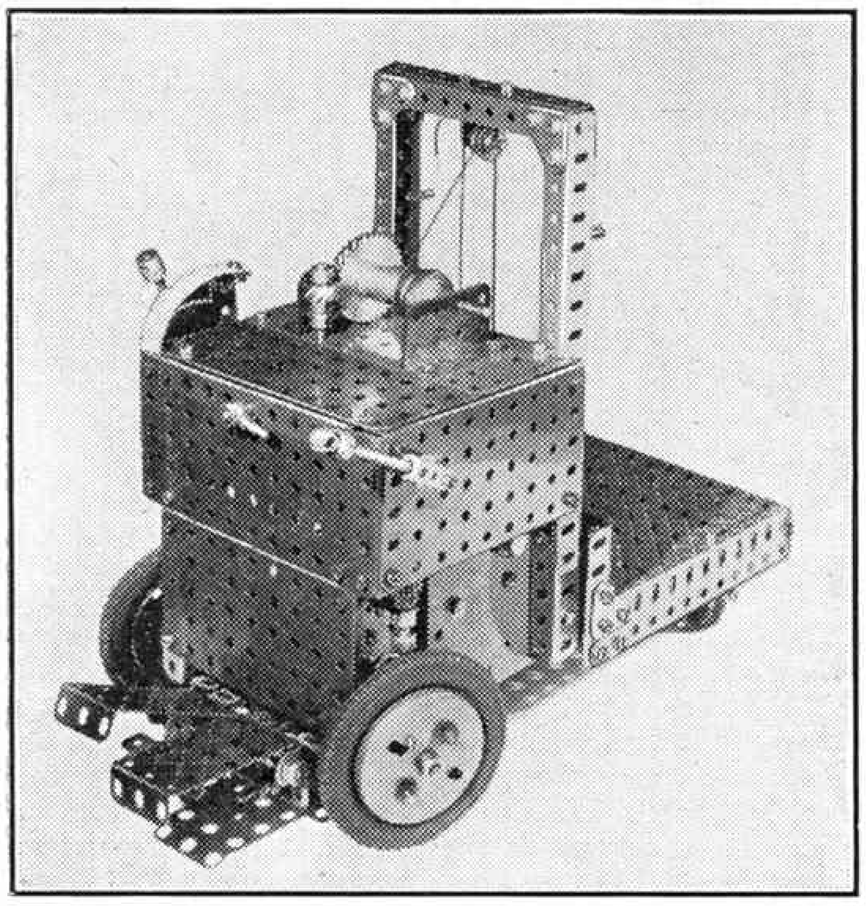
Fig. 511.

Meccano Model-Building Competitions

By "Spanner"

Fine Models from the "Christmas" Contest

I wish all Meccano constructors could have enjoyed, as I did, the privilege of inspecting the entries in the Christmas Model-building Contest, for I know they would have been as greatly interested in the fine models that competitors submitted as I was. The models that won the first three prizes were described in the "*M.M.*" last month, when the results of the Contest were announced, and two further models are illustrated on this page.



A model lifting truck, which won a prize for M. Reed, Woodford Green, in the "Christmas" Model-building Contest.

The model shown in the upper illustration is an interesting miniature of an electric lifting truck and was built by M. Reed, Woodford Green, who was awarded a prize of 10/6 for it. The model reproduces all the movements of its prototype. It is operated by an E6 Electric Motor, the drive from which is led through suitable gearing to either a differential mechanism in the front axle, or to a winch that raises and lowers the load platform. The differential is connected to each of the front stub axles by $\frac{3}{4}''$ Contrates and $\frac{3}{4}''$ Pinions, the latter meshing with $1\frac{1}{2}''$ Contrates secured to the front wheels. The bearings for the winch gear are fixed to the cover of the gear-box, which may easily be detached from the chassis simply by removing four Bolts that are screwed into Threaded Bosses fixed to the sides. The speed of the Motor can be varied and its direction reversed, through a controller and electrical reversing gear, which is placed at the driver's right-hand side and is operated by means of a lever.

The accurately detailed model of a 2–6–4 type L.M.S. locomotive shown in the lower illustration is the work of C. Howard Pendlebury, Hinckley, and it is built to a scale of $\frac{7}{8}$ in. to 1 ft. The main frame is built up from $12\frac{1}{2}''$ and $18\frac{1}{2}''$ Angle Girders, and the tapered boiler consists of $12\frac{1}{2}''$ Strips bolted to a framework of $5\frac{1}{2}''$ Strips.

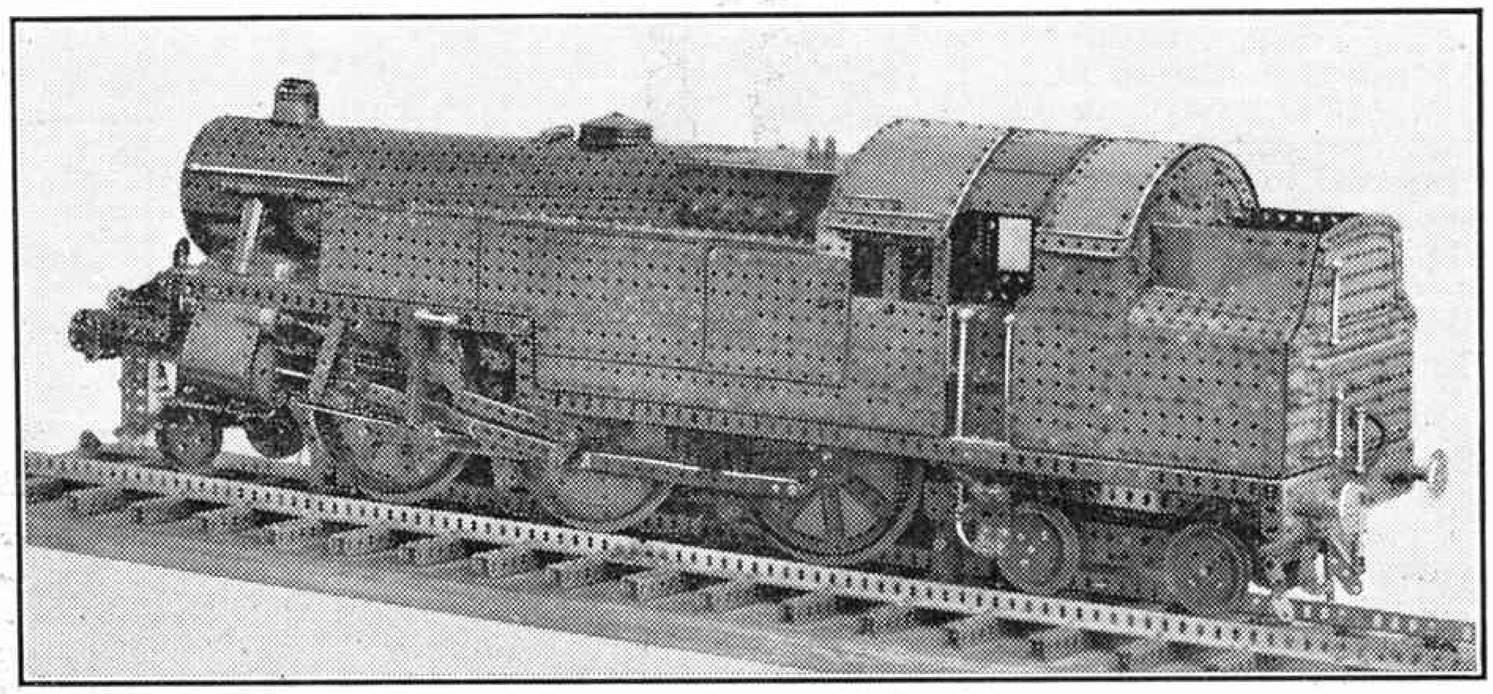
The coupled wheels consist of Hub Discs bolted to Circular Plates, and the axle of the centre pair is coupled to the driving Motor. The leading bogie is attached to an Eye Piece that is free to slide along a Curved Strip, and the trailing bogie is pivoted on a Ball Bearing.

A splendid model of H.M.S. "*Duke of York*" submitted by J. Nowlan, Dagenham, and a model of a Bedford tipping lorry built by R. Hearne, Annesley, were also awarded prizes in the competition, and I hope I shall be able to find space to illustrate them in a future issue of the "*M.M.*" The model battleship is 7 ft. 11 in. long, with a beam of 1 ft. $1\frac{1}{2}$ in. and a realistic outline for the hull is obtained by the use of Strips and Flat Plates. The big guns are elevated and traversed by an Electric Motor, while the smaller guns and deck cranes are positioned by hand.

R. Hearne's tipping lorry is driven by a 6-volt Electric Motor, which operates through a three-speed and reverse gear-box and drives a differential in the rear axle assembly. The cab doors and the sides of the bonnet are mounted with Meccano Hinges so that they may be opened. The container is tipped by turning a Bush Wheel placed at the side of the chassis. This rotates a vertical Screwed Rod, which causes a Coupling attached to the front end of the container to move up and down.

Michael N. Allen, Morecambe, was one of the many competitors who chose a crane as the subject for their models. It is based on the derrick type used in building construction. It is operated by an Electric Motor, which is constantly running in neutral, and the various motions of hoisting, luffing and slewing are brought into operation by actuating one or more of three Flanged Wheels, which in turn bring the particular gears into engagement with a Pinion on the constant running main shaft.

A small pendulum on the jib makes electrical contact when the jib reaches its highest and lowest positions, thus lighting a warning red light on the top of the control box.



C. Howard Pendlebury's well-built scale model of a 2-6-4 type locomotive.

Prizes for Models in Outdoor Settings

In this Contest competitors are asked to submit photographs showing Meccano models set up in natural and realistic outdoor surroundings. Models need not be specially built for this Contest; any model that is available may be used, provided that it has not won a prize in any previous "*M.M.*" competition.

Suitable subjects would be a scene in a railway goods yard, a steam shovel or a dragline at work in a miniature excavation of some kind, a bridge erected over a stream in the garden, or a dock view showing a Meccano ship alongside a wharf fitted with the usual mechanical devices such as cranes and conveyors for discharging the cargo. These suggestions will give competitors some idea of the lines on which they should work, and there should be no difficulty in finding other equally interesting and suitable subjects. Any kind of model may be used, but one that can easily be incorporated in a setting should be chosen.

The main object of competitors should be to make their settings as lifelike as possible, and this will be easier with a simple design than with an elaborate arrangement crammed with unnecessary detail. The model itself may be quite a simple one, good proportions and a realistic appearance being the main features required.

The seasons in certain Overseas countries are exactly the opposite of those in Great Britain. For this reason competitors living Overseas are asked to send entries showing Meccano models in realistic surroundings of any kind, arranged either indoor or outdoor. This special condition applies only to Overseas competitors.

In order to enter this Contest it is necessary to send a photograph of the model and its setting; drawings cannot be accepted.

Prizes consisting of cheques for £2/2/–; £1/1/–; and 10/6 respectively will be awarded for the three entries that the judges consider to be the most realistic.

Entries must bear the competitor's age, name and address, and should be posted to "*Summer Realism Contest,*" Meccano Limited, Binns Road, Liverpool 13.

The contest will close on 31st August, and all entries must reach Liverpool on or before that date.

Club and Branch News

WITH THE SECRETARY

TAKING STOCK

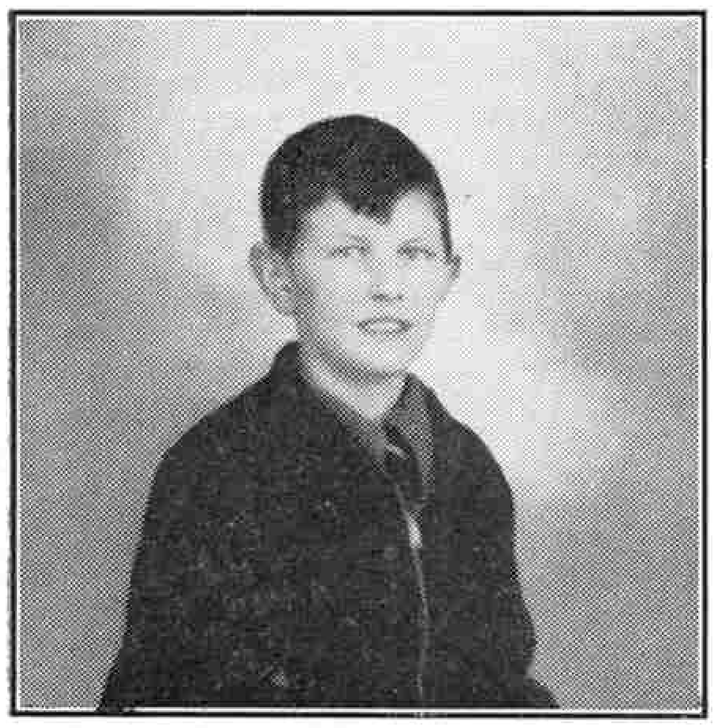
For the first time my notes appear on the same page as Club and Branch News. The cause of the change of course is the reduction in the number of pages in each issue of the "*M.M.*" that paper shortage has brought with it. This has made it difficult to provide the necessary space, but I hope to maintain the interest and practical value of these notes by the use of smaller type, and by being as concise as possible.

I have just been reading the annual report of Mr. J. Ancall, Leader of the Christchurch, New Zealand, M.C. It is a good thing to have an annual report, for its preparation provides an opportunity for taking stock of the position, compared with that of twelve months previously, and for deciding whether it is necessary to make changes of any kind. It is very interesting to find that Mr. Ancall regards as the most outstanding feature of life in the Christchurch Club the good fellowship that exists between all members. He is sure that the loyal co-operation of all connected with the Club has been responsible for the success achieved in the year under review.

A PRACTICAL USE FOR MODELS

As far as the programme is concerned the chief feature is the practical nature of the meetings. All kinds of model-building competitions, large and small, humorous and serious, are arranged, and special display nights are set aside for the visits of parents and friends of members. On these occasions each member not only builds a special model, but explains its working and demonstrates it in action. A good instance of the practical character of proceedings generally was provided by a talk on "*Gold Dredging*" given by Mr. F. G. Dunne, Vice-President of the Club, for his son, one of the members, built a special Meccano model of a dredger so that the lecturer could demonstrate the working of the real machine. This is an idea that could be extended with great advantage.

Social events are given ample prominence. The Annual Birthday Social is always of special interest, and usually members of the Ashburton M.C., the Club's nearest neighbour, are present. They are given hospitality by the parents of Christchurch members, and the most recent of these Birthday celebrations included a motor trip into the hills beyond Christchurch. A photograph taken on this occasion, and reproduced on this page, shows how happy these Meccano Club members are. With all their interests charitable objects too are not forgotten, and at present various schemes are being put into practice for the purpose of raising money for Red Cross funds.



A. W. Heathfield, secretary of the London Section of the Exeter M.C., Leader Mr. M. C. Hodder. The members of this Section are London boys now billeted in Exeter, and they join fully in the many activities of the well known Club that has opened its doors to them.

MAGAZINE EXCHANGES

Following on my notes on Club and Branch Magazines in last month's issue, an interesting suggestion has been made by the secretary of the Monkstown (Co. Dublin) Branch. It is one to which I have often made reference in the past. He asks if any other Branch or Club producing a magazine is prepared to exchange copies for "*The Monthly Express*" of his own Branch. I have always encouraged exchanges of this kind. It is very good to read what other Clubs are doing and those who have adopted the plan have found it a source of inspiration for new features in their own Magazines, and in their regular programmes for Club and Branch meetings.

Branch News

Folkestone.—The Hornby Dublo railway is steadily being extended, and meetings are being held more frequently now that the evenings are lighter. Shunting practice has been enjoyed. New water towers have been completed and footbridges installed, and a road traffic bridge has been built for the Gauge 0 layout. The track is now well equipped with model buildings and attention is being concentrated more on actual operations. *Secretary:* E. Saunders, 79, Dover Road, Folkestone.

