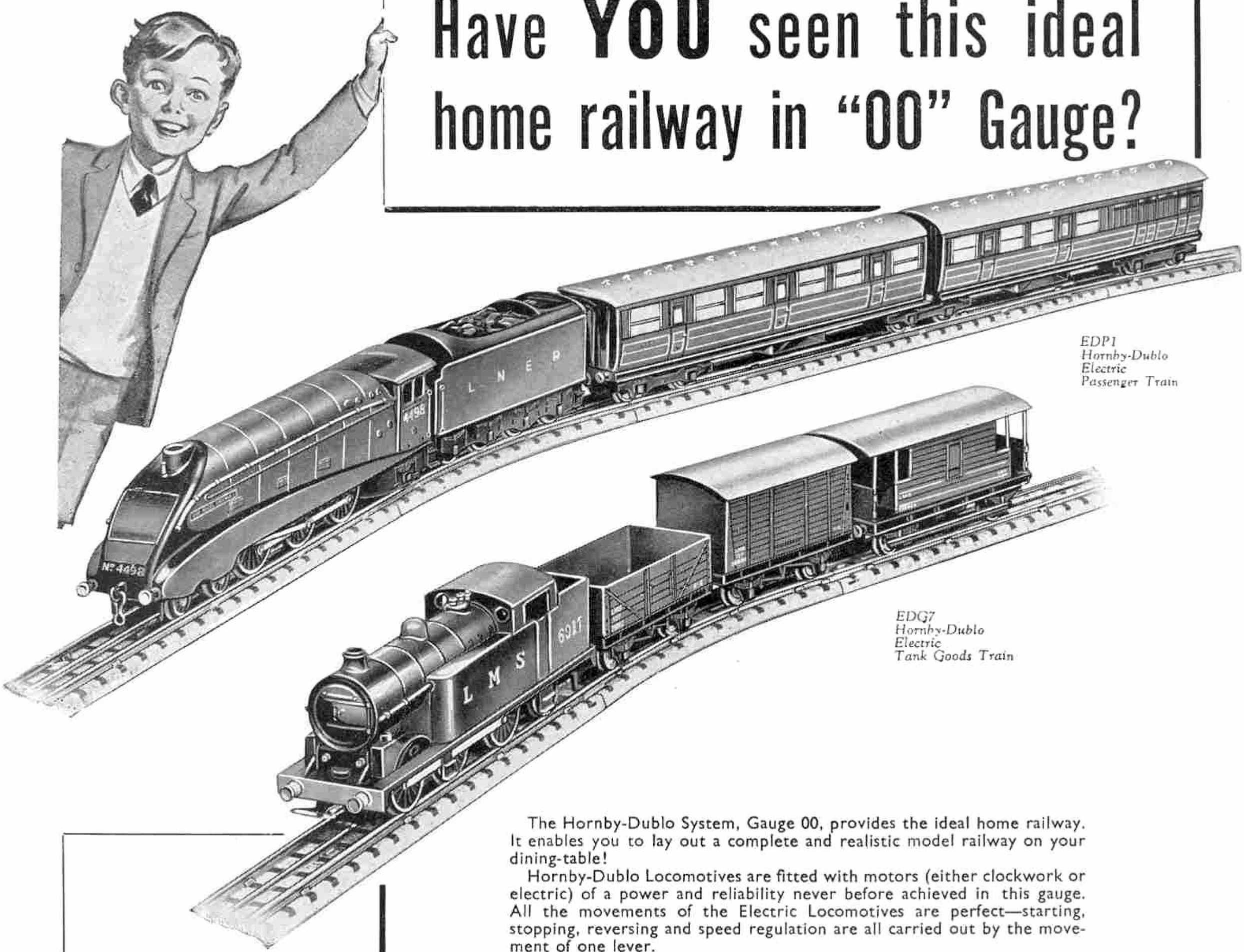
VOL. XXV. No. 8. AUGUST 1940

MECCANO MAGAZINE

AN INDIAN GREETING

6D.

Have **YOU** seen this ideal home railway in "00" Gauge?



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Hornby-Dublo
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Passenger Train

EDG7
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Hornby-Dublo Electric Trains operate on **Direct Current** at 12 volts. This current may be obtained either from **Alternating Current Mains Supply** through a Dublo Transformer and a Dublo Controller No. 1, or from a 12-volt accumulator and a Dublo Controller No. 1a. The Dublo Transformers are specially designed for these Trains; no others should be used.

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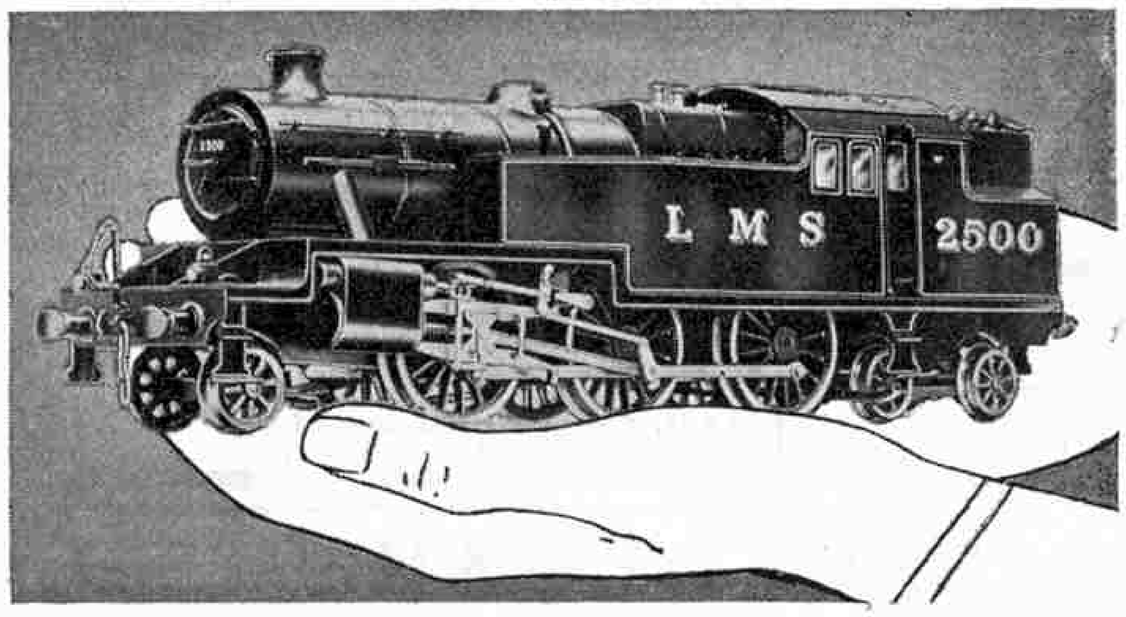

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Kit complete to smallest detail. Nothing extra to buy. 27 in. span, 23 in. length, 11 in. Finished Propeller, Free-wheeling Shaft, Wheels, Printed Sheet Balsa, Ribs, etc., Rubber, Dope, Cement, Tissue, Aluminium Tube, Strip Balsa, Wire, etc., Semi-finished Nose Block.

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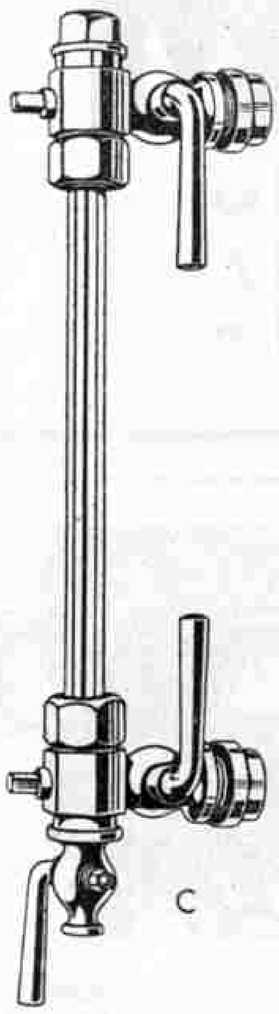

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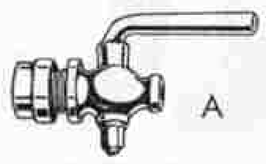

A

Illustration A. Straight Nose Blow-off Cocks. 3/16" Male End. Pre-war price 2/–. SALE PRICE **10d.** Also ¼", ⅜", 7/16" and ½" available.

B

Illustration B. Bell Whistles. 5/16" dia. Usual price 3/3. SALE PRICE **1/10.** Also ⅜", 7/16", ½", and ⅝" dia. available.

Illustration C. 3-Cock Water Gauges. 5/32" glass. Pre-war price 9/–. SALE PRICE **6/–.** Also 3/16" and ¼" glass available.

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Elektron Electrical Outfits provide the necessary material for carrying out a series of fascinating experiments in magnetism, frictional electricity and current electricity.

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MECCANO LTD.
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Nothing better on constructional lines has yet been devised for the younger child than Dinky Builder. The parts are designed on the hinge principle. By simply locking them together with the rods provided, very attractive models can be built. No nuts or bolts are required.

PRICES OF OUTFITS

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No. 3	...	**12/-**

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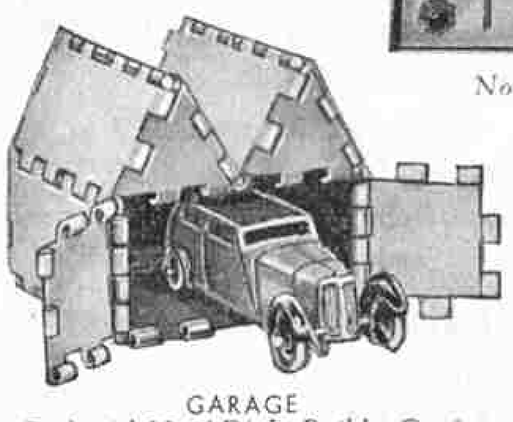

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Built with No. 1 Dinky Builder Outfit

Manufactured by
MECCANO LTD.
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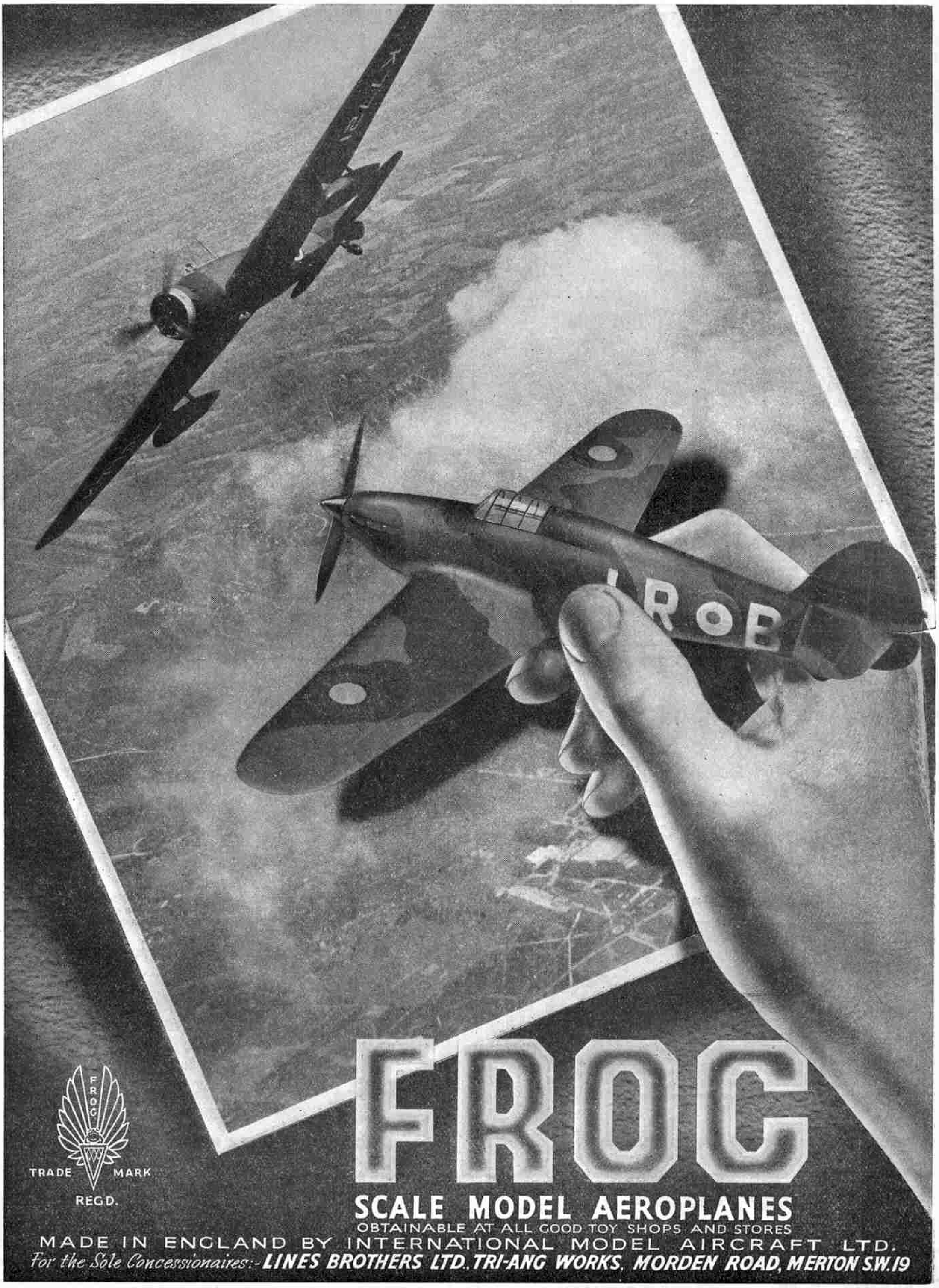
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OBTAINABLE AT ALL GOOD TOY SHOPS AND STORES
MADE IN ENGLAND BY INTERNATIONAL MODEL AIRCRAFT LTD.
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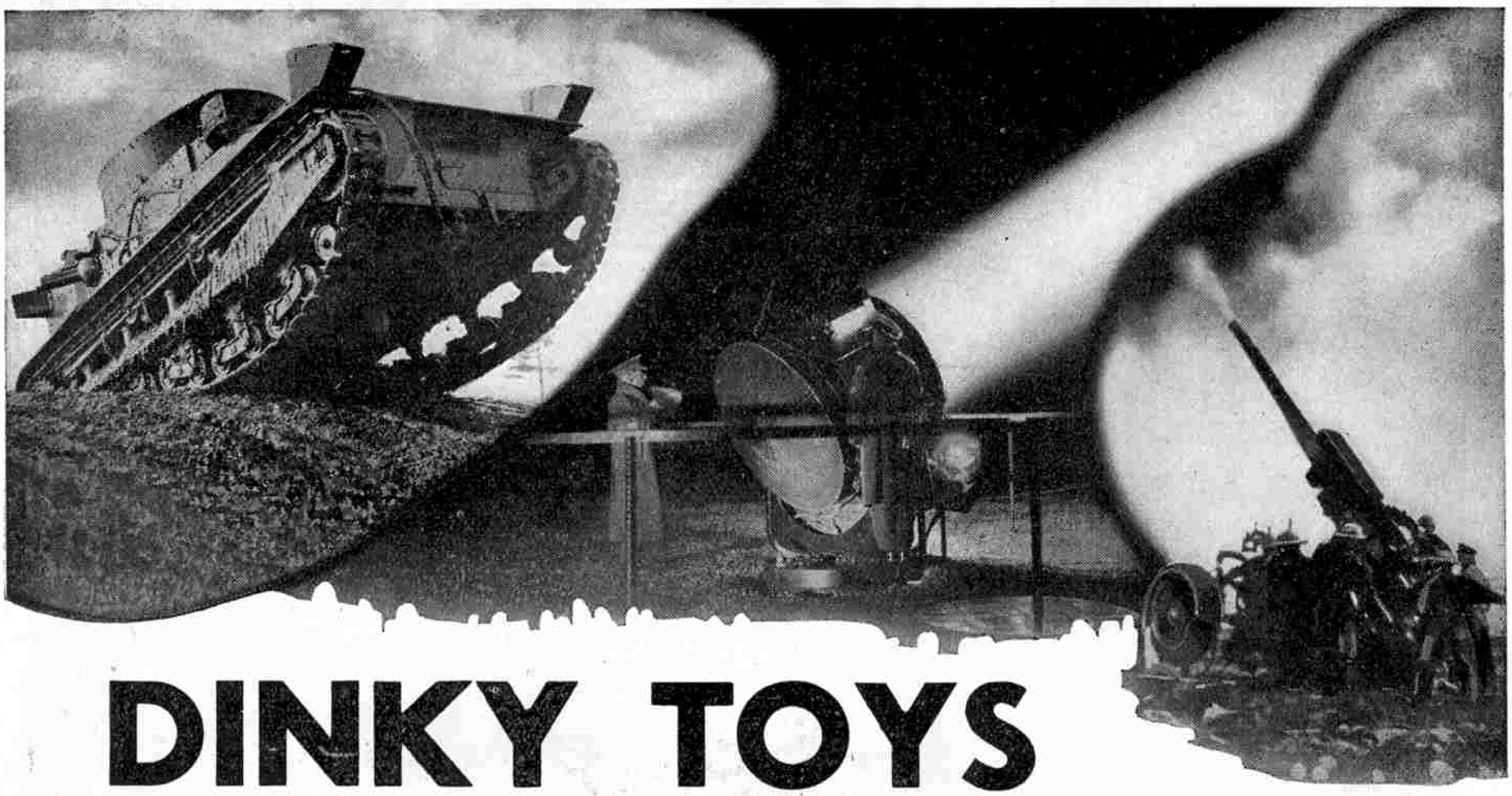


DINKY TOYS

Among the most popular Dinky Toys models are the Mechanised Units of the British Army. They include two Royal Tank Corps Sets, an accurately modelled Mobile Anti-Aircraft Unit, an 18-pounder Quick-Firing Field Gun Unit and Royal Artillery and Royal Tank Corps Personnel.

ROYAL TANK CORPS MEDIUM TANK SET

151a 151d 150d 151c

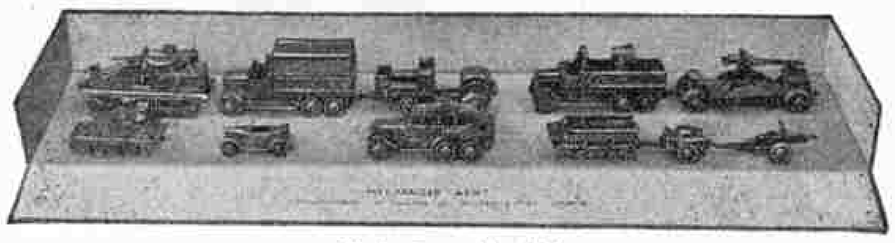
151b

Dinky Toys No. 151

No. 151a	Medium Tank	each **2/-**
No. 151b	Transport Wagon ...	" **1/4**
No. 151c	Cooker Trailer	" **9d.**
No. 151d	Water Tank Trailer ...	" **6d.**
No. 150d	Driver	" **2d.**

Price of complete set **4/9**

MECHANISED ARMY



Dinky Toys No. 156

This fine set contains the principal units of a modern mechanised army. It includes the following items:
Royal Tank Corps Medium Tank Set (Dinky Toys No. 151) without driver.
Royal Tank Corps Light Tank Set (Dinky Toys No. 152) without driver.
Mobile Anti-Aircraft Unit (Dinky Toys No. 161).
18-Pounder Quick-Firing Field Gun Unit (Dinky Toys No. 162).

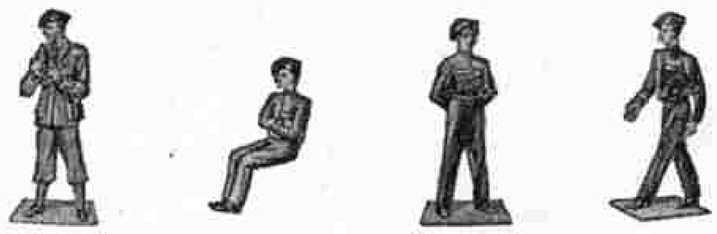
Price **15/-**

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. Price **3/-** per set

ROYAL TANK CORPS PERSONNEL



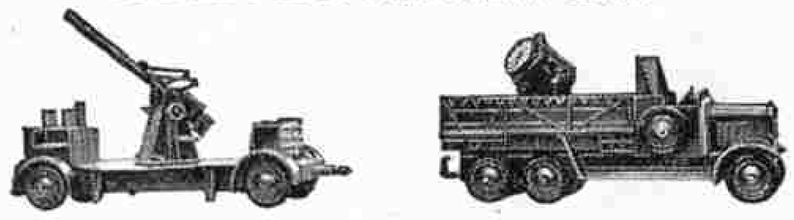
150a 150b 150c 150e

Dinky Toys No. 150

No. 150a	Officer	each **2½d.**
No. 150b	Private, sitting (two in set)	" **2d.**
No. 150c	Private, standing (two in set)	" **2d.**
No. 150e	N.C.O.	" **2d.**

Price of complete set **1/-**

MOBILE ANTI-AIRCRAFT UNIT



Dinky Toys No. 161

Comprises scale models of a Quick-Firing Anti-Aircraft Gun mounted on a mobile platform and a Searchlight mounted on a lorry. Both Gun and Searchlight have elevating and traversing movements. Price **4/-** per set

ROYAL TANK CORPS LIGHT TANK SET

152a 150d 152b 152c

Dinky Toys No. 152

No. 152a	Light Tank ...	each **1/5**	No. 152c	Austin Seven Car	each **6d.**
No. 152b	Reconnaissance Car	" **1/5**	No. 150d	Driver ...	" **2d.**

Price of complete set **3/6**

ROYAL ARTILLERY PERSONNEL

Dinky Toys No. 160

For use with Dinky Toys No. 161, Mobile Anti-Aircraft Unit and No. 162, 18-pounder Quick-Firing Field Gun Unit.

No. 160a	N.C.O.	each **2½d.**
No. 160b	Gunner, sitting (two in set)	" **2d.**
No. 160c	Gunlayer	" **2d.**
No. 160d	Gunner, standing (two in set)	" **2d.**

Price of complete set **1/-**

160a 160b 160c 160d

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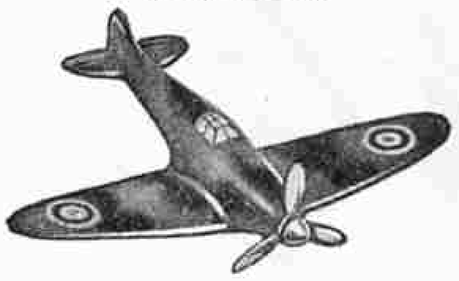
OVER 300 VARIETIES

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 ... **6d.** each
No. 62a Aluminium Finish ... **6d.** each

AIRSPEED "ENVOY" MONOPLANE

Dinky Toys No. 62m

Scale model of the Airspeed "Envoy" twin-engined commercial monoplane. Assorted colours. Price **8d.** each

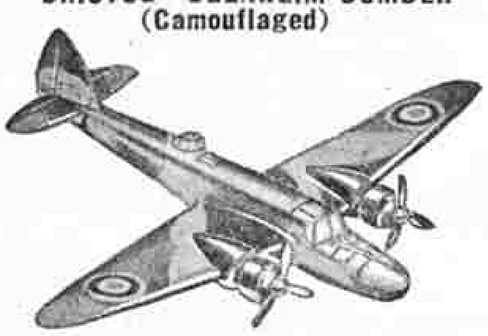
FAIREY "BATTLE" BOMBER (Camouflaged)

Dinky Toys No. 60s

Scale model of the well-known medium bomber used in large numbers by the R.A.F.

Price **8d.** each

"BRISTOL" BLENHEIM BOMBER (Camouflaged)

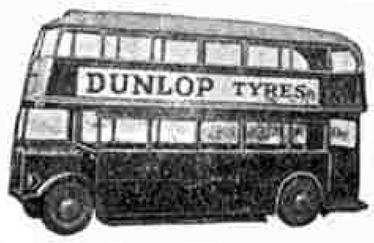


Dinky Toys No. 62d

Realistic model of the latest "Bristol" Blenheim Bomber extensively used by the Royal Air Force.

No. 62d Camouflaged ... **9d.** each
No. 62b Aluminium Finish ... **9d.** each

DOUBLE DECKER MOTOR BUS



Dinky Toys No. 29c

Assorted colours. Fitted with detachable rubber tyres.

Price **1/6** each

REFUELLING TENDER

Dinky Toys No. 60y

Realistic model of Thompson Bros. Tender used for refuelling aeroplanes at aerodromes.

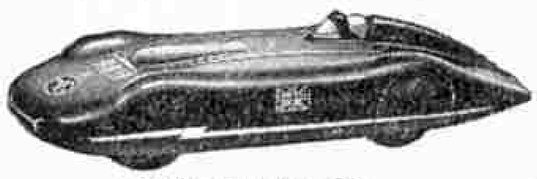
Price **10d.** each

TRACTOR

Dinky Toys No. 22e

Price **11d.** each

GARDNER'S M.G. RECORD CAR



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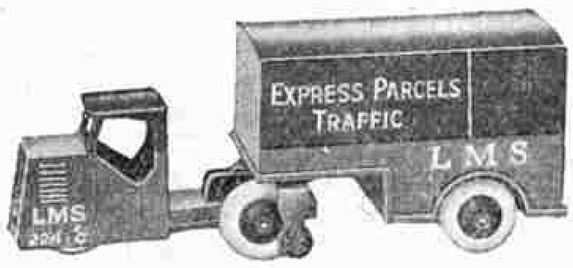
A scale model of the car in which Major A. T. G. Gardner set up new world speed records for cars up to 1,100 c.c.

Price **1/-** each

RAILWAY MECHANICAL HORSE AND TRAILER VAN



Dinky Toys No. 33r

No. 33Ra Railway Mechanical Horse ... each **9d.**
No. 33Rd Trailer Van ... ... „ **11d.**
Price complete, L.M.S., L.N.E.R., G.W.R. or S.R., **1/7**

SALOON CARS

Dinky Toys No. 39

No. 39a	Packard "Super 8" Touring Sedan	each **1/3**
No. 39b	Oldsmobile "Six" Sedan	„ **1/3**
No. 39c	Lincoln "Zephyr" Coupe	„ **1/3**
No. 39d	Buick "Viceroy" Saloon	„ **1/3**
No. 39e	Chrysler "Royal" Sedan	„ **1/3**
No. 39f	Studebaker "State Commander" Coupe	„ **1/3**

Price of complete set **7/6**

POLICE BOX, MOTOR CYCLE PATROL AND POLICEMEN

Dinky Toys No. 42

Each item is finished in correct colours.

No. 42a	Police Box	each **7d.**
No. 42b	Motor Cycle Patrol	„ **1/-**
No. 42c	Point Duty Policeman (in White Coat)	„ **4d.**
No. 42d	Point Duty Policeman	„ **5d.**

Price of complete set **2/3**

SHIPS OF THE BRITISH NAVY

Dinky Toys No. 50

No. 50a	Battle Cruiser "Hood"	each **7d.**
No. 50b	Battleships, "Nelson" Class (2) ...	„ **6d.**
No. 50c	Cruiser	„ **5d.**
No. 50d	Cruiser "York"	„ **5d.**
No. 50e	Cruiser "Delhi"	„ **4d.**
No. 50f	Destroyers, "Broke" Class (3) ...	each **1½d.**
No. 50g	Submarine, "K" Class	„ **1½d.**
No. 50h	Destroyers, "Amazon" Class (3) ...	„ **1½d.**
No. 50k	Submarine, "X" Class	„ **1½d.**

Price of complete set **3/6**

HAWKER "HURRICANE" SINGLE-SEATER FIGHTER (Camouflaged)

Dinky Toys No. 62h

Scale model of the Hawker "Hurricane" single-seater Fighter extensively used by the R.A.F. Price **6d.** each

BOEING "FLYING FORTRESS"

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 **1/3** each

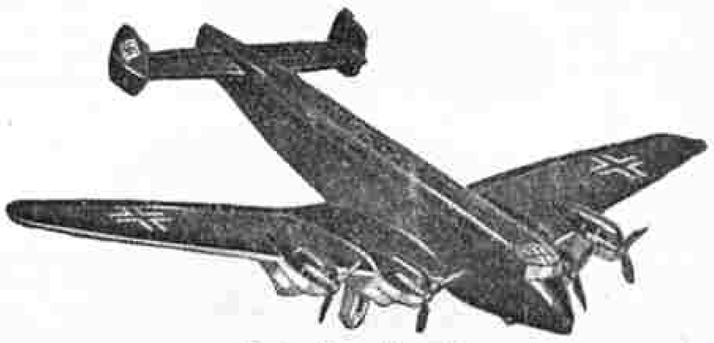
ARMSTRONG WHITWORTH "WHITLEY" BOMBER (Camouflaged)

Dinky Toys No. 62t

Scale model of the "Whitley" long-range heavy bomber adopted by the R.A.F.

Price **1/3** each

JUNKERS JU 89 HEAVY BOMBER (German Service colours)



Dinky Toys No. 67a

Model of the Junkers Ju 89, one of the largest heavy bombers employed by the German Air Force. Price **1/6** each

SIX-WHEELED WAGON

Dinky Toys No. 25s

An interesting model of a modern three-ton wagon. In assorted colours.

Price **1/3** each

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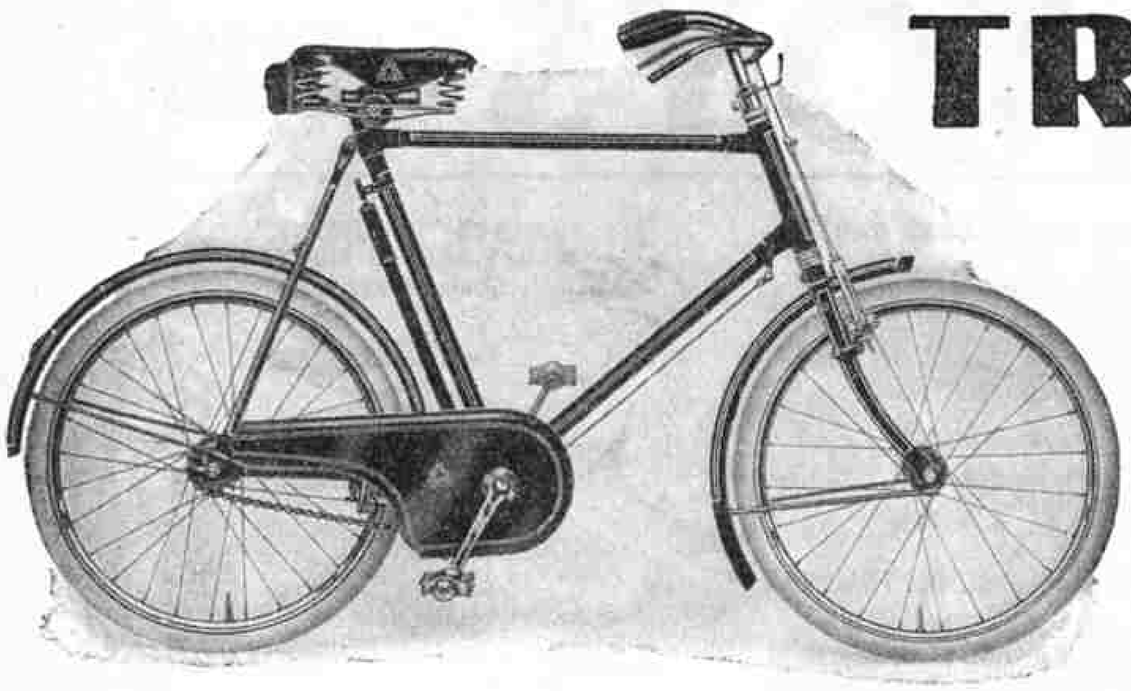

"UNITY" BOY'S CYCLE No. 16 PB

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.

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TRI-ANG TOYS

Obtainable from all Good Toy Shops and Stores

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. 1⅜ in. jointless sponge-rubber tyres. Roller lever brake. Ball-bearings throughout. Coil spring saddle. CHROMIUM FITTINGS. Black, blue or maroon.

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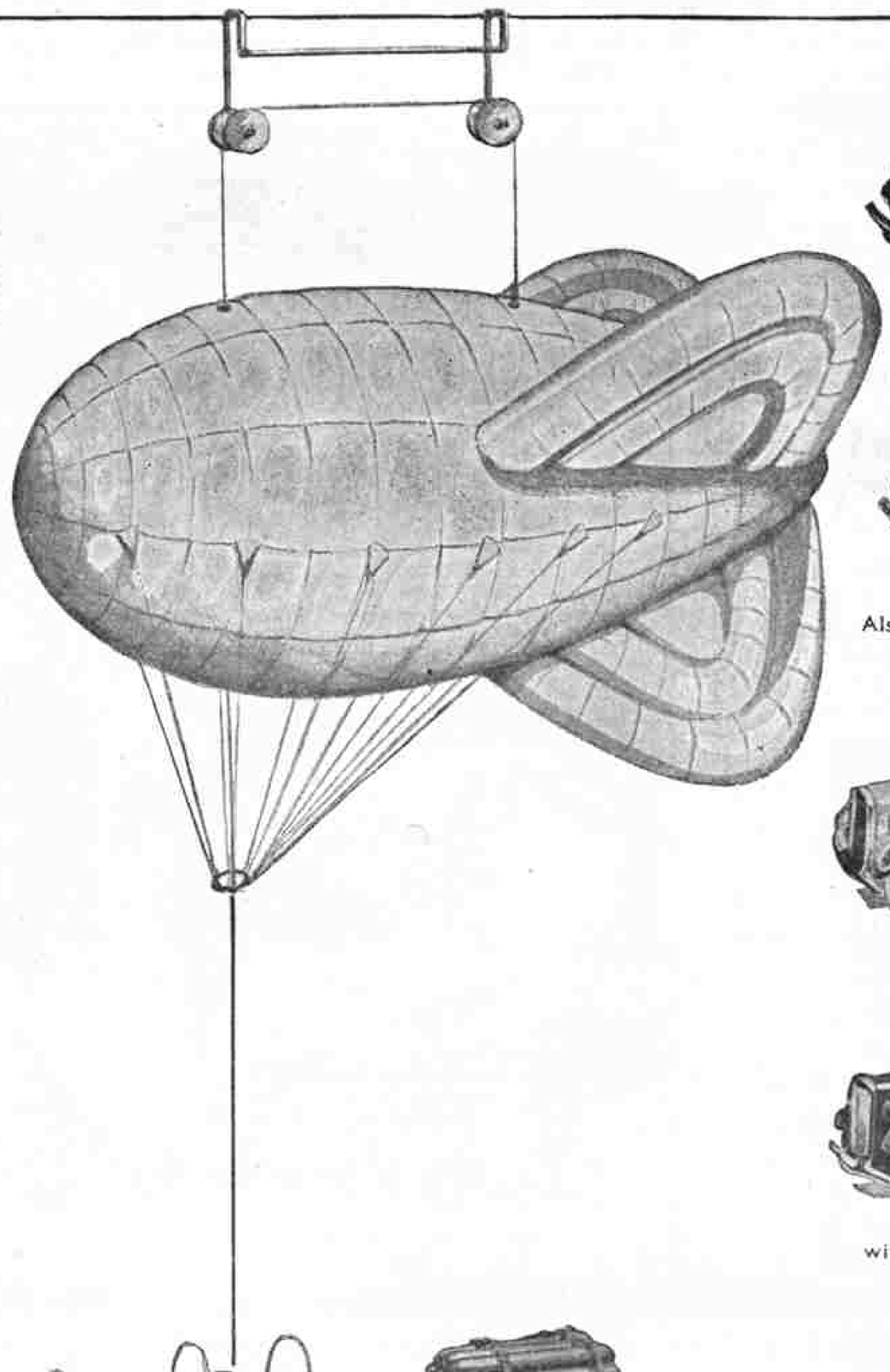
ALL TO SCALE CLOCKWORK TOYS

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. OVER EIGHTY MODELS FROM WHICH TO CHOOSE.

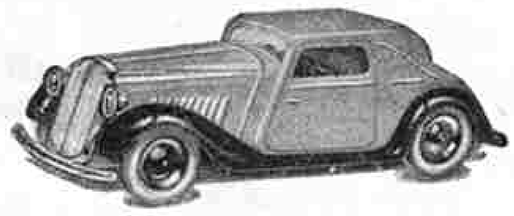
AND NOW!
MINIC SCALE MODEL
BALLOON BARRAGE

Made up Clockwork Winch Lorry with Gas Cylinder Trailer and Construction Kit for Balloon.

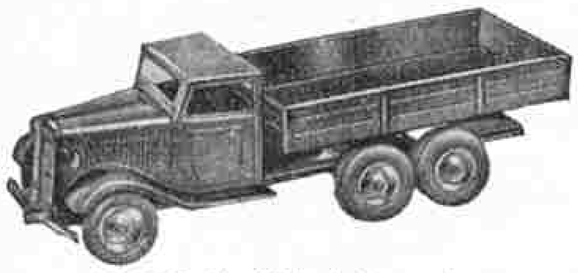
Boxed complete with pulley as illustrated and full working plans and instructions.