Clapham Common. — The Branch has recommenced operations. Mr. E. R. Butcher, the new Chairman, re-opened the Branch room, in which the Branch electric track has been laid down. This has been overhauled, and the locomotives have been cleaned and prepared for service. One meeting was devoted to giving new members special instruction in running operations. Lantern Lectures and fortnightly talks have been planned, and more track is to be bought to extend the layout so that the proceedings may be made more varied and interesting. *Secretary:* K. Maycock, St. Barnabas' Vicarage, Lavender Gardens, London S.W.11.

Loughton. — Meetings are now held on two evenings weekly as well as Saturday afternoons. Most of them are devoted to actual train operations, but maintenance and extension work also are carried out. Visitors who were invited to one meeting became so interested that they applied for admission as members. *Secretary:* G. W. Ruffell, 10, Elmhurst Way, Loughton.

Selly Oak Models Club (Birmingham).—Various adjustments have been made to the track. New sidings have been laid down, and engine sheds have been erected alongside. Timetables are worked out regularly for Branch operations, graphical methods of tracing paths of trains being used. An Advice Bureau has been set up for the benefit of members. A good Library has now been collected. Slight damage has been caused to the Branch room by an enemy bomb, and there have been narrow escapes from damage by incendiary bombs. *Secretary:* G. O. Jones, 12, Blackthorn Road, Bournville, Birmingham 30.

Hornsea.—Mr. R. W. Shooter, Leader, has bought a layout built up of steel track, and this is being permanently laid down on a table specially enlarged for the purpose. The introduction of this extra track will add to the range and interest of the Hornby Train operations carried out regularly. A section of the Club has visited a local gas works, and this was followed by a Lecture on the production of gas. Other Talks have been on "*Food Supplies*," "*Ships*" and "*Iron and Steel*," and Table Tennis and Monopoly and other games have been played. *Secretary:* D. E. Parker, 8, Burton Road, Hornsea.

Club Notes

Totnes M.C.—Members have been extremely active. The Club was invited to enter models in contests at the local Hobbies Exhibition, and members won the first three prizes and several certificates of merit in the model engineering section. A Model-building Competition also has been enjoyed, and there was great interest in a novel blindfold building contest. New equipment for Table Tennis and Darts has been obtained. Club roll: 20. *Secretary:* T. J. Macnamara, Gables, Totnes.

Tynecastle School (Edinburgh) M.C.—Meetings have been chiefly devoted to the construction of flying models, and to practice with these in the school playground. Members' models were entered in a competition, for which the prize was a Meccano Spitfire Pendant. This was won by a youthful member whose model biplane made outstanding flights. The appearance in the April "*M.M.*" of a photograph of a group of members with their models gave special delight. Club roll: 20. *Secretary:* J. Morgan, Enterkin Cott, Lanark Road, Juniper Green, Edinburgh.

Blundellsands M.C.—Conditions are still difficult, but several meetings have been held, at one of which a film show was given by N. J. E. Ellis. A Mock Trial also has been held and provided great fun. Club roll: 39. *Secretary:* J. K. Noel, 24, Lancaster Ave., Liverpool 23.

Moston M.C.—Interesting models built for entry in a recent monthly model-building contest included a stirrup pump, a field gun and a machine gun. One meeting was devoted to Monopoly. A war museum has been started. Club roll: 7. *Secretary:* J. Roberts, 20, Worsley Avenue, Moston, Manchester 10.

King Street Library, Stretford, M.C.—This newly affiliated Club has now held several very successful meetings. Special subjects are set for each model-building meeting. These have included a goods yard, a subject that resulted in the construction of a model ash conveyor, a tractor and several cranes, footbridges, cattle trucks and lorries, and Britain's fighting forces, the best models including tanks, an armoured car, a working anti-aircraft gun, a submarine and a destroyer. A visitor kindly gave a talk on model aircraft building, when an aerodrome was set out on the floor with models of aeroplanes, a hangar, fuel tenders and a searchlight. After each meeting the best models are displayed in the Children's Library, where they arouse considerable interest. A scrap book for material of interest to modellers has been prepared by the Leader. Club roll: 34. *Leader:* Miss D. Carline, A.L.A., Stretford Library, King Street, Stretford, Lancs.

A happy party of members of the Christchurch and Ashburton Meccano Clubs, snapped during a motor trip in the hills near Christchurch. The occasion was the Annual Birthday celebration of the Christchurch M.C., to which members of the neighbouring Ashburton M.C. were invited. The two Clubs often exchange visits to take part in Debates and Model-building and other contests, and a special trophy is competed for annually by the two Clubs.

Exeter M.C.—Last year's football record was surpassed when the Club not only had two teams in the final of the Hodder Cup competition, but actually had three teams in two Cup Finals. The Hodder Cup has never previously been won twice in succession, the record that the Exeter M.C. now holds. The Club continues to maintain contact with the West of England School for the Blind, and several games of football have been played against a team from this school as well as against one from the local Deaf and Dumb School. Model-building is now being taken up with renewed vigour after the intensive football activity of the end of the season. Club roll: 100. *Secretary:* A. E. Davie, 4, Roseland Crescent, Heavitree, Exeter.

Ecclesall (Sheffield) M.C.—Special attention has been given to the design and construction of original models, all of which were carefully examined and assessed. One of the best was a model radio transmitting unit, fitted also with a small gramophone motor. The Club magazine continues to appear regularly, and is now being issued in colour. A Feature Programme has been given on the Club's radio installation. Club roll: 7. *Secretary:* T. K. Jones, 327, Millhouses Lane, Sheffield 11.

NEW ZEALAND

Christchurch M.C.—Excellent displays of Meccano Models and Hornby Trains have been given, and a popular feature was Display Night, when each member explained and demonstrated a model of his own construction. A Talk on "*Gold Dredging*" was given by Mr. F. G. Dunne, Vice-President, who used a Meccano model built by his son for demonstration purposes. Several Debates included one with the members of the Ashburton M.C. Lantern Lectures and Film Displays also have been enjoyed, and Visits have been paid regularly to the School for the Deaf, Sumner, and a Boys' Home in the neighbourhood. Several members gained prizes in a Meccano Contest at the local Industries Fair. By various efforts members have raised £1/1/- for Red Cross Funds. Club roll: 27. *Secretary:* Mr. S. McGregor, 35, Totara Road, Riccarton, Christchurch.

Spring Creek (Marlborough) M.C.—This Club has now received affiliation with the Guild. Interesting meetings have already been held, a series of these ending with a Sale of Work at which the sum of £6 was raised. Half of this was devoted to the Patriotic Fund and the rest to the purchase of Meccano Outfits for use of members requiring extra parts. Club roll: 10. *Leader:* Mr. L. Sharp, Post Office, Spring Creek, Blenheim, Marlborough, N.Z.

Fun With Your Hornby-Dublo Railway

Some L.N.E.R. Operations

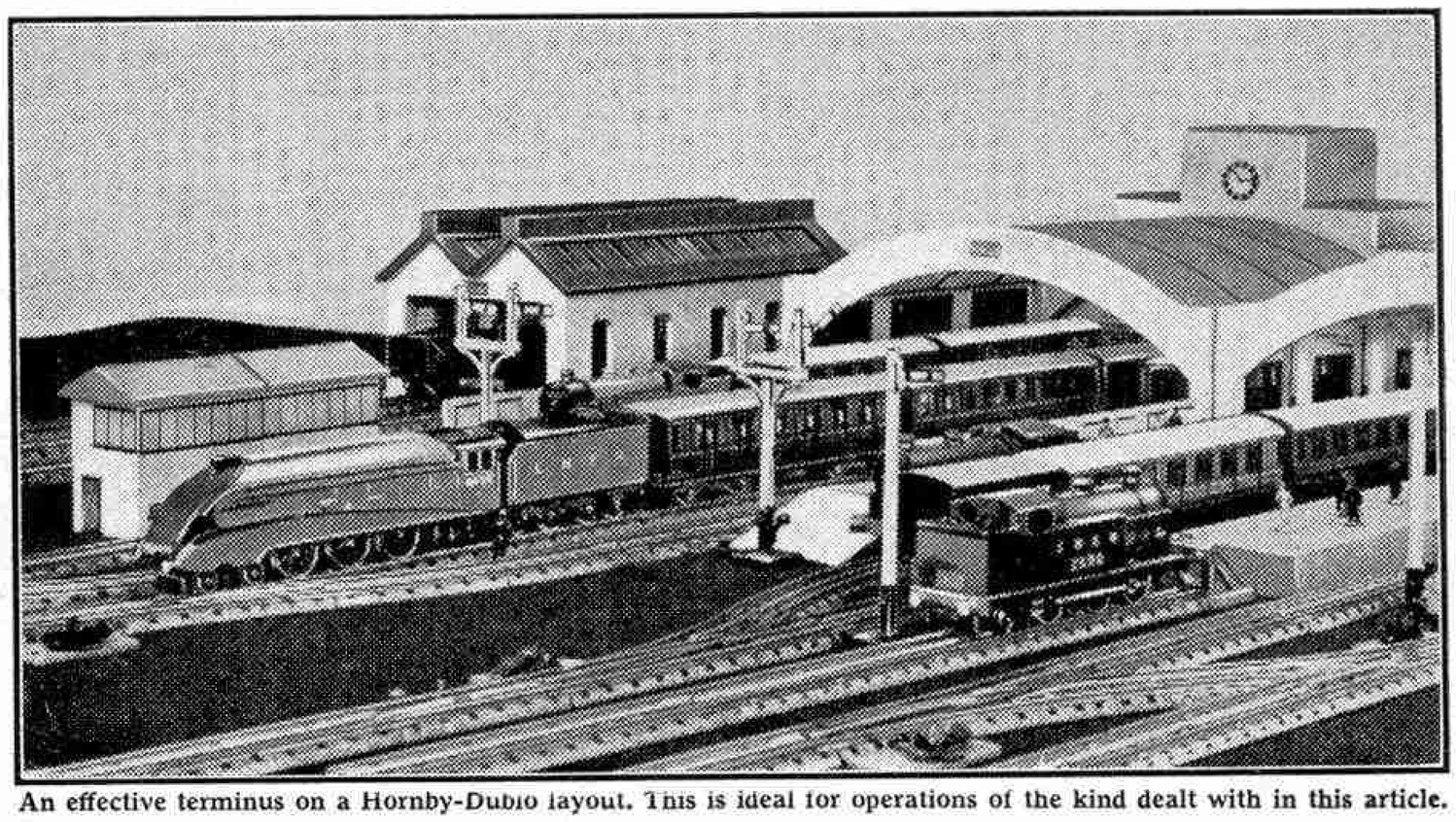
MANY interesting operations based on L.N.E.R. practice are possible with Hornby-Dublo equipment, and we have from time to time given details of various schemes. Those who favour the L.N.E.R. among Hornby-Dublo railway owners are fortunate because there is an L.N.E.R. passenger train set in addition to the standard goods train set that is available in the style and finish of all groups. With this equipment plenty of fun can be had especially since the introduction of the Isolating Rail and the Switch D1 that is specially intended for use with it.

In addition to providing the means for separating electrically the up and down main line of a railway, or for separating the goods yard and so on from the running lines, the Isolating Rail can be employed very effectively to divide single loop lines or individual platform roads into sections so that realistic engine and train movements are possible. For instance, in a terminal station Isolating Rails can be so placed that the locomotives arriving with a train can run on to a separate section which is then switched out. Another engine can then be coupled up to the train, either to work it out again or to move it "Empty" to the carriage sidings.

Variations of this arrangement are possible and some interesting working schemes can be worked out. Let us suppose that a main line train arrives in charge of the streamlined *"Sir Nigel Gresley,"* made up of a two-coach Articulated Unit next to the engine followed by one of the single Corridor Coaches D1. The section on which the main line engine comes to rest is switched out, and the single coach, which may be supposed to be bound for another destination, is approached by one of the standard 0–6–2 Tanks. When this is coupled up the couplings between the single Coach and the Two-Coach Unit are parted, preferably by means of the Hornby Shunter's Pole as suggested recently in these pages, and the through Coach is then ready to start for its destination. Possibly it will be taken all the way on its own, or on the other hand it may be conveyed as part of another train after the necessary shunting has been carried out.

This kind of through working is frequently found in actual practice. Combined Leeds and Bradford services on the L.N.E.R. for instance are worked from King's Cross to Leeds Central which is a terminus. To work the Bradford section over the remainder of the journey, smaller engines than the main line "Pacific" are used, often 0–6–2 tanks of the type represented by the Hornby-Dublo Standard Tank which closely resembles the real L.N.E.R. "N2" class. Real or imaginary services can be operated in this way according to the "territory" that the layout is supposed to serve.

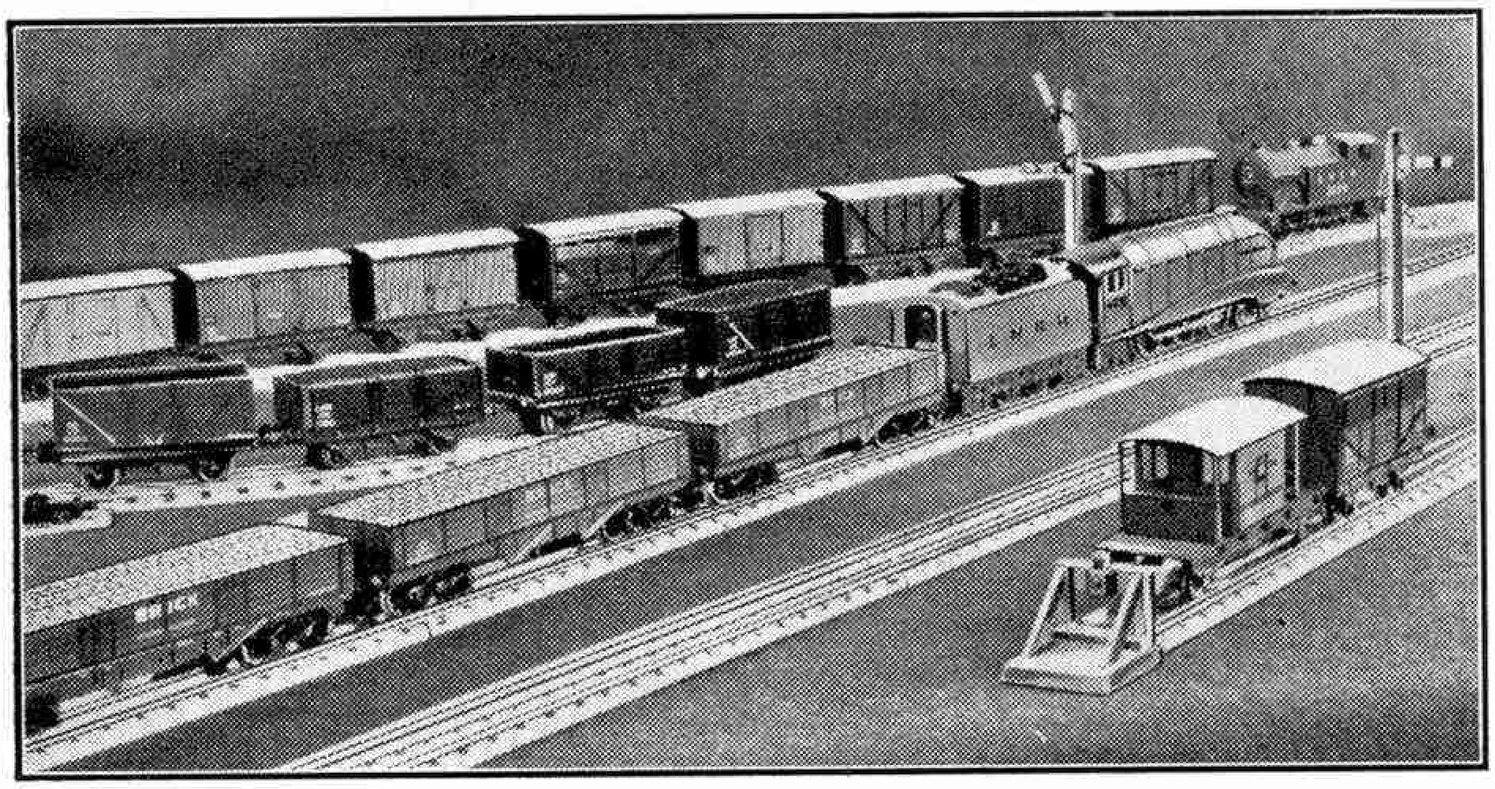
Occasionally it happens in real practice that the stock of a main line train that has arrived at a terminus is not worked out to the carriage sidings immediately. It may be employed between main line trains to run a stopping train service to some point in the district. This is a useful scheme for the miniature railway owner to follow for it justifies the use of the Dublo Corridor-type coaches for suburban trains in charge of one of the Standard 0–6–2 Tanks. It also allows as much service as possible to be obtained from a limited amount of rolling stock. Another point is that it provides a variation in the running programme that adds to the general interest.



An effective terminus on a Hornby-Dublo layout. This is ideal for operations of the kind dealt with in this article.

A particular L.N.E.R. "speciality" is the carriage of bricks, for there is an immense traffic from the brickfields in the Peterborough district. This is provided for in the Hornby-Dublo range by the inclusion of a reproduction of one of the typical bogie brick wagons of the L.N.E.R. This is an excellent vehicle, with its purpose "Brick" indicated boldly on its sides, while below "Return to Fletton" shows the district from which the traffic is worked. Special brick trains made up of this type of wagon are regularly run in real practice and this feature can be followed up in miniature also. Several of the Hornby-Dublo Brick Wagons make a splendid train, and for important traffic of this kind there is no reason why a 4–6–2 streamliner should not be used.

Providing the Wagons with loads presents a problem. It is possible to use the Hornby Imitation Bricks, standing up on end in the Wagons, but they look rather large even then. It is best to fall back on the familiar "dummy load" scheme and to provide a cardboard "false bottom," like a box lid, fitting inside the body of the vehicle. If this is made to finish up $5\frac{3}{8}$ in. in length by $1\frac{3}{16}$ in. in width it will fit just nicely. The height may be varied according to the wishes of the individual railway owner. A height of half-an-inch brings the top of the load just below the top edge of the Wagon sides, and prevents any bend or joint between the sides and top of the dummy load being seen. The cardboard false bottom should be painted brick colour and then ruled out to represent a load of bricks. Alternatively a strip of the small size "brick paper" frequently advertised for 00 Gauge railways can be pasted over the top of the cardboard shape.



An L.N.E.R. "brick express" in miniature. The High-Capacity Wagons are provided with loads as suggested on this page.

Lineside Effects on a Hornby-Dublo Layout

Dinky Toys and Miniature Buildings

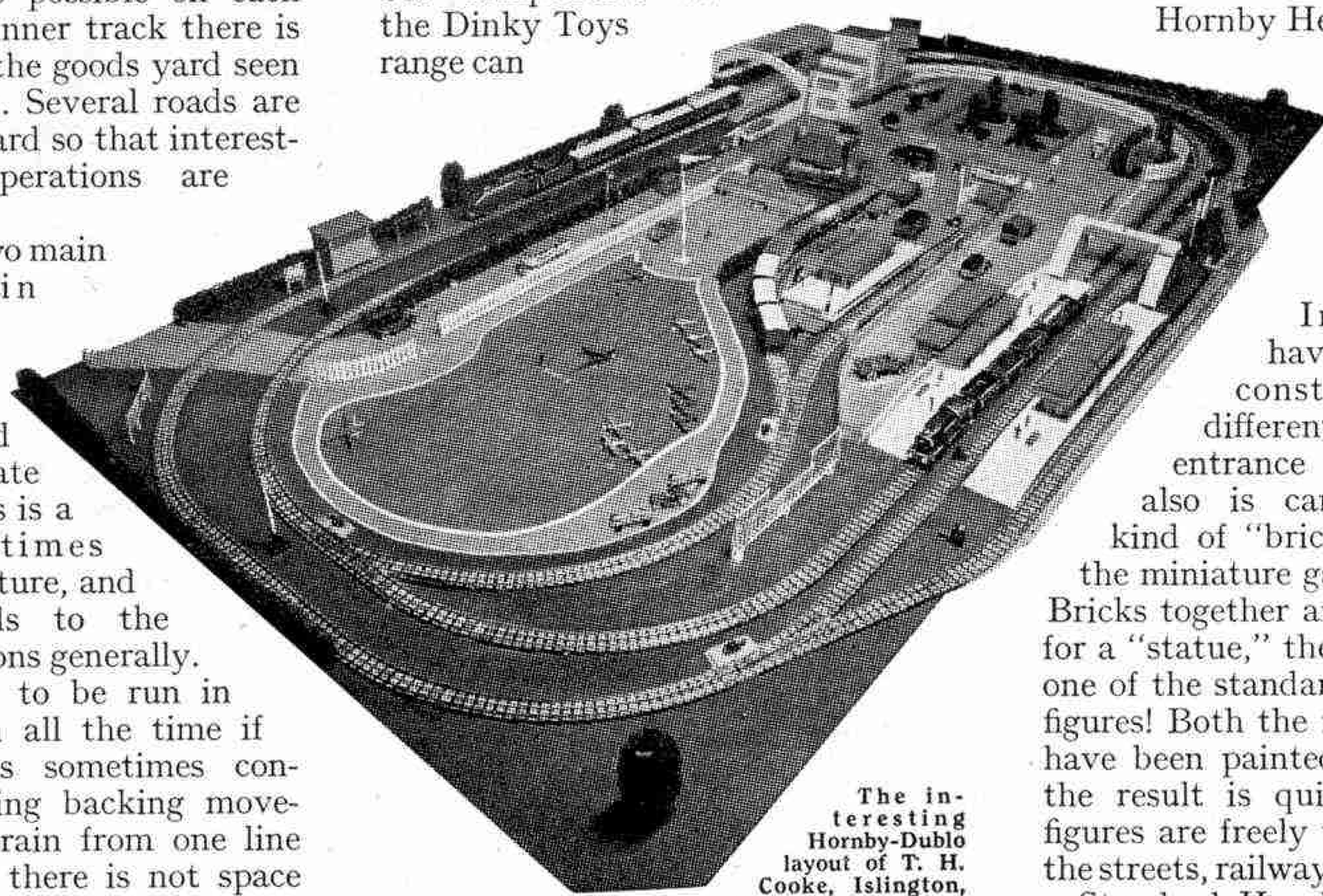
THE Dublo layout illustrated on this page provides a very good demonstration of the fact that a miniature railway system does not have to be a complicated affair in order to be realistic. This system is owned and operated by Mr. T. H. Cooke, of Islington, N.1.

The layout is arranged on a baseboard measuring 8 ft. by 4 ft., and the general form of the system is that of two oval main lines connected to one another by points, with an Isolating Rail included in the connecting line so that independent operation is possible on each track. From the inner track there is a branch serving the goods yard seen in the illustration. Several roads are available in the yard so that interesting shunting operations are possible.

Although the two main circuits form in effect a double track line, they are for the most part operated as two separate single tracks. This is a scheme sometimes favoured in miniature, and it certainly adds to the variety of operations generally. It permits trains to be run in the one direction all the time if required. This is sometimes convenient in avoiding backing movements to get a train from one line to another when there is not space for sufficient sets of points to make direct runs from track to track possible.

Train services are worked by the standard equipment of the Hornby-Dublo range. Passenger traffic is dealt with by a streamlined L.N.E.R. 4-6-2 *"Sir Nigel Gresley"* and the usual coaching stock units. Goods trains, made up of a selection of the Hornby-Dublo freight vehicles, are hauled by one of the useful 0-6-2 Tanks. Occasionally, as on most miniature railway systems, these engines exchange duties. The Tank then takes charge of local passenger trains while the streamliner heads any express freights that may be required. Realistic variety is thus introduced into the working programme.

In general, the lineside buildings have been constructed at home from stiff cardboard. Miniature windows are "glazed" with mica, and the various features of brickwork and the window divisions and so on have been carried out by hand painting. Street and road features include miniature pavements made of cardboard strips painted and lined out to represent flagstones. This is a useful scheme, particularly when the pavements are required to be curved or somewhat irregularly shaped. When they are straight the Pavement Set components of the Dinky Toys range can be used, and it is possible also to adjust these to many special situations by cutting, as suggested previously in these pages. This of course applies only to permanent layouts. The pavements are pierced with holes where required into which the posts of Dinky Toys Belisha Beacons are fitted, the ordinary stands on these being removed. Traffic Signals and Road Signs are similarly treated, and so have exactly the appearance of the real things planted in the ground.



The interesting Hornby-Dublo layout of T. H. Cooke, Islington, N.1. Photograph by courtesy of Messrs. Davey, Photographers, Bounds Green, London N.22.

Miniature street lamp standards are in use; these are home-made and are wired from beneath the baseboard. When illuminated they cast a realistic light over the pavements and the roads, on which a great deal of Dinky Toys motor traffic passes. Various interesting situations are depicted with Dinky Toys components; for instance, in the goods yard a favourite setting involves the use of the heavy six-wheeled lorry and a trailer, which are shown just pulling away from the High-Capacity Wagon on one of the sidings.

Some of the features immediately along the lineside make use of suggestions that have been given from time to time in the articles in the *"M.M."* Thus the standard Hornby Hedging is employed, and in suitable places the Paled Fencing separates the railway property from the road. Again, the Hornby Imitation Bricks have been used for constructing walls in different places, and the entrance to the goods yard also is carried out in this kind of "brickwork." In one of the miniature gardens two of these Bricks together are used as the base for a "statue," the statue itself being one of the standard Dublo miniature figures! Both the figure and the base have been painted stone colour and the result is quite realistic. These figures are freely used also to people the streets, railway premises and so on.

Standard Hornby Trees are used, being "planted" into the baseboard in the same way as the Beacons and other accessories already referred to. An interesting point is that the "trunks" of these have been cut down to varying lengths in order to make them more in keeping with the general scale of the system, and to provide trees of different heights here and there. This is a detail that aids the natural appearance a great deal.

At the end of the layout that is nearest to the camera in the illustration will be seen an airfield and miniature aerodrome buildings. The field portion is represented by painting the various features directly on to the baseboard, a prominent white line showing up the airfield itself for the benefit of aircraft descending.

A Hornby Layout with Sectional Control

DETAILS of the layout described on this and the following page have been submitted by Mr. F. C. T. Foster, Birmingham, and are interesting in that they relate to a system that is owned and operated jointly by a number of boys. The layout was constructed in January 1939 by Mr. Foster and a colleague, Mr. H. G. Gibson. The latter was responsible for much of the work done up to the time he joined the Army.

Given a suitable site, joint ownership has much to commend it, and when the railway is divided up into various separate electrical sections, as this line is, then the fullest advantage is obtained from joint operation. At times as many as 15 boys are busily occupied in working the system. There are four main Controllers, two operators being allotted to each. Other members of the "staff" look after the loading and unloading, coupling up and uncoupling of stock, and the operation of points. There is thus something for each of the boys concerned to do, and all obtain a great deal of fun from operations on the line.

The railway, which occupies a space of 18 ft. square, is laid with Hornby Tinplate Rails. The track plan, as will be seen from the diagram on this page, is extensive, but it is not really complicated; each element of the track follows standard Gauge 0 practice so that the complete system is quite realistic and railwaylike. In general the layout consists of two chief parts, the main line track and the branch which includes the terminus station, locomotive department, carriage and goods sidings. The branch is connected to the main track in such a way that trains can leave the terminal premises, make an interesting journey along the main line, and then be worked back to the terminus to complete the run.

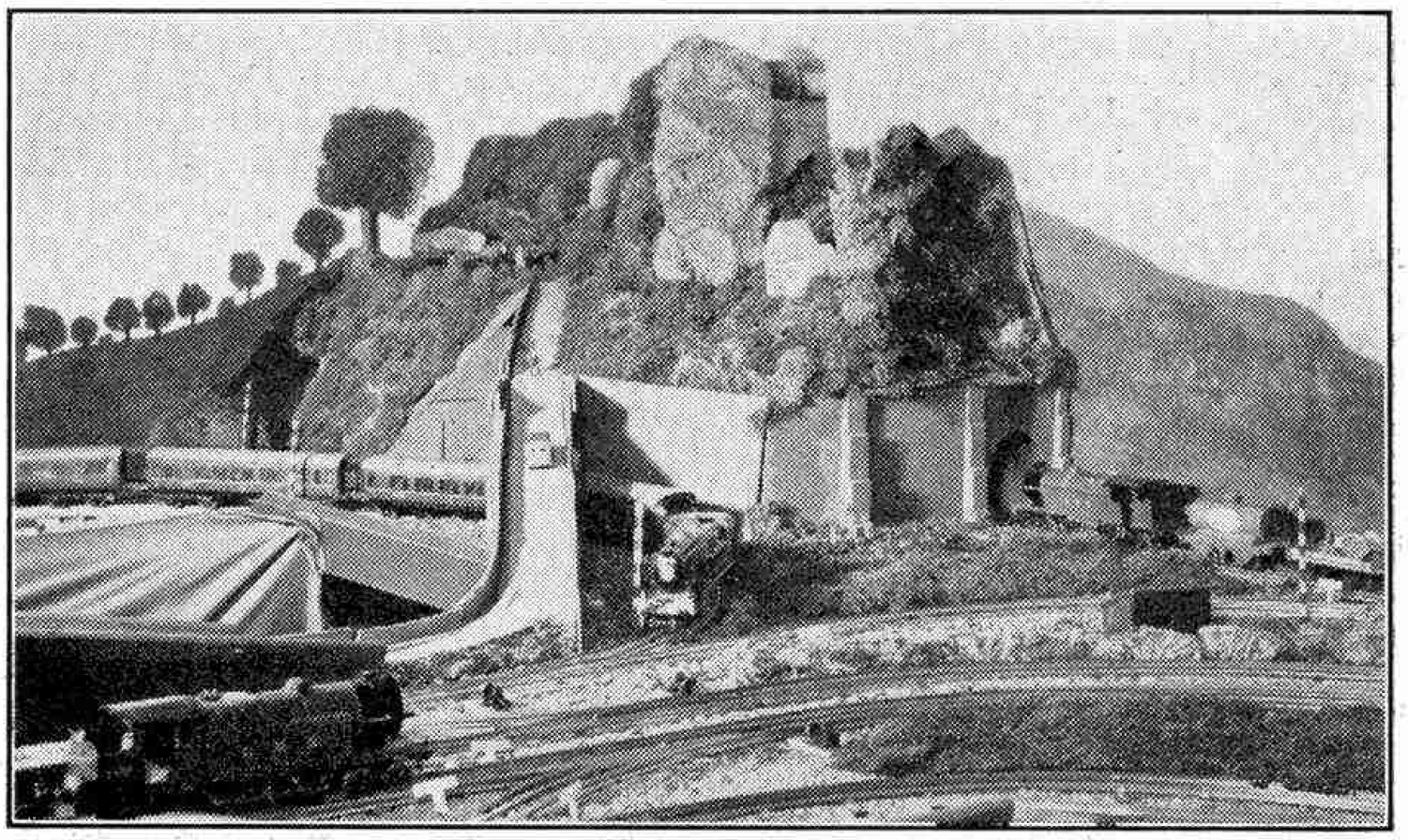


Fig. 2. An interesting junction layout on the system described in this article. The tracks in the foreground are part of the continuous main line, while that piercing the tunnel and that passing under the road bridge connect the main line with the terminus station and goods yard. The photographs to this article are by Mr. J. E. Duggins, Leamington Spa.

The terminus itself is well laid out for handling traffic, a turntable being placed at the inner end of the platform roads which allow the "running round" of arriving engines to be performed easily. The goods sidings lie parallel with the passenger station, and the carriage road is in the form of a loop between one side of the goods sidings and the head of the terminal branch. The engine shed is at the opposite end of the terminal branch from the station, and can be reached conveniently from the terminal roads generally.