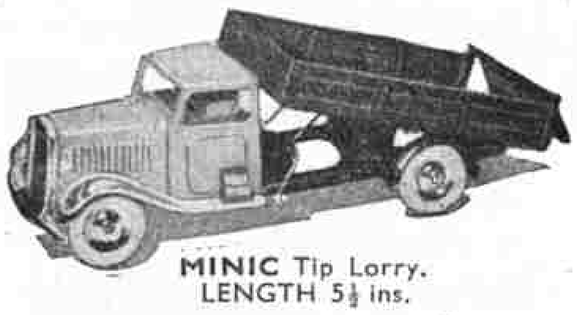
MINIC Traffic Control Car.
LENGTH 7 ins.



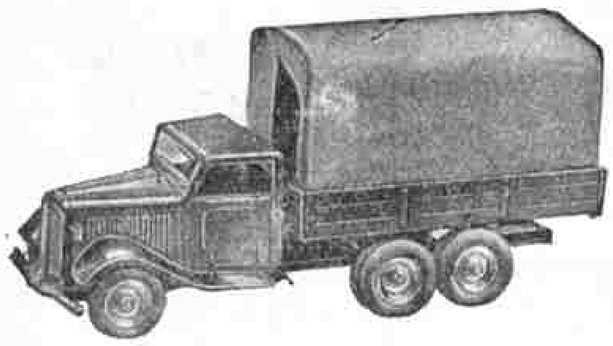
MINIC Vauxhall Cabriolet.
Also obtainable in camouflage colours.
LENGTH 5 ins.



MINIC Six Wheel Army Lorry.
Also obtainable in camouflage colours.
LENGTH 5½ ins.

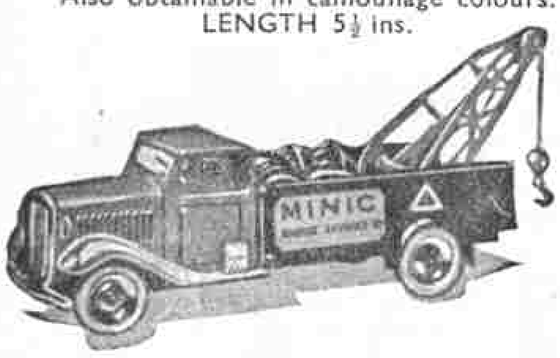


MINIC Tip Lorry.
LENGTH 5½ ins.

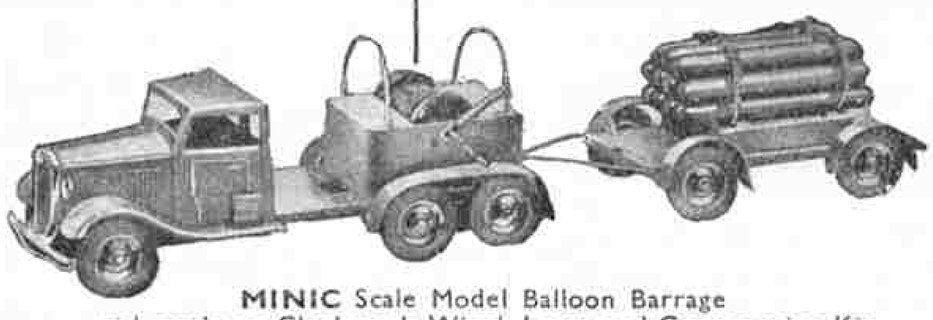


MINIC Canvas Tilt Lorry.
Also obtainable in camouflage colours.
LENGTH 5½ ins.

MINIC Searchlight Lorry
with Electric Searchlight and Battery.
LENGTH 5½ ins.

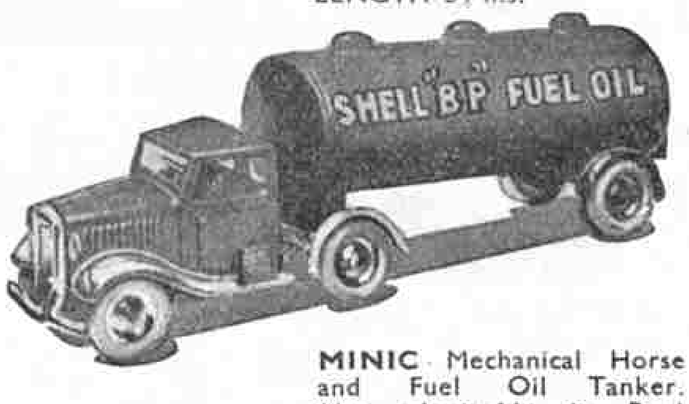


MINIC Breakdown Lorry.
Also obtainable in camouflage colours.
LENGTH 5½ ins.



MINIC Scale Model Balloon Barrage
with made up Clockwork Winch Lorry and Construction Kit for Balloon.

LENGTH of Winch Lorry and Trailer 9 ins.
LENGTH of Barrage Balloon 13½ ins. LENGTH of Cable 18 ft.



MINIC Mechanical Horse and Fuel Oil Tanker.
Also obtainable in Pool colour or camouflage.
LENGTH 7 ins.

Made by LINES BROS. LTD., Tri-ang Works, LONDON S.W.19

Next Month: "HOW SUBMARINES ARE HUNTED." Publishing Date: 31st August

MECCANO MAGAZINE

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Binns Road, Liverpool 13
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Vol. XXV. No. 8
August 1940

With the Editor

Full Confidence in Victory

How this terrible war has changed since I wrote my July editorial and published a photograph of General Weygand! When we heard of the collapse of our great Ally, France, I think most of us felt first stunned, then just a little bit downhearted. But now all that has gone. Under the inspiration of our splendid Prime Minister we are facing the enemy onslaught with resolute courage and full confidence in victory. We shall do all that is asked of us, and more if necessary.

I once heard an African explorer describe how he was deserted by his native bearers in a barren region, and left without water. He struggled on for a while in the terrible heat, suffering agonies from thirst, and then collapsed on the ground. As he lay there helpless, all hope gone, he suddenly seemed to hear his father speaking. He was repeating a favourite phrase of his: *"A British boy can always do a little bit more."* A thrill passed through the almost dying explorer. He made another desperate effort, found water, and was saved.

That father's motto is a good one for us all to remember. Whatever we may have to face, I know that my readers will keep their chins up!

Our R.A.F. Fund

Readers will be interested in the following letter I received on 6th July from the R.A.F. Comforts Committee:

"We acknowledge with thanks receipt of your letter of the 3rd inst. enclosing cheque for £20 on behalf of the "Meccano Magazine" Fund to provide radio sets for the R.A.F., which now makes a total of £95.

"My Committee are deeply grateful, and would like to take the opportunity of informing your readers that with this money they have been able to purchase 21 wireless sets for units of the Royal Air Force situated in isolated operational districts, and which have provided their only means of contact with the outside world. You can imagine how much these are appreciated, and how much they are indebted to your readers for their kindness in making this possible."

(Signed) Officer i/c R.A.F. Comforts.

Leaders in the War

XI.—Sir John Dill

General Sir John Greer Dill was born on Christmas Day 1881, at Ulster Bank House, Lurgan, Co. Armagh. After passing through Sandhurst he joined the Leinster Regiment in 1901. He fought in the South African War, and was awarded the Queen's Medal, 5 clasps. By July 1911 successive promotions had raised him to the rank of Captain.

General Sir John Greer Dill, K.C.B., C.M.G., D.S.O., Chief of the Imperial General Staff.

Sir John served throughout the World War and by 1918 was a Brigadier-General, on the General Headquarters Staff in France. He was awarded the D.S.O. and the C.M.G., and also honours by France and Belgium.

A series of home appointments in the Army followed, broken by a brief period overseas in 1929–30 as Brigadier, General Staff, India; and he was Director of Military Operations and Intelligence, War Office, from 1934 to 1936. In 1936 he was again sent abroad, this time as General Officer Commanding, British Force in Palestine, to suppress the Arab revolt. In the campaign Sir John made such effective use of aircraft in locating and harassing the enemy that the rebel leader, Fauzi, offered a reward of £500 for the head of "the British Devil Dill, dead or alive." When Sir John heard of the offer he remarked that he was proud to know that his head was worth so much! Eventually a trap, in the form of an apparently weak British detachment, was laid for Fauzi. He fell into it, his force was defeated, and he himself was captured and interned.

When the present war broke out Sir John was given command of the 1st Army Corps, B.E.F., in France, where he was very popular with both the British and French forces. In April this year he became Vice-Chief of the Imperial General Staff, and at the end of May he became Chief in succession to General Sir Edmund Ironside who was appointed Commander-in-Chief of the Home Forces.

How Science Aids the G-Men

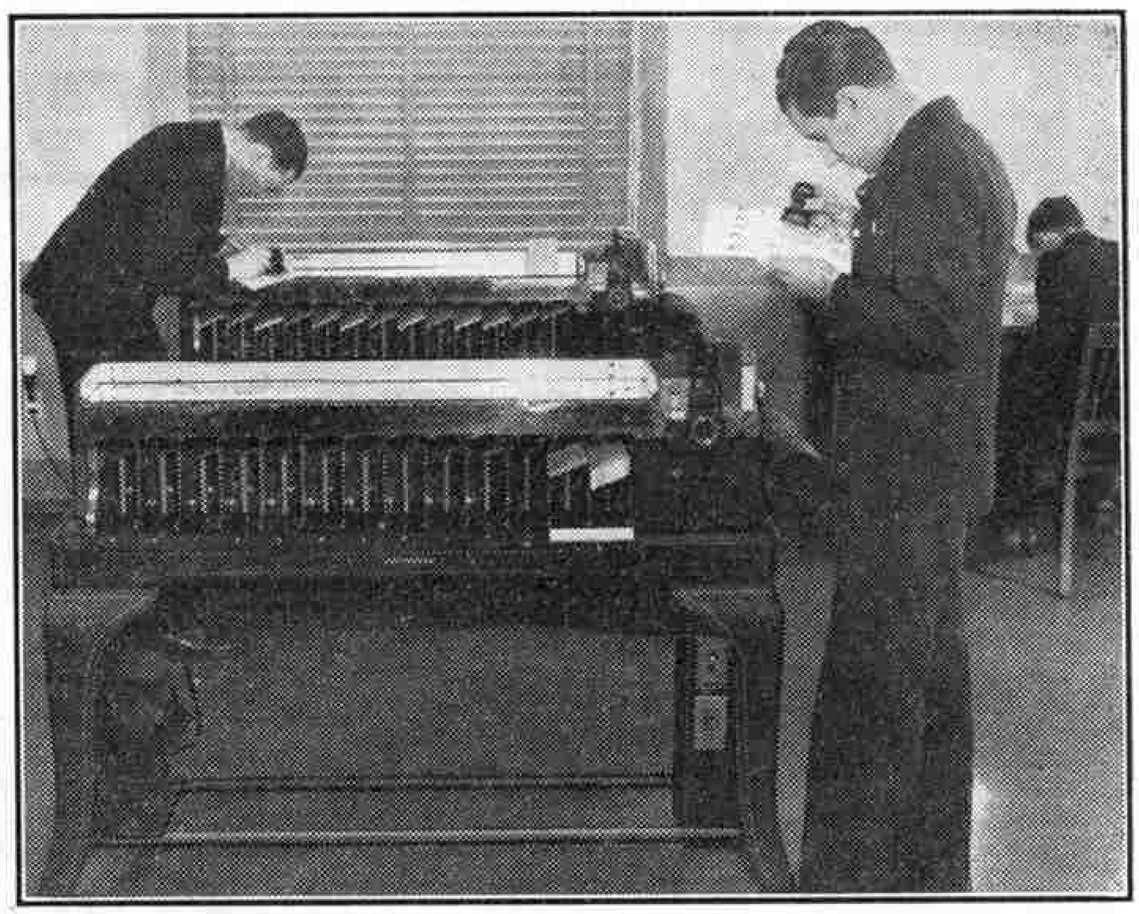
By F. P. Huggins

THROUGH the newspapers and the films nearly everyone must be familiar with those famous criminal-catchers of the United States—the Government or "G-Men." The founder of this organisation, J. Edgar Hoover, is a great believer in publicity to help to combat crime, and the men of the Federal Bureau of Investigation, and their methods of dealing with some of the world's most dangerous criminals, are constantly in the news. While high praise is certainly due to these Special Agents for the courageous way in which they track down and tackle armed desperadoes, it is not generally realised that in most cases they would never "get their man" if it were not for the efforts of the technicians who are employed by the Bureau.

In the headquarters of the F.B.I. at Washington the technical laboratory covers 9,719 sq. ft. of floor space and the staff includes experts on such diverse subjects as document examination, firearms identification, geology, metallography, blood, chemistry, sound, radio and electricity. As an indication of the laboratory's activities, here are some of the numbers and variety of subjects examined last year: 27,194 questioned documents and extortion letters; 2,837 articles received for geologic and petrographic examination; 2,000 articles received for microscopical and chemical analyses; 422 guns; 1,923 bullets and shells; 49 tyre threads; 3,284 articles treated chemically for development of latent fingerprints; 387 articles for spectrographic examination; 81 articles for footprint comparison; 630 articles for metallurgical examination.

Also maintained in this department are various standards used for comparison purposes. These include 1,866 different types and sizes of ammunition; 2,584 types and sizes of rope, cord and twine; 3,620 tyre thread designs; 839 typewriter standards; 36,623 watermark descriptions.

Time after time criminals have been able to cast doubt into the minds of a judge and jury until scientists of the F.B.I. have entered the witness box and proved beyond all possible doubt the guilt of the person in the dock. The following case illustrates how the Technical Laboratory is able to conduct examinations of an unusual type:



The finger-print expert using a machine that automatically sorts cards in classification groups. The illustrations are by courtesy of the Federal Bureau of Investigation, U.S. Department of Justice.

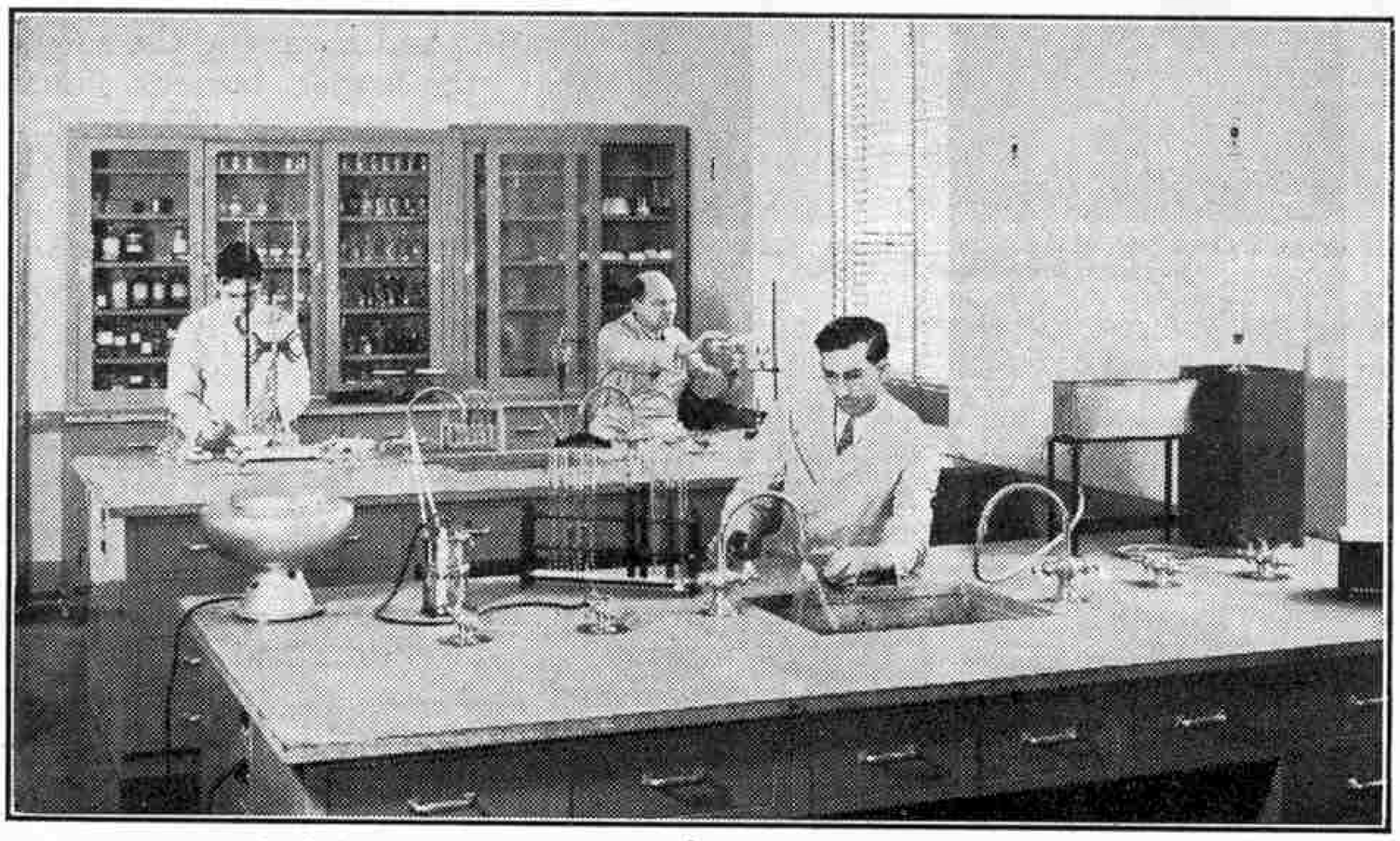
Early one morning a farmer saw a fire a short distance from his farm. Afraid that the flames might spread to his property, he investigated and found two young men busily engaged in tearing up papers and throwing them into a fire. By the time he arrived the fire had been extinguished and the ashes shovelled into a stream near by, and all the remaining evidence had been completely stamped into the soft ground. Suspicious of the actions of these men, the farmer took the number of the car that one of them was driving, and telephoned the local police. The police, who had been informed of the robbery of a safe the night before, immediately appeared and made a careful examination of the spot. Suspended on the leaves and dense bushes some distance from the fire were several very light fragments of charred particles of various sizes that the wind had carried away. These pieces were gathered together, carefully wrapped in cotton, and mailed to the Technical Laboratory of the Bureau. Also sent were various blank forms such as were known to have been in the safe on the night of the robbery.

On receipt in the laboratory, the charred fragments were put into a chamber containing a high degree of humidity, so that after a few days they became quite flexible. They were then placed on a smooth surface where they could be flattened and spread out. Photographs were made using different degrees of illumination, a variety of filters, and various kinds of photographic plates, including infra-red. The result was that the printed matter, as well as the handwriting, could be clearly determined on the photograph. A comparison with the known forms disclosed that these were identical with the fragments recovered from the fire.

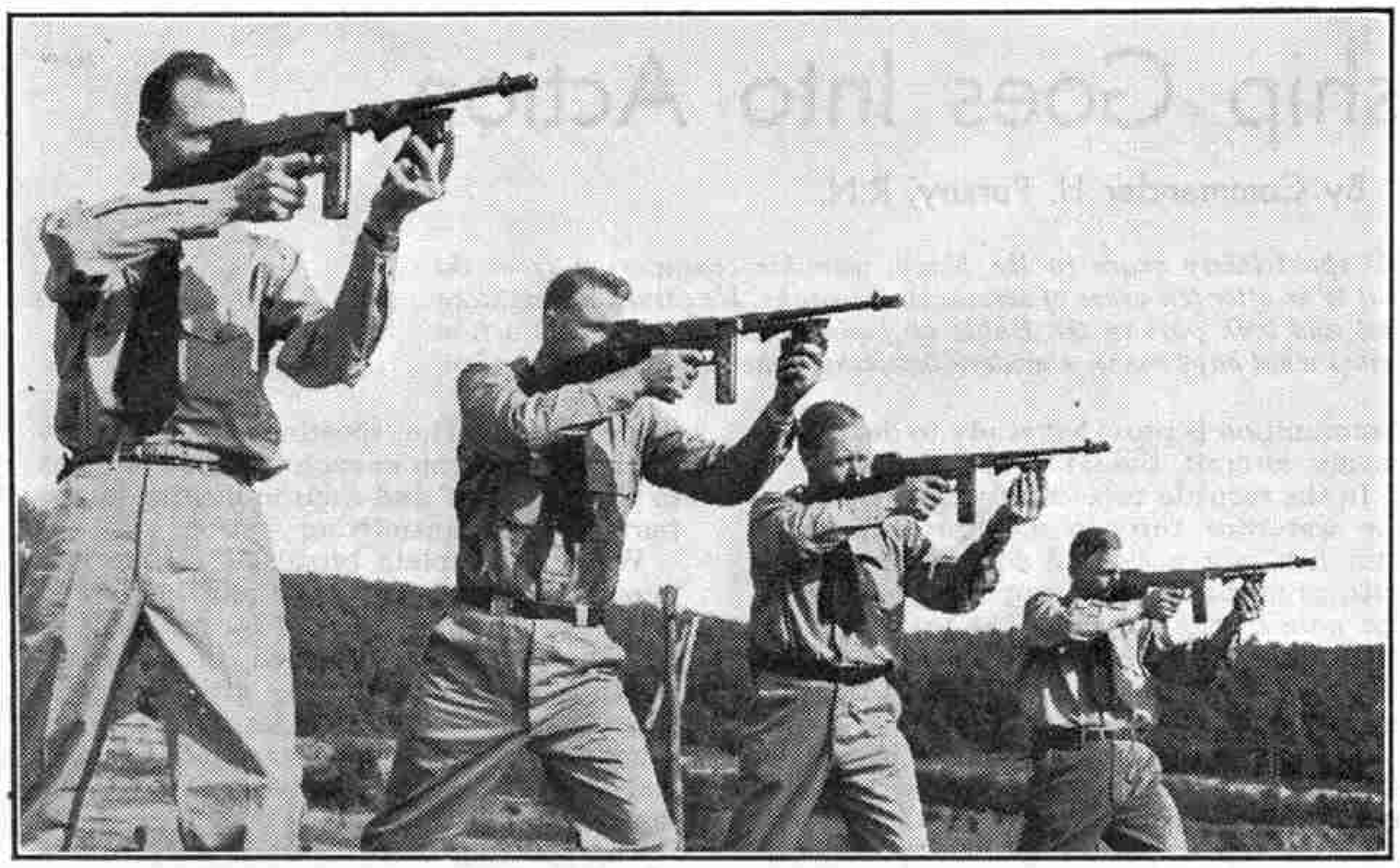
The expert provided himself with photographic enlargements 64 times the original size of both the charred fragments and the known forms, and when he was called to testify in court these enlargements were shown to the jury. The evidence was so graphic that practically no explanation was necessary.

In the list of subjects examined by the technicians the number of bullets and shells takes quite a high place. Many gun crimes are solved each year by the F.B.I. proving that certain bullets are fired by certain guns. One unusual firearms case was that in which a sheriff and a policeman entered a certain George Pingley's house to serve legal papers on him. They were met with a discharge from Pingley's 12-gauge shotgun. The sheriff fell to the floor, mortally wounded; but the policeman, although wounded, managed to continue his way into the now darkened house carrying a flashlamp in one hand and a revolver in the other. Suddenly his gun was knocked from his hand and the flashlamp fell to the floor, and in the darkness and confusion Pingley managed to escape.

A search of the woods near his home resulted in the capture of Pingley next day, and it appeared certain that he would be convicted for the murder of the sheriff.



Analysing evidence at the technical laboratory of the Federal Bureau.



Special agents firing Thompson machine guns.

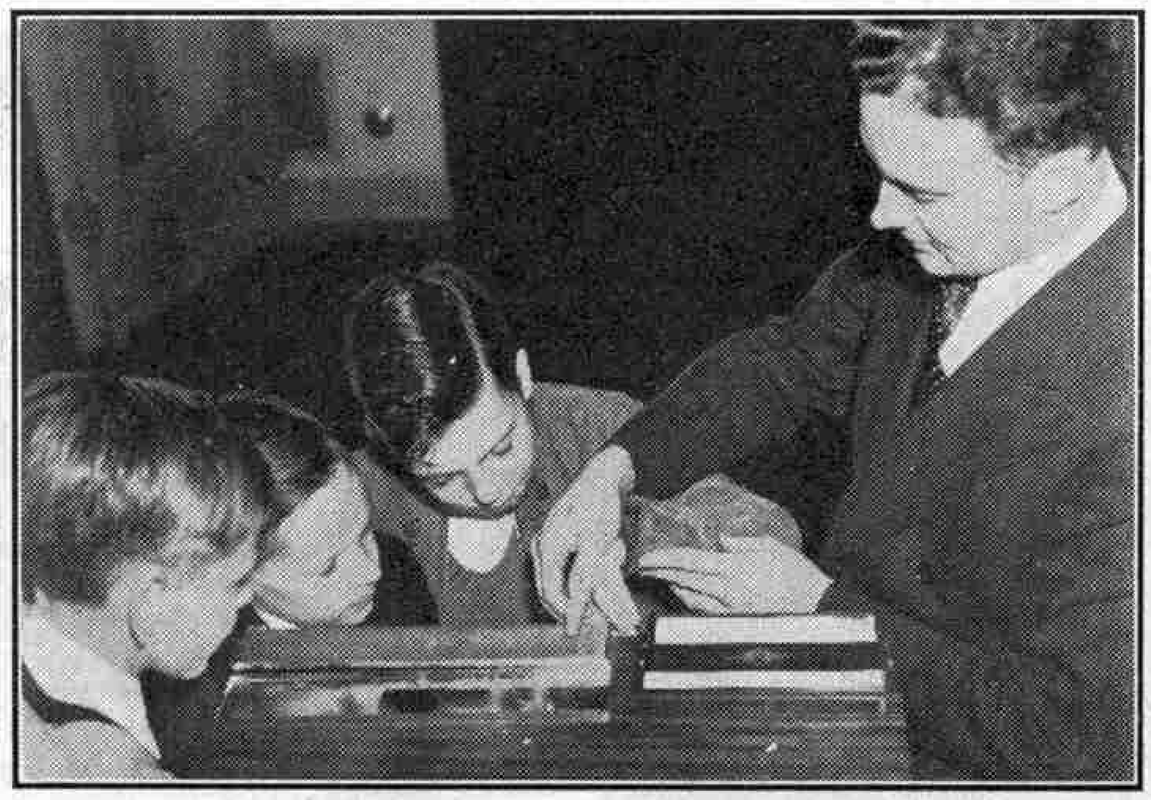
When a statement was taken from him, however, he claimed that he shot the sheriff accidentally in a struggle of self-defence. He also denied that he attacked the policeman, and stated that he fled in fear after the shotgun was accidentally discharged. The police were aware that if the accused man testified to that effect in court the jury would probably swing in his favour. Meanwhile Pingley's shotgun had been recovered and sent to the Bureau for examination. On the barrel of the gun was a small indentation that seemed to contain minute scratches. The policeman's gun was then examined, and photomicrographs of both weapons were prepared to illustrate the examiners' conclusions.

At the trial of this case the firearms examiner of the F.B.I. took the witness stand and was able to prove that Pingley's gun was the one that fired the bullet found at the scene of the crime. He was able to prove also that the revolver belonging to the policeman had been struck with great force by Pingley's shotgun.

While examining the shotgun and revolver the firearms examiner had paid particular attention to the small dent in the shotgun. He had also detected a tiny, almost microscopic scratch on the policeman's revolver. When examined under the comparison microscope, the strictions appearing in these scratches were a perfect match. The mark on the policeman's revolver therefore could be from no other source than the muzzle of Pingley's gun.

The theory of the prosecution that Pingley had first shot the sheriff, and then, because his shotgun was empty, struck the policeman's revolver out of his hand, was thus ably corroborated. Pingley was convicted of the murder of the sheriff and was subsequently sentenced to death.

The most important section of the F.B.I. is the finger-print department. Of all the methods of criminal identification ever discovered the only one with positive proof is the finger print. These ridge formations are permanently a part of the body and remain unchanged during the life of an individual. Most important for identification purposes is the fact that no two fingers have ever been found on which the patterns are identical. All finger-print impressions are divided into the following types of patterns: Loops (radial and ulnar), twinned loops, central pocket loops, lateral pocket loops, arches, tented arches, whorls and accidentals. By studying a definite portion of each finger print, known as the deltas and cores, and by counting or tracing the individual ridges between such points, it is possible to classify each of the 10 fingers into a definite group. The 10 fingers are then considered as a unit to attain the complete classification that permits the filing of finger-print records in sequence, and enables the finger-print expert in a bureau containing millions of prints to establish an identification in a few minutes. For example, the expert examining a finger-print card of a suspected person would mark it in a manner similar to this:



Schoolboy visitors to the identification division have finger-print records made.

$$\frac{10 \quad 25 \quad W \quad 11 \quad 14}{26 \quad W \quad 01}$$

The "10" is a "key" count of ridges occurring on a certain finger. The "25 over 26" in connection with the W/W means that the subject possesses whorls on certain fingers; 11 over 01 concerns the tracing of inner and outer whorls proceeding from certain ridges, and the final number 14 is the ridge count of the right little finger.

The expert now goes to the finger-print files and quickly picks out a card that has the same classification. He does not even look at the name of the criminal printed on the card, but under a magnifying glass carefully examines the whorls, loops, ridges and deltas to see if they match the first card in every detail. If they do, identity is absolutely established.

Before the advent of the finger-print method into general public use, identification was a difficult matter. The two principal methods then were the Bertillon system and the Rogues Gallery. This latter method utilised pictures of known criminals, but owing to the poor quality of fixing chemicals, fading complicated the problem of establishing identity.

The Bertillon system was based on the theory that the size of certain bony parts of the human anatomy remained the same during adult life. Measurements were taken of certain bony structures of the body—length and width of the head, length of left middle and little fingers, length of left foot, length of left forearm, length of right ear, etc. Photographs were also taken and certain characteristics noted. But it was not long before deficiencies in the method were discovered. Some operators used the measuring instruments "close" and some "loose," thus resulting in different classifications. Further, the Bertillon system was not an effective means of identifying persons under 21 or over 60 years of age, for as a general rule the bony structures of the body change at these ages.

The following case illustrates the fallacies in the Bertillon system, which necessitated the adoption of the finger-print system as a medium of identification.

One Will West, a coloured man, was committed to the U.S. Penitentiary at Leavenworth, and a few days after was brought to the record office to be measured and photographed. He denied having been in the penitentiary before, but the clerk doubting his statement, ran his measuring instruments over him. From the Bertillon measurements obtained he went to his files and returned with the card the measurement called for, all properly filled in and accompanied with the photograph and bearing the name Will West. The prisoner continued to deny that the card was his, whereupon the clerk made more enquiries and discovered to his astonishment that another Will West was already a prisoner in Leavenworth, serving a life sentence for murder. The Bertillon measurements of those two men were almost identical, but the finger prints were decidedly different. The warden of Leavenworth, after this confusion, decided to go over to the finger-print system.

It was soon found necessary to have one central bureau for all finger-print records. Through the resourcefulness of J. Edgar Hoover, the Identification Unit of the F.B.I. now occupies an entire floor of the huge new Department of Justice building, and is the clearing house of such records for the whole of the United States. It also co-operates with many other countries.

A Battleship Goes Into Action

By Commander H. Pursey, R.N.

Commander Pursey, who spent thirty years in the Navy, won his commission from the lower deck during the Great War after ten years of service in the ranks. He served for eighteen months in the Grand Fleet and took part in the Battle of Jutland, the greatest fleet action of modern times. He describes what happens in a modern battleship when she goes into action.

"ENEMY in sight!" This is the startling report that few of our battleship crews have heard in this war, owing to the German Navy having avoided conflict with the British Fleet. It may be received by wireless from a ship out of sight, by flags from a consort in company, or from her own masthead look-out.

What happens when such encounters do occur?

"Action stations" are immediately ordered by the captain and the bugler blares forth his clarion call. This brings every man to his battle station at the rush. Control positions, gun turrets, torpedo and other compartments become as busy as a beehive.

On the bridge the navigating officer, under the captain's directions, manœuvres the ship to outwit the enemy and bring all guns to bear in order to inflict the maximum of punishment.

In the control position, high up on the mast, the spotting officer, looking through binoculars, strains his eyes to estimate the enemy's course and speed, and passes his observations to the transmitting station down in the bowels of the ship. Range-finders also pass ranges to this station. Calculations are made here on a plotting table by other officers, and the range and deflection is passed to the gun turrets and director tower aloft by special ratings—usually the bandsmen.

In the turrets, seamen and marine crews clear away the guns and train their turrets round on to the target. At the order" Load!" projectiles and cartridges are sent up in hydraulic cages from shell rooms and magazines and rammed into the breeches by hydraulic rammers. The guns are then reported "loaded."

In the two batteries, one on each side of the ship, the secondary armament of 6-in. guns for destroyer attack is also prepared for action. The gunlayer tries the elevating gear and the trainer his training gear. The sight-setter, usually a boy, puts the telepauds of a voicepipe over his ears ready to receive and repeat all orders, and tests his sights. The breech-worker tests the breech and firing arrangements. Loading numbers provide the 100 lb. projectiles and lighter cartridges from hoists near by, where they are sent up from shell rooms and magazines by electric motors.

Anti-aircraft guns' crews close up at their stations on the upper deck, don anti-gas hoods and gauntlets, and ship their tin helmets. Ammunition is provided ready to deal with enemy aircraft should they appear.

In the torpedo tube compartments below the waterline torpedo men prepare their "tin fish" for action. A four-vaned pistol with primer and detonator is screwed into the nose of the torpedo. The safety pin is then removed, and the torpedo loaded into the tube in readiness to be blown out by air pressure when ordered.

Medical staff proceed to their battle stations behind armour, prepared to tend any wounded. Fire parties run their hoses out and repair parties get ready to deal with any shell damage.

"Full speed ahead" is ordered by the captain; and stokers in the boiler rooms, watching water and pressure gauges, adjust the supply of oil fuel to give increased boiler pressure under forced draught.

In the engine-room the artificers, in reply to the demand from the bridge for increased revolutions, open up more steam to the turbines and their whirr increases inside their wooden shells.

* * * *

With a "bone between her teeth" from the bow wave at the fore-foot, the ship speeds ahead, vibrating as if with excitement and eagerness for the fray.

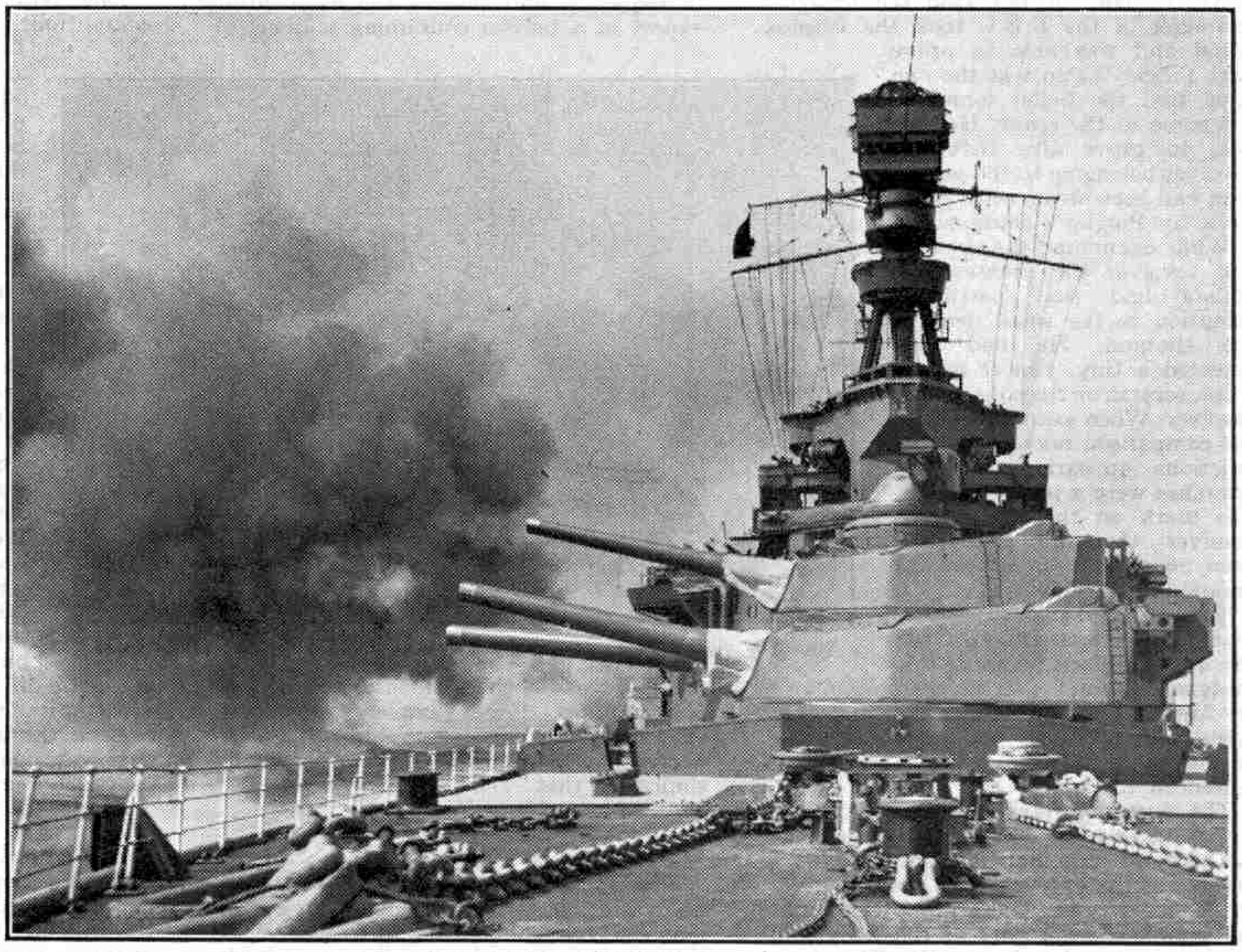
On closing in to gun range the captain gives the order to the gunnery officer: "Open fire!" The spotting officer orders "Salvos," one gun in each turret is brought to the "Ready," and their indicating lamps burn in the transmitting station.

When a complete broadside of one gun in each turret is ready, the plotting officer gives the permissive signal by fire-gong to the director-layer. Perched in an eyrie position on the mast, to give him the longest possible view, the layer presses his firing key when his sights are on the enemy and the salvo of four guns is fired simultaneously.

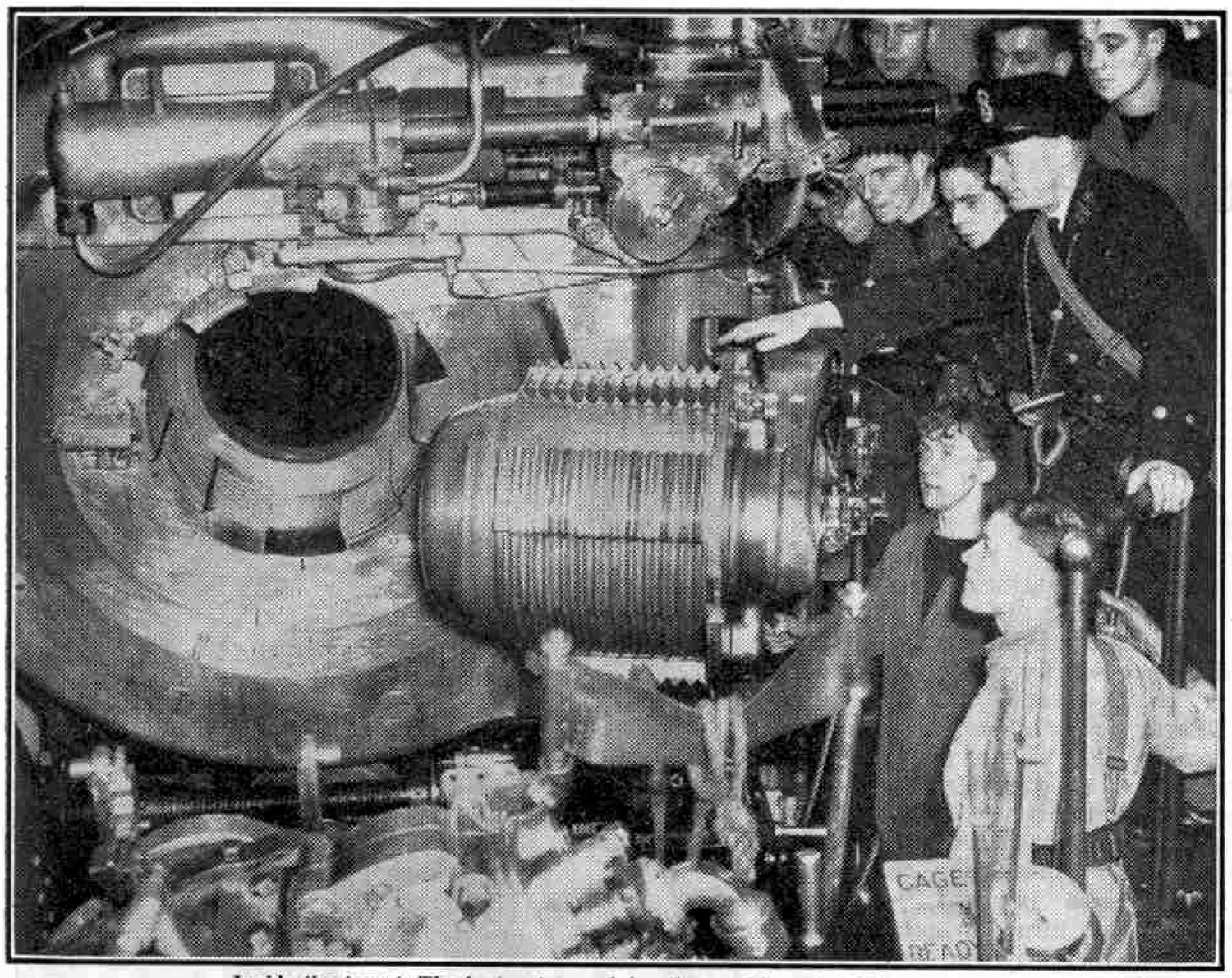
The spotting officer immediately orders "Fire" to have another salvo "in the air" while waiting for the first to fall. When he sees the first splash he corrects his deflection, right or left, or his range by ordering "Up" or "Down 400." By bracketing the target—getting one salvo over and one short—he finds the correct range and orders "Rapid Salvos."

The plotting officer then rings the fire gong as rapidly as a broadside is brought to the "ready," without waiting for further corrections from the spotting officer. The director-layer presses his firing key and fires salvos as fast as the gong gives him permission.

In the turret shell rooms, shells weighing nearly a ton are lifted by hydraulic grabs and transported along overhead rails to the



Firing a salvo of 15 in. guns.



Inside the turret. The instructor explains the working of a 15 in. gun.

cages. Cordite charges from the magazine on the deck above are also inserted, and up goes the cage on its first stage.

After the gun has recoiled on firing and been forced out in the firing position again, the cage is brought up the second stage to the gun house. The projectile is rammed home by the hydraulic rammer with a clatter and this operation repeated a second time to force home the cartridge.

* * * *

In the submerged torpedo flat, torpedoes weighing over a ton are lifted by hand purchases and transported by overhead rails. Lowered into the tube, they are then hauled home with a tackle and the tubes closed up.

When one is about to be fired, the order "Flood and out bar" is given. A door in the side of the ship is opened and a bar run out to carry the torpedo until its tail is clear of the ship. On deck, in the torpedo control tower, the firing officer adjusts his sight and waits for the target to come "on."

He then presses an electric firing key and a magnet on the tube releases a ball. This in turn opens a valve and so admits air pressure to the rear of the tube, which blows the torpedo out into the sea. The outer door is then closed, the tube drained and opened and another torpedo launched in.

* * * *

Suddenly, the captain receives a report from the aloft control position: "Destroyers attacking." The 6-in. gun control officer brings the battery to the "ready" and waits for the enemy to get within range.

His spotting orders are the same as for the main armament, but the work at the guns is done by hand instead of hydraulic power. The 100-lb. projectile is placed on a tray and rammed home with a hand rammer, the length of a broom handle. The charge is placed in the breech by hand and the breech block closed with a metallic clang.

"Rapid salvos" are quickly ordered and a high rate of fire developed of six rounds in a salvo, which almost invariably proves a deterrent before enemy destroyers get within range to fire torpedoes.

If likely to be hit by a torpedo, avoiding action is taken by the captain by altering course away from the enemy for a short period. Actually the torpedo when fired from surface ships is far from a weapon of precision. At the Battle of Jutland the Germans fired over 100 of these "tin fish" and only three got home—one of which was a "sitting shot" on a disabled destroyer.

I took part in this battle on board H.M.S. "*Revenge*," one of the latest ships in the Grand Fleet, and her expenditure of ammunition gives an idea of the work at the guns in a modern fleet action. We fired 102 rounds of 15-in. shell, 87 of 6-in. and one torpedo. She was not hit by gunfire and avoided at least six torpedoes, though the "*Marlborough*," which was the only battleship to be torpedoed, was the ship next ahead of us. She was, however, able to steam at 17 knots and keep her position in the line of battle.

* * * *

As the majority of the officers and men in a modern battleship are employed in turrets or between decks, few see anything of the actual battle. If no damage occurs an appreciable number may go through an action without having anything to do. On the other hand, if the ship is hit and casualties are incurred, as was the case with several capital ships at Jutland, the jobs of the various "between decks" parties are no sinecure.

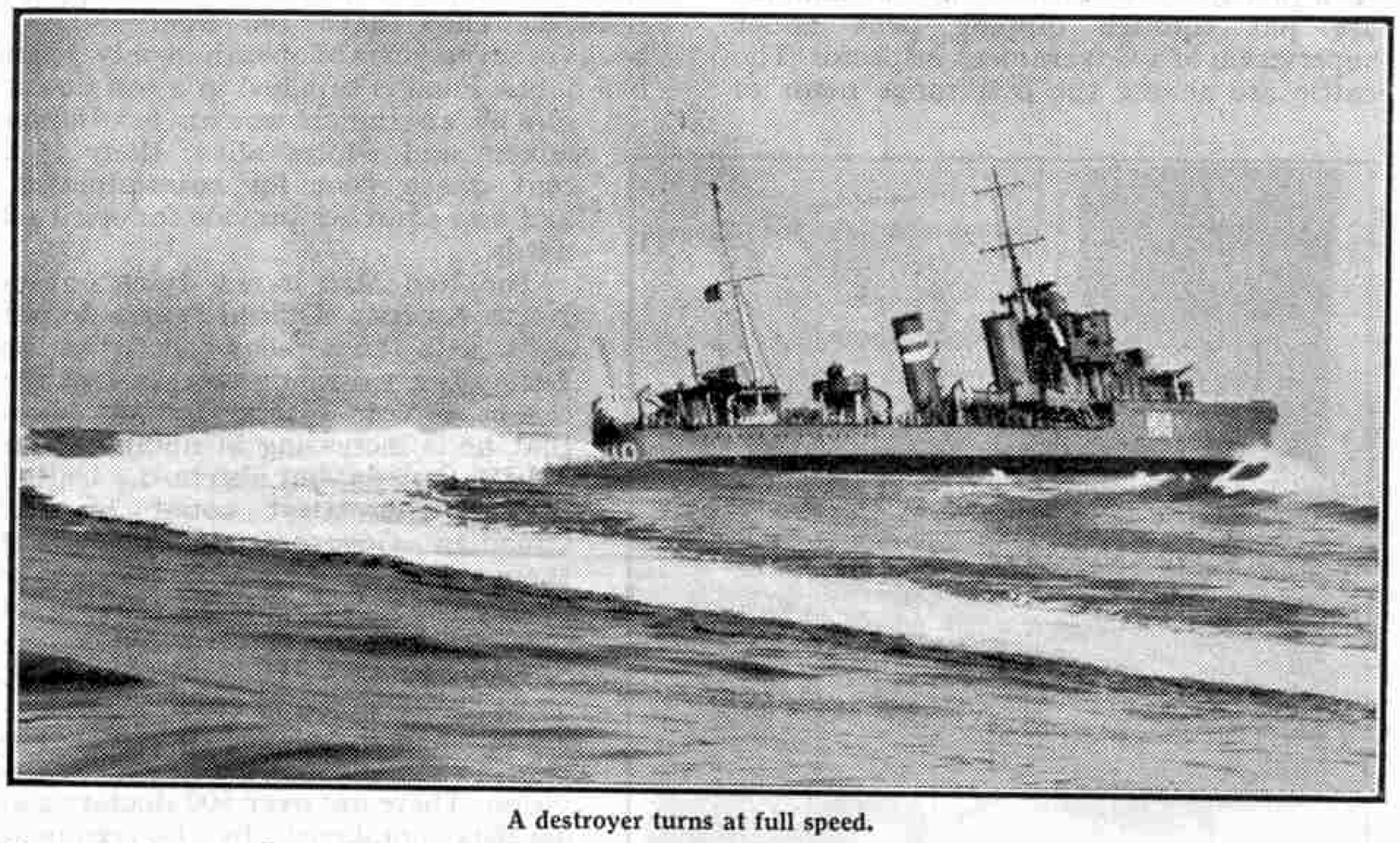
Fire parties have to contend with fires from explosive shells, and repair parties make good damage that may occur below the waterline and require compartments and bulkheads to be shored up. Electric repair parties provide temporary lighting. Damage to machinery or steam pipes may reduce the speed of the ship and cause her to become a "sitting shot" for the enemy, so the engine-room staff have to be well trained and prepared to deal with any emergency—as they invariably are.

While the action is going on, the sick berth staff, augmented by the officers' stewards and cooks, are handicapped in dealing with the wounded owing to the difficulty of getting about the ship. First aid may be all that can be given, and when the action is over it may be found that the well-lit, well-ventilated sick bay on one of the upper decks has been demolished. But generally speaking the medical officers and staff are able to perform wonders.

In such a complex box of machinery of some 30,000 tons with eight 15-in. and twelve 6-in. guns, every one of the 1,200-odd officers and ratings, from the captain down to the youngest boy, has a definite job to do in action.

It may be recalled that one of the few Victoria Crosses granted for bravery in action at the Battle of Jutland was posthumously awarded to Boy 1st Class Jack Cornwell of the cruiser "*Chester*." He was the sightsetter of one of the 5.5-in. guns, and although mortally wounded early in the action, he remained calmly at his gun in a most exposed position, quietly awaiting orders until the end of the battle, with the gun's crew dead and wounded all round him.

He was only sixteen-and-a-half years of age, and Admiral Sir David Beatty said of him: "He showed an example of how English boys should live and how English boys should die."



A destroyer turns at full speed.

Canada's Indian Population

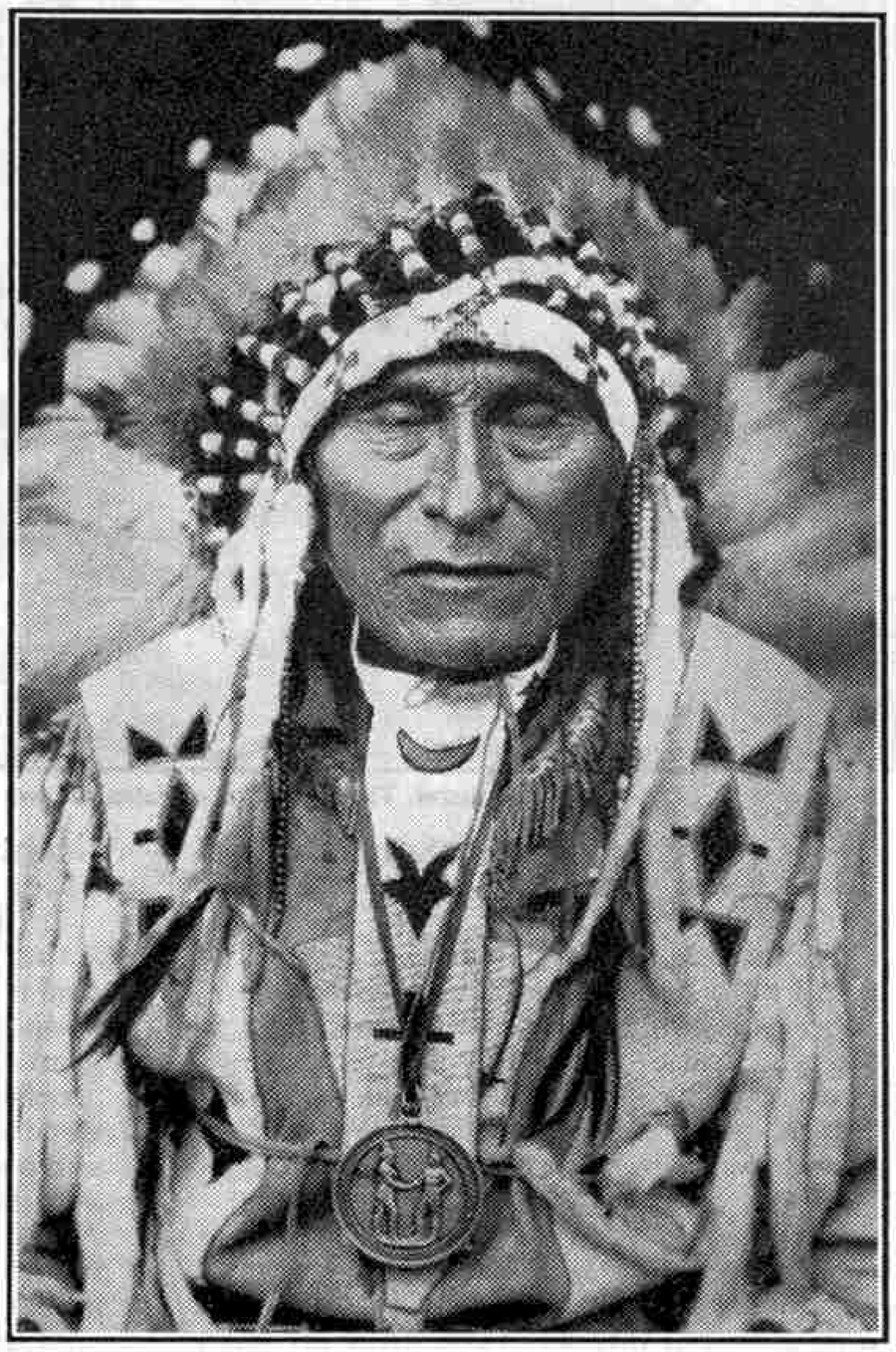
"As Long as the Sun Shines and the Rivers Run"

By James Montagnes

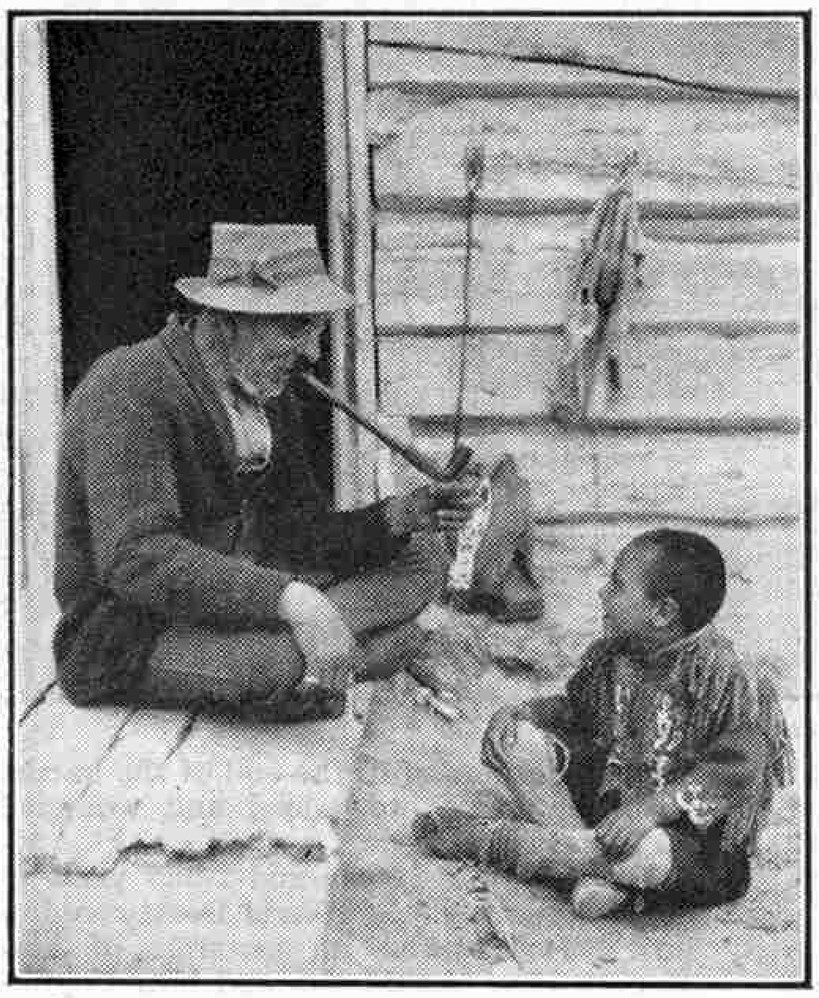
THE growing Canadian Indian generation, whose forefathers lived by hunting and trapping, are being taught practical hunting, trapping and fur farming by Canadian Government instructors. The establishment of a mink farm at the Qu'Appelle Indian Residential school at Lebret, Saskatchewan, is typical of the progressive steps being taken in the vocational training of Indian children. While boys in their teens in areas where the livelihood of the Indians depends largely on the game resources have for some time been given practical training in hunting and trapping, the starting of the fur farm at the Qu'Appelle school is considered the forerunner of an industry that may eventually make many of the Indians self-supporting. The Indian's instinctive knowledge of wild life is expected to make him a specially good fur farmer. If the venture proves successful at Qu'Appelle, other fur bearing animals will be raised on the experimental Indian fur farm, and other Indian schools throughout the Dominion will provide similar vocational training.

Blackfoot Indians living on the Peigan Reserve in the Pincher Creek region of Alberta have made good as ranchers and farmers, and are among the most prosperous and self-reliant of Canada's Indians. The tribe has about 2,000 shorthorn and Hereford cattle, 2,000 horses, and 5,000 acres of their 9,000 acre reserve under cultivation. Ranching operations on the Peigan Reserve are carried out by the Indians themselves on a co-operative basis. The cattle herd belongs to 65 individuals who stage a grand round-up each summer, during which each owner's brand is tallied. As a precaution against mange the animals are put through dipping pens under supervision of a Government inspector. The cattle are among the best range herds of beef cattle in southern Alberta. On the market the Indian cattle bring premium prices. From sales of about 400 head yearly the owners derive an annual revenue of from $15,000 to $20,000 at present prices. The reserve is in the shortgrass country, containing an ideal winter grazing range.

Canadian Blackfoot Indians also successfully run a coal mine on their reserve at Gleichen, Alberta, which last year produced 10,000 tons of coal and has a payroll of $26,000. The mine was started early in 1931 and was on a paying basis by October of that year. Since then coal production has boomed, so that to-day the mine, which is run co-operatively by the Indians of the Gleichen reserve, has 40 houses, a wash-house provided with showers and hot water, a dairy that provides milk from tested cows at low cost, a barn for mine ponies and cows, a blacksmith shop, a first aid station and a drug store. A white mining engineer supervises the Indians' mining venture and under his direction more than 50 Indians work as miners the year round, being paid $1.50 per ton for all coal mined and delivered to the mine head. An Indian is in charge of the office and books, while sanitary men, dairymen, drivers, engineers and slack haulers are all Indians. They have on their books in seven years of operation only $50 in bad debts. Food is supplied in a restaurant run by an Indian woman for Indian miners and whites alike; there is a tent dance floor for entertainment, and two churches provide for spiritual needs.



Western Canadian Indian chief wearing a medal given him at the treaty whereby he ceded his tribal lands to the Canadian Government.



Listening to tales of the buffalo hunt.

The Red Man is not dying out in North America. Official figures do not agree with the popular belief that the Indian is a vanishing race; in fact the census reports of the Indians show that he is increasing in numbers, not only in Canada, but also in the United States. The latest count by the Canadian Government shows that there are 118,406 Indians in the Dominion, an increase of 6,000 over the 1934 special Indian five-yearly census. There are 59,767 men and boys, 58,649 women and girls.

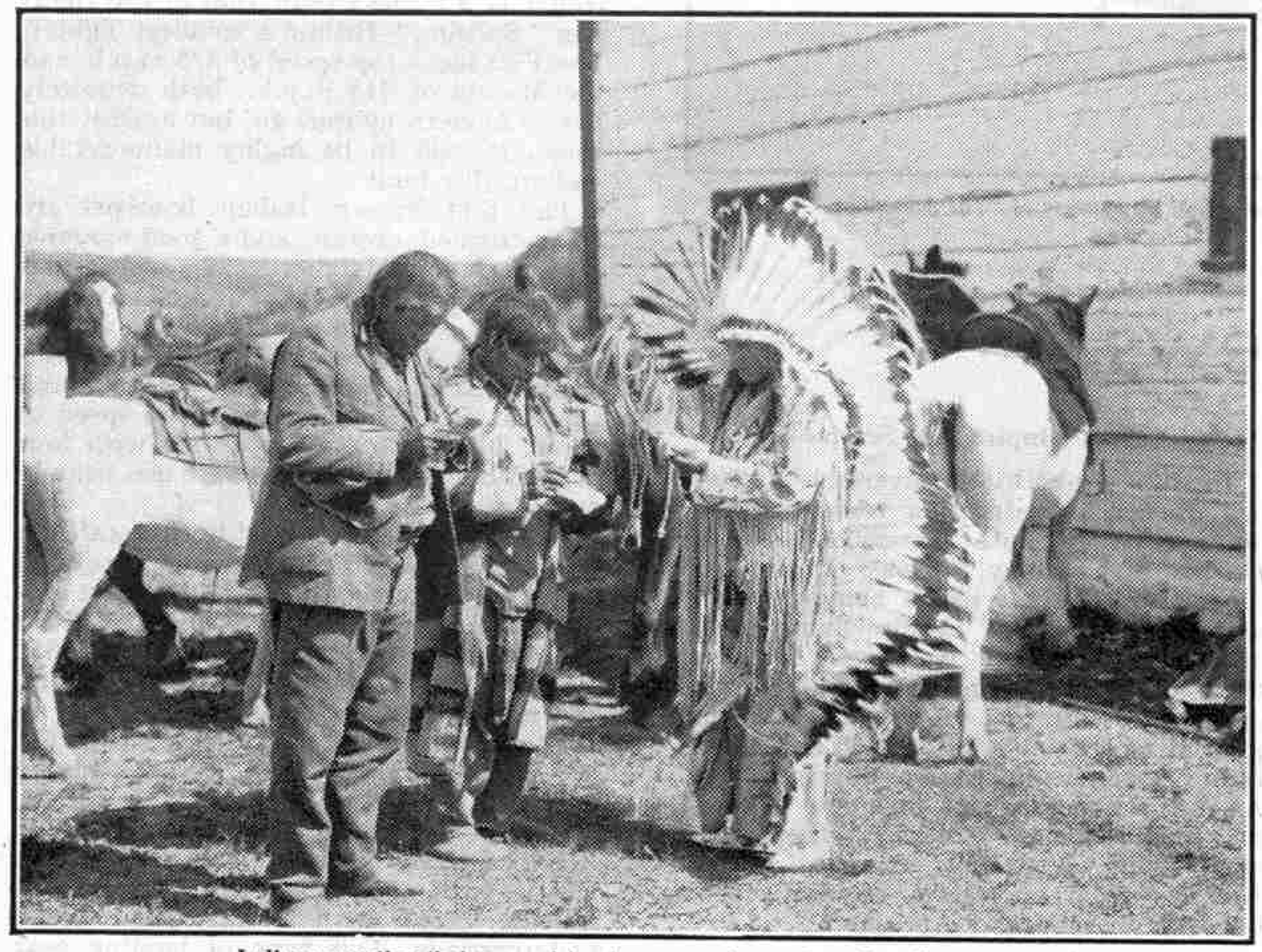
The increase in the Indian population is mainly due to health supervision. There are over 500 doctors and dentists employed by Government departments to look after Indians on full and part time. There are several hospitals, and a field nursing service, while in addition sick Indians are treated at over 200 public hospitals. At the 79 Indian boarding and 270 day schools the 18,000 Indian children receive constant medical and dental examination; they are placed in various health groups and receive medical treatment. In recent years Indian school children have not suffered from much more than measles and whooping cough, and no large epidemics of major communicable diseases have been recorded.

While most of Canada's Indians live on reserves, many still live in the northland where they hunt and trap for fur, help at trading posts, do work at police posts, missions and the mines. Those on the reserves farm and do industrial work near their reserves. When they are in need of food or clothing through bad crops, or a bad fur year, Government aid is given them.

The Indians' manner of livelihood depends largely upon the climatic and physical features of the areas in which they live. In southern Ontario, southern Quebec, and parts of the Atlantic coast provinces, the Indians are engaged largely in agriculture, and some of them find employment in industrial centres near by. Another group occupies the great hinterland comprising the northern parts of the provinces from the north shore of the St. Lawrence River to the Mackenzie Valley and Yukon. These people are dependent mainly on hunting, fishing and trapping for their existence, and large tracts of land have been set aside where only the Indians are permitted to hunt and trap. Efforts are being made

to have this policy extended wherever feasible, having regard to the interests both of the Indians and of wild life conservation.

A third group of Indians is found in the Great Plains region and in the foothills country of Alberta, where their lands are suitable for agriculture and stock-raising. In 1878, when the great buffalo herds were virtually wiped out, these Indians had to turn to farming and ranching, and within two generations large numbers of them have developed into prosperous, self-reliant farmers. Still another group of Indians inhabit the northwestern coast of British Columbia. These people had a highly developed culture before the appearance of the white man. They are fisher-folk, trained to the sea, and for many years have been prominent in the fishing industry.



Indians counting their annual treaty money at a western Canadian reserve.

Government paying officers this summer distributed treaty money to Canadian Indians gathered at 20 central points or at camps in those 20 regions. In Ontario, Manitoba, Saskatchewan, Alberta, British Columbia and the North West Territories, the Indians once more received crisp new dollar bills, once more made merry, and departed to look forward to the day next year when they will again make high holiday, treaty payment day. Treaty payments to Canada's Indians have become a custom. "As long as the Sun shines and the rivers run," say the treaties. And so for three months each summer thousands of new dollar bills are given to Canada's aborigines for ceding their lands to the white man in treaties made as long ago as 1670 and as recently as 1930. For only recently have vast areas in northern Ontario come into possession of the Canadian Government. Those areas belonged to the red man.

There is a doctor and usually a member of the Royal Canadian Mounted Police with the treaty agent—the doctor, because every Indian receives free medical service according to the treaty, and the Mountie in case of trouble, which comes chiefly from the illegal importation of fire-water by an unscrupulous white. The Indians are called by name, they present their identification card, while the agent asks them questions about their health, births and deaths in the family, and what the Indian has done during the past year; how his fur catch has turned out, how many of his children were sick during the year, how many go to school. Sometimes it takes but a few minutes to pay an Indian his treaty money. At other times an hour or more may pass while the Indian and the white man converse, helped by an interpreter if necessary. Then the Indian receives the treaty money for himself, his wife and each of his children.

It is no great sum that changes hands. Some treaties call for $5 to each man, woman and child; others state the annuity to be $4. For once the man with the most children fares best; he receives the largest bundle of fresh bills. Under some treaties the chief and his six councillors receive more, in some cases $25 for the chief, $15 for each councillor. Altogether it mounts up; the treaty paymasters distribute nearly $250,000 each year for the land which the Indians surrendered.

To most of them the money means little; they make much more at their calling and their hunting. But the coming together every year with officials from Ottawa to make council sends them on the trail from far and near. Whether they have to travel 20 miles or 200, they come; it is a mutual keeping of the faith by white and red. It is the one time of the year when they leave everything else to make high holiday at the trading post where they have been advised to meet. For each year in January a batch of letters goes out from Ottawa, one to each chief, telling him where to meet and on what day.

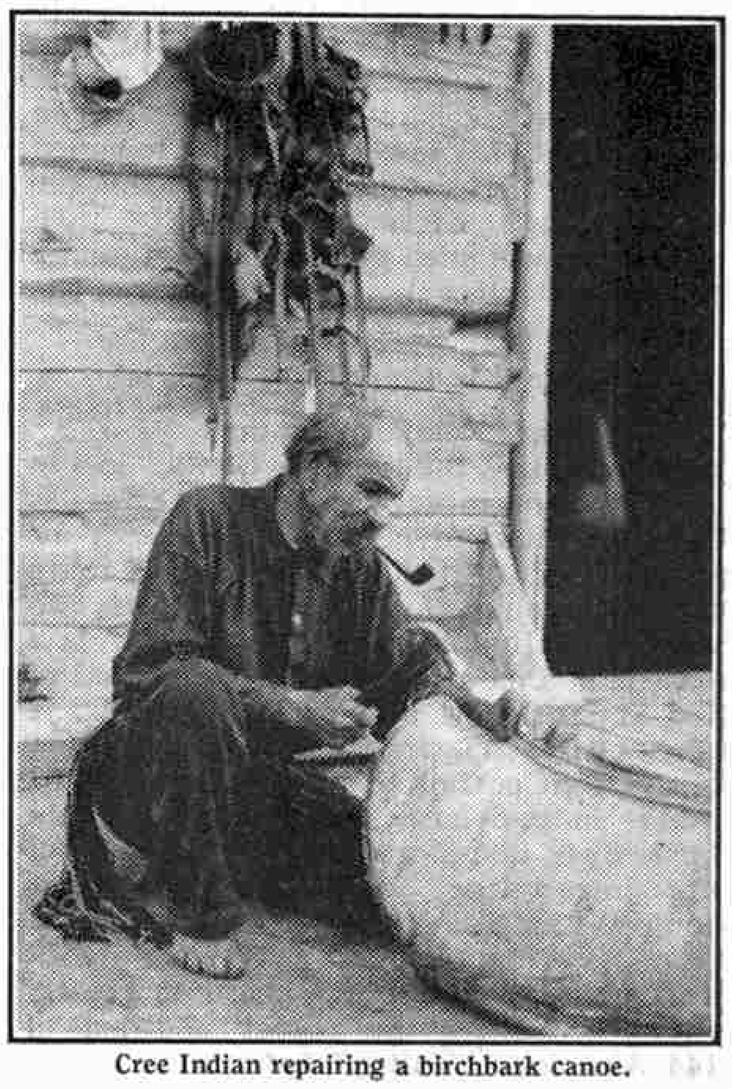
By dog-team or aeroplane that letter goes north as it leaves the railway. It may take weeks from the time that the letter leaves Ottawa till the moment the Indian Chief, perhaps returning from his traps, is given the letter by an aeroplane pilot or the driver of one of the many dog teams that ply the winter trail in Northern Ontario. No matter when he gets it, the letter asks him to pass the information to all the members of the band; and news travels fast in the northland.

According to the treaties, in bad times when the hunting has not been auspicious or the crops have not matured, the Government provides food, medical assistance and clothing. No Indian may be allowed to starve or go naked. The white man has signed solemn treaties and smoked the pipe of peace at the council fires that he will take care of the red man. And that runs to $2,500,000 a year.

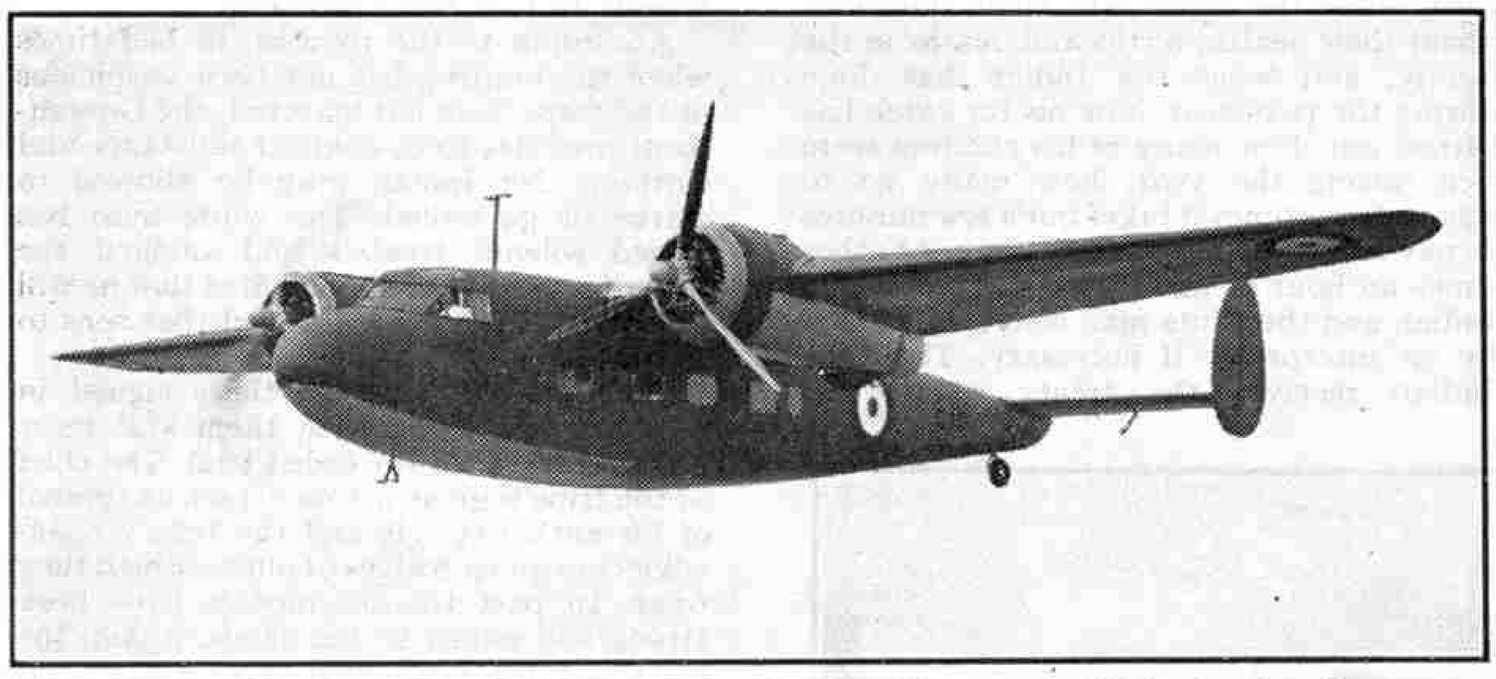
New treaties, such as those signed in recent years, bring with them still more gifts in return for the ceded land. The chief of the tribe is given a Union Jack as symbol of his authority. He and the tribe's councillors are given badges of offices which they wear. In past treaties medals have been struck and issued to the chiefs. Again, the chief and the head men receive caps and coats with brass buttons every three years, as symbols of their office at treaty payment time, gifts from the white chief to his red children's chiefs.