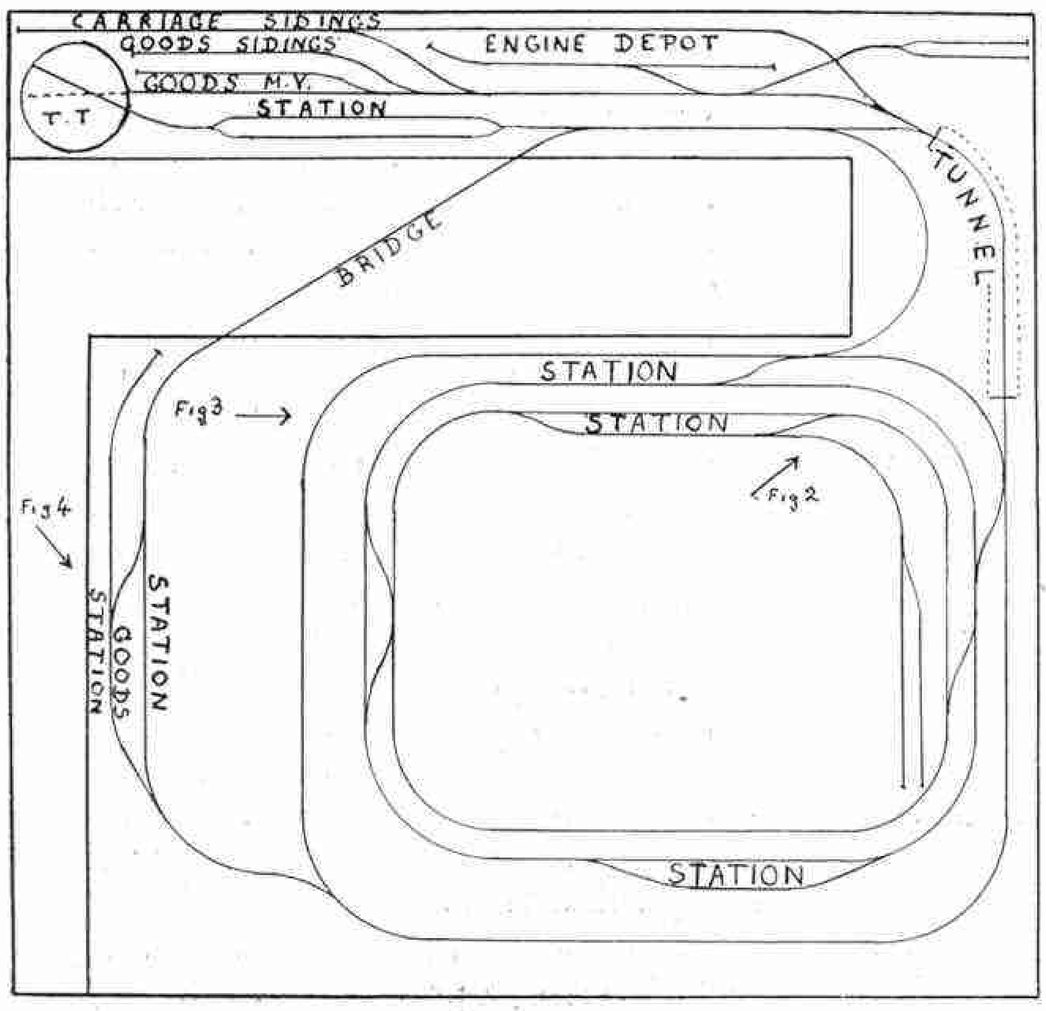


Fig. 1.

The main oval really consists of inner and outer circuits, the outer being directly connected to the terminal branch and being partly single and partly double track. Double track is available at the two stations located on the outer circuit. The actual connections between the terminal branch and the outer circuit are best seen from the diagram; a description of them would only be confusing.

The track is laid on a raised platform 3 ft. high, and there is approximately 70 ft. run of this trestle work ranging in width from 3 ft. to 5 ft. according to the number of tracks, platforms and so on to be accommodated. The "permanent way" is ballasted with fine granite chippings and as the illustrations show this gives a most realistic effect.

A great deal of attention has been paid to scenic effects, and an interesting example of this is found in the hill, tunnel and round bridge shown in the upper illustration on this page. Actually the hill itself covers a gas meter, and thus effectively hides what otherwise would be a very unrailwaylike lineside feature! In addition the tunnelling necessary to carry the railway through the "hill" has the effect of marking each line from the other, and so the purpose of the "return loop" to the terminus is rather cleverly disguised. The hill itself was first built up with plywood, and the grass effects are obtained by means of ordinary moss.

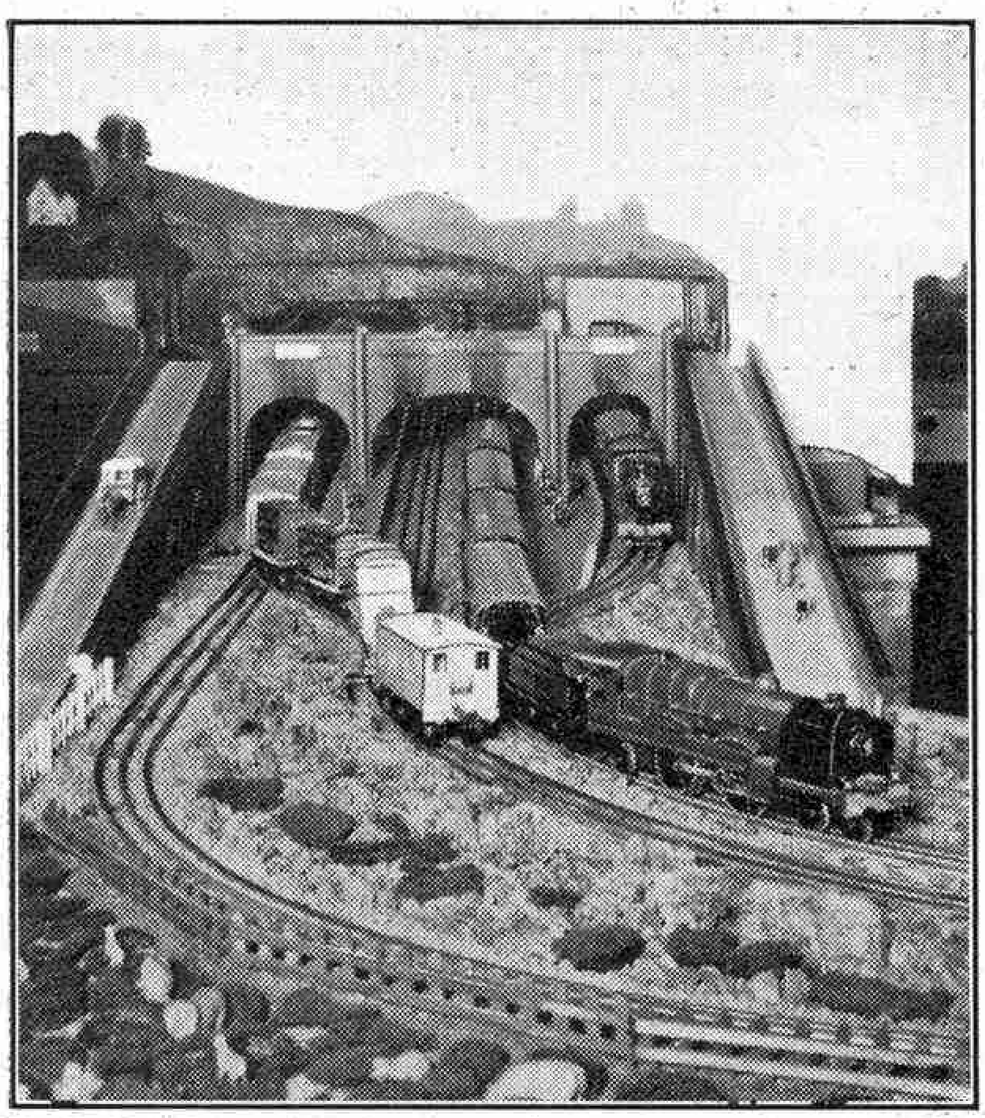


Fig. 3. A station on the main line with an express passing through and a stopping train alongside the loop line platform. A goods train is crossing from fast to slow line through the station.

Both a gas pipe from the meter and a water pipe have been hidden by "growing" trees of moss round them, and in fact the water pipe itself forms the trunk of one of the trees on the hilltop. Other smaller trees are painted directly on the wall of the railway room here as elsewhere on the layout, and they give quite a satisfactory effect of distance. Life is given to the countryside by means of miniature figures of animals and people, and various wagons and carts add to the traffic on the different roads.

The division of the layout into separate electrical sections, each with its own control apparatus, is of great benefit in train working. In addition to the broad division of the line into four sections as mentioned previously, each individual section can be further sub-divided so that side-tracking and shunting movements can be effected within the limits of each main control section. To a certain extent some of the main control sections overlap, so that particular portions can be governed either by one controller or another as required by operations. This has meant a good deal of complex wiring, but it has been worth the time and trouble taken, for operations are far more realistic and comprehensive as a result.

The terminal branch forms practically a main control section in itself. The goods, carriage and locomotive sidings are kept quite separate, however, and the passenger station portion and the connecting lines to the outer circuit of the main track are made to overlap with the control of the outer circuit including the station and sidings on the left side of the diagram. This means that shunting and other movements in the sidings of the terminal branch can proceed without interference from passenger trains transferring from the outer circuit to the terminal passenger station.

Part of the outer circuit forms practically a third track to the main up and down lines of the inner circuit. This provides interesting train running possibilities, as will be seen from the upper illustration on this page. Here the presence of the outer circuit and the addition of a loop line to the innermost track of the inner circuit has the effect of providing a four-road station well adapted to the handling of heavy traffic on both "fast" and "slow" roads. Control arrangements allow trains to be held on the outer tracks while main line trains run through. Alternatively through trains can be "looped" round the platforms if the centre tracks are occupied by main line stopping trains.

The up and down tracks forming the inner circuit are electrically separate, but crossover points are provided, as they are also between the inner and outer circuits as a whole, to allow trains to be run from one to the other. In addition various individual sections can be cut out when required, such as the inner loop road at the four-track station previously mentioned, and the extension of this track that serves a station and goods depot within the main oval on the diagram.

With all these sectionalising arrangements available on the layout, it is possible to have a large number of engines "in steam" at once on the line without their interfering with each other. Train working is therefore an entertaining business, and the locomotives put in a considerable number of "running hours" per week. All are of Hornby manufacture, and they have stood up to their arduous duties remarkably well. It has been the practice on this line to "shop" the engines at intervals of approximately six months, this "Shopping" consisting of a return to the Service Department at Meccano Limited for any repairs, adjustments and replacements that may have become necessary. Similarly good results have been obtained from the rolling stock, of which all items except one are of Hornby manufacture. Passenger stock of bogie No. 2 types is represented, with a variety of goods stock.

One feature of the freight traffic is the special provision made for the conveyance of large tree "butts." The trunks are lengths of thick sticks cut from real bushes and trees, and they are carried on Timber and Lumber Wagons.

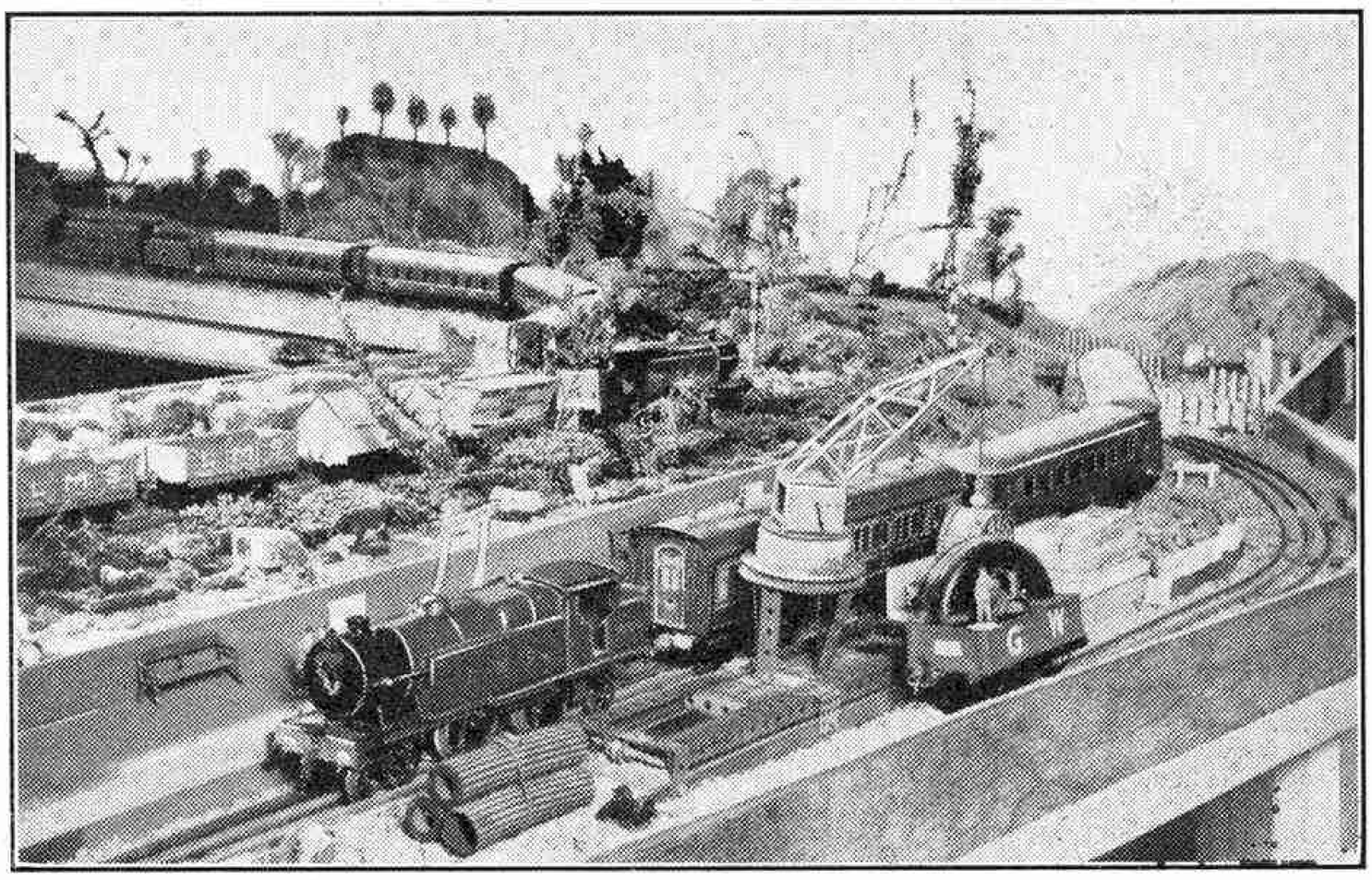


Fig. 4. A stopping train arriving at a wayside station. Note the crane loading a heavy casting on to a wagon at the goods platform in the foreground.

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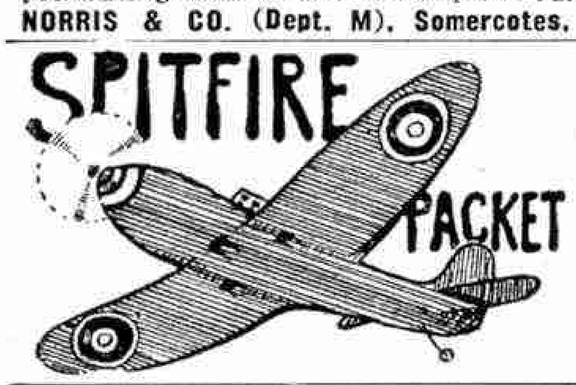

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STAMP COLLECTING

War Stamps of the Allies: Yugoslavia

AS our notes of the war stamps of Greece were appearing in print, that gallant ally and her neighbour Yugoslavia were being fast over-run by the German hordes. Yugoslavian soldiers joined Greek and British Forces in their retirement, and it is fitting that we should take the stamps of their country as the next instalment of our war stamp story.

The country that we know as Yugoslavia comprises the ancient Kingdoms of Serbia and Montenegro, with Croatia and Slavonia, Bosnia and Herzegovina and parts of the Banat, Carniola and Styria, all of which were Austrian when war broke out in 1914. Montenegro ended its own independence in November 1918, by a parliamentary decision to depose King Nicholas and re-unite with Serbia, in the hope that re-union, following the incorporation of the Austrian Provinces, would be the means to a lasting era of peace and prosperity.