Do not for a moment think that the Indians are poor, or that the Canadian Government is not giving them a square deal. There were new reserves established with each treaty, areas where the Indians who surrendered their land will still be the only inhabitants allowed. In northern Ontario one square mile is set aside for each family of five Indians in the tribe at the time the treaty was signed. These reserves are solely for the red man, no white man may enter them without permission from the Government and the consent of the Indians. Often these reserves become too large for the Indians to operate, and then the Government advises selling. The proceeds of such a sale are kept in custody for the Indian by the Dominion Government. There is at present more than $15,000,000 at Ottawa belonging to Canada's Indians.

While no figures are available on how many Indians roamed the Dominion in the long ago, records go back to 1871 when it was estimated that there were 102,358 red men in the country. The fact that the Indian is holding his own, and in recent years has even shown an increase in numbers, is important as showing that no longer does the aborigine disappear where the white man brings his civilization.



Cree Indian repairing a birchbark canoe.



Test-flying a D.H. "Flamingo" on one engine. Photograph by courtesy of "The Aeroplane."

Air News

The R.A.F. Pilot who Saved his Gunner

A fine act of heroism by the pilot of an R.A.F. bomber during the fighting in France was revealed recently. A few days before the final evacuation to England, he led a bombing raid on strong enemy columns, and after the task had been completed he was chased by seven Messerschmitt Me 109 fighters. His rear gunner shot down one of the enemy machines in flames and disabled another. The British bomber then escaped into the clouds, but on emerging it was again attacked, this time by a stray Messerschmitt Me 110 from a range of only 50 yds. The attack was returned, and once more the R.A.F. rear gunner saw his opponent burst into flames and dive headlong to the ground.

During the short duel, however, the German pilot had managed to achieve a few hits, and these set on fire the bomber's port petrol tank. It was obvious that the machine would soon be ablaze, and the order was given to abandon it. The observer jumped and made a safe landing. The pilot then stood on the wing, and was just about to jump when he noticed that his rear gunner was still inside the machine. He realised that the man was wounded, and saw that his parachute harness had become entangled with his gun. Without hesitation the pilot got back into the cockpit, regained control of the bomber and brought the flaming mass safely to earth. He then helped the wounded gunner out of it, and a few minutes after they had got clear of the machine it blew up.

Russian Air Giant Now at Work

The giant Russian air liner *"L-760,"* built to replace the *"Maxim Gorky,"* lost in 1935, is now in service on the 965-miles Moscow-Mineralniye Vody (Caucasus) air route. During a test flight over this route the machine did the full journey, with two stops, in 7 hrs. 42 min. The *"L-760"* is a six-engined monoplane with a top speed of 186 m.p.h. and a range of 1,864 miles. It carries 64 passengers, 14 of them in a cabin in the front portion of the fuselage and the others in two large and one small cabin farther aft, and a crew of 8 to 10. Each of the huge wings contains four cabins equipped for use as sleepers.

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The Swedish Air Force has been greatly strengthened by the recent addition of 144 American "Vultee" fighters.

New Empire Air Service

In June last British Overseas Airways Corporation introduced a regular weekly air service in both directions between Durban and Sydney, by way of Cairo and Singapore. The service is being operated with the company's Empire flying boats, and from Singapore passengers continue their journey to Sydney in similar aircraft of Qantas Empire Airways. The full journey at present takes about 12 days, and both passengers and mail are being carried. At Sydney passengers for New Zealand make the last stage of their journey in the new flying boats of Tasman Empire Airways, who operate a regular service between Sydney and Auckland.

Italian Aircraft Types

The entry of Italy into the war will add new names to the list of types of enemy aircraft already familiar. German types that have become well known owing to being shot down by the Royal Air Force include Heinkels, Messerschmitts, Junkers, and Dorniers. Some of the Italian aircraft that are becoming familiar in the same way are Fiats, Macchis, Bredas, Savoia-Marchettis, Cants and Capronis. Altogether the Regia Aeronautica, or Royal Italian Air Force, employs about 30 different types of machines, and of these one is a flying boat and about six are seaplanes. Many of them are obsolete.

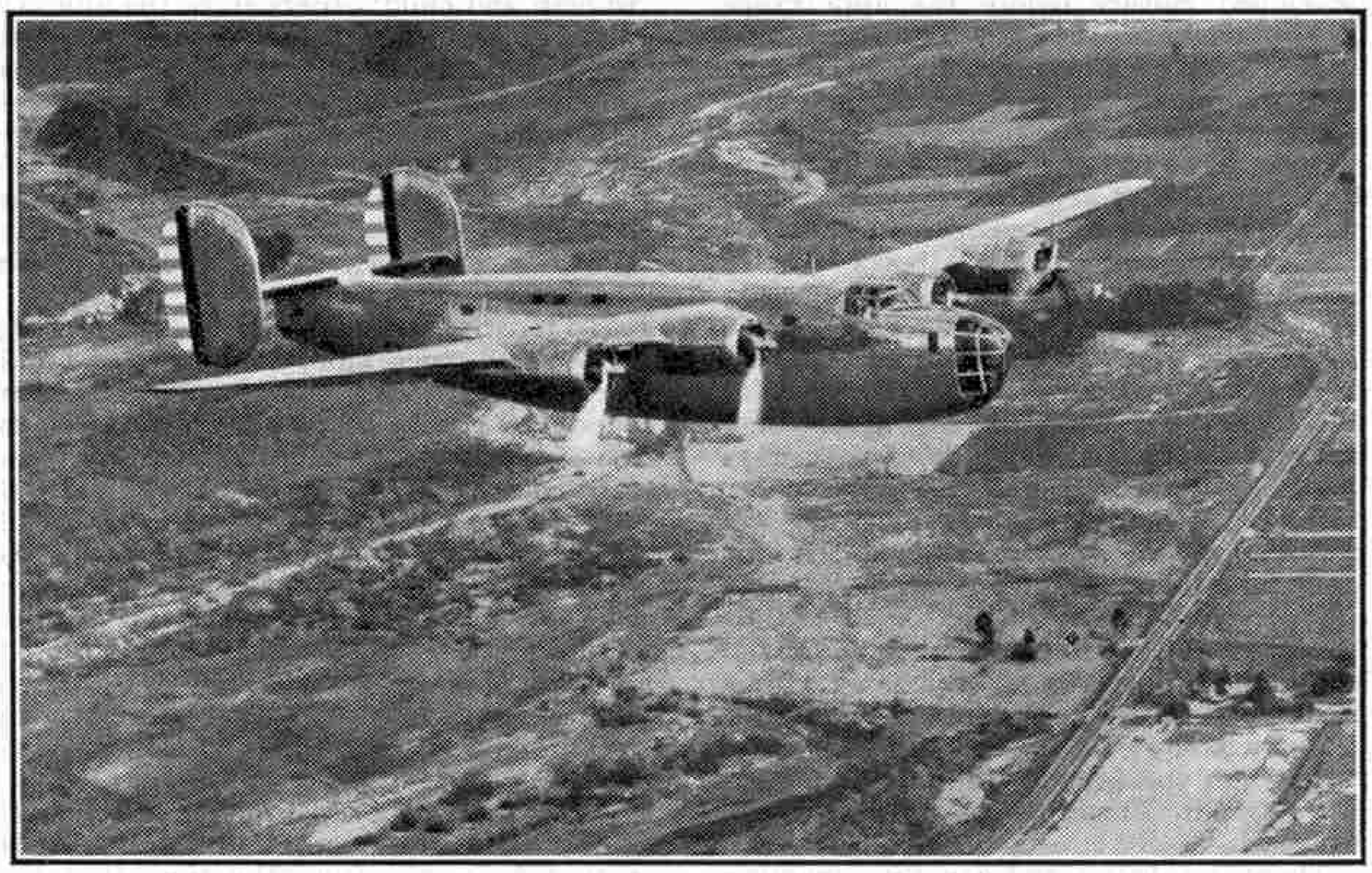
Foremost among Italian fighter aircraft can be reckoned the Fiat G.50 and the Macchi C.200, both modern single-engined, single-seater machines armed with two heavy machine guns firing forward. The wing span of these aircraft is about 35 ft., which is 2 ft. less than that of the eight-gun "Spitfire," Britain's smallest fighter. The Fiat has a top speed of 375 m.p.h. and the Macchi of 315 m.p.h., both definitely low as modern fighters go; but against this they are said to be highly manœuvrable and sturdily built.

The best known Italian bombers are three-engined aircraft, and a good example is the Savoia-Marchetti 79, which has "Bristol" Pegasus engines and can attain a top speed of 270 m.p.h. The wing span is about 66 ft. More recent types are the twin-engined Savoia-Marchettis 85 and 86, and the Fiat BR.20, which has a top speed of about 260 m.p.h. and is armed with four guns. Most Italian bombers are less heavily armed than the BR.20.

Out of roughly 2,100 first line aircraft the Royal Italian Air Force musters about 340 seaplanes and flying boats. The fastest seaplane types are the little Caproni CA.312 and the big three-engined Cant Z.506B. Many of these aircraft are out of date, and none of them compares favourably in either armament or performance with the British "Sunderland" and "Lerwick" flying boats.

* * * *

Experiments have been carried out in Russia with a Soviet P-5 mail transport aircraft fitted with a caterpillar track undercarriage. This type of landing gear dispenses with the replacement of wheels by skis, or vice versa, when ground conditions make such change necessary.



The Consolidated Model 32 heavy bomber, named by the United States Army Corps the XB-24. It has a top speed of over 300 m.p.h. Photograph by courtesy of the Consolidated Aircraft Corporation, U.S.A.

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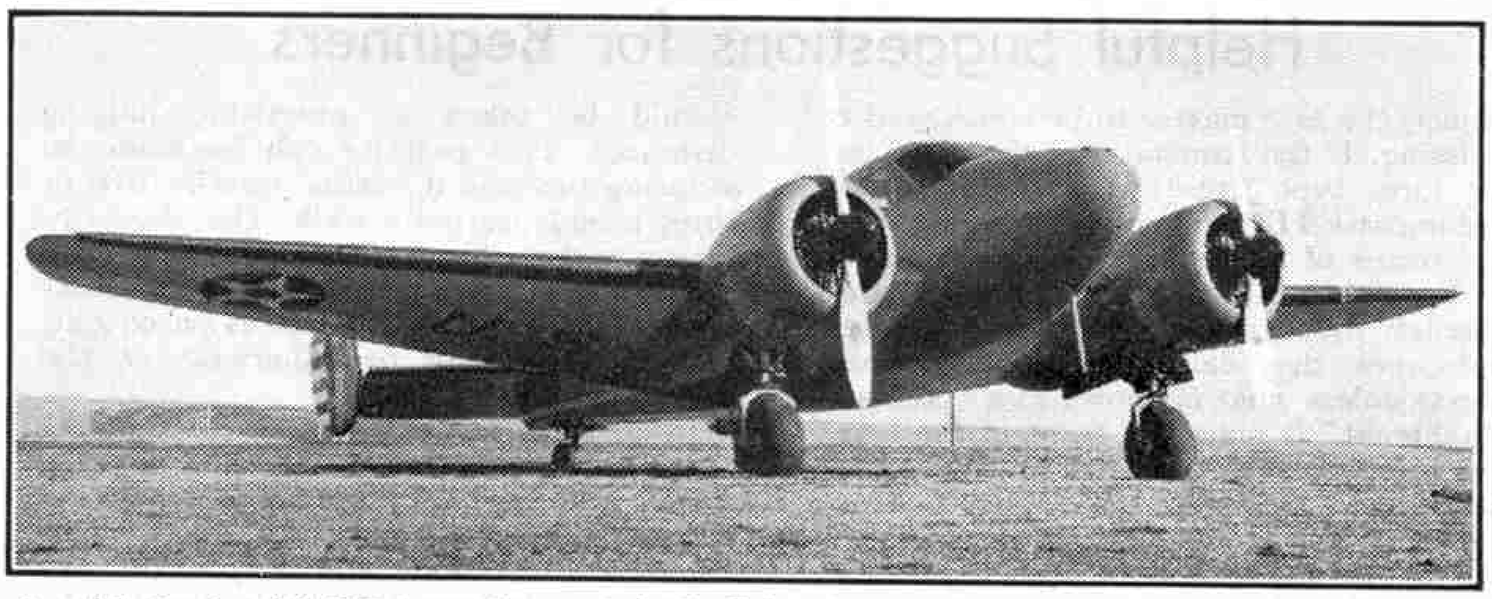
The preparation of a flying boat base which, it is claimed, will be the largest of its kind in the world, has been begun on an artificial lake near Rome. A special railway will connect the airport with the city.

Beechcraft Light Transport for United States Army Corps

The United States Army Corps have released a few details of the Beechcraft C-45 personnel transport, one of the Corps' newest types of aircraft. The first batch of these machines have been tested and accepted by the Corps, and the upper illustration on this page shows one of them.

The Beechcraft C-45 carries three passengers and a crew of two. It is an all-metal low wing monoplane with flaps, ice-removing and anti-icing equipment, and retractable landing gear. The two 400 h.p. Pratt and Whitney "Wasp Junior" engines fitted drive two-bladed metal airscrews. No details of performance are available.

The new transport is believed to be similar in design to the commercial Beechcraft 18S, which also uses "Wasp Junior" engines. A standard 18S won the 1940 Macfadden race in the United States by covering the 1,084 miles from St. Louis to Miami at an average speed of more than 234 m.p.h. The 18S has a rate of climb of 1,850 ft. per min. at sea level, and the service ceiling is 27,000 ft.



One of the Beechcraft C-45 Personnel Transports for the United States Army Air Corps. This light monoplane carries three passengers and a crew of two. Photograph by courtesy of Beech Aircraft Corporation, U.S.A.

Famous American Flying Boat for Sale

The famous United States Consolidated flying boat *"Guba"* was advertised for sale as a bargain in an American aviation magazine recently. This boat was much in the news last year, when it carried out a series of fine flights across British territories overseas. It accomplished a remarkable long-distance round trip that included crossings of the Atlantic and Pacific Oceans, the continents of Australia and Africa, and the first coast-to-coast crossing of the Indian Ocean from India to British East Africa. This achievement demonstrated some of the possibilities of modern long-range aircraft in linking up distant parts of the British Empire.

The *"Guba"* is said to have a range of 4,000 miles and a top speed of nearly 200 m.p.h. The extensive equipment aboard includes automatic pilot homing devices and direction-finding apparatus.

A Fine Safety Record

Striking proof of the safety of air travel has come from the United States. During the year ended 26th March last a total of 2,028,817 passengers were carried on air services in that country, without a single accident involving fatal or serious injury to a passenger, member of crew, or anybody else. This fine record was achieved in spite of the fact that the volume of passenger traffic by air was 58 per cent. greater than during the year ended 26th March 1939.

Varied American Aircraft for the R.A.F.

The diversion to this country of large numbers of American military aircraft ordered by the late French Government will add several interesting American types to those already included in the equipment of the Royal Air Force. The varied types covered by the French orders include Douglas DB-7 and Martin 157-W bombers, Vought-Sikorsky V-156 naval dive-bombers, and Curtiss Hawk 75-A fighters.

In addition to these newcomers there will be other American types that have been ordered by the British Government, and these include Consolidated long-range flying boats and Grumman fleet fighters.

Balloon Barrage for Hollywood

Hollywood film producers are being troubled by the noise of local aircraft spoiling the sound tracks of films made out-of-doors. They have decided to see if a balloon barrage will end the nuisance by preventing the machines from approaching too near to the filming sites. The barrage will consist of 12 ft. Goodyear spherical balloons painted bright orange and equipped with reflectors to make their presence still more evident to aircraft.

Lockheed "Hudsons" in Action

Among the first American-built aircraft to go into action with the Royal Air Force was the Lockheed "Hudson" fast reconnaissance monoplane, a specially equipped military version of the well-known Lockheed 14 air liner. Though fast and manœuvrable, the "Hudson" is primarily a scouting rather than a fighting machine; but in the hands of pilots of the R.A.F. Coastal Command it has earned a great fighting reputation.

In the first months of the war a single "Hudson" took on two big German Dornier flying boats, and held them in close battle until two other British aircraft came up and helped to defeat the enemy. Another engagement, over Bergen Fjord, Norway, ended with a Dornier being shot down; and in a fight between a "Hudson" and another Dornier, over the North Sea, the R.A.F. machine settled its adversary in 35 sec. It was also one of these Lockheeds of the Coastal Command that first spotted the ill-famed German prison ship *"Altmark"* off the Norwegian coast.

A recent exploit of the "Hudsons" was an attack by three of them on a formation of 40 enemy machines, including protective fighters, attempting to bomb a British troopship. Three Junkers Ju.87 dive bombers were destroyed, two more were driven down, and the formation was broken up. The "Hudsons" were untouched.

The Lockheed "Hudson" is a twin-engined middle wing monoplane with enclosed accommodation for a crew of four, and in addition to forward firing armament it has a rear gun turret.

* * * *

The Douglas Aircraft Company, of Santa Monica, U.S.A., now employ over 15,000 men and women, about a quarter of the total engaged in American aviation.

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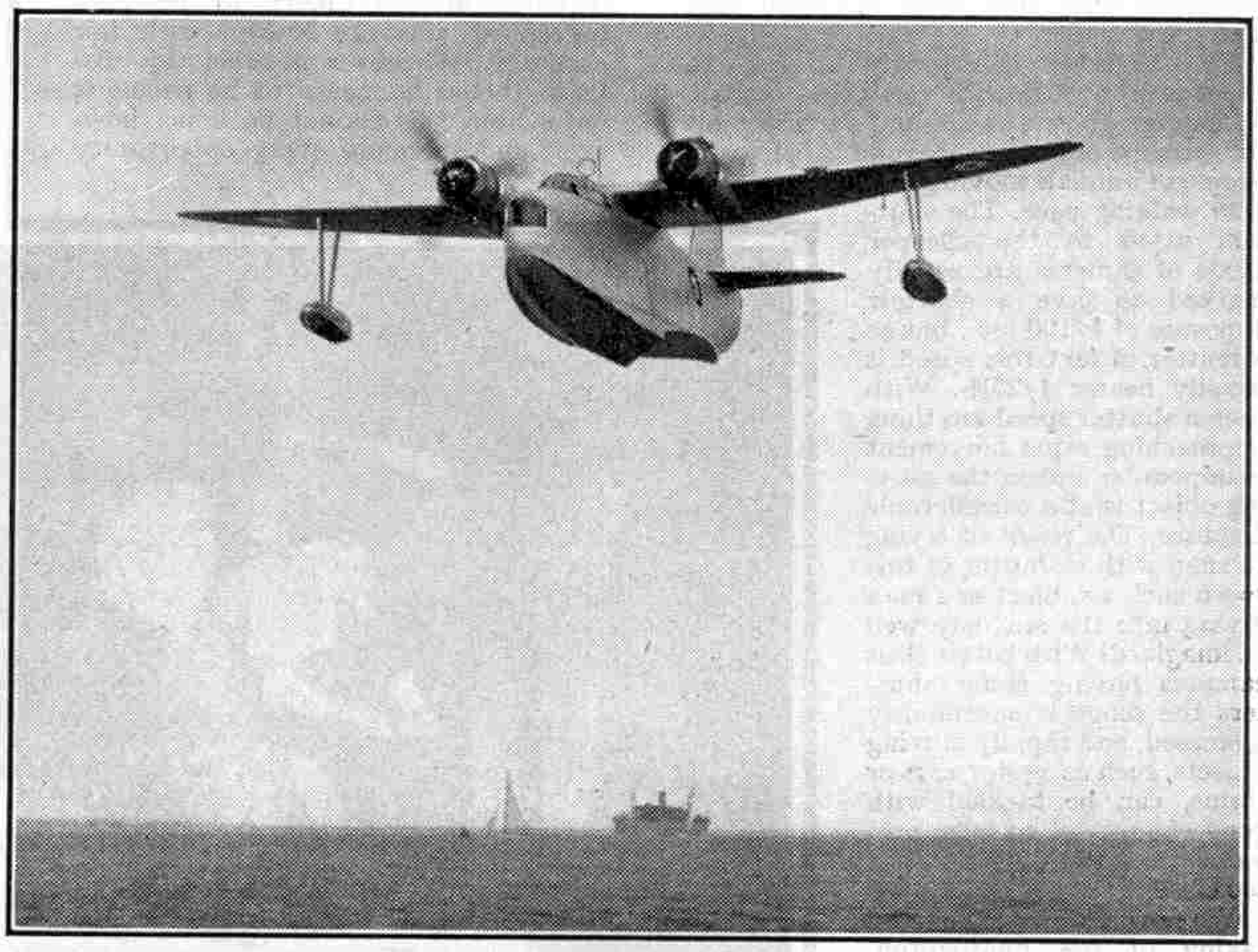
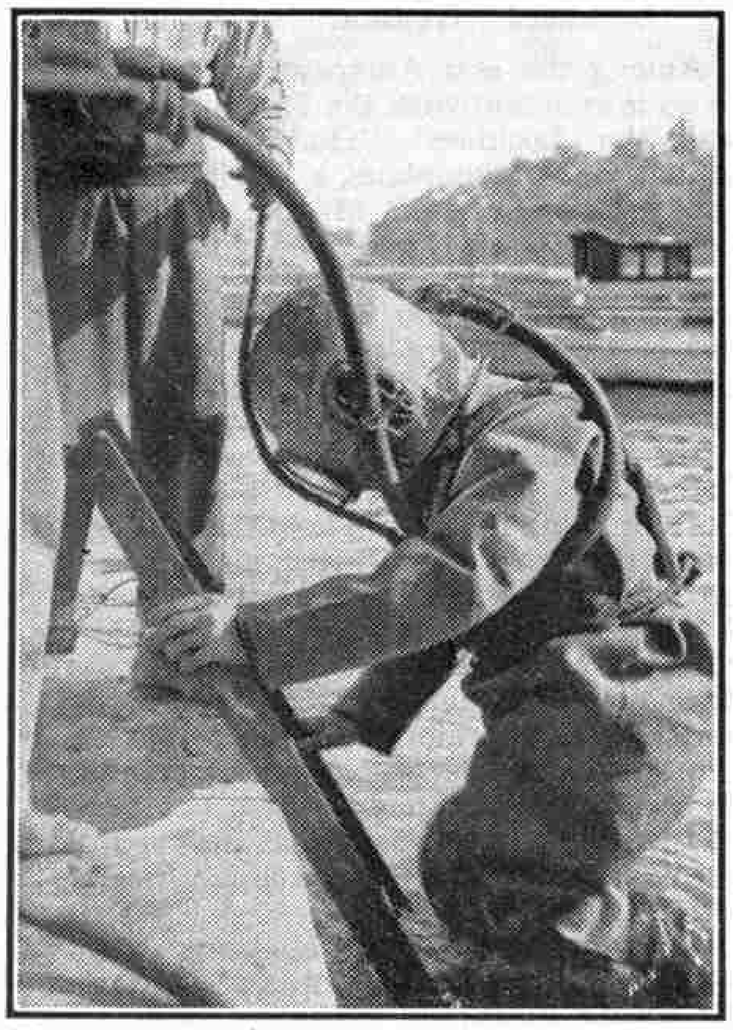
The late Mr. S. Spooner, founder of *"Flight,"* the aviation journal, left £5,000 to the Royal Aeronautical Society for a Stanley Spooner scholarship for aeronautical research.



A fine view of a Saro "Lerwick" flying boat in the air. Photograph by courtesy of Saunders-Roe Ltd.



"Going down." This picture of a diver at work is by J. M. Demanuele, Valletta, Malta.

PHOTOGRAPHY

Helpful Suggestions for Beginners

DURING the month of August more readers take up the hobby of photography than at any other period of the year. This article therefore is devoted to a few suggestions that will be helpful to beginners.

The first and most serious problem the beginner in photography has to solve is that of exposure. It is quite impossible to give any useful advice on this matter in the space at my disposal; and instead I advise every beginner to buy a copy of the Burroughs Wellcome Photographic Handbook, which can be obtained from any photographic dealer. This handbook contains a simple and efficient exposure calculator, and this, used in conjunction with the very practical information that is given, simplifies the whole problem in a way that cannot be improved upon. Included in the handbook are also lists of plate and film speeds.

The beginner is strongly advised to experiment at first with views that contain no moving objects at all, and certainly not to attempt anything beyond a snap of people or animals moving at a slow walking pace. The shutters fitted to the cheaper kinds of cameras are usually marked to give a shortest exposure of 1/100 sec., but as a matter of fact this speed is usually nearer 1/25th. With such a shutter speed anything approaching rapid movement is impossible unless the moving object is at a considerable distance. The result of trying to snap with a shutter of this speed such a subject as a man diving into the sea may well be imagined! With better class cameras having faster shutters the scope is enormously increased, and rapidly moving objects, such as motor cars or trains, can be tackled with good chances of success, provided that the object is not too close.

We now come to the actual taking of the photograph, and having decided on our subject, the first matter to be considered is focussing. If the camera is of the ordinary box form type fitted with a single lens working at F.11 it will not be provided with any means of focussing. Such instruments are known as "fixed focus" cameras, and although they are perfectly successful for landscapes, they cannot be used for near objects unless what is known as a "portrait attachment" is placed in front of the lens, thus bringing objects a few feet away into sharp focus.

Most folding cameras, however, are fitted with a "focussing scale." This is a scale marked off in distances, feet or yards, and fixed at one side of the camera base below the lens. The front of the camera in which the lens is fixed is moved in or out by means of a rack and pinion, and when it is desired to focus on any particular distance the controlling screw is turned until a small pointer attached to the camera front is exactly over the figure indicating the desired number of feet or yards.

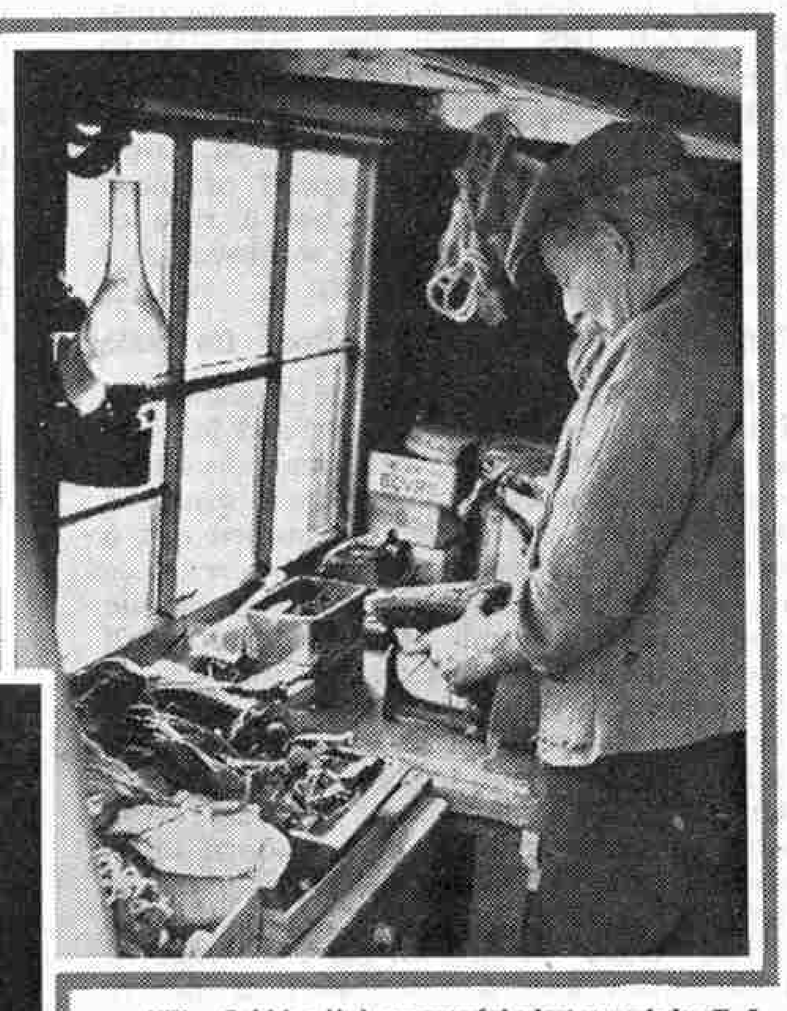
There is also another type of camera in which the body of the instrument is fixed and focussing is carried out by revolving the lens, thereby causing it to travel in or out as required. The various distances are marked off on the lens mount, and when any particular figure is brought opposite a certain fixed mark the camera is then focussed sharply for that distance.

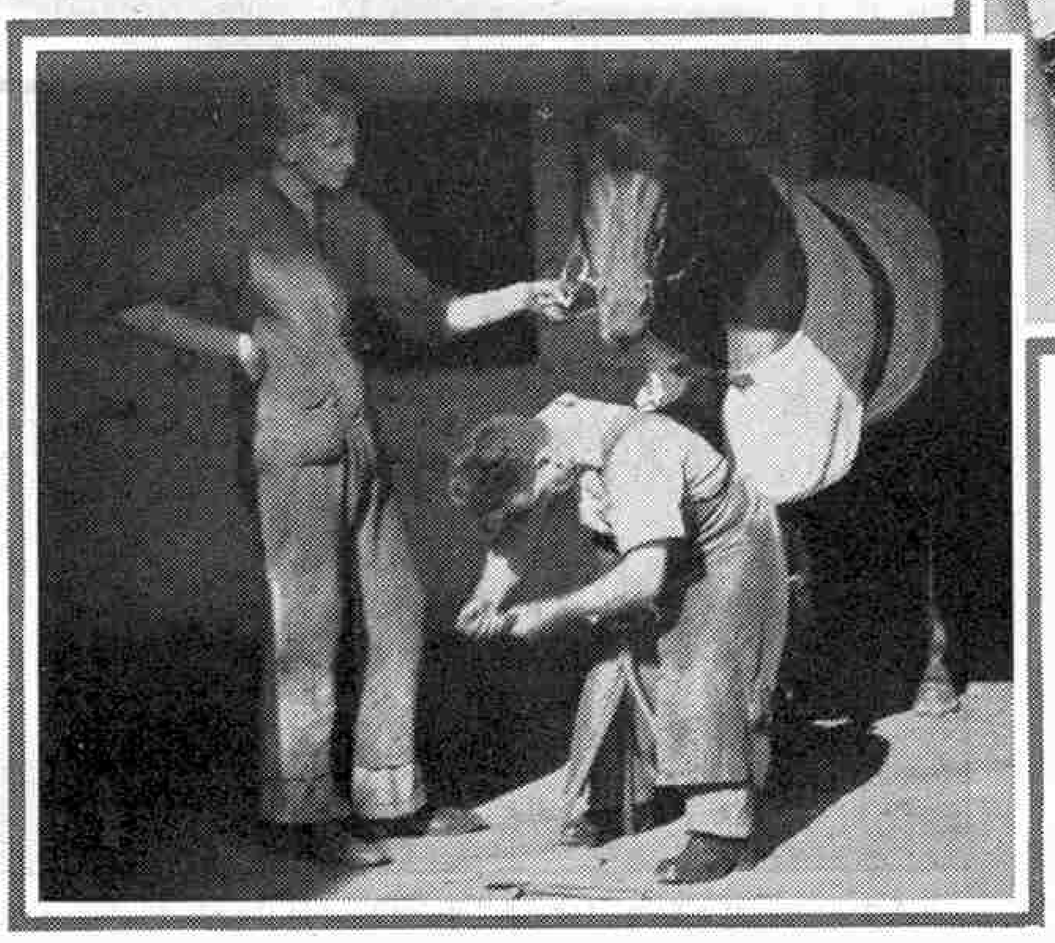
It is obvious that in using either of the two foregoing types of camera the distance of the object to be photographed must be known with fair accuracy. Whenever possible this distance should be measured by pacing it out. Often this cannot be done, however, and therefore every opportunity should be taken of practising judging distances. This practice can be made an amusing pastime if carried out by two or three friends during a walk. The idea is to fix on some object ahead, and for each member of the party to make a guess at its distance. Then that distance is paced out, and the accuracy or otherwise of the estimates is seen.

In making the exposure it is essential that the camera should be held perfectly steady. To the average person this is almost an impossibility for more than about 1/15 second, and for longer exposures it is necessary to use a tripod or to place the camera on a wall or other firm object. Another important point is to press the trigger gently and steadily until the shutter is released, thus avoiding any jerking of the camera.

If roll films are used the camera may be loaded and unloaded in daylight. It should be remembered, however, that although these cameras are "daylight loading," it is not advisable to carry out the process in direct sunlight. A shady place should be chosen, or at least the camera should be screened by the body.

One other piece of advice—always change your plate or film immediately the photograph has been taken. If this is not done at once there is always a great danger that it will be forgotten entirely, with the result that the photographer has the aggravating experience of taking two photographs on the same plate or film.





"The Cobbler." A successful photograph by F. L. Atkins, St. Leonards-on-Sea. The picture on the left is by A. G. Dell, West Norwood.

Life-boat Thrills in Wartime

IN the first six months of the war 1,774 lives were saved by life-boat crews, a greater number than were rescued in the previous four years of peace. Help was given to 149 vessels belonging to 18 different foreign countries, and from these 490 lives were rescued, including crews of German bombers attacking our coasts that had been shot down by our fighter aeroplanes.

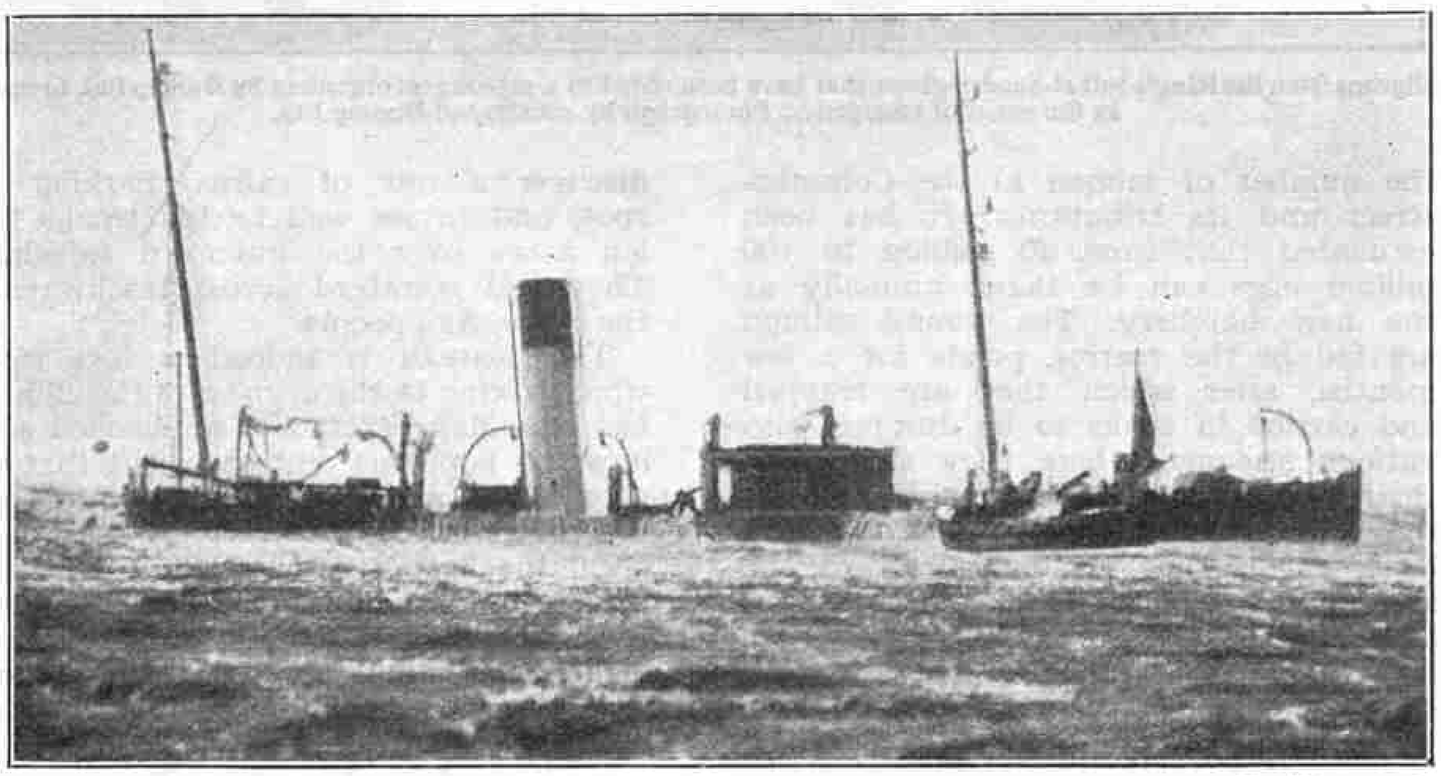
The full story of this marvellous service, given in foul weather, high seas, and bitter cold with the greatest courage and endurance, and without fear or thought of self, is told in a fine booklet, *"The Life-Boat Service and the War,"** which has recently been issued by the Royal National Life-Boat Institution. This is full of stirring tales of rescue in storm and even under fire from enemy aeroplanes.

The many illustrations in the booklet of ships sunk by enemy action, and of injured and exhausted men being brought ashore by the life-boat crews, help to show in what perilous conditions life-boat men have been working since the outbreak of war. They have been constantly exposed to the danger of destruction by mines, and of attack by torpedoes from submarines and by the bombs and machine guns of aeroplanes. The crews have to be summoned individually, for they cannot be called out by maroons, as these might be mistaken for air raid warnings. As the blackout must be observed, the life-boats have had to be manned and launched in complete darkness; and then has come the perilous task of navigating without the guidance of coastal lights. Yet there has never been any hesitation in answering calls for help, and the skill and fine seamanship of the life-boat men have been equal to every emergency.

It is on the east and south-east coasts that the burden has been heaviest. The Walmer life-boat has been launched 36 times and has rescued 85 lives. There have been 31 calls for the Margate boat, which has the proud record of the rescue of 104 lives, 53 of them within a period of 8 days; and equally strenuous tasks have been set the boats of Cromer and the Humber, with the result that their crews have rescued 115 and 189 lives respectively. The number of launches of course depends largely on position, but wherever the call has been given, there has been the same willing and cheerful response. Take for instance the story of the Stromness life-boat in wartime. This vessel has been launched six times, and the number of lives rescued by her crew is 22. This splendid result was achieved only after long and arduous service, in which the boat travelled altogether 700 miles in very bad weather, with no lighthouses or light-buoys to give guidance, along the islands and reefs and dangerous coasts north of the Pentland Forth, which have the reputation of being a terror to all mariners.

The Arbroath motor life-boat bringing ashore the seven survivors of the hopper barge "Foremost." The men had been rescued while the barge was being bombed and machine-gunned by a German aeroplane.

Two stories of rescue under fire illustrate both the terrible dangers that may attend life-boat service, and the calmness and devotion with which the crews go about their duties in all conditions. The Cromer life-boat went out to help the crew of an Italian steamer that had been sunk by enemy action. While the men were being taken on board a German aeroplane first circled round and then attacked with bombs and machine guns a trawler a mile away. The Germans circled round again and repeated the attack, but the life-boat made at once for the trawler, where the Captain was found to be injured. The engines were out of action, and for three hours the life-boat towed the trawler while these were repaired. Farther north, the Arbroath life-boat went to the assistance of the *"Foremost,"* a hopper barge that was being attacked by two German aeroplanes. Bombs fell so close that they seemed to lift the vessel out of the water, but the life-boat men went on and rescued seven of the crew of the barge.



The Blackpool motor life-boat taking men off the wreck of the pilot boat "Charles Livingstone," of Liverpool, which had been driven ashore in a gale off Ainsdale, Lancashire.

Other stories tell of the calling out of the Great Yarmouth and Godstone life-boat in the middle of January, when seas breaking over her deck froze into a solid mass and spray on the men's oilskins became icy armour. Life-belts had to be broken off the men when they landed, and the vessel herself was thickly coated with snow and ice. Yet after this terrible experience the Coxswain merely remarked: *"We have never had so bad a washing."* The Wells life-boat on one occasion was out for 22 hours and returned covered with ice an inch in thickness. All her crew were suffering from frostbite when they returned. Life-boatmen have even given their lives in the service, as did two Whitby men in February last during gallant but hopeless attempts to rescue the crew of a Belgian steamer that had gone ashore under a 200-ft. cliff. The second coxswain and the bowman were washed overboard when a huge sea rising out of the darkness flung the vessel over on her beam ends.

The Arctic rigours of the past winter and war perils have combined to put upon the life-boat crews a strain such as they have never known before. The majority of them are fishermen who sail the seas in all weathers, and know their own pieces of coast as other men know their gardens. This knowledge they place freely at the service of all in peril at sea, whatever their nationality; and the work is done voluntarily, with no thought of payment. Actually the Institution does reward them for every service in which they take part. It also compensates them for injuries, and presents gold, silver and bronze medals for conspicuous gallantry. These men are proud of their medals, but it is not to win them that they embark on stormy seas, un-buoyed and unlighted, and dotted with sunken wrecks.

* *"The Life-Boat Service and the War." Royal National Life-Boat Institution, Life-Boat House, 42, Grosvenor Gardens, London S.W.1. Price 6d. post free.*

Of General Interest

King's Pigeons for Postal Service

Pigeons from the King's loft at Sandringham have been added to a pigeon post organised by Dunlop Ltd. to operate in the event of a national emergency. The pigeon post was inaugurated last July by the Duchess of Kent when she visited Fort Dunlop and released the first flock of pigeons from their baskets.

On the eve of the outbreak of war a pair of long-distance birds, four or five years old, arrived from the King's pigeon keeper. They are of the stock that has won big races from Lerwick in Shetland and Bordeaux. To-day they have four young ones, all at present being trained by Mr. Harry Collins, a fancier who has charge of the loft of 50 birds. Two of them are being trained to fly 30 miles away to the company's wartime headquarters, and the other two will make the return journey. Their trainer says that they will fly almost a mile a minute, except in a side wind. They do not fly at night; homers are not trained to do this, but come down to sleep. They will go two days without food.

In addition to the pigeon loft at headquarters, lofts are being opened up in other parts of the country for the service, which is the only organised civilian pigeon post in Great Britain. By reducing messages to a small size on a thin film the birds can take 35,000 words in an aluminium carrier fixed to their legs. Each centre has apparatus for reducing the messages for transmission, and for magnifying them to a readable script when received.

Nursing Millions of Young Salmon

When dams or other obstructions are built across the courses of salmon rivers the fish are unable to make their way up to the spawning grounds It is usual to erect fish ladders alongside the structures, and up these salmon can make their way in a series of small leaps. Such a ladder is not always possible, however. For instance, the Grand Coulee Dam, across the Columbia River in the United States, is so high that the construction of a ladder to allow salmon to pass round it would be far too costly. Even if this were done young fish coming down the river would be destroyed by passing over the Dam or through the turbines that drive the dynamos of the power station built there. A gigantic scheme therefore has been worked out and put into operation for collecting the fish and carrying them by road to a hatchery, where young fish are reared and nursed until they are old enough to be sent to streams from which they can set out for the sea.

There are several dams along the course of the Columbia River, and at one of them, Rock Island Dam, about 150 miles below the Grand Coulee, three fish ladders have been constructed with pools and traps in which the fish can be caught. There they are sorted out and delivered into lorries in which they travel to the hatchery, which is about 40 miles away. The tanks of the lorries contain water that is cooled by ice to the proper temperature, and into which air is introduced by an injector.

This great scheme will not only save fish from destruction, but also will increase the number of salmon in the Columbia River and its tributaries. It has been estimated that from 40 million to 100 million eggs can be taken annually at the new hatchery. The young salmon are fed in the rearing ponds for a few months, after which they are trapped and carried in tanks to be dumped into various streams, where they stay until their seaward migration begins. Eventually they will return to these streams, which in time will become prolific salmon rivers, and the result of the careful nursing they receive is that a far greater proportion survive to travel down to the sea than if they were left to their own devices.

Pigeons from the King's loft at Sandringham that have been added to a pigeon post organised by Dunlop Ltd. to operate in the event of emergency. Photograph by courtesy of Dunlop Ltd.

A Lost World Revisited

Except for a few scattered oases, the Sahara west of Egypt is a forbidding waste of rock and sand. One of its most astonishing features is the isolated plateau of Gilf Kebir, bounded by a wall of cliffs 1,000 ft. in height that rise abruptly from the yellow plain around it. This is 500 miles west of the Nile. It stretches over more than 150 miles of desert, and branching valleys extending into it give its rocky walls a total length of more than 2,000 miles.

The district is now completely waterless, and it is difficult to imagine it peopled by human beings. Yet there are cave paintings in red, white and yellow that must have been executed between 4,000 and 6,000 years ago, and there are actually unused pigments lying around, just as they were left by unknown artists of the Stone Age. There are even traces of the hearths of unknown peoples of bygone ages, with household tools and trinkets strewn about, and the ashes of the fires themselves.

Modern explorers had never visited the plateau itself until 1938, when nine men spent two months in examining the Gilf Kebir. They travelled there by car, and while some members of the party were examining the prehistoric sites they discovered, others drove up the long gorges that pierce the plateau in the hope of finding a way to the top. At length a huge sand drift was discovered that actually lapped over the over-hanging rock, and after several trials the pioneers succeeded in charging up its final slopes, to find themselves on the flat rock surface of the plateau. There they were astonished to discover a row of cairns marking the spot, and to see well beaten tracks that led away over the unknown tableland. They had stumbled across trackways of the Stone Age people.

The plateau is indeed a lost world which, owing to the dryness of the climate, has remained practically unchanged since it was a populous centre, except that the people who made the paths and laid out the cairns have died away. It must have been the last home of the prehistoric race whose remains have been discovered there, for the rainfall produced by these high lands would provide water for a time after the surrounding country had become uninhabitable desert.

* * * *

The highest pressure ever achieved is 3,500,000 lb. per sq. in. This was reached in efforts to produce diamonds from crystal graphite. No diamonds were obtained, and it seems unlikely that pressure without high temperature will bring about the change.

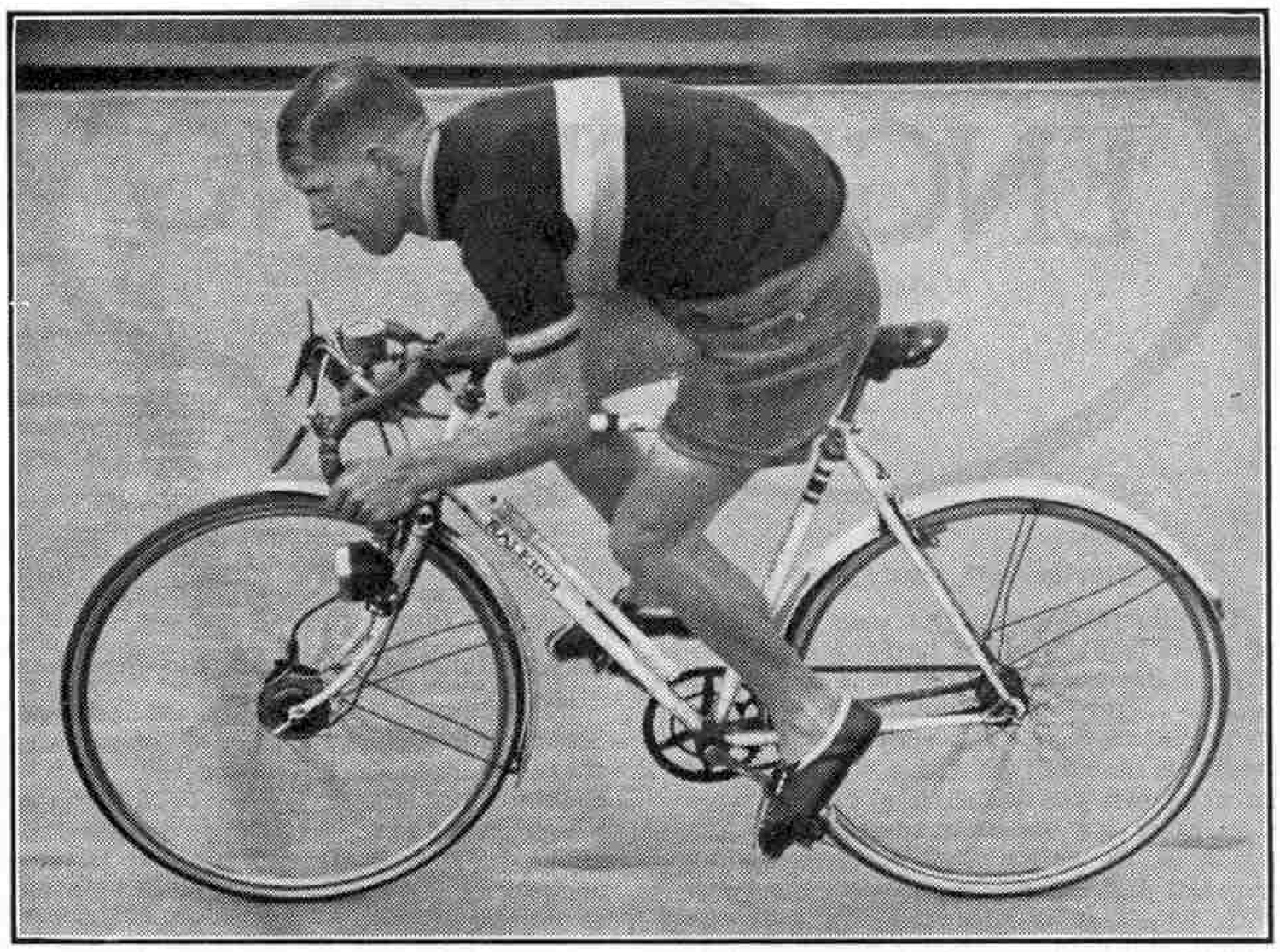
Black-headed Gulls and Little Auks

We have six familiar sorts of gull that can be seen on rambles, not only along the seashore, but also by lakes and flooded fields far inland. The kittiwake and the greater and lesser black-backed gull usually keep to the seaside; but the herring gull, which nests on the cliffs, often roams far inland to follow the ploughs in winter. The so-called "common gulls," which nest on the Scottish and Irish moors, are also seen in our fields in autumn and winter, but the most familiar of all is the little black-headed gull, which nests by the seaside, on our moors and by our inland marshes, where it is to be met with all the year round.

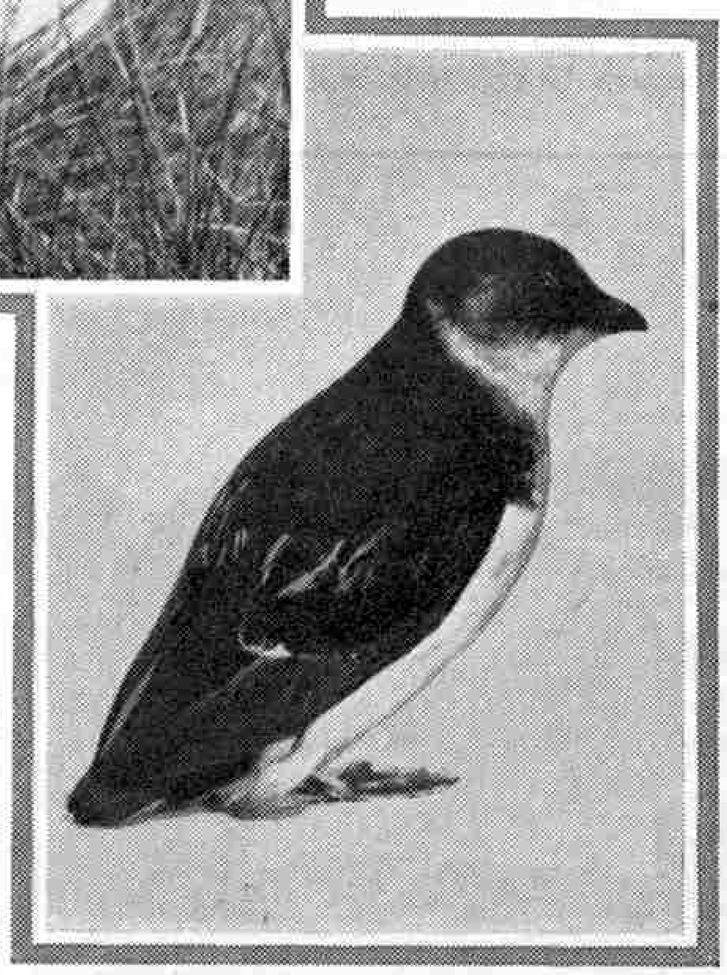
The photograph of a black-headed gull reproduced on this page is one I took when "stalking" these gulls at the Ravenglass bird sanctuary on the Cumberland coast, their greatest nesting colony in England, where 50,000 pairs of black-headed gulls nest amongst the sandhills. When looking at that bird through a pair of field-glasses the head would appear dark brown, not black, and the bill and legs would be red. When autumn arrives this nesting plumage is slightly altered. The dark head feathers are moulted off and only a couple of dark spots remain behind the eye, so that this common little gull, which is smaller than the other sorts, is better remembered by its red bill and legs than by its dark head. Some of the old countrymen in Cheshire and other places call it the "peewit-gull," and fishermen may name it the "laughing gull," for its cry sounds like a screaming laughter which can easily be imitated by blowing on a piece of tissue paper or thin rubber stretched between the thumbs.

A census of the black-headed gulleries in Britain was recently completed. It was found that Scotland had 145, Ireland 39 and Wales 34. In England 70,000 pairs of birds nest at 124 gulleries, most of which are in the north. There are no gulleries of this bird in the Isle of Man, where the herring gull is so common.

Our illustration shows also the little auk. This funny little black and white seabird is as brave as the famous storm-petrel in facing the winter storms, and is often found stranded on our coasts after the big winter gales. In summer its nearest haunts are St. Kilda, where at one time it nested; but hundreds of little auks nest on the cliffs of Iceland and Greenland. In winter they are common around the Muckle Flugga lighthouse, the most northern light of the Shetlands, and they may sometimes be seen swimming in the Firth of Forth and often in the harbour at Lerwick. We seldom find them alive in winter, however, for they usually fall victim to the fury of the storms; yet sometimes living specimens are blown miles inland and found exhausted in a field or swimming on some lake. The only way to save these storm-stranded birds is to give them a meal of minced herring or other fish, in water, and then take them out to sea in a hamper and release them.



Tommy Godwin, the famous cyclist, indulging in a final burst of speed at the end of a record endurance ride of 100,000 miles in 499 days. Godwin beat the previous record by 86 days. His best day's ride was 361 miles, and in one week he covered 1,908 miles. Photograph by courtesy of Raleigh Cycle Co. Ltd., Nottingham.



Above is the black-headed gull, and on the right the little auk. Photographs by Eric Hardy, Liverpool.

Last winter, when several specimens were "wrecked" by the big gales near my home, one of the little auks appeared quite hale and hearty on the local seaside bathing and paddling pool. There he spent some time diving and swimming about, a very rare sight indeed in England. For over half-an-hour he was there, floating fairly high on the water, while his dives were timed to last from 25 to 36 sec. under water. When swimming he made a good flurry of water "aft," and occasionally he flew to a fresh position 80 or 100 yds. away, rising 15 to 20 ft. in the air in doing so, but he soon came back to his favourite position. E. HARDY.

Marsh Gas for Motor Cars

In the search for motor car fuels to take the place of petrol the suggestion has now been made that firedamp, the gas responsible for explosions in coal mines, should be used. Its chemical name is methane, but it is also known as marsh gas because it is the gas that rises in bubbles to the surface of marshes and sludgy ponds.

Large quantities of firedamp are now being wasted. It has been calculated that a single pit produces nearly 2,000,000 cu. ft. a day, an amount equivalent to over 12,000 gal. of petrol. At present the gas is diluted and removed from the coal face by efficient ventilation. If some means of collecting it could be devised there would be a saving of fuel equal in value to a million tons of coal a year.

Sewage works also yield large quantities of the gas. A reader's article in the "*M.M.*" for September 1933 described and illustrated the collection of methane from sewage tanks near Bath. There the gas was used for lighting and heating purposes, but in Middlesex it is now being collected from sewage and stored under pressure for employment as a substitute for petrol. Methane actually is a very suitable fuel for petrol engines, and it gives twice the mileage that an equal amount of ordinary coal gas gives. It would have to be purified before it could be used, however, particularly to get rid of sulphur compounds, which would corrode the metals within the engines that it drives.

* * * *

The sting of a bee is said to be good for rheumatism, and last century an Austrian doctor treated rheumatic patients by turning them out into his grounds at intervals, to be stung by swarms of bees kept there. The cure can now be applied without pain, by rubbing on the skin salve containing bee venom in the form of tiny crystals that make slight scratches through which it is absorbed.

ENGINEERING NEWS

A Tractor with many Uses

The illustrations on this page are views of a Fordson Roadless half-track tractor, which is designed so that various accessories such as a crane or a winch can be fitted to its forecarriage. In the lower illustration the tractor is shown fitted with a winch. Folded back against the winch is a stout hinged steel plate for use as a sprag. When the winch is in action the plate is swung outward and downward, so that the teeth with which it is provided dig into the ground and hold the tractor firmly against the pull of the winch rope.

In addition to its use for hauling agricultural machines, a half-track model fitted with a hand-operated crane is of particular service for aerodromes. Without the crane it can be used to haul a gang mower for cutting the grass, and when the crane is fitted it can be very serviceable for dealing with a crash or for lifting engines in and out of aircraft. The crane is easily fitted or removed.

Among other accessories that can usefully be mounted on the machine are dynamos, pumping outfits, spraying equipment and air compressors.

A Giant Metal Testing Machine

The Aluminium Company of America now have in service a metal testing machine capable of exerting a force of 3,000,000 lb. in compression, and 1,000,000 lb. in tension. It towers to a height of over 40 ft., its width being over 16 ft. and its depth 9 ft. It is said to be the largest machine of its kind, and although designed specially for testing purposes it can also be used as an extrusion, forging or forming press.

Russia Building a Wooden Floating Dock

The Russians are building at Tobolsk, Siberia, one of the largest wooden structures that have yet been constructed. It is a floating dock 450 ft. long and 75 ft. wide, which will have a lifting capacity of about 1,300 tons. It will be used for dry docking local river craft in need of painting or repair.

Long Piles for an American Bridge

Over 37 miles of steel H section girders are being used as piles in preparing the foundation for a new bridge, two miles in length, that is now under construction over the Potomac River, U.S.A. Some of the girders are nearly 200 ft. long and weigh 12 tons, and they are thought to be the largest of their kind ever used to support a bridge.

The girders are driven into the bed of the river by a special 16-ton steam hammer having a 7-ton ram, which is mounted on a floating pile driver. For placing the piles in their correct positions on the river bed a wooden template in which rectangular guide holes are cut is used. This is sunk to the river bottom, and fastened on wooden piles driven previously and cut off to a set height above the level of the bed.

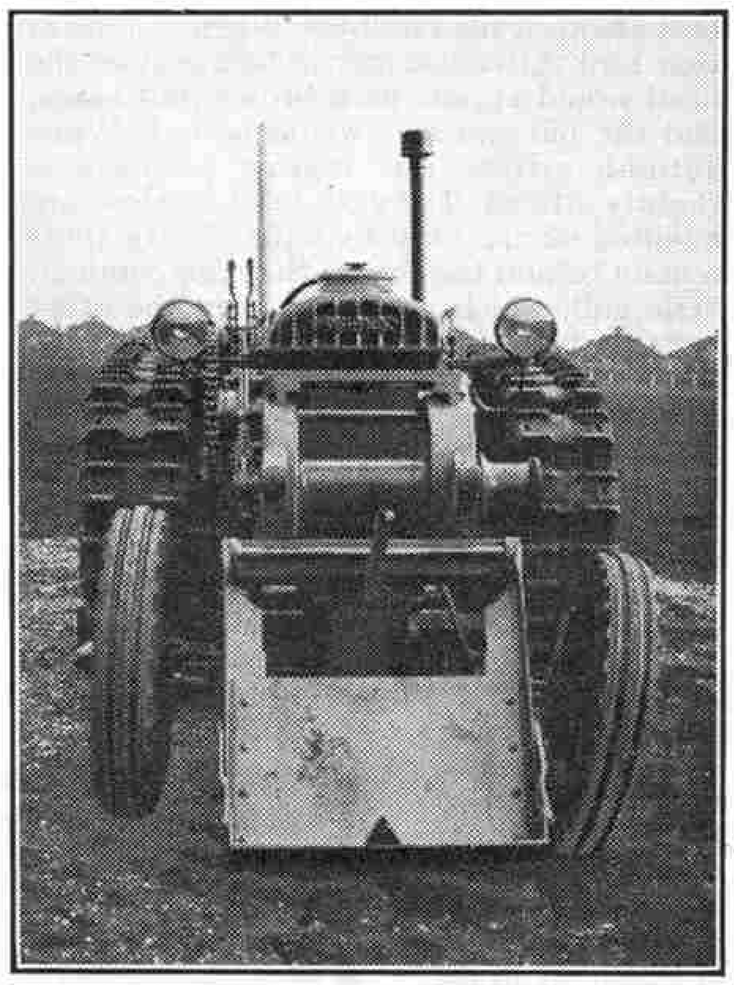
The New Niagara Falls Bridge

The new £1,000,000 bridge over the Niagara Gorge that will replace the old Falls View Bridge, which was swept away by an ice jam in January 1938, will be a high level steel arch structure having a single clear span of 960 ft. It will be about 20 ft. higher than the former structure, and there will be a clearance of 217 ft. between mean water level and the crown.

Provision is being made for four lanes of traffic across the bridge on two roadways each 22 ft. wide, which will be separated by a raised strip 4 ft. wide. On the south side a footpath 10 ft. in width will be provided, and this will be separated from the road by a solid guard rail.

A Novel Metal Fastening Device

A new fastening device has been introduced for joining metal parts in cases where it is not possible to gain access to the back of the parts being assembled. It is known as the "Speed Clip," and consists of a tubular formation of spring steel that is packed into the hole. The forward end of the spring is curled inward, and the outer end is provided with a flange that rests on the metal outside the hole. A plug or stud is pushed into the clip, and as it is pushed home two tongues spring outward and lock the clip firmly in the hole, while the curled end of the clip bites into the stud to lock it securely.

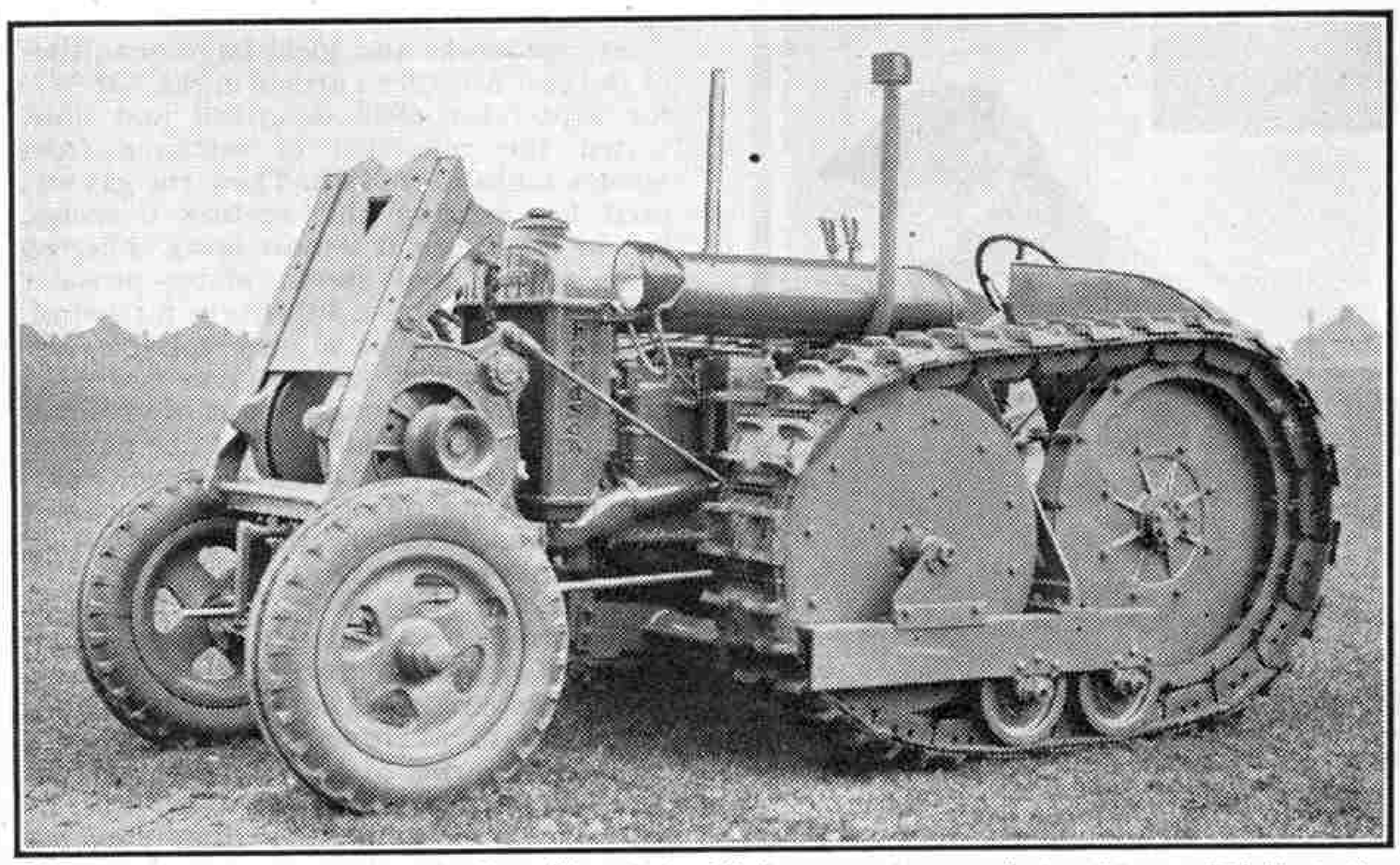


Another view of the tractor. The sprag for holding the machine against the pull of the winch rope is in the operating position.

More New Life-boats

Two new motor life-boats have been built for service on the East Coast. Both boats are of the light Liverpool type for launching off the beach, and are 35 ft. 6 in. long and weigh seven tons. If a sea breaks on board they can free themselves in 12 seconds. Each boat is driven by a 35 h.p. engine at speeds up to 7½ knots, and can travel 100 miles at full speed without refuelling. They have each cost about £4,000 and they both take the place of pulling and sailing life-boats.

As a result of the wireless broadcast appeal for the life-boat service which was made on 21st April by Coxswain Robert Cross of the Humber, the Royal National Life-boat Institution has received £5,587 17s. 11d. The responses have been coming in every day for eight weeks. There have been over 11,000 gifts, ranging in value from 3d. to £100.



A Fordson Roadless half-track tractor fitted with a winch at its forward end as described on this page. This illustration and the one above are reproduced by courtesy of Roadless Traction Ltd., Hounslow.

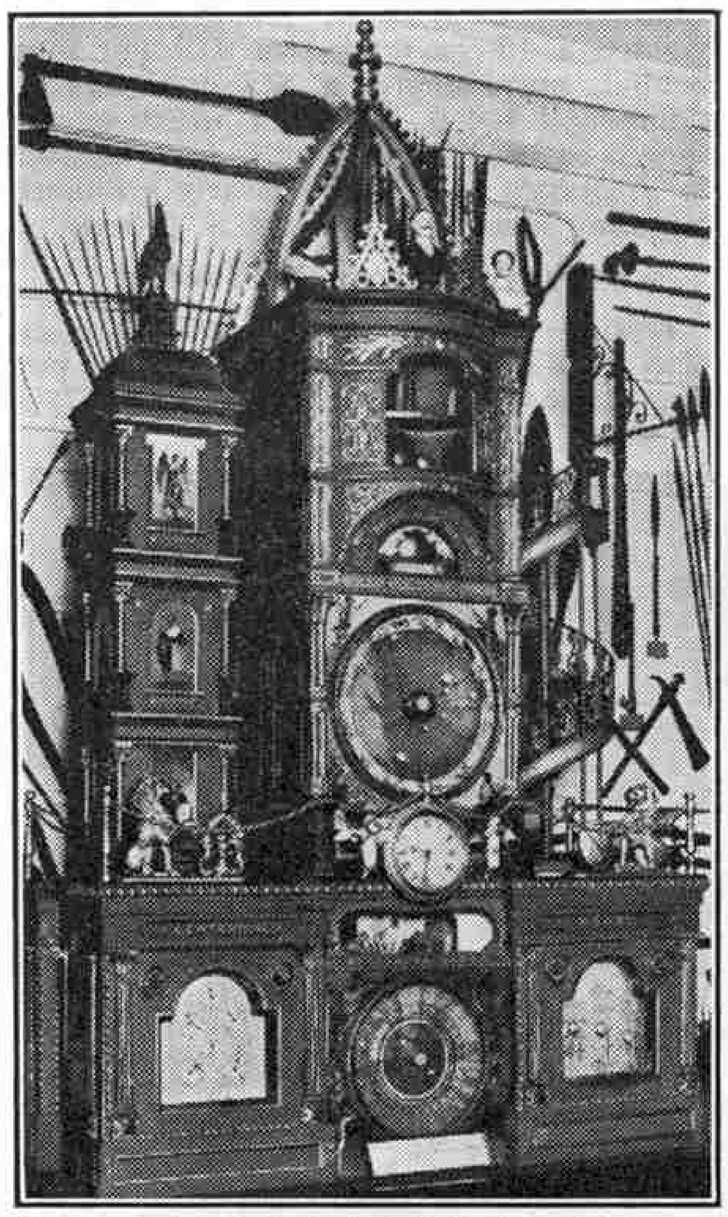
From Our Readers

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 Famous Australian Clock

In the Technological Museum, Sydney, there is a replica of the famous Clock in the Cathedral of Strasbourg. This Australian model, 12 ft. high, 6 ft. wide and 3 ft. deep, was commenced in 1887 by Mr. R. B. Smith, a noted clock-maker. He was engaged for 12 months on the drawings alone, and the clock was completed in 1889. In 1890 it was sold to the N.S.W. Government for £700, and eventually was exhibited in the Museum.

Chief among the many interesting features of this clock is the "Procession of the Twelve Apostles," which takes place



The wonderful clock in the Technological Museum, Sydney. Photograph by courtesy of the New South Wales Government Printer.

daily at 3 and 4 p.m. in the top alcove of the model. As the clock strikes the appointed hours the Apostles enter the centre of the alcove to the accompaniment of sacred organ music, and when Peter, the sixth Apostle, appears and denies Christ, the rooster atop of the tower at the left flaps his wings and crows thrice. In the second alcove is depicted the "Four Ages of Man," represented by four figures that change every quarter hour. That of Childhood remains in position until the first quarter, when it strikes a tiny bell and then moves off to give place to Youth. The second figure leaves with two bells at the half hour, while the Warrior and Old Man, the latter's departure marked by a death knell sounded by a skeleton at the back, strike three and four bells at the third quarter and the hour respectively.

Below this section is a semicircular niche, with a sphere representing the Moon and showing its various phases. Beneath this sphere is a silver sheet of metal representing water between two rocky promontories, which records the daily rise and fall of the tides. Below this section is an orrery with a large gilded ball in the centre to represent the Sun, round which the planets revolve. The rays of the light thrown out by the Sun are seen pointing towards the Twelve Signs of the Zodiac, which are painted on the outer edge of the dial. Within the circle are the planets themselves, each arranged in its own orbit, and set to perform its revolution in the proper time.

Next is the clock dial showing Sydney mean time, on each side of which is a cherub, one striking a gong at each quarter hour while the other inverts a sand-glass. There is a grand astronomical clock at the foot of the model, in the centre. This shows the apparent motion around the Earth of the Sun, Moon and stars, with their times of rising, southing and setting, the age and phases of the Moon, and the Signs of the Zodiac.