Archduke Ferdinand of Austria

Yugoslavia issued a special commemorative series in November 1929 to celebrate the millenary of the Croatian Kingdom, and the design showed portraits of Tomislav, the first King of Croatia, and Alexander, the reigning King of Yugoslavia.

The first incident in our story is the spark that set the world ablaze with the war of 1914—the assassination of the Austrian Archduke Ferdinand by a Serbian patriot at Sarajevo. A view of Sarajevo is shown on the Bosnian overprinted 1 K. stamp of Yugoslavia's December 1918 issue, which is reproduced on the next page.

There is something deeply symbolic in the most famous of all Yugoslavian stamp designs. This is the "chain-breaker," which appeared with various minor modifications in several issues of 1919. The higher values of these issues bore the portrait of King Peter of Serbia, the first ruler of the new state. The name "chain-breakers" is derived from broken chains dangling from the wrists of a figure symbolic of the country's new-found life. This stamp is illustrated on page 200.

On King Peter's death his son Alexander ascended the throne as King of of the Serbs, Croats and Slovenes, and it was not until 1929 that the simplified title, King of Yugoslavia, was adopted. In the meantime several stamps had been issued that make interesting inclusions in our story. The most attractive is a series of three stamps issued in 1921 in aid of funds for the assistance of disabled Yugoslav soldiers. The design showed the legendary maiden of Kosovo tending wounded soldiers on the battlefield. Other stamps in this series showed a wounded soldier, a 15 par. value typifying the retreat from the Austrian army through Albania in 1915 and a 25 par. value bearing a design symbolising National Unity.

The Serbian death mask stamp.

In April 1931 another very interesting "war" issue appeared to raise funds to further a project for a Serbian War Memorial in Paris. This also consisted of three stamps, with designs showing trenches at Dobropolje, a bivouac in the mountain snow at Kajmaktschalan, and a view of the proposed war memorial design.

The history of the Balkan countries has rarely been free from stormy periods for long, and it was not King Alexander's fate to live long in peace. In October 1934 he paid a visit to France as the guest of the French Government, and was assassinated when driving through the streets of Marseilles. He was succeeded by his young son, Prince Peter, whose first stamp portrait, in the uniform of the Yugoslavian Boy Scouts, is to be found on the 75 par. + 25p. and 1½d. + ½d. values of the "Sokol" issue of 1933.

Up to this point all our illustrations have been drawn from the stamps of Yugoslavia itself, but if the story is to be complete we must bring in all suitable stamps from the earlier issues of the countries incorporated in the new state. There are not many, but by far the most interesting is the famous "death mask" stamp issued by Serbia in 1904 to commemorate the coronation of King Peter and the centenary year of the ruling dynasty. It shows King Peter and his ancestor Karageorge I, but the death mask of the murdered King Alexander is plain for all to see in the design if they examine the coronation stamp upside down. The example reproduced on this page shows the effect well.

Another interesting Serbian issue, a true war stamp that appeared in 1915, shows a view of King Peter on the battlefield in the campaign against the Austrians. Only three values are known to have been issued, 5, 10 and 15 par., each bearing the same design, but it is known that further values in the series were actually ready for issue and were in the Post Office at Nish when that town was captured by Austrians.

Above, the Memorial Church at Sarajevo. Below the Archduke Ferdinand and his consort.

Bosnia and Herzegovina, the Austrian provinces incorporated in Yugoslavia, had their own stamp issues separately from Austria, and the principal stamp drawn for our story from this source is the 10 heller value of the issue of 28th June, 1917, marking the third anniversary of the assassination of the Archduke Ferdinand. This shows the design for a memorial church at Sarajevo that the Austrians projected to build at the end of the war. The 15h. value shows a portrait of the Archduke. There were three values in this 1917 issue and the remaining stamp, 40h., shows the Archduke with his consort. Each of the stamps bore a 2h. premium to be devoted towards the fund for building the church, and all three are illustrated here.

Montenegro has no stamp that can be classed as a war stamp, and the best way to bring this country into our story is to include one of the stamps of the 1913 issue, the last bearing the portrait of King Nicholas. That monarch succeeded his uncle Danilo as prince of Montenegro in 1860. The independence of his country was recognised in 1878, following on his military successes against the Turks during the Russo-Turkish war of 1876-7, and he assumed the title of king in 1910. Montenegro, joined Serbia on the outbreak of war in 1914, and it was unfortunate that his deposition should have become necessary 4 years later.

The 35 p. value of the King Nicholas Jubilee issue of Montenegro.

New Collectors' Corner

Stamps Not Wanted in the Album

The most natural thing in the world is for a young collector to wish to include in his collection anything resembling a stamp that comes his way. In consequence most new collectors possess quite a lot of things that would be much better left out. Among those that should not be included are common stamps that are dirty, torn or heavily postmarked. The reason is obvious. A stamp collection should be a thing of beauty possessing interest for everyone.

The 20 h. Serbian "chain-breaker" of 1919.

Few people fail to be interested by attractive pictures in bright colours that are well arranged. Modern stamps provide that brightness in full measure, and if readers would try to treat their stamp albums as miniature art galleries, they would be surprised at the number of friends who would suddenly commence to take an interest in their hobby. And the adult friends very probably would produce quite a number of new specimens to add to the show.

A reader wrote recently to ask whether stamps that have been used on receipts could be included in his collection. These definitely must be excluded, for the reason that they are not philatelic pieces. The word "philately" means the study of postal services, and only stamps that have been employed philatelically are eligible for study.

Stamps that have holes punched in their faces, for instance, those perforated with the initials of the name of a business firm, should not be included if better specimens in perfect condition can be found, and that is rarely difficult. Most collectors regard such stamps as damaged.

There are a few examples of punched stamps that may be included, such as Australian stamps punched "OS." These are official stamps for Government use, and as the punching is done before issue they are quite rightly regarded as perfect issues.

A Hungarian stamp overprinted to make one of Yugoslavia's first issue.

Another query put to us by the same reader concerns stamps that have missed the obliterator when passing through the Post Office. Here again we think that exclusion is the only proper course. It is true they are "used" stamps, but they are unsatisfactory and usually very easy to replace with properly postmarked specimens.

In early days, before cancelling stamps were in universal use, it was quite usual for stamps to be cancelled by penmarks applied by the Post Office, but such pieces are not sufficiently common to cause confusion.

Stamp Gossip

and Notes on New Issues

Empire Stamp Colour Changes

The Colonial Office in London controls the stamp issues of the Colonies and the uniformity of colour of these issues is due to adherence to the scheme laid down by the Universal Postal Union at Berne to simplify the handling of international mail. Under the U.P.U. plan, green, red and blue are the predominating colours to be employed for values most nearly approximating to 5, 10 and 25 gold centimes. These rates were, at the time of deciding the colours, the fixed rates for inland postcards, foreign postcards and foreign letters respectively. By the use of stamps in these standard colours, the work of postal sorters was greatly simplified.

During and after the last war, postal rates altered greatly in many countries, and the colour scheme lost much of its practical value. In 1939 the U.P.U. decided upon a revised scheme of postal rates, and Britain and most of the Colonies adopted the new scale. Others did not do so, since their rates were already sufficiently high, but generally it will be found that throughout the British Empire the colour for an overseas letter stamp is still blue and that for a postcard red.

1 K Bosnian stamp overprinted.

Certain Colonies are finding it necessary to increase their rates for overseas letters now. Hence the changes in colour for individual stamps. But it will be obvious that a colour change is not necessarily a simple matter of adopting the U.P.U. colour for the value newly decided upon for overseas postage. For example, a Colony may decide upon making its overseas letter rate 3d. Then new supplies of this value must be in blue. But already there may be a blue stamp, say 2½d., which probably has been the overseas rate previously. That stamp also must change colour to avoid confusion, and thus the single change in postal rate has involved two colour changes. If the postcard rate has been changed simultaneously two more changes also will be necessitated.

It will be understood from this explanation that the recent colour changes have the fulfilment of a definite plan behind them, and are not merely the outcome of an idea to increase sales of stamps to philatelists, as has been suggested in some circles.

Among the latest changes, the new 3c. and 4c. issues of Trinidad and Tobago afford a good illustration of the operation of the general scheme. The 3c., now to be the inland letter rate, changes from black and scarlet to chocolate and green, while the 4c., now the overseas postcard rate, changes from chocolate to carmine.

Eire Rising Commemorative

Collectors had a surprise when they saw specimens of Eire's 2d. stamp issued to commemorate the Jubilee of the 1916 rising against British rule. It was understood that the issue would consist of a simple overprint on the current 2d. and 3d. issues. Instead the Eire Post Office made a special printing of the 2d. design in orange and overprinted that. The 3d. value is the normal light blue in colour. A specimen of the 2d. value is illustrated here.

The new 2d. Eire stamp overprinted.

Marshal Petain Stamp

Reports from America tell of a new French stamp bearing a portrait of Marshal Petain. The stamp is a 1 fr. value, coloured orange-brown, but its most interesting feature is that for the first time since the issues of Napoleon III in 1869, a stamp of France has appeared without the designation Republique or the initials "R.F."

An Interesting Forgery

What may prove on further enquiry to be an interesting effort of the Nazis to use postage stamps to acquire foreign currencies is revealed by the appearance of a clever forgery of the rare 2c. "cotton-reel" stamp of British Guiana, catalogued by Stanley Gibbons at £2,500. This stamp was one of a series that appeared in 1850. They were initialled by the postmaster or one of his clerks before being issued.

Reports of the discovery had already reached Britain when a photograph of the stamp was submitted to Mr. H. R. Harmer, the London stamp auctioneer, by a prominent philatelist in British Guiana. Mr. Harmer had no hesitation in identifying the original of the photograph as a forgery from peculiarities in the figure and letters of value, but as the copy of the postmaster's manuscript initials was so amazingly faithful to known specimens, further enquiries were put in hand. These revealed that the initials had been copied from a genuine specimen of the stamp in the Berlin Postal Museum. Investigations are now on foot in British Guiana in an effort to locate the source of the forgery.

Austrian field post stamp overprinted for use in Montenegro.

The description "cotton-reel" comes from the similarity of the simple design to the printing of the paper end label on a reel of cotton.

From Our Readers

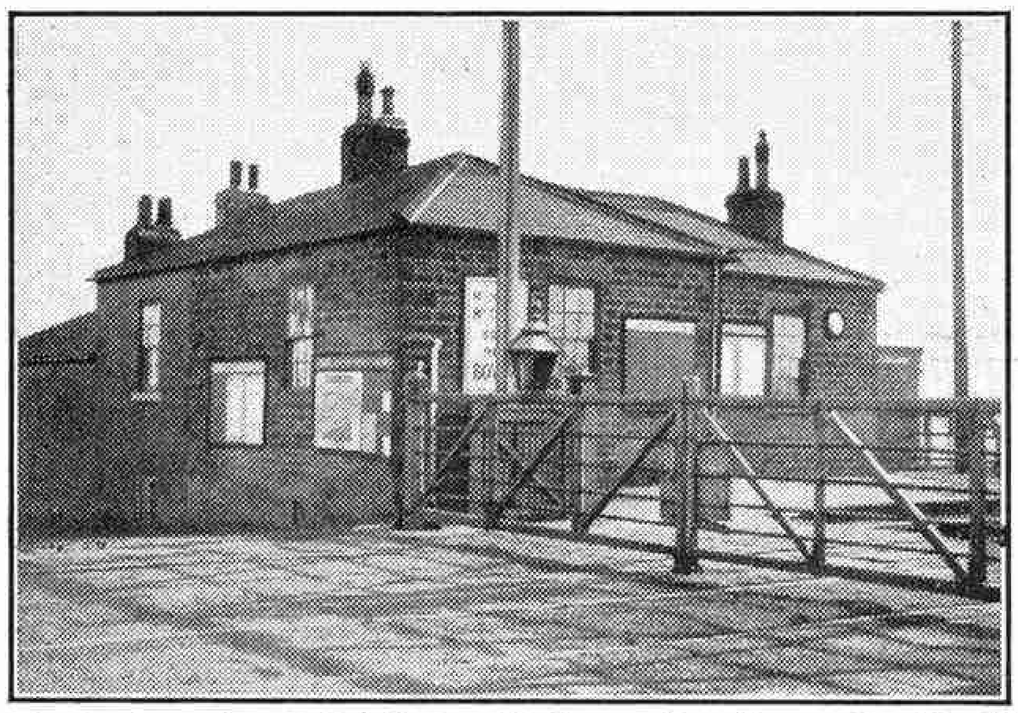
This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs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

A Level Crossing with a History

The level crossing at Heighington station, in the county of Durham, must surely be the most historic in the land. The station is just four miles north of Darlington, on the Darlington-Bishop Auckland branch line, and thus on the original Darlington-Stockton Railway, the first passenger line in the country. It was at the level crossing at Heighington that George Stephenson's famous engine *"Locomotion No. 1"* was first put on the rails of the Darlington-Stockton Railway. It arrived there on a summer day in 1825 on a truck drawn by horses, after travelling by road from the Forth Street Engine Works at Newcastle-on-Tyne.

Under the watchful eye of George Stephenson *"Locomotion No. 1"* was carefully transferred from the truck and put on the rails, after which the fire was laid in the fire-box. It is said that flint and steel had been forgotten—there were no matches in those days—and the men had to rely upon the rays of the Sun concentrated through a burning glass to light the fire. With steam up the engine then puffed away towards Shildon, and on 26th September it made a trial trip to Darlington hauling passengers, for the first time in railway history. The opening of the line followed next day.

From 1825 to 1841, exactly a century ago, when *"Locomotion No. 1"* was finally taken off the rails, the engine must have puffed its way thousands of times past this level crossing at Heighington. The old stone building in the picture, now the station waiting room and booking office, is the sole survivor of the six wayside public houses built for the accommodation of travellers on the original line.



The level crossing at Heighington, Durham, where "Locomotion No. 1" was first put on the rails of the Stockton and Darlington Railway. Photograph by J. Durey, Newcastle-on-Tyne.

J. Durey (Newcastle-on-Tyne).

Seringapatam

A few years ago I was in the city of Mysore in Southern India, and decided to visit Seringapatam, about 12 miles away. The city is on a large island of the same name formed by the division of the river Cauvery. At one time it was the capital of the state of Mysore.

During our wars in India against the French or their native allies 140 years ago Tippoo Sultan, the "Tiger of Mysore," was a constant thorn in our sides. He took many prisoners, most of whom were confined in the fortress of Seringapatam. I saw the dungeons in which they were imprisoned, with the holes in the stone through which their chains were fastened. These fastenings necessitated their remaining in an upright position day and night.

The triple line of fortifications still remains, together with Tippoo's summer palace, his tomb, and until a few years ago De Havilland's arch. This arch was built on the barrack square by a French engineer, after whom it is named, to prove to Tippoo that it would be possible to bridge the river Cauvery by a structure of a single span. The arch was built entirely of native bricks, and was roughly 3 ft. wide, 20 ft. high in the centre, and 50 yds. long. All visitors to Seringapatam were expected to cross it, which would cause it to sway up and down in a most alarming manner.

When Tippoo's stronghold was finally captured by the English, the Tiger himself was killed in the Water Gate as he fled from the battle. The tyrant now lies in a mausoleum built by him at the eastern end of the island for his father, Hyder Ali.

A prominent member of the attacking army was Colonel Arthur Wellesley, later the Duke of Wellington. This was the beginning of his career as a soldier and a statesman, for he was appointed to supreme command in Mysore, and it was from there that he moved northward to punish marauders and eventually to overthrow the Mahrattas in the great battle of Assaye.

Seringapatam is now a shadow of its former self, but many traces still remain of its previous grandeur, and it is easy to realise that it was once one of the most highly fortified positions in the world.

W. Blakemore (Chester).

Felling a Beech Tree

Last autumn I did some forestry work in Breconshire, Wales. A large area had been taken over for afforestation and it was intended that planting should begin the following December. In the meantime there was much "clearing" to be done in preparation. This included felling trees of all sizes, cutting them up, and burning the brushwood. While on the last two of these jobs I was able to see the more experienced men at work felling. Then one morning I was able to take photographs while a large beech tree about 60 ft. high was being felled.

Tree fellers at work with the cross-cut saw. Photograph by J. E. Martin, Fishguard.

The direction in which the tree was intended to fall was first decided, and an incision or "sink" was made low down in the trunk on that side of it. The sink was made with axes. Then a "cross-cut," or double-handed saw, was brought into action on the opposite side of the trunk, the cut being made at the level of the apex-line of the sink. Two men operated the saw, a job that requires strong arms and a smooth steady swinging action. As the saw-edge bit deeper, the weight of the tree tended to press down on the blade and prevent its movement. So, wedges were inserted, and these were driven in deeper and deeper as the saw cut further in order to keep the blade clear. When at last the cut was almost through to the sink, sawing was stopped. A few extra strong blows with the hammer were given to the wedges and then, with a tearing crack, the base of the tree was severed, and the whole mass began to fall.

The fall of a big tree never failed to thrill me, although the men themselves seemed to have got accustomed to it. The time during which the trunk is falling through the air seems an age, and the only sound is a queer sighing effect caused by air rushing past so many branches and twigs. This sound is faint to begin with, and rises in intensity and pitch as the speed of the fall increases. There is a rending crash as the first of the bigger branches strikes the earth, to snap and splinter like matchwood; and a louder and deeper noise follows as the full weight of the tree falls on to the turf. Then the wind whistles up and down the valley in a series of shuddering echoes that die away in the distance, to announce that another giant has fallen.

J. E. Martin (Fishguard).

Notes on Iraq

The outbreak of fighting in Iraq, in the Near East, has again brought into the news such places as Basra and Habbaniyeh, and has quickened interest in the famous pipeline through which oil from Kirkuk flows to the Mediterranean coast at Haifa.

Habbaniyeh aroused the greatest interest because it was the scene of the most intense activity, Iraq artillery shelling the R.A.F. base there and being bombed heavily in return. Habbaniyeh is really a lake that serves two purposes, catching flood water from the Euphrates and serving as a refuelling stop, and as an occasional stop, on the main flying boat route of British Airways. To one side of the lake is the R.A.F. base. Apart from the air, the only way of approach is by the so-called high-road. The lake itself and its surroundings are utterly cheerless, for the Iraq desert is without life or colour, and the only break in the monotony of the sands is provided by dunes round the lake itself. Jackal and vultures are seen occasionally, the latter preying on fish washed ashore in squalls, but at certain times great flights of duck, geese and other water fowl are seen, for Habbaniyeh lies on their main migration route.

There is no village except in so far as the needs of the R.A.F. and British Airways staffs have to be met. The R.A.F. has its own cantonments, with rows of huts and native shopkeepers offering an astonishing variety of goods. A rest house run by British Airways is a favourite resort for Europeans wishing to escape the terrible summer heat of Baghdad. It is in fact the only excursion resort in Iraq. The R.A.F. has its own sailing club and regattas are held. Squalls often arise, the wind raising short steep seas. The lake indeed can be very rough, and on one occasion British Airways passengers had to sleep on board the flying boat in which they arrived, as the launch could not reach them.

Basra is the chief air and sea port of Iraq, and the control centre of its railways. The town itself is a labyrinth of narrow streets, with overhanging houses. Margill, where the airport is, is a new town of bungalows and small gardens. The airport is on the right bank of the Shatt-el-Arab, a tributary of the Tigris, and was opened in March 1938 by King Ghazi. There is ground for landplanes, with exceptionally clear approaches, and a stretch of river alongside for flying boats.

The land for this great airport was reclaimed from a malarial swamp, and millions of tons of soil were used to raise the level of the ground 4 ft. to make an all-weather landing field of 200 acres. The port took six years to complete, and its floodlighting, radio service and runways are of the most modern type. In normal times a beacon showing for 95 miles guides aircraft to port, and the terminal building incorporates the most luxurious hotel in the Near East in addition to control, administrative and operating offices.

The great Iraq pipeline is of special interest to-day. The fields feeding it are at Kirkuk, which is 150 miles north of Baghdad. Kirkuk is a typical oriental small town, with bazaars that are indescribably noisy and smelly, storks nesting on the housetops everywhere and mud walls that give a surprising coolness and shade. The whole place is dominated by a long viaduct over a dry river bed leading to the oil fields a few miles to the north, where natives bring pans to help themselves to oil from roadside pools and giant derricks start the oil on its long journey to the outer world.

From Kirkuk the pipe runs double across the Tigris to Haditha on the Euphrates. There the French portion branches off, running due west to Tripoli on the Syrian coast, while the British portion crosses the deserts of Iraq and Transjordan to Palestine. The country over which the pipe passes varies greatly. Between Haifa and Tiberias, on the sea of Galilee, it traverses rocky, beautiful country, with valleys full of flowers in summer and high peaks crowned by the ruins of crusaders' castles. The Jordan is crossed at Tiberias. There the pipe is 700 ft. below sea level, and it mounts steeply to the long stretch of desert to the East, crossing hard dry black lava, dotted with vast volcanic craters, in which a trench 100 miles long had to be blasted. Then the country suddenly changes to desert proper, where excavators were used instead of dynamite to dig the 2 ft. hole in which the steel pipe, here about 1 ft. in diameter, was laid. When the pipeline is joined by the French branch it again enters a bleak mountainous country to pass once more across desert to its terminus at Kirkuk.

For these notes on Iraq we are indebted to the courtesy of British Airways.

AIRCRAFT IDENTIFICATION

The excellent aircraft photographs published by our advertisers Real Photographs Company are proving helpful to "roof spotters," air raid wardens, and others interested in identifying British and enemy aircraft at sight. As a further aid in achieving this the Company have issued a handbook "*The Identification of British and Enemy War Planes*" *No. 1*, in which photographs of 23 British and enemy machines are supplemented by silhouettes in which the distinctive features of the machines are shown against a contrasting background that makes them specially clear, and therefore all the easier to remember. In addition to British, German, and Italian types of military aircraft, the handbook includes photographs and detail silhouettes of the Curtiss "Tomahawk" fighter and Lockheed "Hudson" reconnaissance bomber, two American types now doing good work with the Royal Air Force. A brief summary of the main features of each machine accompanies the illustrations.

The handbook is of a size that can be slipped easily into a coat pocket and thus kept handy for profitable study at any leisure moment. It costs 1/3 post free from the publishers, Real Photographs Company, Cooper's Buildings, Church Street, Liverpool 1.

"SKYBIRDS" IN ACTION AGAIN

We are glad to be able to announce that our advertisers A. J. Holladay and Co. Ltd. have now settled in their new premises and have resumed production. It will be remembered that the former premises of this firm were destroyed by enemy action in December of last year. In this issue they are advertising a scale model of the "Defiant," their latest production, and the name of this fighter typifies the spirit of the firm.

The new Headquarters address of the Skybird League is 9, Southampton Place, High Holborn, London W.C.1. and Skybirds are anxious to get in touch with all modellers and members of the League. Owing to prevailing difficulties and the loss of the Skybird Trophies it has been necessary to postpone the Eighth Annual Model Rally planned for March next. It is possible that the North of Ireland Rally will be held, with a section open to all members in the United Kingdom. Modellers who are interested should write for further particulars to League Headquarters at the address already given.

INTERESTING INSTRUMENTS OF NAVIGATION

We regret that by a misunderstanding the illustration of the Sperry Mk XIV Gyro compass on page 150 of the May "*M.M.*" was reproduced upside down. The page should be inverted to get the correct view.

A War Patrol in a Submarine

(*Continued from page 179*)

at this depth the periscope is cautiously raised till the prism is a few inches above the surface. There, astern, is the cruiser, with her bows awash, and the destroyers, reckoning they have finished off the "*Sea-Lark*," are alongside taking off the crew. This is sufficient evidence. Down to 90 ft. and away at full speed. The "*Sea-Lark's*" mission is accomplished, but for two more days the patrol is maintained in the neighbourhood of a vast sea of oil which marks the grave of the enemy cruiser.

The emblem of the first British motor torpedo boats. Photograph by courtesy of the British Power Boat Co. Ltd.

On the last evening of the diving patrol the crew makes merry with spare provisions and a gramophone concert. Up to the surface at dusk, and away for home, this time with a following sea and at full speed—18 knots.

How good to all on board is the prospect of a bath and shave, and an uninterrupted sleep in what, by contrast with the past 14 days, seems a paradise—The Parent-ship.

A report of the success is wirelessed when clear of enemy waters, and as the "*Sea-Lark*" noses her way alongside her sister-submarine in harbour she is greeted by the cheers and congratulation of messmates, and of the old "dug-out" who had a similar experience 20 years ago.

Perhaps a week in harbour, and the "*Sea-Lark*" will be off again.

Well Known Air Officer's Passing

The death occurred recently of Squadron Leader C. F. Snowden Gamble, Publicity Manager of Imperial Airways from July 1931 until the outbreak of war. Gamble had recently been Acting Staff Officer dealing with personnel in the North of England and had been ordered to rest on medical grounds. In the last war Gamble served with the R.N.A.S., the Tank Corps and the R.A.F. He was one of the original members of the R.A.F.V.R. and joined his first war station on 28th August 1939.

COMPETITIONS! OPEN TO ALL READERS

Can You Find These Tunnel Names?

Famous tunnels have always been subjects of the greatest interest to *"M.M."* readers, who are familiar with the stories of the stupendous struggles that had to be waged with inrushing water and other obstacles in building many of them. For our competition this month we have taken the names of 20 famous British railway tunnels, and have mixed up the letters to give some extremely queer combinations. In these jumbles the names of the tunnels can be detected, however, and that is what we ask readers to do. To make it plain what is required we may take the first jumbled name "XBO." This is easily seen to be "Box," the name of the famous tunnel on the original main line of the G.W.R. The remaining jumbled names are more difficult to decipher than the example we have given, but readers will find real interest in trying to find what all these jumbles mean.

Every reader of the *"M.M.,"* whether he is a member of the H.R.C. or not, can enter this contest. When his list has been completed it should be written out on a postcard or a sheet of paper and forwarded to *"Jumbled Tunnel Names, Meccano Magazine, Binns Road, Liverpool 13."* Even if all the names cannot be discovered the reader should send in his list, for others may be no more successful than himself, and there is a good list of prizes. The name and address of the competitor of course must be clearly marked on his entry.

XBO	**YBKISL**
YALNOCT	**LNEACYLFHLGA**
MPOHERBA	**KORASHONBR**
THOTLIBELROGU	**LARYHPECIL**
TYELOT	**DURSBOY**
ORTWAOEL	**DEGSATNDE**
NRVEES	**GOTSFIENI**
ODHAOWED	**DHORDAN**
KENSEVOSA	**NEPOSUNROB**
PIWAPGN	**ROLVOBSE**

There will be two sections in this contest, for Home and Overseas readers respectively, and in each prizes of 21/–, 10/6 and 5/– will be awarded for the best lists in order of merit. In addition there will be several consolation prizes for other good efforts. In the event of a tie for any prize the neatness or originality of the entries will be taken into account. The closing dates are 30th June in the Home Section and 31st October in the Overseas Section.

Like all other *"M.M."* contests, the purpose of this one is to interest and amuse readers. All that competitors need to work out the solution is a pencil and a sheet of paper, and new readers have as good a chance as older ones of winning one of the fine prizes offered. Every reader therefore is urged to make an effort to solve this easy puzzle and to send in his entry.

A New Names Puzzle

Here is a new style of competition that should be both attractive and exciting. It is based on the letter square that is shown in the panel on the right. There are 100 of these letters, and they have been so arranged that the names of 22 famous engineers or inventors can be traced, starting in each case with any letter and passing on to that immediately above or below it, or to the left or right. Diagonal moves are not allowed. Every letter will have been used when the full list of names has been made out, but there are no restrictions on the number of times a letter can be included in a name. For instance, the letter I in the sixth row forms part of three of the names.

When a full list has been made out it should be written on a postcard and addressed to *"Letter Square Contest, Meccano Magazine, Binns Road, Liverpool 13."* An entry should be sent in even if all the 22 names have not been found, for there are many prizes, including consolation prizes for efforts that just fail to win one of the principal awards. Competitors must write their names and addresses on their entries; a prize cannot be expected if these are omitted!

There will be two sections in the contest, for Home and Overseas readers respectively, and in each there will be prizes of 21/–, 10/6 and 5/– in addition to the consolation prizes already referred to. The closing dates are 30th June in the Home Section, and 31st October in that for Overseas readers.

N	G	U	C	A	M	H	E	D	L
O	E	M	S	C	A	D	A	N	E
T	A	W	S	T	R	Y	M	I	Y
T	U	F	L	E	C	A	K	R	B
N	L	O	H	P	O	E	S	U	L
E	T	R	E	N	N	I	E	N	L
W	O	D	V	S	O	D	L	B	E
C	N	A	I	T	H	P	M	I	N
O	Y	V	K	C	I	S	Y	N	O
M	E	N	N	I	P	A	P	G	T

COMPETITION RESULTS

HOME

April Photographic Contest.—First Prizes: Section A, A. G. Dell (London S.E.27); Section B, A. Rose (Ulverston). Second Prizes: Section A, F. Murley (Plymouth); Section B, M. W. Taylor (Southall). Consolation Prizes: D. J. Daniell (Darlington); R. A. Jones (Great Crosby); H. B. Parker (Little Sutton); S. S. Pethybridge (Newton Abbot); R. J. Taylor (Bradford).

April "Missing Words" Contest.—1. T. D. Tasker (Barnsley); 2. H. E. Rose (Castle Cary); 3. J. Castell (Helensburgh); 4. G. H. Boocock (Halifax). Consolation Prizes: D. Crawshaw (Newton Abbot); R. Graney (Nottingham); C. H. Wolff (Lytham St. Annes).

April "Jumbled Names" Contest.—1. G. Roberts (Liverpool 11); 2. A. Blencowe (Banbury); 3. R. P. Walford (Newton Abbot); 4. H. T. Buckingham (Bletchley). Consolation Prizes: D. A. Jamain (London N.11); E. Moores (Manchester).

OVERSEAS

December "Advertisement Jig-Saw Puzzle" Contest.—1. W. C. Smith (Ontario); 2. P. Worthington (Vancouver, B.C.); 3. P. F. Smith (South Australia); 4. W. J. Hyland (New Zealand). Consolation Prizes: G. Draper (Durban, S.A.); D. B. Kibblewhite (New Zealand).

January "Railway Voting" Contest.—1. J. D. Burnell (Cape Town): 2. C. W. Wadham (New Zealand); 3. F. J. Harrison (South Africa). Consolation Prizes: W. Lam (Transvaal, S.A.); G. Myburgh (Claremont, S.A.).

June Photographic Contest

Here is the third of our 1941 series of photographic competitions, in which competitors are asked to submit photographs of any kind that they have taken themselves. An entry may consist of more than one photograph, but each print submitted must have on the back of it a title. If a photograph is given a general or fancy title the real name of the place shown also must be written on the back, while the competitor's name and address, and age also must be given.

It is not necessary that the printing and developing should have been done by the competitor. This can have been carried out professionally, so long as the entrant himself has made the exposure. Competitors should take care to avoid including in their photographs any scenes or objects of military, naval or Air Force interest. Guidance in regard to this point was given in the Editorial and the Guild Secretary's Notes in our April issue.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16, and in each section prizes of 15/– and 7/6 respectively will be awarded. There will be two similar sections with prizes of the same value for Overseas readers, with consolation prizes for other good efforts in each section.

Entries in this month's competition should be addressed *"June Photo Contest, Meccano Magazine, Binns Road, Liverpool 13."* The closing date in the Home section is 30th June and that in the Overseas section is 31st October.

FIRESIDE FUN

PROOF OF THE PUDDING

A ship called at a cannibal isle and was surprised to see a missionary come out to greet them in a canoe.

"How did you keep them from eating you?" he was asked.

"It was easy," said the missionary. "You see, I have a cork leg. As soon as I landed I cut a slice off it and handed it to the chief. He decided I wasn't worth cooking."