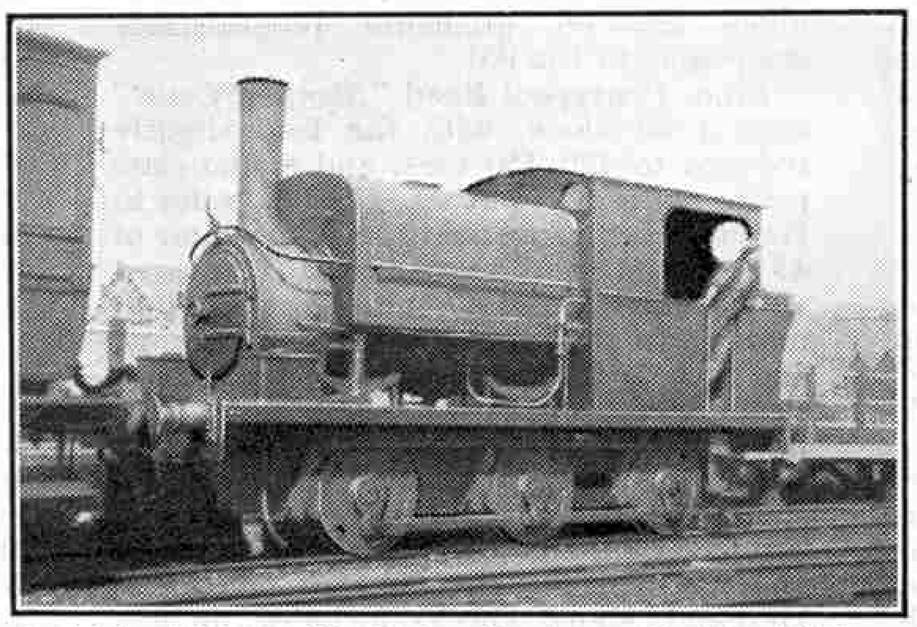
On the left is a section with six dials showing the correct time at London, Edinburgh, Dublin, New York, Leningrad and Berlin respectively. On the right-hand side are three more dials showing the cycle of the Sun, solar time and the cycle of the Moon, and there are many other symbolical features, as the accompanying illustration shows. K. N. ALLEN (Oatley, N.S.W.).

Do You Know Your History?

You are a little hazy on the dates, perhaps. A well-known firm of express carriers will help you to remember in a rather novel way. Where the numbers of the vans of Carter Paterson Ltd. coincide with the dates of historical events of note, the firm paints the number on the cab door, with a note underneath on the event concerned.

In the example shown in the accompanying photograph the number is 1677, which is the date when William of Orange, afterwards William III of England, married Princess Mary, the daughter of the Duke of York, who became James II. The event was the beginning of William's close association with this country.

C. E. KNIGHT-CLARKE (Enfield).



An 0-6-0 saddle tank of the Weston, Clevedon and Portishead Railway, now closed. Photograph by R. D. Butterell, Burnham-on-Sea.

The Weston, Clevedon and Portishead Light Railway

This versatile railway was opened in 1897, and sad to say was closed in May of this year. It has been a landmark

A history note on a motor lorry. The number coincides with the date of the marriage of the Prince of Orange, afterwards William III, to Princess Mary of England. Photograph by C. E. Knight-Clarke, Enfield.

for years, and as many people have protested against its closing there are hopes that it may be opened again soon, or at least after the war.

The railway is 14½ miles in length and runs between the three towns named in its title. The track is of Vignoles rail weighing 60 lb. to the yard and spiked to concrete sleepers. The gauge is standard. The sheds and main station are at Clevedon, about midway along the line.

In constructing the line no engineering difficulties were encountered, except that a bridge at one point had to be built over a tidal river. The track is mostly grass-grown and in a bad state of repair. Most of the level crossings are unprotected, except for cattle guards, and at others the guard had to jump down, open the gates and rejoin the train after shutting them.

There were only two power units operating at the time of the closing of the railway. One was an ex-S.R. petrol railcar, which ran between Weston and Clevedon The other was an ex-S.R. 0–6–0 tank, a former London, Brighton and South Coast engine, which pulled two dilapidated 4-wheeled coaches between Clevedon and Portishead. The accompanying illustration shows another 0–6–0 saddle tank engine formerly in use. This is noteworthy for the disc wheels fitted to it.

R. D. BUTTERELL (Burnham-on-Sea).

RAILWAY NEWS

L.M.S. Locomotive Classifications Explained

In view of enquiries received from time to time as to the meaning or method of the various letter and numerical classifications by which the locomotive classes of the four British railway companies are now designated, we propose to give in this and subsequent issues some explanatory detail that may be helpful.

We begin with the L.M.S. The principle employed is the power or haulage rating, as indicated by a figure on the outside of the engine cabs. This figure is followed by P, meaning "Passenger," or F for "Freight," and in the case of the Stanier "5000" class mixed traffic engines both letters are used. The most powerful engines have the highest class figure, 8, and the least powerful have the figure 0, which indicates power below that of class 1. All the 7,500 locomotives of the company are grouped within this range. The engine numbers, apart from those of some old classes becoming extinct, are almost entirely arranged in consecutive groups, so that after a little memorising representatives of all the principal classes or types can usually be recognised from their numbers.

As examples of the leading classes, we find that the "Pacifics" are class 7P, numbered 62xx, the "x" indicating any figure from 0 to 9. Thus the "*Duchess of Atholl*" is No. 6231. The "Royal Scots" are class 6P, numbered 61xx. Of other 4–6–0's the "Jubilees," numbered 5552–5742, the "Patriots," numbered 5500–51, and the few remaining "Claughtons," with numbers 59xx or 60xx, are all classed 5XP which, following an original Crewe plan, is a superior grade to the class 5P accorded to the ex-L. and Y. 4–6–0 engines numbered 10xxx.

The 4–4–0 compounds are class 4P, numbered 9xx–11xx. The standard L.M.S. freight 2–8–0's numbered 80xx are class 8F, the 2–6–0's are class 5P5F, numbered 2700–29xx, and the 0–8–0's bearing numbers 88xx–96xx or, in the case of those from the former L. and Y., 127xx–129xx, are 6 or 7F. The remaining 0–6–0's, too numerous to detail, range from class 2 to class 4F. The largest continuously numbered batch of these is the class 4, Midland type series of no less than 765 engines numbered 3835–4599.

Of modern tank engines, the 2–6–4s are class 4P, numbered 23xx–26xx; the 2–6–2s class 3P are numbered 1–209; and the standard L.M.S. shunting and local 0–6–0s numbered 72xx–76xx are class 3F. Space unfortunately does not permit of full descriptions of each class.

All locomotives now regarded as standard have numbers below 10000; those soon due for withdrawal have had 20000 added to their L.M.S. numbers. The engines of the former L. and Y., Furness and Scottish Companies still running carry five-figure numbers between 10xxx and 17xxx. Generally speaking, locomotives of former L.N.W. type are numbered between 5000 and 9999, and ex-Midland classes below 5000, with the very considerable additions of new standard types also included within these ranges, as described above.

Sprightly "Saint" and Shining "Star"

A recent trip from South to North Wales afforded some first-rate running. The mid-day train from Cardiff to the North (now running independently of the train from Plymouth, with which it formerly combined at Pontypool Road) was loaded to 15 vehicles, 435 tons tare and fully 465 tons gross, and not surprisingly the 2-cylinder "Saint," No. 2949 "*Stanford Court*," was provided with a pilot, a veteran "Bulldog" 4–4–0, No. 3371 "*Sir Massey Lopes*," as far as Pontypool Road. Even so, 15¾ min. instead of 15 min. were taken on the 10 miles from Newport to Pontypool Road, a 40 m.p.h. start-to-stop booking being optimistic, to say the least, when 7 of the 10 miles are on gradients progressively steepening to 1 in 95!

From Pontypool Road "*Stanford Court*" carried on alone, with the load slightly reduced to 420/450 tons, and a first-class performance was put up. The 33½ miles to Hereford were covered in an actual time of 43 min., and a net time of 42 min., compared with a schedule of 47 min.—yet some 14 miles of the distance are against the engine, and include the terrific 7-mile ascent from Penpergwm to Llanvihangel, more than half of which rises at between 1 in 82 and 1 in 95! Yet on breasting Llanvihangel summit at 31 m.p.h. the driver already had 2½ min. to his credit from Pontypool Road, and he then ran the final 20 miles into Hereford, signal checks included, in less than 23 min. At Hereford, detaching of the Birmingham portion reduced the load to almost exactly 300 tons tare; here "*Stanford Court*" retired honourably in favour of No. 5076 "*Drysllwyn Castle*," which covered the 51 miles on to Shrewsbury in the booked time of 68 min., inclusive however of a signal stop, costing fully 5½ min., at Berrington. From the last-named station to Church Stretton is a steady "drag," with several pitches little easier than 1 in 100, but the 22½ miles from the restart to the summit were covered in 29 min., and the train ran into Shrewsbury dead on time after having recovered 6 min. in the course of some 32 miles.

The next stage was by the 4.5 p.m. express from Shrewsbury to Chester. With a 7-coach train of 219/235 tons, "Star" class 4–6–0 No. 4058 "*Princess Augusta*" reached Gobowen in 20¾ min., at an average speed of over 52 m.p.h. "*Princess Augusta*" steadily maintained 60 m.p.h. up two miles at 1 in 178–1 in 132 near Rednal, and the same figure up more than a mile at 1 in 156 past Whittington.

Finally, the 4.30 p.m. Manchester-Llandudno "Club Train," joined at Chester, yielded a 13-coach load of 413/440 tons behind, surprisingly, a Standard L.M.S. Compound 4–4–0, No. 1123, which nevertheless covered the 26.3 miles from Chester to Prestatyn in 32¼ min., nearly a minute less than schedule. D. S. BARRIE.

The old and the new in Waverley Station, Edinburgh. Left, Stirling No. 1, the famous engine that hauled the "Flying Scotsman" of 1888. Right, No. 2005 "Thane of Fife." Prize-winning photograph by D. F. Forbes, Edinburgh.

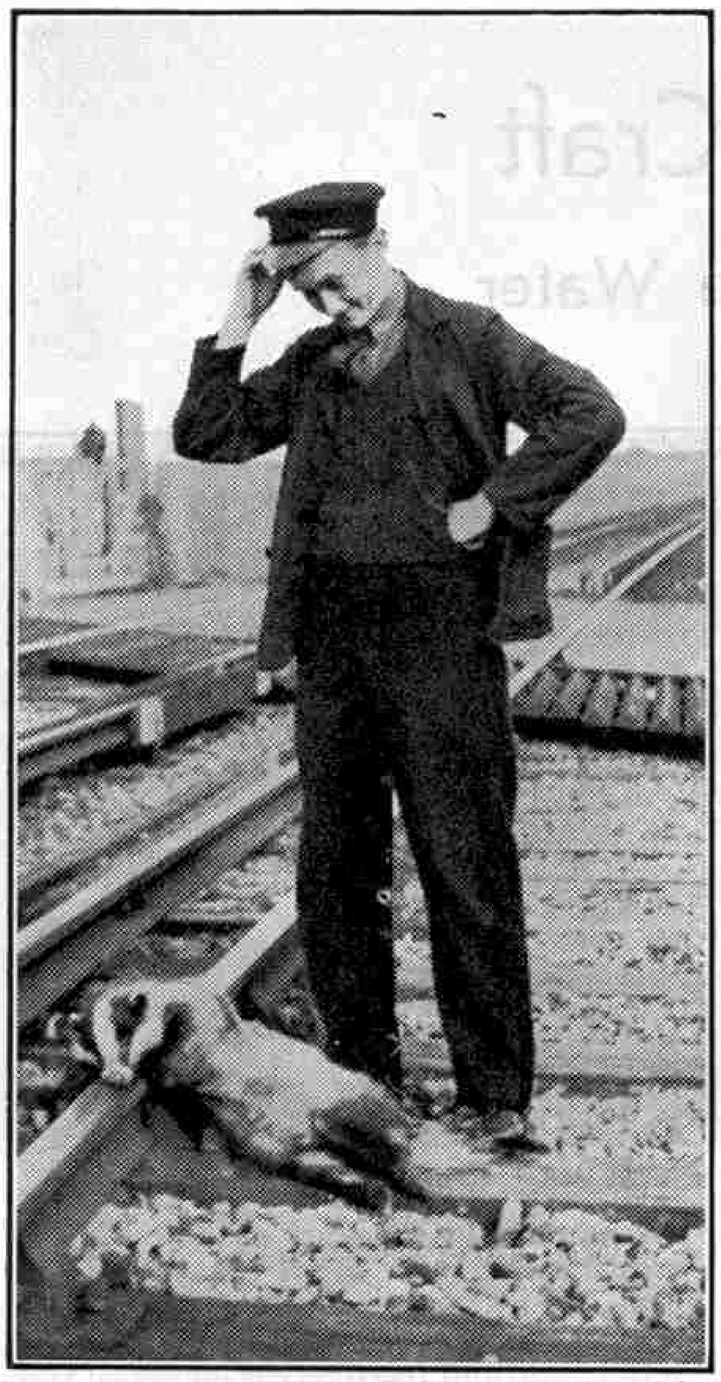
L.M.S. Locomotive Stock

During the four-weekly period ending 15th June 1940 three new engines were put into traffic on the L.M.S. These were Class 7 4–6–2 passenger tender engine No. 6243 "*City of Lancaster*," built at Crewe, and 0–6–0 heavy oil engines Nos. 7096–7, built at Derby. Class 3 2–4–2 passenger tank engine No. 10947, a former L. and Y. locomotive, was condemned.

During the same period engines Nos. 8896, 8942, 9009, 9036, 9046, 9077, 9318, 9348 and 9377, formerly Class 6 0–8–0 freight tender, were re-classified Class 7. The 0–8–0 freight tender engines of Class 7 Nos. 9089, 9372 were placed in Class 6.

Diesel Industrial Engines

Many shunting locomotives employed by private firms in their yards are driven by heavy oil engines. A new 0–4–0T engine of this type has been added to the railway stock of the famous brewery lines at Burton-on-Trent. It is rated to haul 30 loaded wagons, a total weight of 320 tons, at 4 m.p.h. on the level, or 161 tons at 8 m.p.h.



A surprise for the porter! A badger electrocuted by contact with the third rail at Bishopstone. Prize-winning photograph by J. Tree, Bishopstone.

Express Running with 615 Tons

The following details summarise the log of a run from Peterborough to London behind L.N.E.R. *"Green Arrow"* 3-cyl. 2–6–2 No. 4840, working the afternoon north express. This was made up to 18 coaches, weighing 562 tons tare, brought up to 615 tons gross by a heavy complement of passengers, luggage, etc. Following a good start, 60–61 m.p.h. was attained on the Holme level, although on the long rise at 1 in 200 past Abbots Ripton speed fell to a minimum of 37 m.p.h. Huntingdon, 17½ miles, was passed in 23¼ min., speeds on the next undulating 20 miles varying from 65½ m.p.h. to 48½ m.p.h., an improvement on the wartime schedule. A bad signal delay occurred near the foot of Hitchin–Stevenage bank, and from this recovery was slow; but later a fine demonstration of the engine's powers was the maintained average of 60 m.p.h. with this heavy train up the 5 miles of broken ascent between Hatfield and Potters Bar. The maximum before Hatfield had been 67½ and the minimum was as much as 56½ m.p.h., so that with a comparatively gentle descent to Wood Green, 71½ miles passed in 87¾ min., there would have been no difficulty in stopping in King's Cross in the present allowance of 95 min. had not a diversion to the slow line supervened, which lost two minutes.

Allowing for the delay before Hitchin, an average of 52.3 m.p.h. was sustained over the 54 miles from Huntingdon to Wood Green, and the net time for the complete 76½-mile run was 92½ min. It was evident that most of the way the engine was being worked under quite "easy steam."

On another recent occasion *"The Aberdonian"* of practically the same weight was brought up from Peterborough by Ivatt "Atlantic" 4413, built in 1905, as the customary "Pacific" was not available. There was a loss of only about 2 min. on an easier 100-min. booking.

The Maintenance of Permanent Way

The high standard of track maintenance for which British railways are famous costs each year about £300 to £400 per track mile, or about 11d. per train mile. On the Southern, in view of the heavy electrically operated traffic, these figures are higher. In a year 1¾ million cu. yds. of ballast are used on the British railways, as well as 208,000 tons of rails and millions of sleepers.

The Army of Railwaymen

Nearly 600,000 railwaymen in Britain are playing a vital part in national defence in all parts of the country. Since the outbreak of war thousands of special trains have been run on behalf of the Government and the Forces, often at short notice and involving long hours of duty. In connection with the miraculous combined efforts on sea and land that achieved the evacuation of Dunkirk, 620 special trains were run in nine days without any previous planning. All these trains originated on the Southern system, but were bound for many scattered destinations. The gigantic railway achievement successfully and safely carried through well merited the praise it received from the War Office, the Ministry of Transport and the chief officers concerned.

S.R. Wagons with Shock Absorbers

Some three years ago a set of open wagons fitted with rubber shock absorbers was built by the L.M.S., with a view to reducing possible damage to fragile or brittle goods during shunting operations. Now 12 new wagons under construction at Ashford works for the S.R. incorporate steel springs parallel to the main frame to act as shock absorbers. On account of the shortage of imported foreign timber eight of these will have bodies constructed of English green oak, the other four being built of Douglas fir from British Columbia. Some covered freight wagons with shock-absorbing equipment also are in hand for the S.R.

A Run on an Irish Narrow Gauge Line

We have received the following notes from Mr. V. Boyd-Carpenter on some interesting experiences on the narrow gauge (3 ft.) Londonderry and Lough Swilly Railway. On a special excursion from Londonderry to Buncrana the load was 17 coaches, 11 six-wheeled and the remainder four-wheeled. This was taken by engine No. 5, one of the two 4–8–4 tanks owned by the railway, which were when built in 1912, and may be still, the largest tank engines in the world running on 3 ft. gauge rails. They weigh 59 tons. The engine dealt splendidly with the train which, although advertised as "3rd class only" included 1st and 2nd class accommodation. In truly Irish fashion the latter compartments were used by the excursionists, who numbered over 1,000. Speed rose to 38 m.p.h. and 40 m.p.h. at times, as the track is fairly level, although poor and not very well maintained.

At Gallagh Road all trains stop for Customs purposes, and they have to slow down for staff exchange through Tooban Junction, where the Buncrana branch diverges from the main line. On the return journey the train was waved on at Gallagh Road by the Customs officials. The main line from Tooban Junction to Letterkenny and its extension thence to Burtonport are now closed to passenger traffic, and over the latter stretch the track is to be removed shortly. Our correspondent rode on the footplate of the engine of the last passenger train from Burtonport to Londonderry. Motor buses and wagons replace the trains between Letterkenny and Burtonport, and buses also take the place of passenger services elsewhere, although goods trains still operate between Londonderry and Buncrana and Letterkenny. The line has 15 engines, all tanks except one, a 4–6–0.

Rolling Stock Dimensions

The average overall length of a modern British passenger coach is 61 ft. 6 in. Coach lengths on the Continent are often 68 ft. 3 in., while in the United States they may be as much as 78 ft. The maximum width and height allowable on the mainland of Europe and in America also are greater on account of a wider clearance gauge.

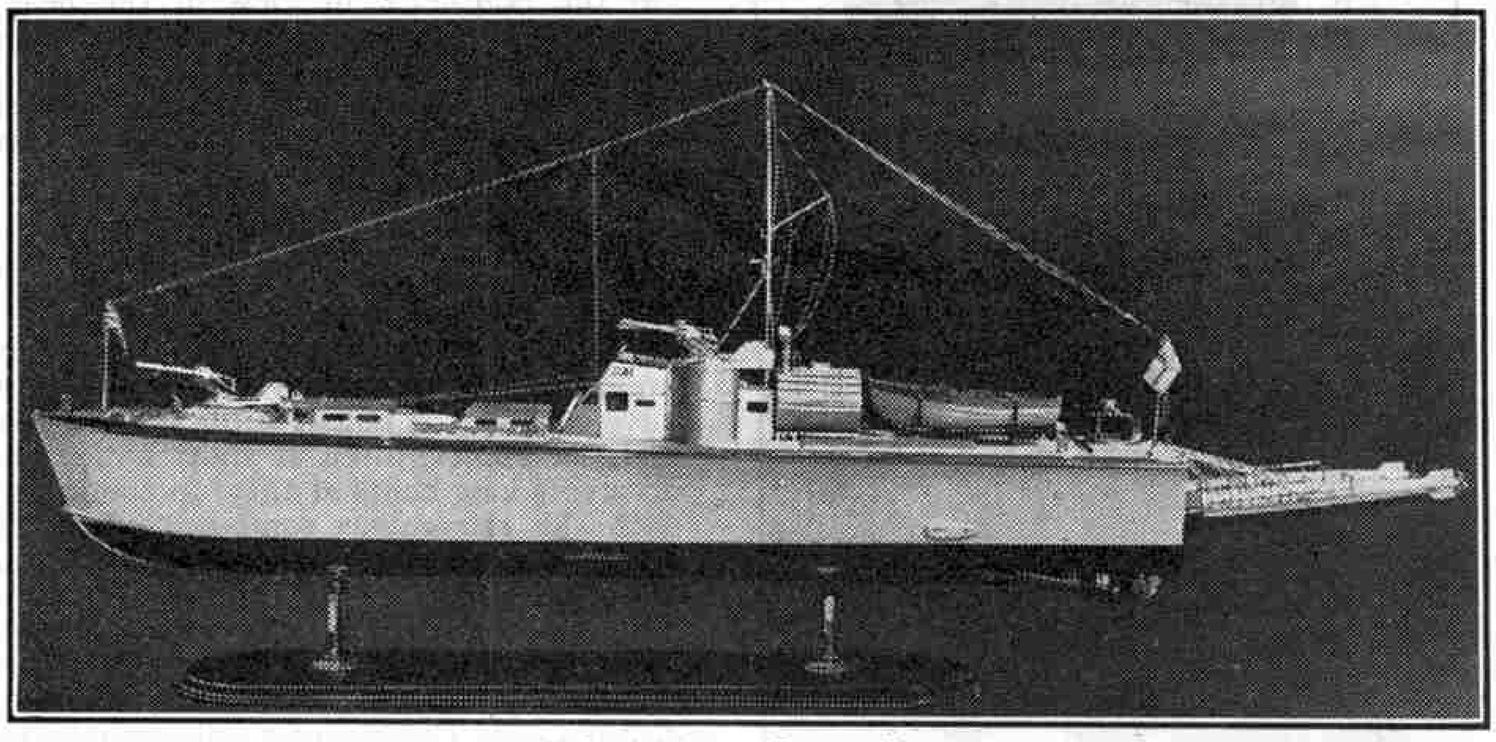
L.M.S. No. 189 and No. 14507 at Gleneagles, on a stopping train from Perth to Stirling. The Crieff-Edinburgh coach is being backed on. Photograph by D. F. Forbes, Edinburgh.

High Speed Surface-Craft

Planing Vessels that ride over the Water

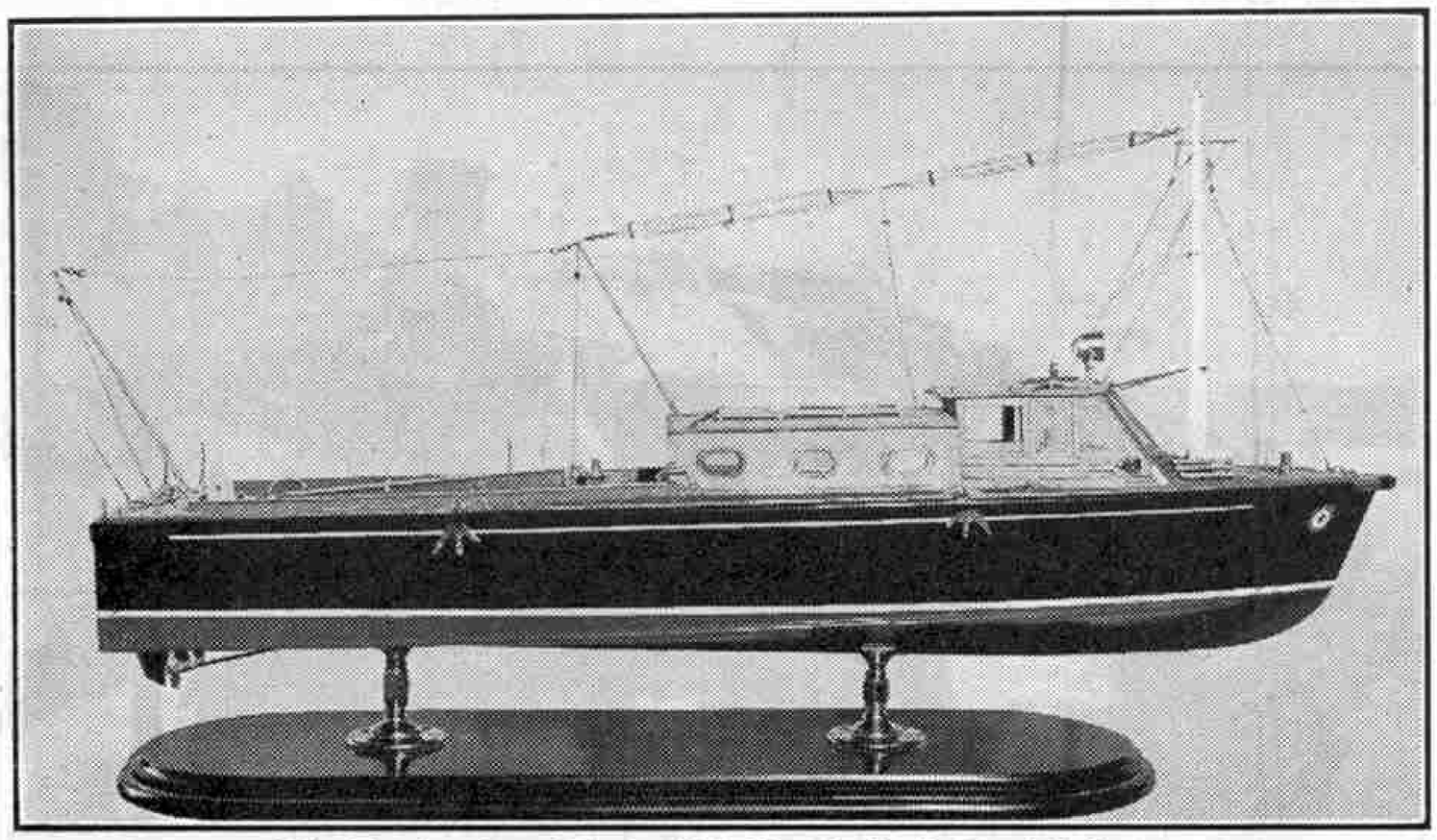
OUR illustrations show two models of high speed surface-craft built by the British Power Boat Company Limited, by whose courtesy we reproduce the photographs. These models have been exhibited at Selfridges, London, and also in Birmingham, where they attracted crowds of enthusiastic admirers.

Surface-craft are high speed planing vessels that ride over the water, not through it. They use the greater portion of their motive power for forward propulsion, without having first to displace the bulk of water in which the conventional or round bilge hull rests. Ordinary planing craft raise their bows out of the water when at speed, but their sterns sink deeper into the water. The vital features of Scott-Paine surface-craft are that they remain practically level on the water, and actually draw less water at speed than when at rest. Further, they do not materially alter trim when gathering or decreasing speed.



60 ft. class Motor Torpedo Boat.

The idea of the surface or planing craft came from the desire to travel by water at comparatively high speed. The first 20 years of the present century will be outstanding because of a new conception of time and space. The automobile has reopened the roads, the railway has added electric power to the successful use of steam, and in the skies the pioneers of the air have been consolidating their hard-won triumphs. But this development seems to have passed over the facilities available for navigating coastal waters and the approaches to the great seaways of the world, which have continued to be served by slow, cumbersome craft. The opinion continued to be held that high speed could not generally be combined with seaworthiness and reliability.



37 ft. 6 in. class General Service Aircraft Tender for the Royal Air Force.

Speed afloat was confined mainly to craft built for sporting events, which craft were almost all practically uncontrollable, and unreliable for more than momentary bursts of speed. These craft were termed planing craft, and followed the lines of early research that had shown that increases of speed over what was then considered to be normal depended very largely on the elimination of skin drag, arising from the wetted area of the hull. From the many systems developed, two had received most attention as a basis for building. First, the formation of the bottom of the craft into one or more steps, so that when travelling at speed the water flows from the after edge of the step to a point some distance further aft, without materially touching the hull; second, to form the bottom of the craft so that when travelling at speed it would change trim and lift the forward section out of the water. Both these methods result in a reduction of stability when travelling at speed, with loss of directional control; hence they are unseaworthy, and they largely contributed to the feeling that high speed afloat was unsafe.

It was left to Mr. Scott-Paine to discover that, by lifting the whole boat in a horizontal attitude on to the surface of the water, safe and relatively economical speed could be achieved. His work resulted in the production of a seaworthy fast hull, riding in a horizontal direction on the surface of the water, and possessing full stability and directional control.

The Navy, the Army and the Air Force now use these high speed craft for a variety of purposes, and probably the most outstanding are the Royal Navy's motor torpedo boats and the Royal Air Force high speed ocean-going rescue craft.

It will be remembered that it was in June 1937 that the first motor torpedo boat flotilla made its remarkable voyage, under its own power, to the Mediterranean. This voyage was the longest ever undertaken by a formation of craft so small, and was completed one week ahead of Admiralty schedule. Readers will recall also that shortly before the outbreak of the war—in May 1939—one of the latest motor torpedo boat type craft, designed by Mr. Scott-Paine, made a record cross-Channel trip from Southampton to Cherbourg. The boat was carrying a full "war load," including 16 people, and weather conditions were good. Running out into the Channel, with Mr. Scott-Paine at the helm, the Rolls-Royce-Power-Merlin engines of about 3,300 h.p. were set at a speed of 2,750 r.p.m., considerably below their maximum of 3,000 r.p.m., and the French coast was sighted 80 minutes after passing the Needles. A minute or two later the boat had run into Cherbourg Harbour to complete the crossing in the remarkable time of 86 minutes, giving an average speed of 42 knots, or about 48 m.p.h. Next day the boat returned to Hythe in 87½ minutes.

We understand The British Power Boat Co. Ltd. still have a few reproductions of one of Captain Bryan de Grineau's remarkable paintings of high speed motor craft, which are available to readers on application to the British Power Boat Co. Ltd., Hythe, Southampton.

Facts about British Railways

Carrying on in Wartime

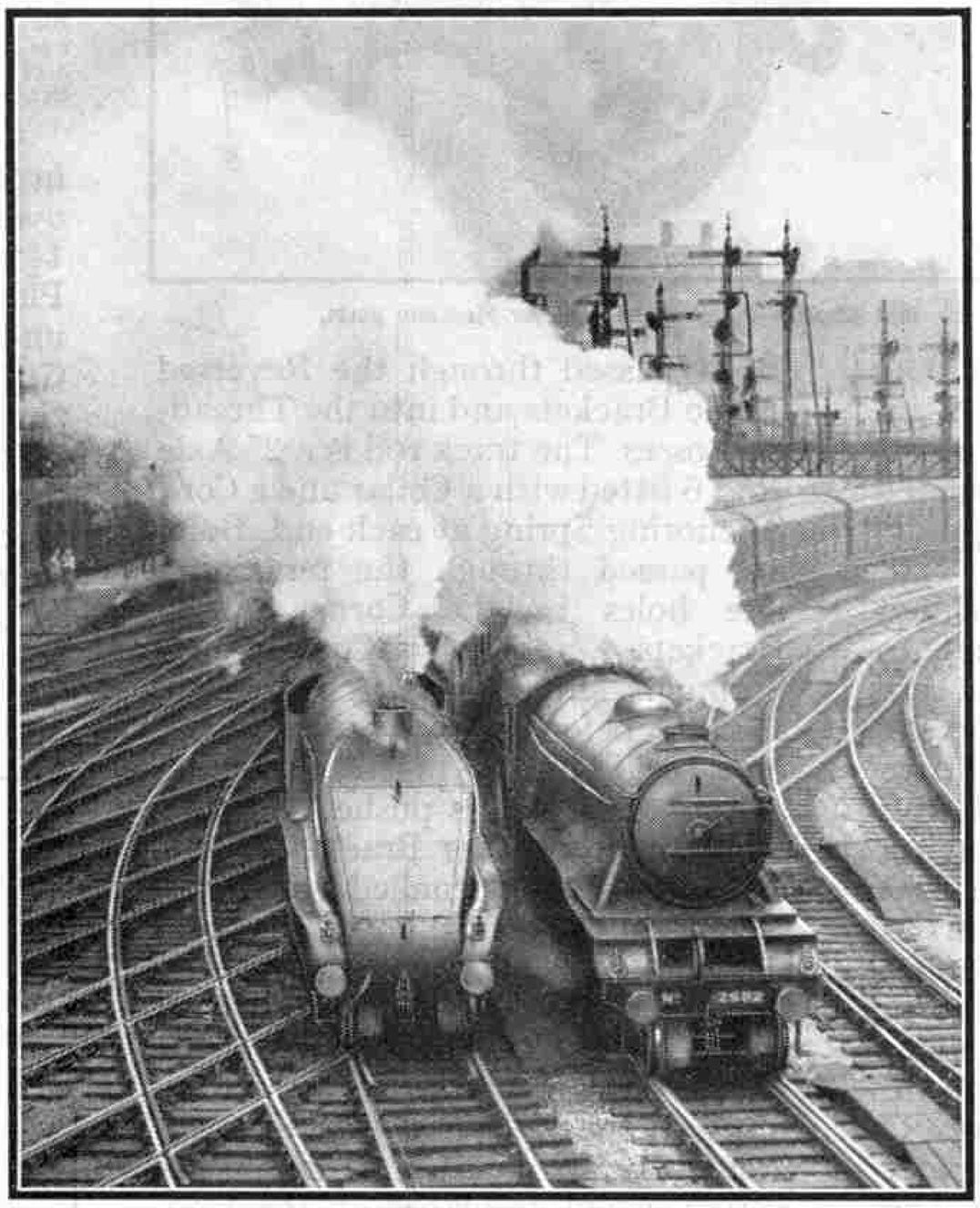
"M.M." readers, with their keen interest in locomotives, rolling stock and equipment of all kinds, realise the vital importance of railways in our national effort, but even they will be surprised when they learn the full facts about them. British railways constitute the largest private undertaking in the country. The amount of capital invested in them is £1,099,621,000, and their resources are at the disposal of the public for private as well as national service. The part they play emphasises the truth of Kipling's words: *"If you can tie up a nation's transport you can take her off your books."*

Here are some astonishing facts in brief. The busiest railway junction in the world is Clapham Junction, through which 2,500 trains pass every day. British railways own the world's largest covered goods station, Temple Meads at Bristol, the world's largest graving dock, at Southampton, and the largest suburban electric train system, that operated by the Southern Railway. Our railways also are the largest owners of docks and hotels in the world, and the highest speed ever attained by a steam train was recorded on a British railway in July 1938, when the L.N.E.R. *"Coronation"* attained 125 m.p.h. This is indeed a remarkable series of world records, of which British railways may well be proud.

The total mileage run annually is 583,007,000, and more than 1,158 million passenger journeys are made in a year. For hauling the trains there is an immense fleet of locomotives, of which 19,577 are driven by steam, 13 by electricity and 35 by oil. The largest and most powerful of these is the L.N.E.R. "Garratt," which weighs 178 tons 1 cwt. in working order and has a tractive effort of 72,940 lb. The transport activities of the four companies extend far beyond the provision of the most intensive railway services in the world, however, for they are the largest owners of road vehicles in Great Britain and possess 130 steamships with a gross tonnage of 176,145. There are railway-owned docks, harbours and wharves at 76 places, with a total length of quays of 501,402 ft.

There is another way of looking at the importance of British railways in our national life. They are Britain's own best customers. Thousands of British miners are regularly employed in producing the 14,724,000 tons of coal required in a year for the 19,577 steam locomotives owned by the companies, and for steamships, hotels, works and other departments of railway working. They use 21,121,000 bricks a year, British steel works supply them annually with 257,000 tons of rails, and 2,295,000 yards of cloth for uniforms reach them from British manufacturers.

Let us look at some of the services that result from these gigantic efforts. Every year passenger trains cover a distance of 284,946,000 miles in perfect safety and in comfort, thanks largely to the excellence of the British railway track, the best in the world, and to efficient signalling, in which modern electric colour-light signals play an increasingly important role. Such facilities as cheap day return tickets, workmen's tickets and cheap monthly returns are available, and restaurant cars, buffet cars and sleeping cars are provided on a large number of trains. Some 9,000,000 meals are served on railway trains in a year.



"The Silver Jubilee," hauled by "Silver Link," and the 10 a.m. Liverpool express, headed by "A1" Pacific No. 2582, "Sir Hugo," leaving Newcastle. Photograph by courtesy of the L.N.E.R.

On the goods side there is an even more remarkable record. The latest available figures show that 254,496,000 tons of merchandise of all kinds are carried annually. There are 50,000 special wagons available for conveying plate glass, long girders and heavy machinery, and high capacity wagons have increased considerably in numbers in recent years. The largest railway wagon in the country has 56 wheels and can carry a load of 150 tons. British railways also operate the largest household removal organisation in the country, and there are suitable containers for almost every special kind of traffic, including meat, fish and fruit, furniture and bicycles.

The wartime effort of British railways claims a special place in this review. The companies are working together under a committee appointed by the Minister of Transport, and thousands of trains have already been run for troops and munitions. Every day transport has to be provided for huge quantities of war supplies, including such things as gas cylinders to keep barrage balloons in the air. Road vehicles loaded with these are run direct on to special flat wagons to avoid the necessity of loading and unloading the cylinders. Many wagons have been converted to carry explosives, and great ingenuity has been shown in designing and adapting fittings for loading and carrying guns, tanks and military equipment of all kinds. On one railway alone an average of 4,000 freight trains has been operated every 24 hrs. since the outbreak of war, an increase of 500 on the same period of the previous year.