* * * *

The curfew tolls the knell of parting day,
A motor-car speeds swiftly o'er the lea;
A pedestrian homeward plods his weary way,
And leaves the world quite unexpectedly.

* * * *

Proprietor of mountain hotel (to newly arrived guest): "This is your room, sir. If you want a fine view over the mountains, put a dime in the slot and the shutters open for five minutes."

* * * *

A postcard from a small boy evacuated from London during the recent air raids read:

"We have been having grand fun and a boy was nearly run over yesterday."

* * * *

Teacher: "Willie, can you tell me if fish can travel long distances?"

Willie: "Well, ours go around the globe every day."

* * * *

"Maggie," said Angus to his wife, "here's a wee ticket for to-night's conjuring show, and when he comes to that part when he takes a teaspoon o' flour and one egg and makes 20 omelettes, watch verra, verra carefu'."

* * * *

Pat worked at a factory where they encouraged the staff to think of ideas for the smoother running of the business.

One morning he was shown into the chairman's office and announced that he had thought of a way of ensuring that no one would be late in future.

"That sounds good," said the Chairman. "How do you propose to do it?"

"Sure, that's aisy, sir," said Pat; "the last man in blows the whistle."

* * * *

Bobby: "And is Tom as fat as ever?"

Jimmy: "Fat! Why, he had mumps for three weeks before we knew it."

* * * *

Smith: "I've got a little attachment for your radio."

Brown: "Thanks! Let's have a look at it."

Smith: "Well, it's just a brick and a yard of rope, and the river is the first turning on the left!"

* * * *

Barber: "Was your tie red when you came in here?"

Customer: "No, it wasn't."

Barber: "Gosh!"

* * * *

Caller: "What a terrible cough you have! Why don't you consult Dr. Knowall, the great lung specialist?"

Invalid: "He's gone abroad for his health!"

* * * *

SAFETY FIRST

Visiting Aunt: "I'm glad I'm going home on Friday."
"Why Auntie?"
"It won't be safe here after then."

A DAY OF REST

Mistress: "Norah, only yesterday you broke four cups. How many will you break to-morrow at this rate?"

Norah: "None, ma'am. To-morrow is my day off."

* * * *

"I hope your daughter gets first prize at the music competitions this year."

"It's nice of you to say that."

"Yes. If she has to practise for another year I'll be driven into an asylum."

* * * *

NOT WHAT HE THOUGHT

Boss: "Would you like to take a day off, Jones?"

Office Boy: "Yes sir. Thank you very much sir."

Boss: "Well take it off that calendar. To-day's the 8th."

* * * *

There was a young fellow from Wales,
Who always was looking for snails,
He said, "When I find them
I'll creep up behind them,
And sprinkle some salt on their tails."

* * * *

From the bedroom of the twins came the mingled sounds of loud weeping and hearty laughter, so Father went up to investigate.

"What's the matter up here?" he inquired.

The joyous twin indicated his weeping brother. "Nothing," he chuckled, "only Nurse has given Alexander two baths and hasn't given me any."

* * * *

Father (facetiously): "Don't you think our son gets intelligence from me."

Mother (likewise): "He must. I've still got mine."

* * * *

Three weeks after Jessie reached boarding school she began signing her letters "Jessica." Brother Tom didn't like it. He replied:

"Dear Jessica. Uncle Samica is buying a new machine, but doesn't know whether to get a Hillmanica or a Fordica. The cowica had a calfica, and I was going to call it Nellica, but changed it to Jimica because it was a bullica. Your loving brother, Tommica."

* * * *

An Englishman touring Canada was staying in a wayside hotel. One night it was very cold, and the Englishman, feeling it pretty badly, came downstairs early next morning to get warm. At the same time a trapper, who had been out looking at his traps, came in at the door. Icicles were hanging from his moustache, and with a pitying expression the Englishman looked at him and exclaimed: "By jove, old man, what room did you sleep in?"

* * * *

"I hear you've decided to get rid of that old car of yours."

"Yes. Every time I park it, up comes a policeman and asks if I've reported the accident."

* * * *

THIS MONTH'S HOWLER

"Sponge is what you have to give up when you die."

UNNATURAL HISTORY

The class of small boys were having a natural history lesson.

"Now Tommy," said the schoolmistress, "give me the name of an animal that is peculiar to Australia."

Tommy thought hard for a little while and presently he answered: "An elephant, teacher."

"But an elephant isn't found in Australia."

"I know, Miss," returned Tommy; "that's what would make it peculiar."

* * * *

"What a big family you have, Mrs. Jones," said the visitor.

"Yes'm. And the funny thing is that all the names begin with a haitch. There's 'Orace, 'Erbert, 'Enery, 'Ugh, 'Ubert, 'Arnold, 'Arriet and 'Etty—all except the last one, and we 'ad 'er named Hallice."

* * * *

There was a scream of brakes as the London bus pulled up to a sudden stop, to avoid a flustered pedestrian who was dithering in the roadway. Crimson with strain and anger, the bus driver leaned out. Passers-by expected a burst of strong language. But the driver, controlling himself with a great effort, asked the pedestrian politely: "May I ask what are your plans, sir?"

* * * *

"We don't need any of them new-fangled scales in Ireland," said O'Hara. "There's an aisy way to weigh a pig without scales. You get a plank and put it across a stool. Then you get a big stone. Put the pig on one end of the plank and the stone on the other, and shift the plank until they balance. Then you guess the weight of the stone, and you have the weight of the pig."

* * * *

Here lies a pedestrian;
He's as cold as ice.
He jumped only once when
He should have jumped twice.

* * * *

The coal-merchant rushed into the street. "Hurry up," he cried to the Air Raid Warden, "incendiary bombs have fallen on the coal in my yard."

"Well," said the Warden, "if they've fallen on the coal you sent us last week you've no need to worry."

* * * *

Mother: "How is it I find you in the pantry?"

Sandy: "Because I didn't hear you coming."

* * * *

Q: Who invented the jig-saw puzzle?"

A: "A Scots butcher who dropped a one pound note by mistake into a meat-mincing machine."

* * * *

Mistress: "Where's my husband?"

Maid: "I ain't seen him since we rolled the carpet up, mum."

* * * *

A certain small restaurant was kept by a man who prided himself on his cooking. He was amazed to hear a young man criticise a pie one day.

"Pie, young fellow? Why, I made pies before you were born."

"But why sell 'em now?" the young man replied.

* * * *

The student's allowance had run out, so he wrote home for more money. Feeling a bit nervous about the impression it would make he ended his letter: "P.S.—I did not like writing to you. In fact, I ran after the postman to get this letter back."

A week later he received the following reply: "You will be glad to know I did not receive your letter."

* * * *

Cockney Conductor: "Is that your bag on the front, sir?"

Passenger: "Yes."

Conductor: "Then you left a pie on it sir."

Passenger: "I left a pie on it?"

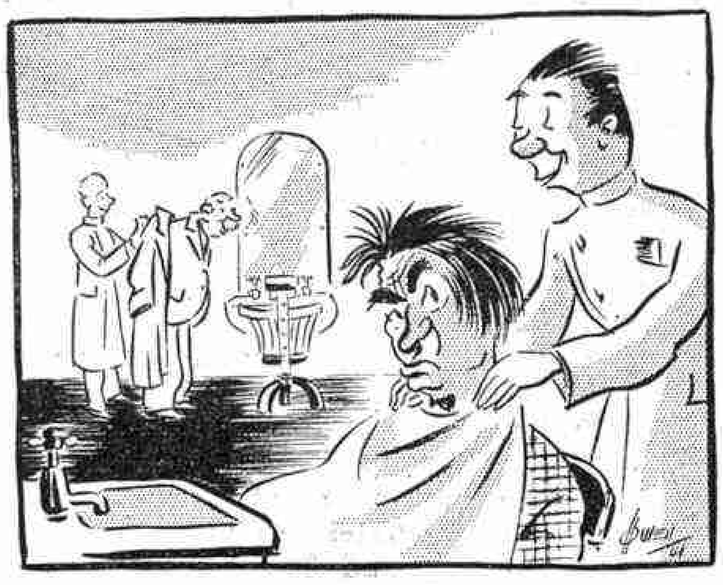
Conductor: "Yessir, you left a pie on it."

Passenger: "But I didn't—I mean it's not my pie, Oh, you mean I'll have to pay on it."

Conductor: "Yes, you left a pie."

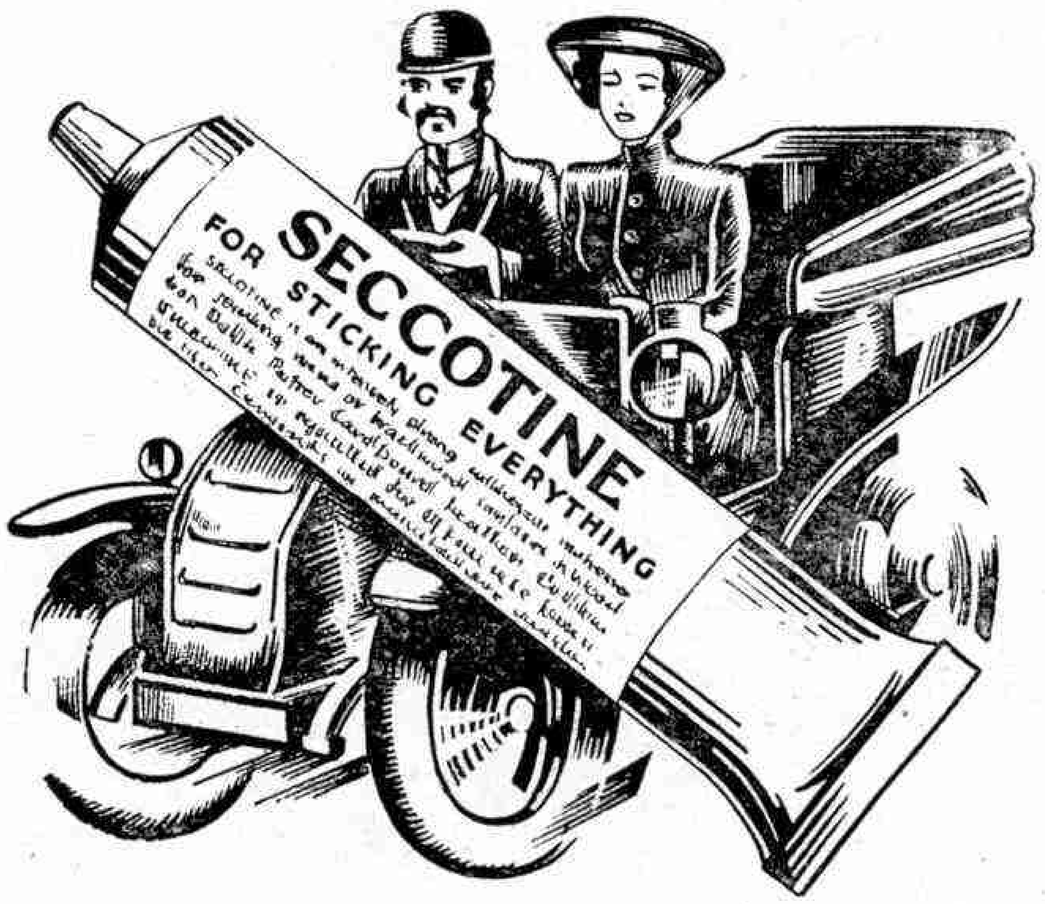
* * * *

TOO LONG FOR THAT



"I believe I had my last hair-cut here."

"I don't think so, sir. We've only been in business twelve months."



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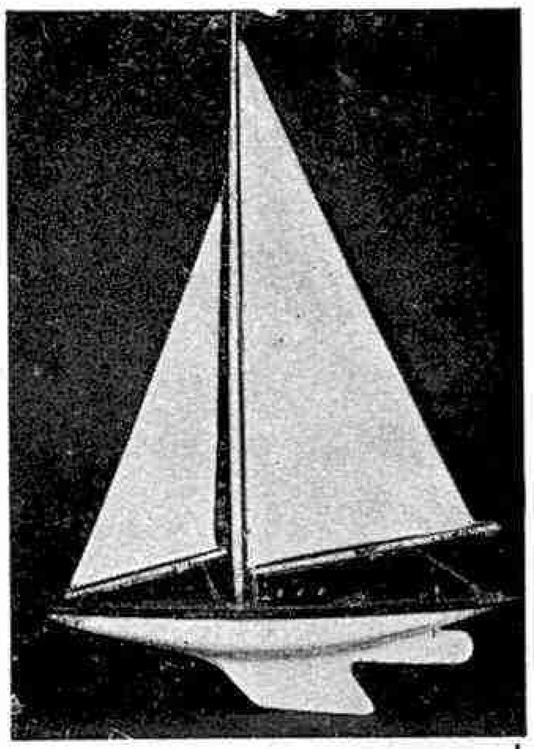

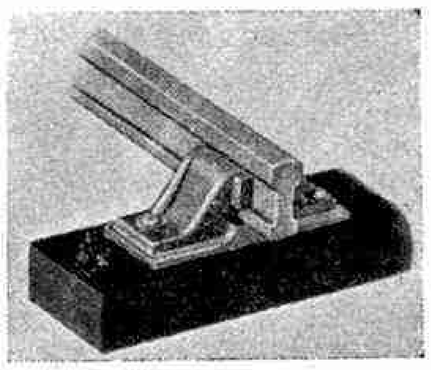

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CAVALCADE *of* CYCLING

A print bearing the date 1819, while yet the bicycle had not emerged from the hobby-horse stage, nevertheless is eloquent of the excitement occasioned by the new mode of transport. Whether this epic contest was ever staged is not known beyond the evidence afforded by the print, but the description "Match against Time," or "Wood beats Blood and Bone" is certainly prophetic.

Horse v. Cycle

THE MOST NOTABLE CONTRIBUTION to the development of cycling was the introduction, scores of years later, of the pneumatic tyre, by a Scottish veterinary surgeon, John Boyd DUNLOP. Destined to revolutionize mechanical transport, it made cycling popular for the million.

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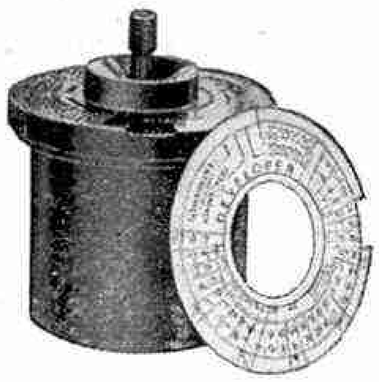

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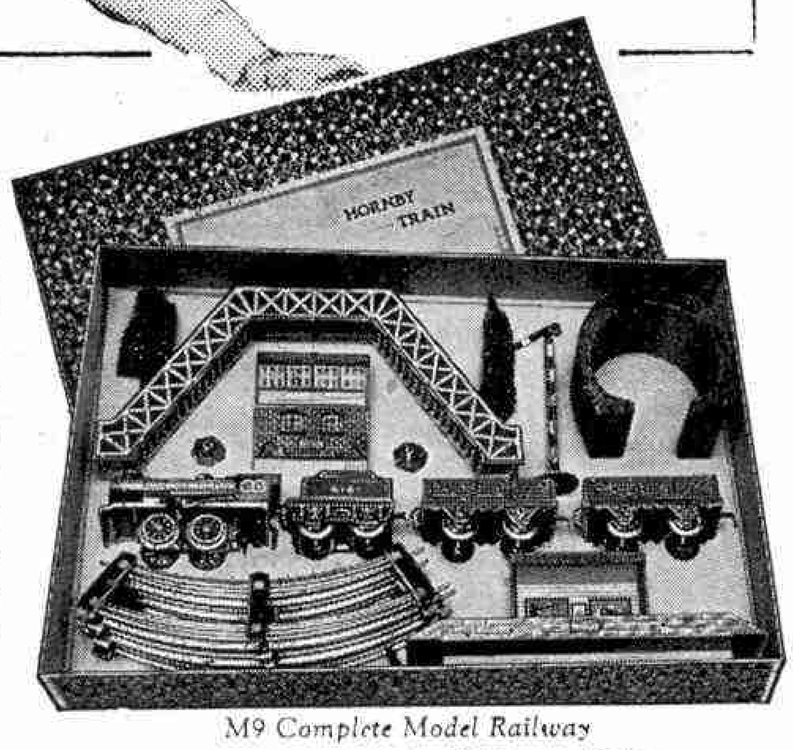

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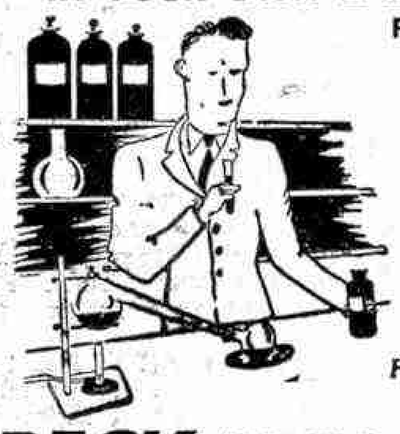

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READERS' SALES AND WANTS

Readers should note that all advertisements of Hornby Trains and other Meccano products included in this column relate to items no longer featured in the catalogue. Advertisements of current products cannot be accepted for this column.