Other special services have included civil evacuation trains, which completed their part without a hitch, thanks to the plans that were made in detail for the moving of more than 3,000,000 children and others from the towns and cities included in the original evacuation scheme. In the London suburban area alone the total number evacuated at the outbreak of war was 1,300,000, for whom 1,500 special trains were run. Fully-equipped ambulance trains also have been provided by British railways, in addition to casualty evacuation trains, and it is estimated that seven miles of railway passenger train vehicles have been set aside for these hospitals on wheels.

It must be remembered that all these tasks were carried out during a winter when virtually no lighting could be shown, either in trains or on railway premises. Much experimental work has been undertaken to determine the best possible lighting conditions in shunting yards and stations as well as in trains, and to find the best means of hooding signal lights, fogmen's fires and the glare from locomotive fire-boxes. In peace time railway working at night was carried out with the aid of powerful lamps. In wartime this lighting has been reduced by as much as 88 per cent. Yet railwaymen have carried on with courage and determination, providing services far in excess of those of normal times although 25,000 men have been released for the forces.

These details and many others of equal interest are given in the booklet *"Facts About British Railways."* 1940, issued free of charge by the British Railways Press Office, 2, Caxton Street, Westminster, London S.W.1.

New Meccano Models

Three Wheel Car—Balance—Tramcar

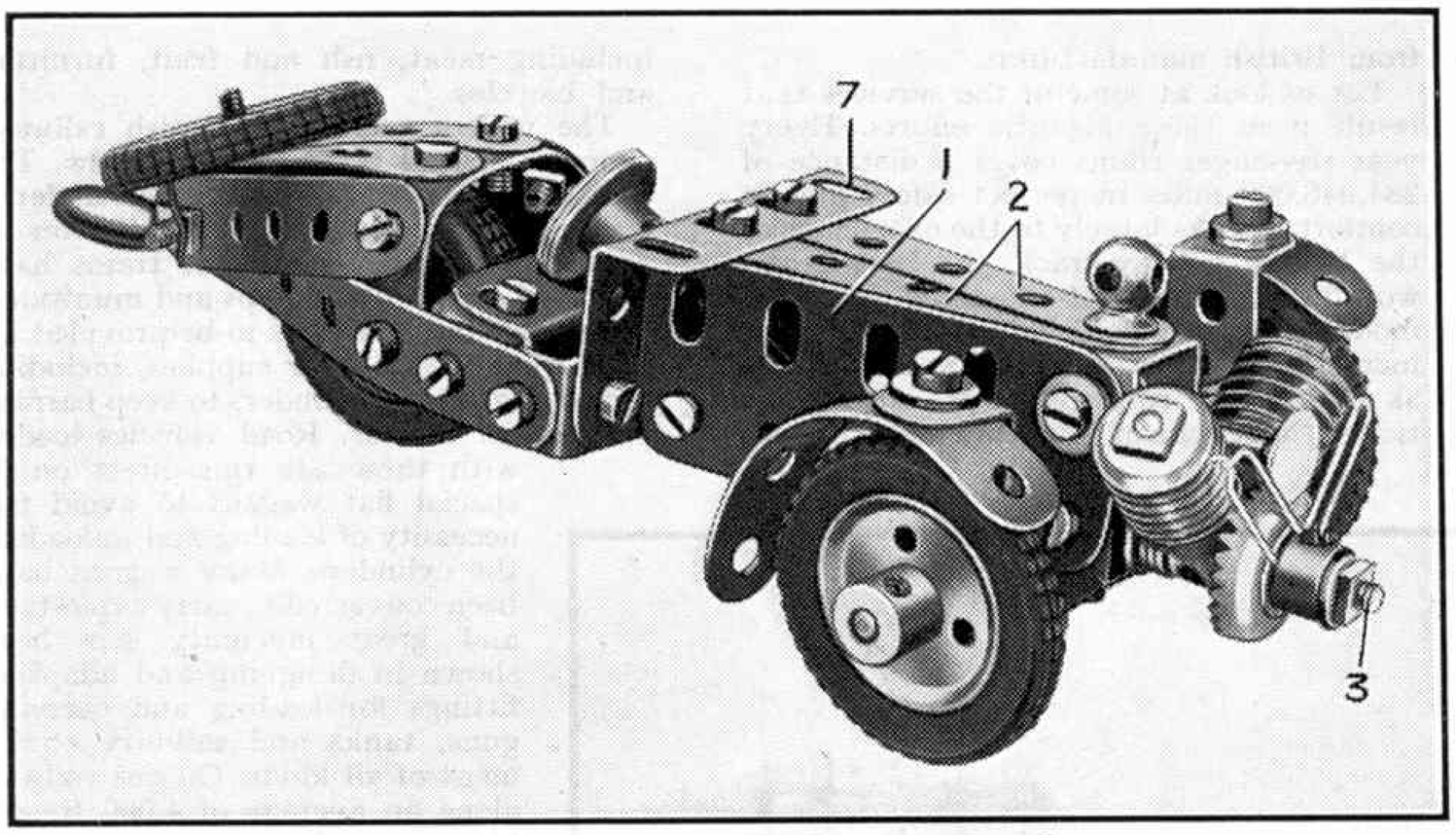


Fig. 1. A miniature three wheel car that displays many novel uses for Meccano parts.

READERS who like building miniature models will be interested in the neat three wheel car shown in Fig. 1. This is constructed from very few parts, yet its appearance is remarkably realistic.

The top and sides of the bonnet are formed by a Girder Bracket, to which two $2\frac{1}{2}''$ Flat Girders 1 are secured by means of Angle Brackets, and also two $2\frac{1}{2}''$ Strips 2. The Strips are held in place by the shank of a Handrail Support passed through a Double Bracket bolted to the Flat Girders. The Double Bracket carries also the plunger of a Spring Buffer, which represents an electric horn. A second Double Bracket provides support for the steering mechanism.

The "engine" consists of two 1" Threaded Rods screwed into a spider removed from a Swivel Bearing. The spider is pushed on a 2" Threaded Rod 3, which carries also a $\frac{3}{4}''$ Contrate Wheel that represents the crankcase. A Worm is placed on each of the 1" Screwed Rods and is held in place by a Nut. Pieces of thin copper wire twisted around the Worms and bent as shown represent valve rods.

The steering arrangement comprises two Corner Angle Brackets 4 secured to Threaded Bosses on the $2\frac{1}{2}''$ Strips 5 by means of Threaded Pins, which form bearings for the front wheels. The $2\frac{1}{2}''$ Strip is bolted to the lower Double Bracket, and the Threaded Bosses are held to it by $\frac{3}{8}''$ Bolts. They are held in place by Bolts passed through the Reversed Angle Brackets and into the Threaded Bosses. The track rod is a 2" Axle Rod 6 fitted with a Collar and a Cord Anchoring Spring at each end. Bolts are passed through the remaining free holes in the Corner Angle Brackets 4, and half a Compression Spring is slipped on each of their shanks before they are screwed into the Collars.

A 3" Axle Rod is pushed through a hole in the Girder Bracket 7, and its lower end is journalled in a Collar secured in the centre bottom hole of the Flat Girder forming the side of the bonnet. Two Washers are placed on the Bolt before it is tightened up. The lower end of the 3" Axle Rod touches the $2\frac{1}{2}''$ Strip mentioned previously, and a Cord Anchoring Spring, which is placed on the Rod below the Collar, prevents upward movement. Cord is wound around the lower end of the Rod, and its ends are tied to the Cord Anchoring Springs on the track rod.

The rear of the body consists of two $3\frac{1}{2}''$ Strips bolted to $1'' \times \frac{1}{2}''$ Angle Brackets fixed to the Girder Bracket 7. A 3" Strip is bent as shown, and 2" and $2\frac{1}{2}''$ Strips are bolted to it. The $3\frac{1}{2}''$ and $2\frac{1}{2}''$ Strips are joined at their rear ends by a $\frac{3}{8}''$ Bolt. The 2" Strips are bent downward slightly, and to them is fixed a 1" loose Pulley with tyre.

The driving seat is a $1\frac{1}{2}''$ Angle Girder fixed by two Angle Brackets between the $3\frac{1}{2}''$ Strips. Two $1\frac{1}{2}''$ Strips are fastened to a Double Bracket 8 bolted to the Angle Girder, and a 1" Axle Rod journalled in holes in the Strips forms the axle of the rear wheel.

The model is completed by fixing in place the exhaust pipe, which is represented by a $3\frac{1}{2}''$ Crank Handle.

Parts required to build model three-wheel car: 2 of No. 3; 9 of No. 5; 3 of No. 11; 8 of No. 12; 1 of No. 9f; 1 of No. 19h; 4 of No. 22; 1 of No. 29; 2 of No. 32; 12 of No. 38; 24 of No. 37a; 19 of No. 37b; 1 of No. 48a; 4 of No. 59; 2 of No. 64; 2 of No. 82; 1 of No. 81; 4 of No. 111c; 1 of No. 120a; 1 of No. 136; 1 of No. 161; 4 of No. 142c; 2 of No. 125; 1 of No. 154a; 1 of No. 154b; 3 of No. 176; 4 of No. 217b; 1 spider (from Swivel Bearing).

Construction of the tramcar shown in Fig. 3 should be commenced by overlapping two $5\frac{1}{2}'' \times 3\frac{1}{2}''$ Flat Plates $1\frac{1}{2}''$ along their short sides. The Plates are then bolted centrally under the flanges of two $12\frac{1}{2}''$ Angle Girders, so that the slotted holes in the Girders are vertical. Two $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates are fitted to the projecting ends of the Girders at each end of the chassis, across which, $2\frac{1}{2}''$ from the ends, two $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips are bolted. Four $5\frac{1}{2}''$ Strips are bolted to the lugs of the Double Angle Strips,

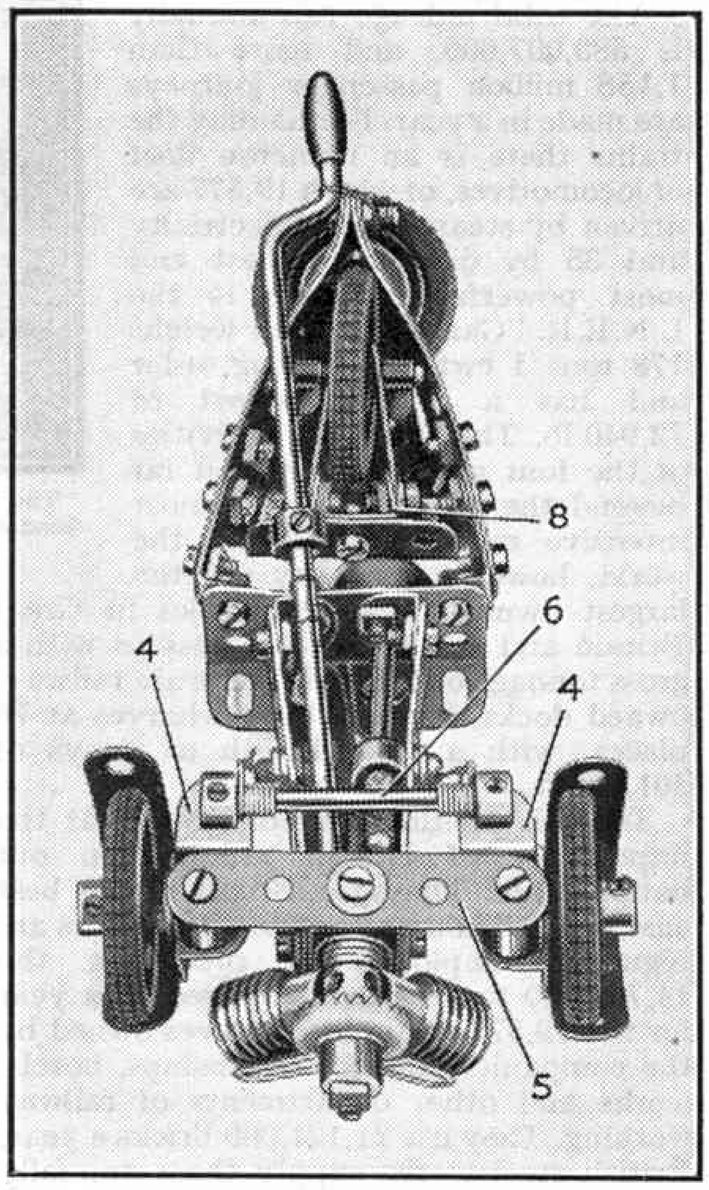


Fig. 2. An underneath view of the three wheel car.

and two $12\frac{1}{2}''$ Strips to the $5\frac{1}{2}''$ Strips. A $4\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plate are overlapped $1\frac{1}{2}''$ along their short sides and are bolted to the $12\frac{1}{2}''$ Strips. The same operation is repeated on the other side of the model. The Plates are held to the lower ends of the vertical $5\frac{1}{2}''$ Strips by Flat Brackets. Two $9\frac{1}{2}''$ Strips are bolted to the vertical $5\frac{1}{2}''$ Strips, and two 3″ Strips are bolted to the $9\frac{1}{2}''$ and $12\frac{1}{2}''$ Strips at each side to represent window frames. Further 3″ Strips are bolted to the $12\frac{1}{2}''$ Strips and to the chassis sides.

Each of the motor controls is a Bush Wheel fitted with a Threaded Pin, and the hand brake controls are each formed from a Double Arm Crank also fitted with a Threaded Pin. To the tops of the vertical $5\frac{1}{2}''$ Strips are bolted two compound $15\frac{1}{2}''$ Strips, each of which consists of a $12\frac{1}{2}''$ Strip and a $4\frac{1}{2}''$ Strip overlapped 2″ and bolted together. Further $5\frac{1}{2}''$ Strips are bolted to the existing vertical $5\frac{1}{2}''$ Strips overlapping them by 1″.

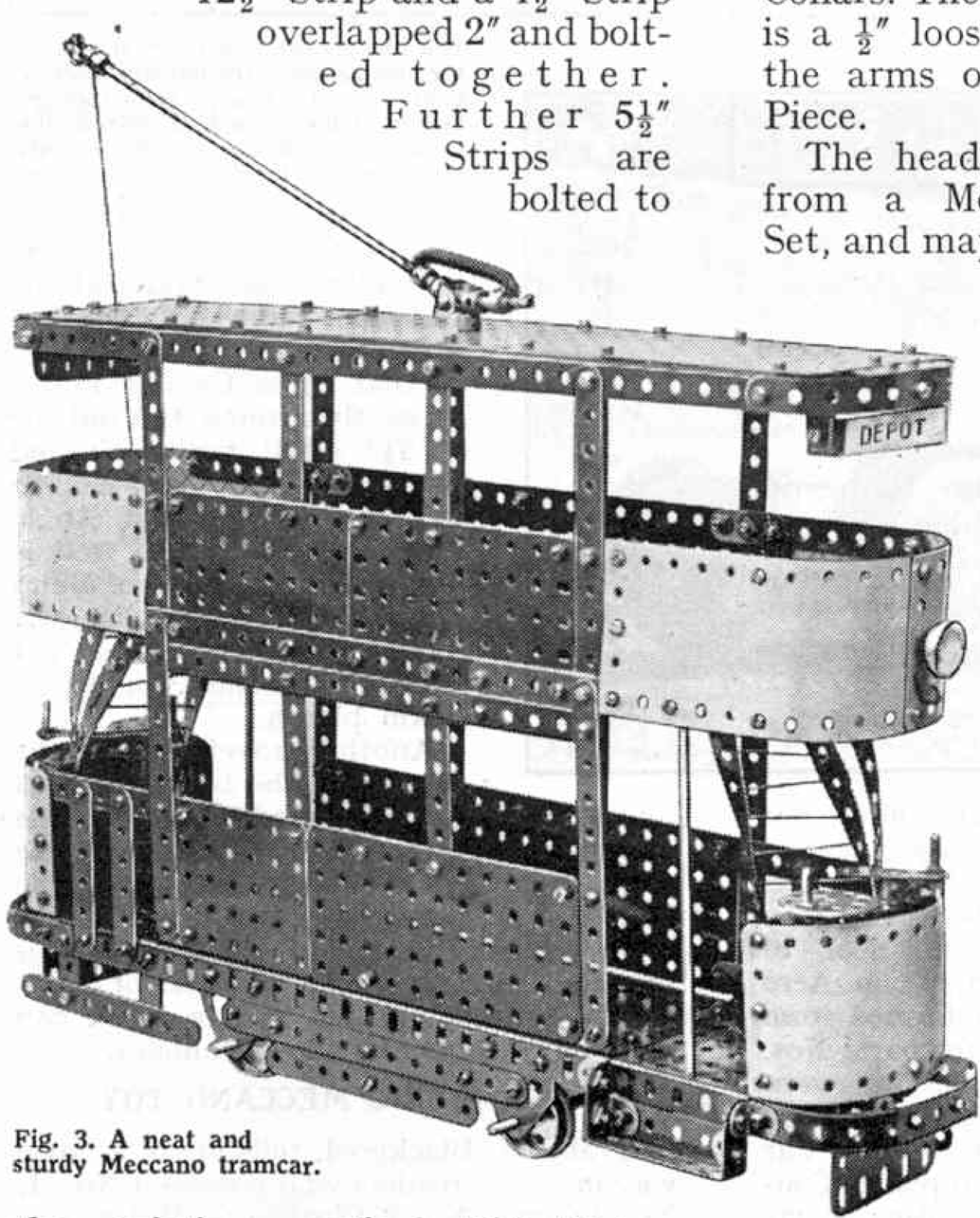


Fig. 3. A neat and sturdy Meccano tramcar.

Each side of the top deck consists of two $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates overlapped $\frac{1}{2}''$ and bolted together. The curved ends are formed from two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates overlapped $\frac{1}{2}''$ and bolted together. The floor of the top deck consists of two $5\frac{1}{2}'' \times 3\frac{1}{2}''$ Flat Plates overlapped $1\frac{1}{2}''$ and attached to the sides by Angle Brackets.

Each flight of stairs consists of two $7\frac{1}{2}''$ Strips suitably bent and held to the upper and lower decks by Angle Brackets. The treads consist of cord.

The roof is filled in with three $5\frac{1}{2}'' \times 3\frac{1}{2}''$ Flat Plates, overlapped $\frac{1}{2}''$ and bolted together. This large plate is then extended at each end by a 2″ Flat Girder and is attached to the sides of the roof by Angle Brackets.

The trolley pole is a 7″ Rod fixed in the boss of a large Fork Piece that pivots on a 1″ Rod gripped in the end tapped hole of a Coupling. A $1\frac{1}{2}''$ Rod gripped in the transverse bore of the Coupling carries a Spring, which is retained in place by a Collar, the other end of the Spring being held by a Collar on the 7″ Rod. The trolley pivots on a $1\frac{1}{2}''$ Rod attached to the roof by two Collars. The current collector is a $\frac{1}{2}''$ loose Pulley held in the arms of a Small Fork Piece.

The headlamps are taken from a Meccano Lighting Set, and may be lighted from a battery housed in the base of the model.

Parts required to build model tramcar: 6 of No. 1; 2 of No. 1a; 6 of No. 1b; 14 of No. 2; 4 of No. 2a; 8 of No. 3; 20 of No. 4; 12 of No. 5; 4 of No. 6a; 2 of No. 8a; 10 of No. 10; 37 of No. 12; 4 of No. 12a; 1 of No. 13a; 1 of No. 14; 2 of No. 15b; 4 of No. 16b; 2 of No. 18a; 4 of No. 20; 1 of No. 23; 2 of No. 24; 184 of No. 37a; 190 of No. 37b; 25 of No. 38; 1 of No. 40; 1 of No. 43; 2 of No. 46; 2 of No. 48a; 2 of No. 48b; 2 of No. 53; 7 of No. 52a; 4 of No. 53b; 2 of No. 59; 2 of No. 62b; 1 of No. 63; 2 of No. 103f; 2 of No. 103g; 1 of No. 111a; 4 of No. 115; 1 of No. 116; 1 of No. 116a; 4 of No. 124; 4 of No. 126a; 6 of No. 192; 2 of No. 203; 2 of No. 208. Wire for Connecting Purposes.

The simple balance shown in Fig. 4 can be built from the parts in Outfit No. 3, and if carefully calibrated may be used to weigh light articles.

The base of the balance is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate to which are bolted two 7″ compound strips each strengthened by a Trunnion and a Flat Trunnion. Each of the compound strips consists of a $5\frac{1}{2}''$ and a $2\frac{1}{2}''$ Strip overlapped 1″ and bolted together. These Strips are joined across at the top by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. Two built up $2\frac{1}{2}'' \times \frac{1}{2}''$ double angle strips are formed by bolting $\frac{1}{2}''$ Angle Brackets to the ends of $2\frac{1}{2}''$ Strips. To one end of each double angle strip is then bolted a $2\frac{1}{2}''$ Strip and to the other end a $5\frac{1}{2}''$ Strip. These form the counterweight arms, and they are pivoted on two $\frac{3}{8}''$ Bolts lock-nutted to them and to the 7″ compound Strips. The weights on each arm consist of a Road Wheel, two $2\frac{1}{2}''$ Curved Cranked Strips, a 1″ Pulley and a $2\frac{1}{2}''$ Semi-Circular Plate.

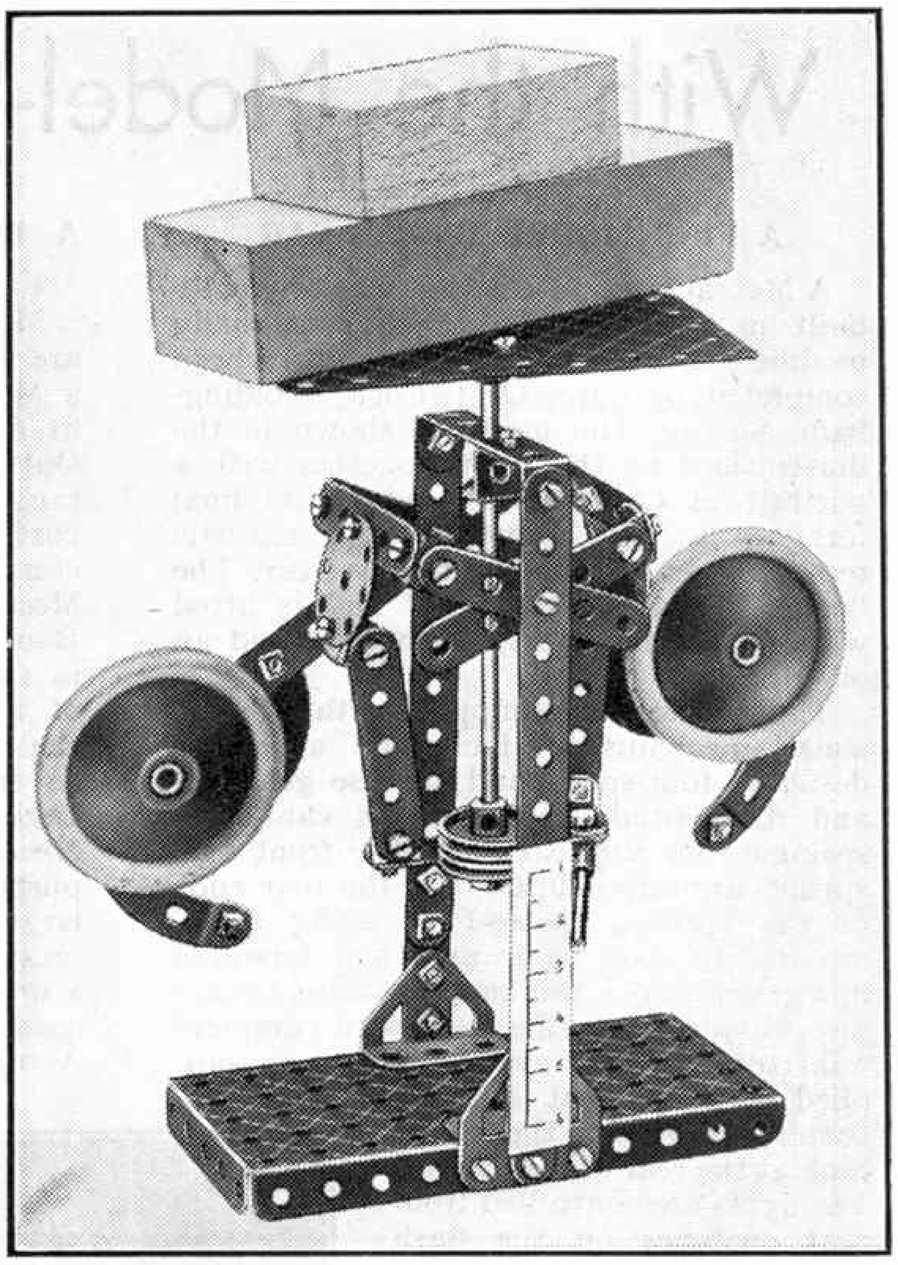


Fig. 4. This balance can be built from the parts in Outfit No. 3.

The weighing pan consists of two $2\frac{1}{2}'' \times \frac{1}{2}''$ Flexible Plates bolted together. The Bolts that hold the Flexible Plates together also hold a Bush Wheel, which is carried on one end of a $5\frac{1}{2}''$ rod consisting of a $3\frac{1}{2}''$ Rod and a $2\frac{1}{2}''$ Rod joined by a Rod Connector. The compound rod is journalled in the centre hole of the $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip and in a Reversed Angle Bracket bolted to it.

The counterweight arms have $1\frac{1}{2}''$ Discs bolted to them as shown in the illustration, and these are connected to a $2\frac{1}{2}''$ Strip held to the compound $5\frac{1}{2}''$ Rod by two 1″ Pulleys. They are attached to the $2\frac{1}{2}''$ Strip by further $2\frac{1}{2}''$ Strips and Angle Brackets. The pointer, a 2″ Rod held to the centre $2\frac{1}{2}''$ Strip, moves over a scale pasted to one of the $5\frac{1}{2}''$ Strips.

To calibrate the scale it is only necessary to place various small articles of known weight on the pan and then to mark on the scale the positions taken up by the pointer.

Parts required to build the lever balance: 4 of No. 2; 9 of No. 5; 8 of No. 12; 1 of No. 16; 2 of No. 17; 4 of No. 22; 1 of No. 24; 45 of No. 37a; 39 of No. 37b; 3 of No. 38; 1 of No. 48a; 1 of No. 52; 4 of No. 90a; 6 of No. 111c; 1 of No. 125; 2 of No. 126; 2 of No. 126a; 2 of No. 187; 2 of No. 190; 1 of No. 212; 1 of No. 213; 2 of No. 214; 2 of No. 217a.

With the Model-Builders

A FINE MODEL SPORTS CAR

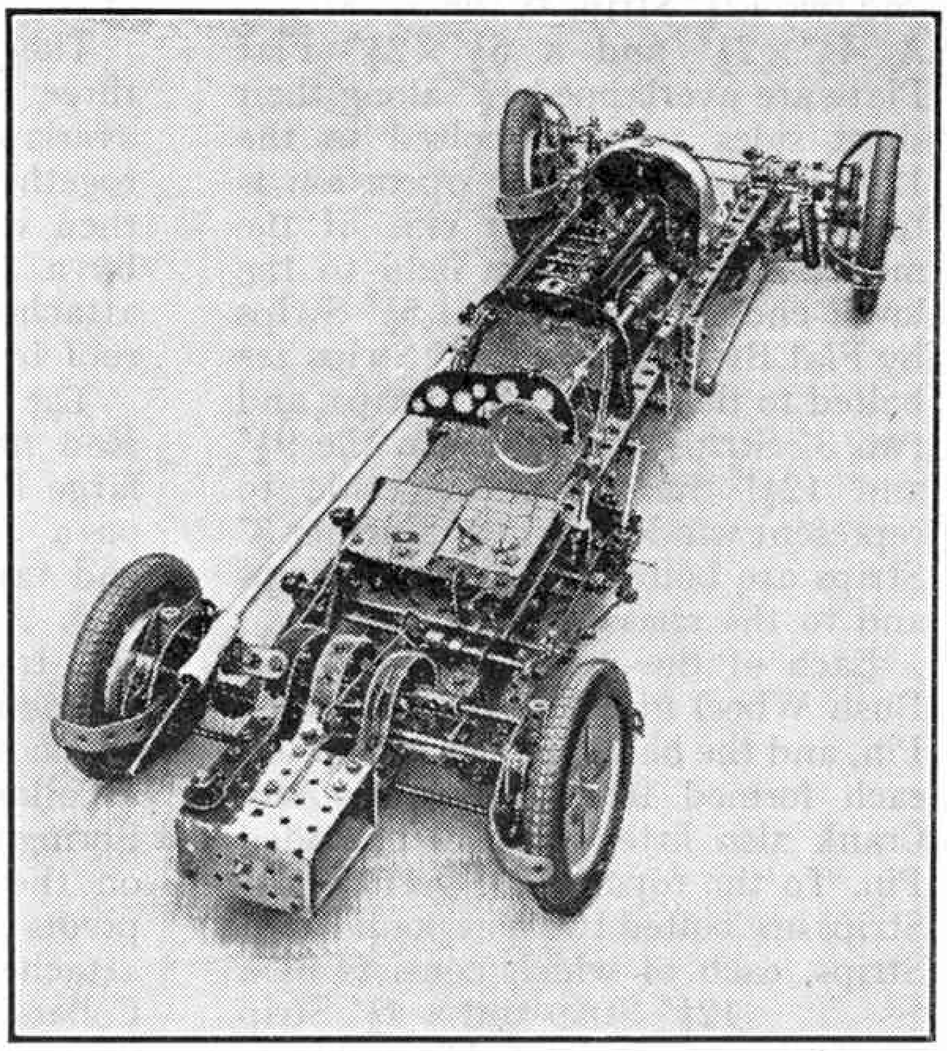
A Meccano model car that was originally built in 1921 and has been continually modified and improved, has recently been completed by Capt. O. J. Cock, Woldingham, Surrey. The model is shown in the illustrations on the right, together with a portrait of Capt. Cock, and in its final form is a very complete and realistic reproduction of a modern sports car. The "engine" is a straight "8," and is fitted with two carburetters, a magneto and an oil filter.

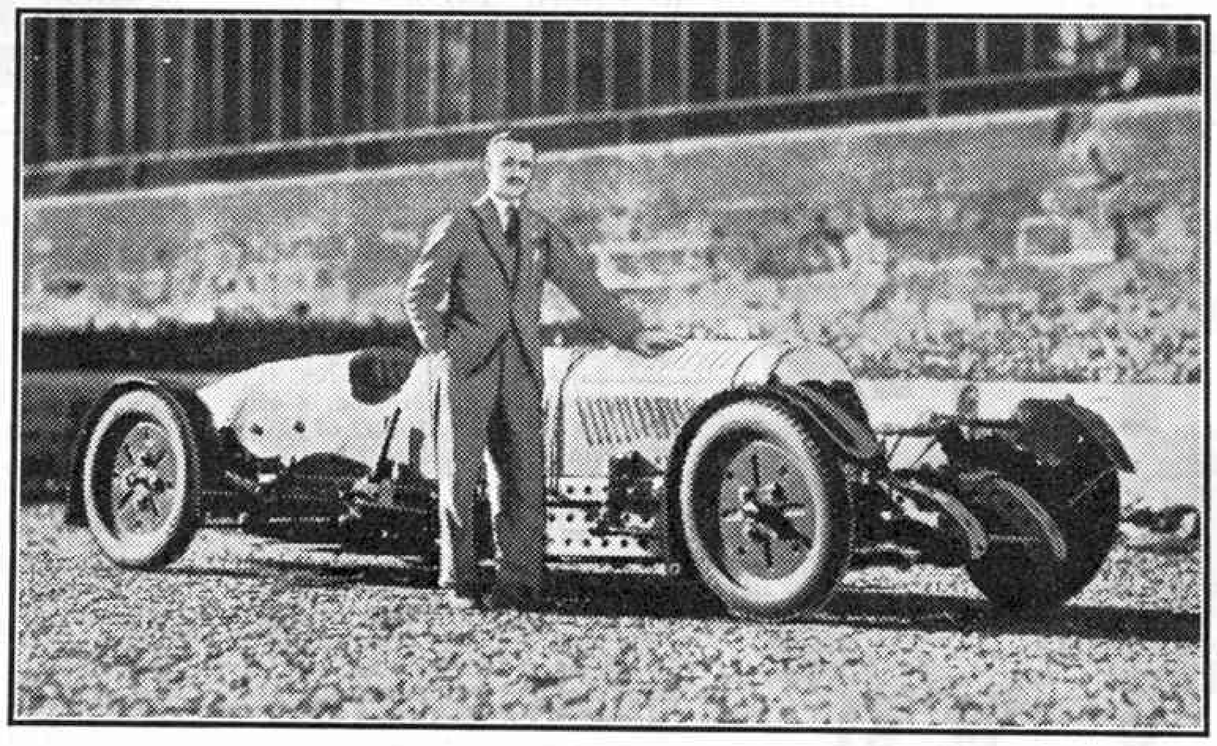
The chassis is equipped with all the usual mechanisms, including a neatly designed four-speed and reverse gear-box and differential, and there is cantilever springing for the rear axle. The front axle springs are semi-elliptic, but the rear ends of the springs, instead of being fixed, are free to slide backwards and forwards in a groove. Foot and hand operated brakes are provided and there is also a complete miniature lighting system, which is supplied with current from a battery housed in the petrol tank at the rear of the chassis. The lights are controlled from neat switches on the dash board. These consist of pins, the points of which are bent over to make contact with the feed wire when the heads of the pins are pulled outward.

The body is built up from pieces of cardboard cut to the required shapes and fastened to a sturdy framework of Strips. There is also a covering plate enclosing the underside of the chassis. The model is the result of much care and skilful work, and is one of the most interesting of its type that I have seen.

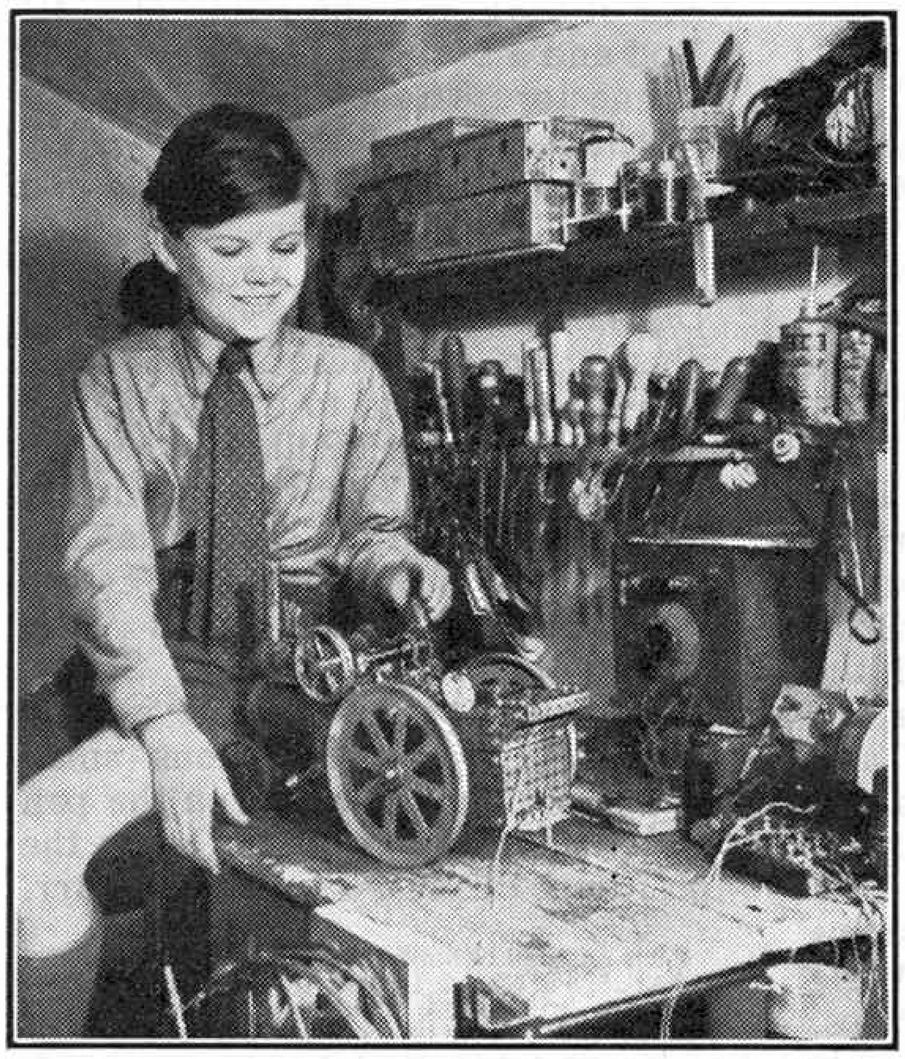
A BOURNVILLE READER'S SUGGESTION

Meccano model-builders who are fortunate in possessing also a Motor Car Constructor Outfit, or an Aeroplane Constructor Outfit, can greatly increase the range of their models by using parts from these Outfits in conjunction with ordinary Meccano parts. P. E. Randall, Bournville, has experimented in this direction and tells me of a neat method of joining the parts that he has discovered. He uses headlamp angle brackets from the Meccano Lighting Set for this purpose. These have one hole large enough to take the ordinary Meccano Bolts and a smaller one that fits the Bolts used in the Motor Car and Aeroplane Outfits.