Wanted. Twenty-eight pairs or portion thereof, spoked or Mansell Wheels, gauge 0.—Blower, 38, High Road, Beeston, Notts.

"B.O.P.'s" from January 1936 to present issue; two missing. Also perfect Schuco Tele-steering Car. What cash offers?—K. J. Brown, 36, de Montfort Road, Lewes, Sussex.

"M.M.'s" 1938-1940, 12/-. Also eight bound volumes of "Wonders of World Aviation," "Wonders of World Engineering," "Shipping Wonders of the World," "Railway Wonders of the World." As new, 15/- per volume. No offers.—C. Pickering, 68, Cole Park Road, Twickenham.

Wanted. Boys' Friend Library Books containing "Capt. Justice" tales. Must be in good condition. Apply stating full particulars—Slodden, 198, Albert Road, Leyton, E.10.

Sale. Camera, Stamps, Annuals, Coins, Games, Cigarette Cards, etc. Stamp for list. Wanted, Adana Printer.—Oakley, 1, Cheverton Road, Birmingham 31.

Wanted. In as perfect cond. as possible, covers intact and clean, "*M.M.'s*" (for binding): Sept-Oct., Nov.-Dec., 1916; Mar-Apl., July-Aug., Nov.-Dec., 1917; Feb.-Mar., July-Aug., 1918; Dec.-Jan., 1918-9; May-June, Sept.-Oct., 1919; Mar.-Apl., June-July., Nov.-Dec., 1920; Mar.-Apl., Dec., 1922; Feb., May, 1923; Sept., 1924; Feb., Mar., Apl., Oct., 1925; Dec., 1926; Jan., Feb., Mar., July, 1927; June, July, Aug., Sept., Oct., Nov., Dec., 1928; Jan., Feb., Mar., July, Nov., Dec., 1929; Mar., May, June, July, Oct., 1930; Jan., Feb., Mar., May, Nov., Dec., 1931; Jan., Mar., 1932; Jan., Feb., Mar., Apl., May, 1933; Jan., 1934; Sept., 1935; Feb., Sept., Oct., Nov., 1936; Mar., 1937; Jan., Aug., Nov., 1940; Jan., 1941; 6d. each issue offered.—F. G. Reynolds, 30, Portland Ave., Sidcup, Kent.

Advanced Collection Red/Green Meccano wanted—plenty of gears, wheels, etc.—D. Brand, 7, Westbourne Gardens, Bayswater, London W.2.

Sale. Red/Green Meccano in Cabinet. Value £12. What offers?—E. Hill, 49, Sweetcroft Lane, Hillingdon, Middlesex.

Wanted. Gauge "0" Bassett-Lowke (1938-41) L.M.S. Mogul Steam Locomotive 2-6-0, with Tender. Price and condition.—Kent, 20, Parkview Road, New Eltham, S.E.9.

Large quantity Meccano, Red/Green, Gears, etc.; sold separately.—239, Broadway, Southall.

Sale. £5/5/- Bayko, inc. 6 Bases. Best offer. Stamp for details.—J. S. Baxter, 4, Old Park Ridings, London N.21.

Wanted. Meccano Cabinet. Also "*M.M.*'s," bound, 1934-1940 inclusive.—Nathan, 4, Braeside Avenue, Sevenoaks, Kent.

ALL Gauges, Makes and Types bought, sold and part exchanged. Large stocks. Lists free. Watford Model Exchange, 29, Queen's Road, Watford, Herts.

BINDING THE "M.M."

Binding cases for back numbers of the Magazine may be obtained from Messrs. O. H. Bateman and Co., 23, Hanover Street, Liverpool. These are supplied in two sizes (1) for six copies price 3/3 and (2) for twelve copies price 4/9, post free in each case. The binding cases are supplied in what is known as "Quarter Basil, full cloth"—that is to say three-quarters of the sides are dark crimson cloth and the back and a quarter of the sides are dark crimson leather as shown here. The case is tastefully embossed in gold with the name "Meccano Magazine," and on the back is the name and volume number.

Binding 6 and 12 copies. These binding cases are supplied so that readers may have their Magazines bound locally, but where desired, the firm mentioned above will bind Meccano Magazines at a charge of 5/9 for six issues or 7/6 for twelve issues, including the cost of the binding and also return carriage. The covers of the Magazines may be included or omitted as required, but in the absence of any instructions to the contrary they will be included.

Whilst the binding of the twelve Magazines is quite satisfactory, they form a rather bulky volume and for that reason arrangements have been made to bind six months' Magazines where so desired, as explained above.

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

Publication Date. The "*M.M.*" is published on the 1st of each month and may be ordered from any Meccano dealer, or from any bookstall or newsagent, price 6d. per copy. It will be mailed direct from this office, 4/- for six issues and 8/- for twelve issues.

To Contributors. The Editor will consider articles and photographs of general interest and payment will be made for those published. Whilst every care will be taken of articles, etc., submitted, the Editor cannot accept responsibility for any loss or damage. A stamped addressed envelope of the requisite size should be sent where the contribution is to be returned if unacceptable.

Readers' Sales and Wants. Private advertisements (i.e., not trade) are charged 1d. per word, minimum 1/-. Cash with order. Editorial and Advertising matters should not be dealt with on the same sheet of paper.

Small Advertisements. 1/6 per line (average seven words to the line), or 16/- per inch (average 12 lines to the inch). Cash with order.

Display. Quotations for space bookings, and latest net sale figures, will be sent on request.

Press Day, etc. Copy should be sent as early in the month as possible for insertion in following issue. We usually close for press on or before 6th of each month for following issue. Half-tone blocks up to 100 screen.

Proofs of advertisements will be sent when possible for space bookings of not less than half-an-inch.

Voucher copies. Sent free to advertisers booking one inch or over. Other advertisers desiring vouchers should add 8d. to their remittance and should order voucher copy at same time.

Remittances. Postal Orders and Cheques should be made payable to Meccano Ltd.

Ordering the "M.M." Overseas

Readers Overseas may order the "*Meccano Magazine*" from regular Meccano dealers or direct from this office. The price and subscription rates are as above, except in Australia, where the price is 1/- per copy (postage extra), and the subscription rates 7/- for six months and 14/- for 12 months (post free), and Canada, where the price is 10c. per copy, and the subscription rates 65c. for six months, and $1.25 for 12 months (post paid).

The U.S.A. price is 15c. per copy, and the subscription rates $1 and $2 for 6 and 12 months respectively (post free).

Overseas readers are reminded that the prices shown throughout the "*M.M.*" are those relating to the United Kingdom and Northern Ireland. Current Overseas Price Lists of Meccano products will be mailed free on request to any of the undermentioned agencies. Prices of other goods advertised may be obtained direct from the firms concerned.

CANADA: Meccano Ltd., 187-189, Church St., Toronto.
UNITED STATES: Meccano Co. of America Inc., New Haven, Conn., Meccano Co. of America Inc., 200, Fifth Av., New York.
AUSTRALIA: Messrs. E. G. Page & Co., 52, Clarence Street, Sydney, N.S.W.
NEW ZEALAND: Models Limited, Third Floor, Paykel's Buildings, 9, Anzac Avenue (P.O. Box 129), Auckland, C.I.
SOUTH AFRICA: Mr. A. E. Harris (P.O. Box 1199), 142, Market Street, Johannesburg.
INDIA: Karachi: Daryanamal & Bros., Elphinstone Street, Bombay: Bombay Sports Depot, Dhobi Talao. Calcutta: Bombay Sports Depot, 2, Lindsay Street. Madras: Bombay Sports Depot, 162, Mount Road.

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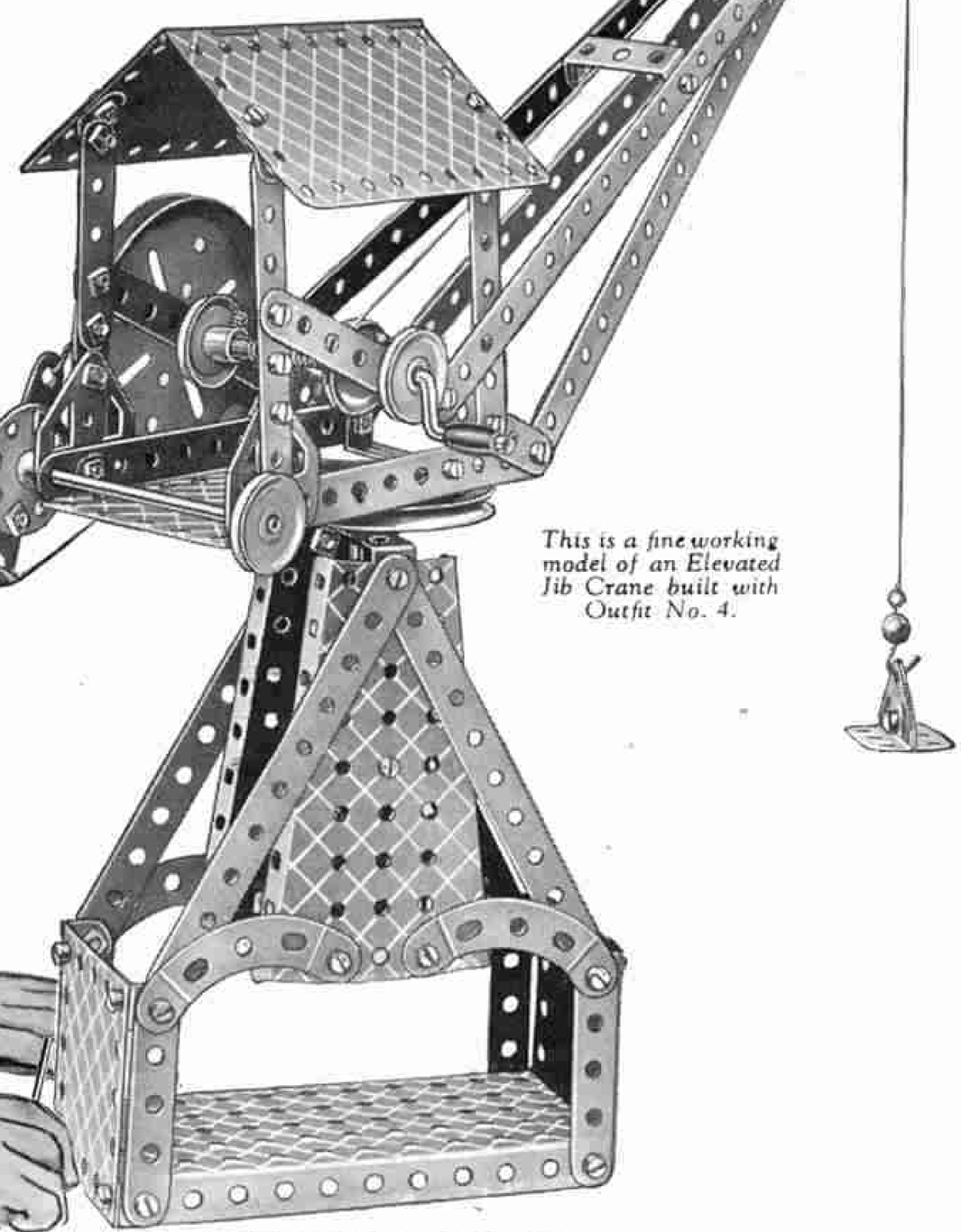

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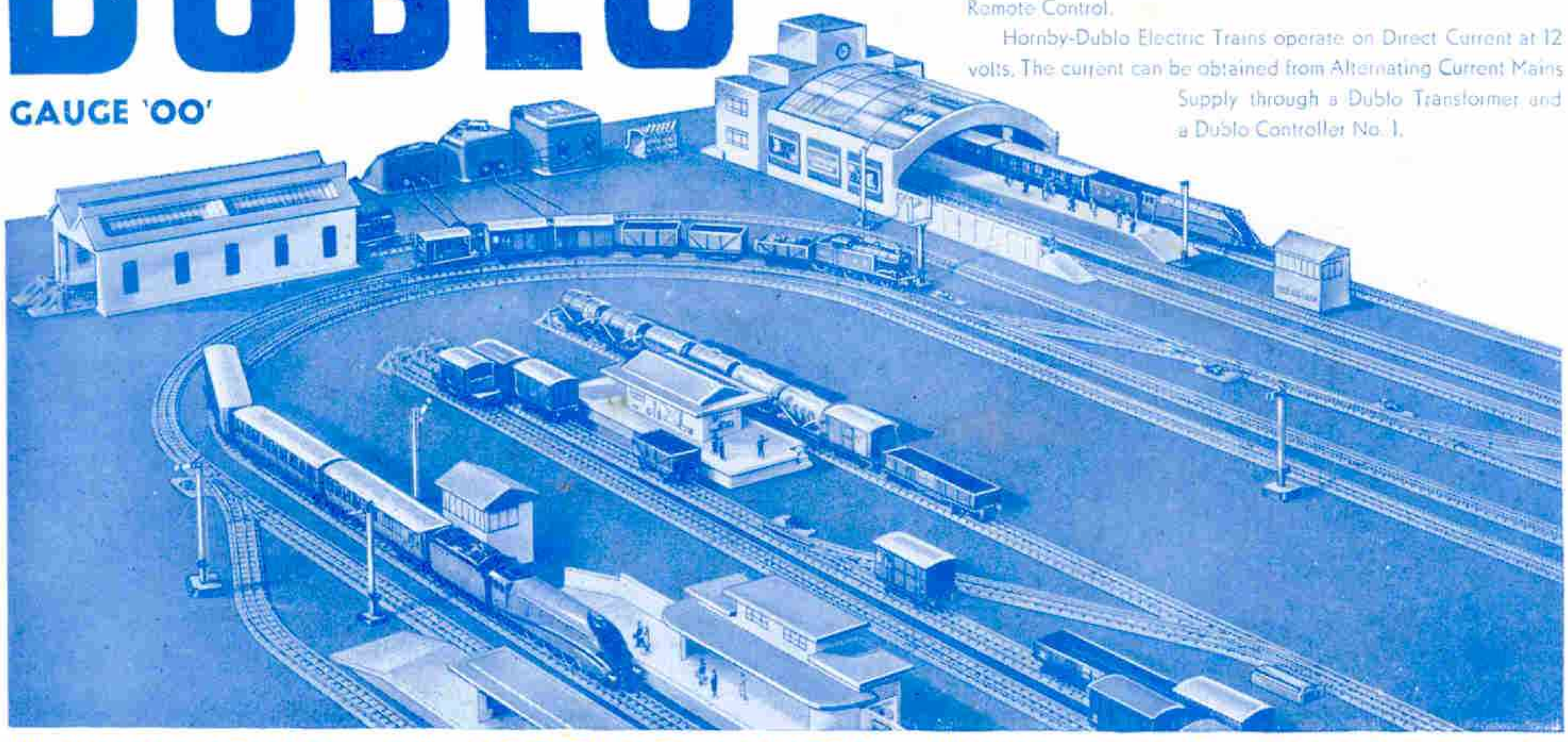

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