The fine model sports car shown in the illustration to the left was built by Capt. O. J. Cock, Woldingham, Surrey, who is seen alongside the model. The details of the chassis are shown in the illustration above.



Michael Gainsborough-Waring, London W.2, who is a keen Meccano model-builder, photographed in his "den."

Model-builders who have not yet experienced the enjoyment of combining Meccano, Motor Car and Aeroplane parts in this way are missing a great deal of pleasure. For example, an Aero Engine Casing Unit formed from Aeroplane Constructor parts Nos. P40 and P41 makes a very realistic petrol tank for a Meccano motor cycle. The Motor Car Headlamp and Aeroplane Constructor Struts are other parts that can be made to serve a useful purpose in a model built mainly from Meccano.

HOW TO USE CURVED PLATES

Some of my younger correspondents are rather puzzled regarding the purpose of the 9/32″ and $1\frac{11}{16}$″ radius Curved Plates, Parts Nos. 199 and 200 respectively. These are intended mainly for use in the construction of small Outfit models, and many examples of their use are illustrated in the Instruction Manuals. The special feature of both is that their use prevents a great deal of unnecessary bending and distortion of other parts.

Part No. 200 probably has the wider range of applications and the radius of $1\frac{11}{16}$″ to which it is bent was chosen so that these Curved Plates fit neatly around the outside of $2\frac{1}{2}$″ small radius Curved Strips, to which they can be secured by means of Angle Brackets. The $1\frac{11}{16}$″ radius Curved Plates will be found particularly useful in the construction of motor car bodies and boilers for model steam plants.

Another novel use for the parts is in the building up of undulating track for model roundabouts and scenic railways. In order to form the track the Plates should be overlapped one hole at one corner and two holes at the other corner. By overlapping them in this manner a circle having a diameter of about 9″ can be constructed. Such a track can be used with Dinky Toys vehicles.

AN AMUSING MECCANO TOY

L. Morris, Blackpool, tells me of a novel way in which readers who possess a No. 1, No. 1a or a No. 2 Clockwork Motor, can use it as the main feature of an amusing toy horse on wheels. The Motor forms the body of the horse, and to the lower corners of its sideplates the legs and neck are bolted. These are represented by $2\frac{1}{2}$″ Strips, and the front legs are connected by Angle Brackets that carry a $2\frac{1}{2}$″ × $\frac{1}{2}$″ Double Angle Strip, through which passes a $3\frac{1}{2}$″ Rod fitted with a 1″ Pulley at each end.

A single 1″ Pulley forming the rear wheel is carried on a 2″ Axle Rod passed through the lower end holes of the $2\frac{1}{2}$″ Strips. The Pulley is driven from a similar Pulley on the motor driving shaft by a Driving Band. A Trunnion forms the horse's head and is fitted with two Flat Brackets for ears. A $2\frac{1}{2}$″ Curved Strip bolted to the brake lever of the Motor represents the animal's tail.

New Meccano Competition

Summer "Sharp Eyes" Contest

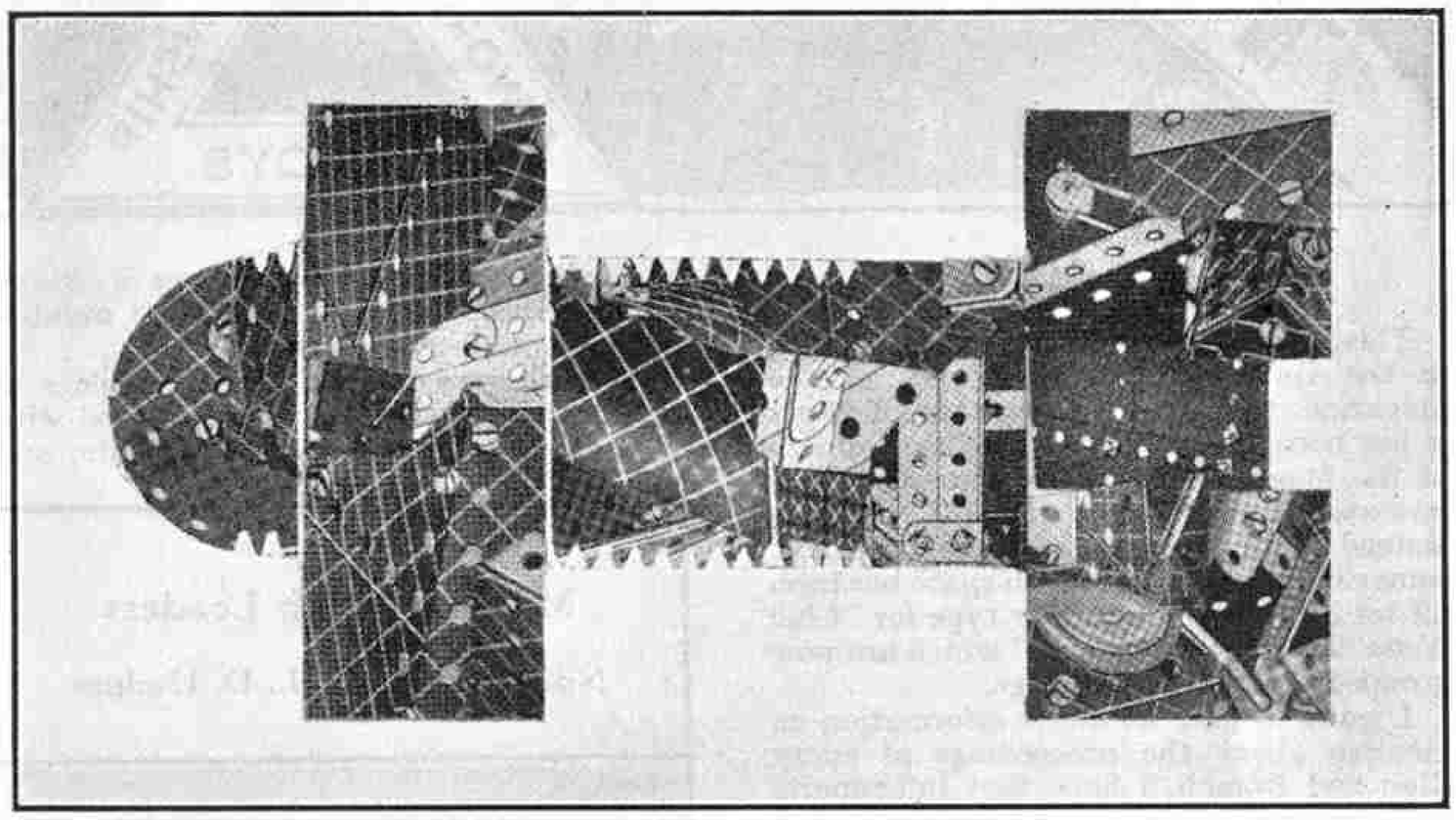
This month we publish details of our second special summer Contest. In this competition there is no model-building to do, and all that a competitor needs to prepare his entry is a copy of the Meccano Instructions Manual for Outfits Nos. 0–6, a pencil and a postcard.

The outline picture of a Meccano Bolt and Nut that appears on this page is made up from numerous pieces cut from illustrations of models in the Meccano No. 0–6 Instructions Manual. Readers are asked to write down, on a post-card, the Manual numbers and the names of the models concerned.

Careful inspection of the illustration will soon enable competitors to "spot" the source of a number of the fragments that have been used. The nature of the Meccano parts shown in the various pieces will help considerably in solving their identity. For example, if the fragments contain part of an Angle Girder it is at once obvious that it has been taken from an illustration of one of the larger models, while a simple model is suggested if the only parts shown are Strips and Pulleys.

It should be noted that the fragments are not necessarily printed in the same angular positions in the illustration on this page as they occupy in the Manual. Some of them may have been reproduced upside down, while others may be placed sideways.

If no competitor succeeds in identifving all the pieces in the illustration, the prizes will be awarded to the readers who send in the best attempts, and in the event of a tie the prizes will be given to those readers whose entries are the most neatly and carefully prepared.



This novel picture forms the subject of the "Sharp Eyes" Contest announced on this page. Prizes are offered to readers who can identify the fragments of which it is composed.

The competition is open to readers of all ages and it should be noted that each competitor is allowed one attempt only.

The principal prizes to be awarded are as follows: First, Meccano or Hornby products value £3/3/–; Second, products value £2/2/–; Third, products value £1/1/–. There will be also five consolation prizes of products value 5/–.

The closing date for receipt of entries is 30th September next. *Entries must be by postcard only*, and should be addressed "*Sharp Eyes Contest*," Meccano Ltd., Binns Road, Liverpool 13.

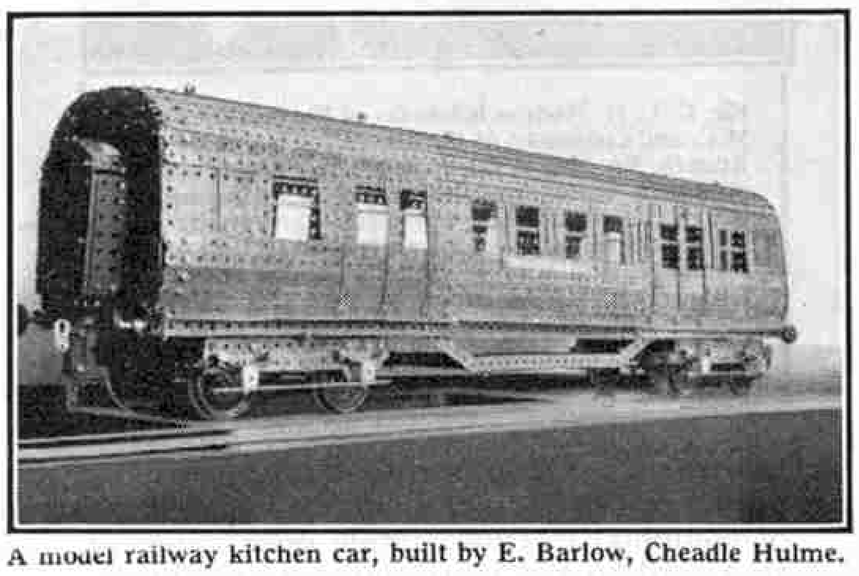
More Prize-Winning Models

Last month I described several of the most outstanding models that won prizes in the "New Year" Contest. There were many other equally interesting entries in this competition among them a reproduction of the specially designed machine that is used for cleaning the inside lining of the great Queensway Tunnel under the River Mersey. This model was built by E. D. Clements, Orpington, and earned a prize largely for its novelty.

The actual machine consists of a huge curved steel arm pivotally mounted on a Diesel-engined chassis. The arm provides a runway for a trolley that is pulled up and down by means of wire ropes attached to an electrically operated drum. The trolley carries two horizontal spindles, each provided with several cloth flaps. The spindles rotate in opposite directions at 120 r.p.m. as the trolley moves up and down the track, thus causing the flaps to strike the walls and roof of the tunnel and wipe them. The model is an excellent reproduction of the actual machine both in appearance and method of operation.

The original machine was described and illustrated in the "*M.M.*" for August 1935, and its selection as the prototype of a prize-winning model shows the value of the Magazine to those in search of interesting subjects.

Another uncommon type of model entered in Section A was a miniature kitchen car based on those in service on the L.M.S. Railway. This model is illustrated on this page. Although its novelty was a powerful contribution to its success in this Contest, I have no doubt that the judges were greatly influenced also by its exceptionally neat and well proportioned appearance. These are very important factors in favour of any model, and I am glad to say that competitors are paying greater attention to them in preparing their entries.



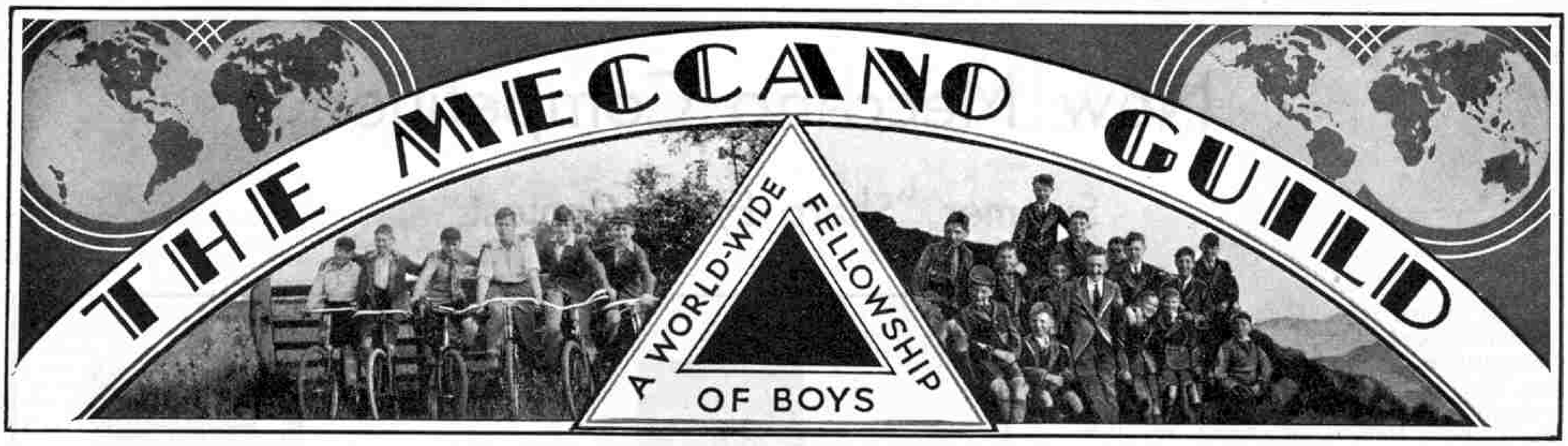
A model railway kitchen car, built by E. Barlow, Cheadle Hulme.

So far I have said nothing about the many good models entered in Section B of the Contest. In this group the principal award was made to Geoffrey Bland, who lives at Monk Bretton, Yorkshire, in view of his good workmanship in building a model traction engine. There is nothing particularly original in the design of the model, and the award was made for neat and sturdy construction, realism and attention to details.

Second Prize in Section B was awarded for a model motor fire escape built by W. A. Kirby, Haslingden. The escape is mounted on a four wheel chassis and can be extended to a height of 5 ft. Its inclination can be varied as required by turning a handle that operates through gearing neatly arranged at the rear of the chassis.

Michael Alden, Romford, another prize-winner in this Section of the competition, chose a British warship as the subject for his model. Michael is only just 10 years of age, and I am sure the judges must have been very pleased with the clever manner in which he used the Meccano parts at his disposal. It is difficult to single out for special mention any particular feature of the model, but it possesses the "satisfying" appearance that results only from careful planning and workmanship.

A novelty in this Section of the Contest was provided by a water motor submitted by Edward J. Henry, Cardiff. The rotor consists of Dredger Buckets fixed to a hub formed from Face Plates.



Reports Wanted

This month readers will notice a change in the Guild and Branch pages of the Magazine. Owing to the shortage of paper it has become necessary to reduce the size of the Magazine, and only two pages are now available for Guild and H.R.C. matters, instead of the three previously allotted. To some extent this reduction in space has been off-set by the use of smaller type for *"Club Notes"* and *"Branch News,"* which are now grouped together on one page.

I want to give as much information as possible about the proceedings of every Club and Branch. I hope that full reports will continue to come in, and ask particularly that secretaries of organisations that have not been represented in these pages for the last two or three months should get into touch with me as soon as possible.

The "M.M." Radio Fund

On page 403 of this issue appears the third list of contributors to the *"M.M."* Radio Fund for the R.A.F. I am delighted to see that Clubs and Branches make excellent showing in this list. The amounts that have been contributed represent real personal effort on the part of members, who have either saved money themselves to be collected on behalf of the Fund, or have helped in arranging the successful displays, concerts, etc., that their officials have planned.

I want every Club and Branch to be well represented in the effort. The size of the contribution does not matter in the least. A few shillings collected in small instalments are as well received as larger sums raised by special efforts, and all who contribute in any way will share the pleasure of heartening the men who are engaged on the task of keeping our country secure.

A Programme Suggestion

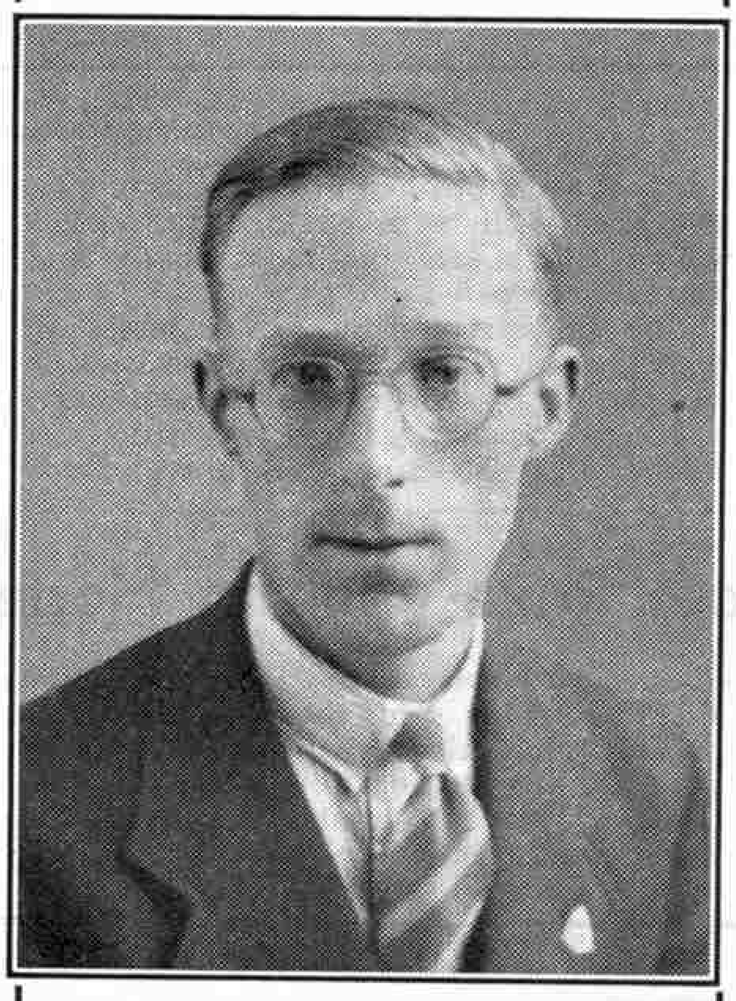
The programmes of many Clubs and Branches already provide opportunities for the aeroplane enthusiast, and I should like to impress on Leaders and officials of others that both real and model aeroplanes can be made to give programme items that will be immensely popular with all members. Interest in aeroplanes to-day has a practical value, for it is as well that as many people as possible should be able to recognise different types of both British and German machines. A special meeting might well be devoted to the study of the silhouettes of German machines, especially troop carrying aeroplanes, which have been reproduced in newspapers and other periodicals by special request of the War Office. These would provide the basis of an interesting contest. Members might be allowed to study the details for a certain time, and prizes could then be awarded to those who can best reconstruct the drawings in outline from memory and give the largest number of recognition points correctly.

The construction of flying models is another hobby that can be introduced with advantage into Club and Branch life, and the present is a good time for actual flying meetings. Models can be of varying degrees of complexity, from simple ones made of thin card to the more elaborate machines, based perhaps on kits supplied by well-known makers, and provided with rubber motors. In judging models neatness and care in construction must be taken into account, but the chief factor must be flying ability.

Flying model aeroplanes is great fun, and any Club or Branch that arranges meetings for this purpose will find the trouble well worth while.

Meccano Club Leaders

No. 102. Mr. G. L. D. Hodges



Mr. G. L. D. Hodges is Leader of the Northampton M.C. and Chairman of the associated Northampton Branch, No. 284, of the H.R.C. These organisations pursue a varied and interesting programme, in which Hornby Train operations and visits are special features. A model aeroplane section meets regularly, and a club magazine "The 284 News Letter," is issued monthly. The 5th birthday of the club and Branch was recently celebrated by a special concert.

Small Clubs and Branches

Many members of the Guild and H.R.C. meet together in small groups to enjoy their hobbies. For various reasons these small Clubs and Branches have not yet reached the stage at which they can apply for formal recognition, and I want to impress on all of them that I am greatly interested in their progress. I hope that the members of every group of this kind will write to tell me what they are doing, so that I can give space in these pages to reports of their activities. This will serve two good purposes. On the one hand it will encourage them and give me opportunities of helping them. On the other it will make their existence known to other enthusiasts who would be willing to join them, and so help to bring them up to the point of official recognition.

Proposed Clubs

Attempts are being made to establish Meccano clubs in the following places, and boys interested should communicate with the promoters, whose names and addresses are given below.

ALDEBURGH—E. Wisbey, 33, High Street, Aldeburgh, Suffolk.

DUNDEE—E. B. Bowie, 39, Provost Road, Dundee.

NEW ZEALAND—J. Cresswell, Spring Creek, Blenheim, Marlborough, New Zealand.

SOUTH AFRICA—R. P. Middleton, 128, Jameson Avenue, Salisbury, Southern Rhodesia, South Africa.

Proposed Branches

The following new Branches of the Hornby Railway Company are at present in process of formation, and any boys who are interested should communicate with the promoters, whose names and addresses are given below.

BILLINGSHURST—G. James, The Post Office, Wisborough Green, Billingshurst, Sussex.

DUKINFIELD—J. E. Hill, 147, Pickford Lane, Dukinfield, Cheshire.

LONDON—D. E. Smart, 50, Woodgrange Avenue, N. Finchley, London N.12.

LONDON—R. Egner, 54, George Road, Chingford, London E.4.

SHIRLEY—M. R. Gilmour, 206, Marshall Lake Road, Shirley, Warwickshire.

WATFORD—K. R. Cooper, 25, Berry Avenue, Watford, Herts.

WESTON-SUPER-MARE—G. J. Allen, 14, Aspcombe Park Road, Weston-super-Mare.

Branches Recently Incorporated

395. BROMLEY—Mr. M. Pooley, 15, Pickhurst Lane, Hayes, Bromley, Kent.

396. NOTTINGHAM—Mr. R. O. Hooton, 1, Laurie Avenue, Forest Fields, Nottingham.

Club and Branch News

Meccano Clubs

Coloured Mission (Cardiff) M.C.—A Life Boy Team is now associated with the Meccano club, and members took part in a special demonstration, in which they were very successful. Outdoor meetings are being held, and a baseball team has been formed. A large Hornby Train layout has been presented to the club, and operations on this are to be added to the programme. Club roll: 20. *Secretary:* D. H. Binstead, 37, Penhill Road, Llandaff Fields, Cardiff.

Hornsea Evacuee M.C.—Cricket has been enjoyed regularly, all members being given good opportunities for batting and bowling as well as fielding in practice. The club possesses excellent fast bowlers, who were instrumental in getting the better of the Hornsea M.C. in a special game. Meetings in the club room have continued, and at one of these Miss Highly gave talks on curios collected by her father while at sea. Club roll: 15. *Secretary:* F. Gladstone, 3, Alexandra Road, Hornsea.

Acton M.C.—Steady model-building work is in progress, models completed including a tramcar and a Meccanograph. At one meeting competitions in the current issue of the "*M.M.*" were tackled. A Lecture on "*The Great Western Railway*" was given by H. B. Boreham, who illustrated his story with maps, diagrams and photographs. A further Lecture was given on "*The East Coast Route.*" A scale drawing for the club's Hornby Train layout has been approved and construction work is to commence as soon as the materials are to hand. Club roll: 15. *Secretary:* S. W. Simmons, 7, Alfred Road, Acton, London W.3.

Exeter M.C.—Great progress has been made with model-building. The models constructed are original in design, and include cranes, a railway station, a gunboat and a cake walk of the fairground type. One member is building the model crane shown on the now well known National Savings Committee poster. Indoor games tournaments have been continued. Club roll: 60. *Secretary:* M. F. Golesworthy, 122, Old Tiverton Road, Exeter.

Totnes M.C.—Model-building Contests have been the chief feature of the programme. Table Tennis Tournaments also have been held, and the summer programme includes cricket, boating and the flying of model aeroplanes. Enthusiasm is at its highest and recent attendances are the best yet recorded. Club roll: 20. *Secretary:* T. J. Macnamara, "Gables," Totnes.

Hornsea M.C.—Meetings have been continued along the usual lines and have been particularly interesting. Film displays have been given and there have been Lectures on "*How We Are Governed,*" by Mr. R. W. Shooter, Leader, and on scientific subjects by A. Tawn, Craftsman. Junior members have built models with small outfits, and a particularly interesting model prepared for display at the club by one of the members was a large warship. Cricket also has been played, and in a game against the Hornsea Evacuees M.C. the latter were the winners. Club roll: 24. *Secretary:* P. Richardson, 14, Grosvenor Terrace, Hornsea.

MALTA

The Lasallian M.C.—Model-building and fretwork have been carried on, parents of members kindly supplying plywood boxes for the Fretwork Section. An interesting Lecture was given by Rev. Bro. Walter Joseph, F.S.C., who presented the club with a photograph album. Mr. J. M. Demanuele has given an interesting talk on how to use Meccano parts. A visit has been paid to an ice cream factory, the proprietors of which kindly allowed members to sample the products, which were greatly appreciated. Club roll: 32. *Secretary:* A. Caruana, "Floria," Victory Street, Gzira, Malta.

CEYLON

Colombo M.C.—This newly formed club is under the Leadership of Mr. J. Deegalle, and Mr. S. Perera is President. Excellent meetings have been held. Most of these were devoted to model-building and model-building contests, in which prizes were awarded to successful competitors. Lectures have been given, including one entitled "*Man Rivals the Birds,*" and Debates, football matches and a visit to the site of a hydro-electric power scheme have completed a very interesting programme. Club roll: 21. *Secretary:* S. L. Abeysinghe, "Simpson Villa," Udahamulla, Nugegoda, Colombo, Ceylon.

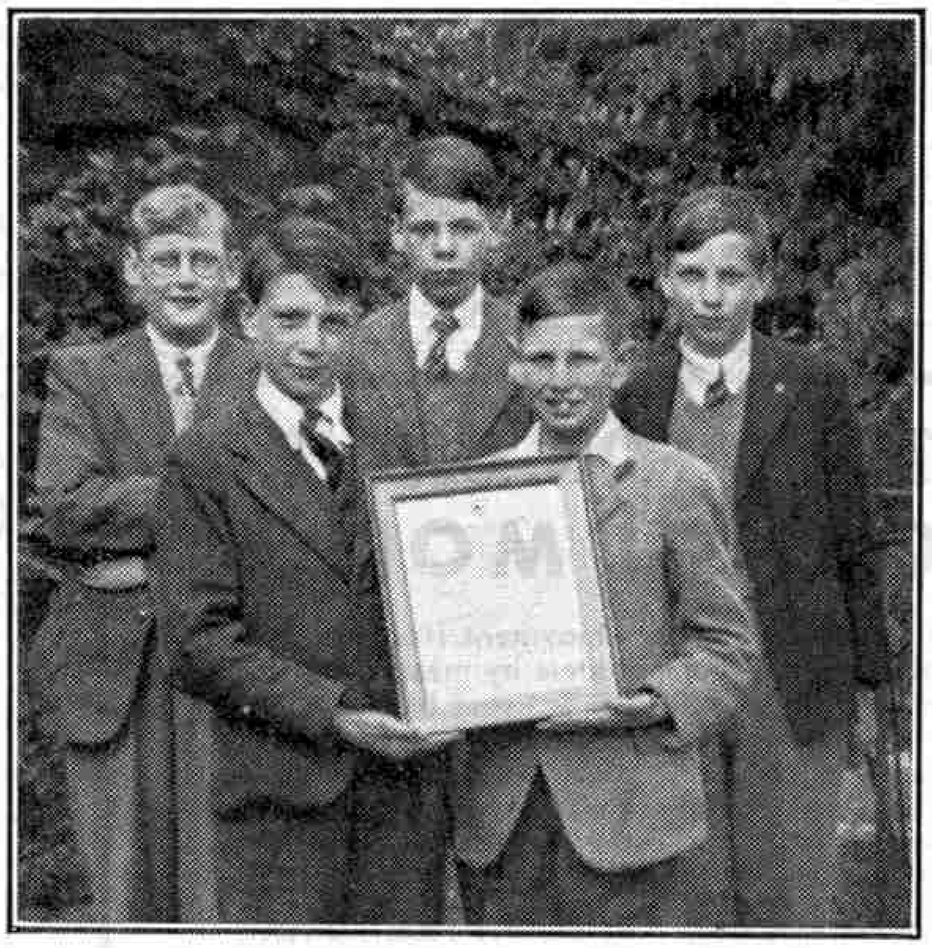
NEW ZEALAND

Spring Creek (Blenheim) M.C.—This recently formed club has been granted affiliation with the Guild. It is well organised under the Leadership of Mr. L. Sharp. Boxes for housing members' outfits have been obtained, and spare parts have been purchased to form a stock from which members can obtain extra requirements on loan. In a special model-building contest members were grouped in pairs, and the winning model was a reproduction of a Vickers "Wellington" bomber. Other good entries were a locomotive, a crane and a tractor with trailer. Club roll: 9. *Secretary:* J. Cresswell, Spring Creek, Blenheim, New Zealand.

A group of members of the Totnes M.C. Leader, Mr. P. Harvey; secretary, T. J. Macnamara. This club was affiliated to the Guild in February 1940. Model-building, Hornby Train operation and cycling are the chief pursuits of members, who have formed a savings club. A recent Exhibition attracted many visitors, and resulted in a handsome contribution to the "M.M." Radio Fund.

SOUTH AFRICA

The Pioneer (Durban) M.C.—A very successful Exhibition has been held. The outstanding model was a splendid grandfather clock, which gained a prize, and other prize-winning models were a battleship and a tractor with trailer. In a novel contest members were asked to build car models with a limited number of parts, and a speed contest was held with the entries. The Air-Rifle Section continues to be a success, shooting meetings being held monthly. The club Ssvings Bank also continues to do very good work. Club roll: 9. *Secretary:* W. D. Everton, 491, Longmarket Street, Peitermaritzburg, Natal, South Africa.



Members of the Monkstown, Co. Dublin, Branch, No. 377. Chairman, Mr. R. F. Pierce, secretary, R. D. Pierce. The Branch was incorporated in July 1939. It has an excellent layout, on which timetable operations are carried out. A Branch Magazine is published, its contents including excellent railway articles.

Branch News

Clapham Common.—This recently incorporated Branch is holding successful weekly meetings. An electric train has been purchased and is run in conjunction with clockwork operated services. Lectures have been given by members on the British railway companies, and a Lantern Lecture on "*The York Railway Museum*" has been arranged. Outdoor events also are to be held, and a ramble on Wimbledon Common has already been included in the programme. *Secretary:* K. Maycock, St. Barnabas' Vicarage, Lavender Gardens, London S.W.11.

Greenlands (Buxton).—A good start has been made with the programme. Meetings are being held regularly. The subscription has been fixed. Cricket is being played regularly at present, and a subscription in support of the "*M.M.*" Radio Fund is being taken. *Secretary:* J. R. Swain, "Greenwood," College Road, Buxton.

Hornsea.—A new track has been laid down after careful consideration of its design. The track formerly in use is now laid down out of doors, for use at informal meetings of junior members. Interesting operations are carried out regularly, a feature being made of special trains with topical applications. On one occasion additional milk trains were run to meet an imaginary shortage of petrol for the usual road transport. Operations at certain track meetings are controlled by senior members training for official positions. *Secretary:* D. E. Parker, 8, Burton Road, Hornsea.

Northampton.—An outstanding recent event was the visit of members of the Rugby Model Railway Club, who were entertained by the running of special timetable train services on the Branch layout. On a return visit members of the Branch were handsomely entertained by their friends at Rugby. A special wartime committee has been formed to conduct the club. A Model Aeroplane Section has been formed and has held successfnl meetings. *Secretary:* P. W. Samwell, 47, Clarke Road, Northampton.

Blackpool (North Shore).—The construction of the Branch track continues satisfactorily. A goods yard has now been almost completed and an engine shed is being erected. Operations are carried on continuously as the track grows, and very interesting single line working was enjoyed. Special tests have been carried out of the capacity of the Branch locomotives for hauling large weights and long distance running. The Hornby "*Princess Elizabeth*" gave splendid results in these tests. *Secretary:* J. R. Irvine, 8, Dudley Avenue, Blackpool.

Loughton.—The programme is remarkable for its variety. The extension of the Branch railway continues, and other pursuits have included fishing, cycling, rowing and outdoor games in addition to Meccano model-building. Members of the Model-building Section have constructed bridges and lorries. Indoor games are played when the weather is unsuitable for outdoor occupations. It has been decided to include the making of railway buildings among the hobbies followed. Members have been grouped into three teams for competitions. The teams are named after the G.W.R., L.N.E.R. and L.M.S. *Secretary:* G. W. Ruffell, 10, Elmhurst Way, Loughton.

Carmarthen.—Enjoyable track operations have been made very realistic by the use of a Meccano crane to load and unload goods wagons. From time to time modifications are made to the layout to simplify and speed up train movements. At one track meeting the driving ability of members was tested. Points were awarded in this contest and in games, the winners being awarded small prizes. Two outings have been held, Dryslwyn Castle and a neighbouring fishing village having been visited. *Secretary:* J. D. Lewis, 7, Spilman Street, Carmarthen.

Upper Wharfedale.—Further details of the Branch Exhibition have been planned and there is great activity in the construction of Meccano models and other prospective exhibits. A cricket pitch has been rolled and many games enjoyed on it. During the fine weather a large proportion of the members enjoyed camp life. *Secretary:* D. H. Scales, 1, The Avenue, Grassington.

NEW ZEALAND

Wellington West.—Intense activity continues. Excellent track meetings have been held, and at one of these, when a heavy programme of train services was run, several country visitors were present. A special party did good work touching up the layout, painting the roundhouse and tunnel mouths. Several work trains were run during these proceedings. A signalling class has been formed. In an interesting contest members were shown illustrations of locomotives and aeroplanes and were asked to identify them. Keen Debates have been held and a Draughts Tournament has been enjoyed. *Secretary:* K. R. Cassells, 26, Sugarloaf Road, Brooklyn, Wellington, New Zealand.

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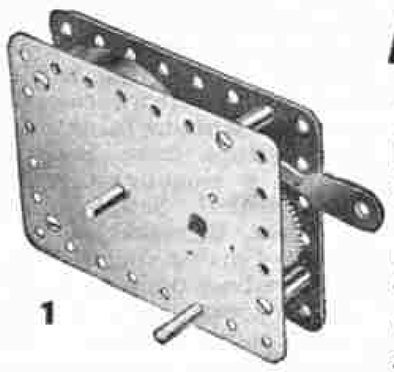

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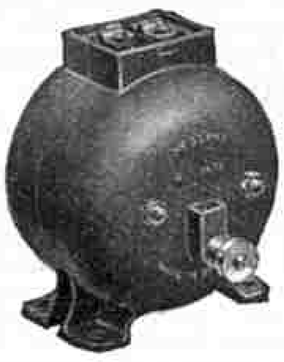

2

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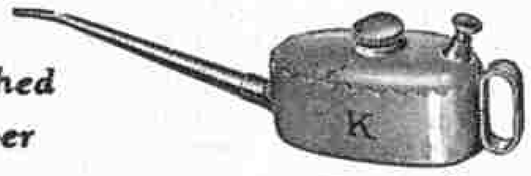

Every Meccano and Hornby Train enthusiast should add a miniature "K" type oil can to his equipment for the purpose of oiling Meccano models, Hornby Trains, etc. The oil is ejected drop by drop by depressing the valve, as in the full-sized model, and in all other respects the oiler is perfect. Price 3/6

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STAMP COLLECTING

Soldiers on Stamps

IN our last two issues we traced on stamps the development of naval and air power. This month we recount the stamp story of the development of land fighting forces. There is no lack of material. We can begin with primitive fighting with spears and shields. Then come illustrations of warfare in the middle ages, when cavalry comprised the shock troops of up-to-date armies; and this is followed by stamps revealing something of the horrors of modern warfare, with all the resources of mechanical and scientific genius at the disposal of vast armies.

Our stamp illustration of primitive warfare shows a Dyak warrior of North Borneo on the 10c. value of North Borneo's 1931 issue. Here we have the typical native warrior, equipped only with spear and shield and dependent for further frightfulness on weird painting of the body and face with mud and crude pigments. The same design is repeated on the 15c. value of the 1939 issue.

French Colonial stamps, notably the Somali Coast, Upper Volta and Mauritania issues of 1938, also show typical native warriors, the last-named differing from the others by presenting a view of Moorish camel cavalry. A more interesting illustration of a mounted force is provided by the trooper of the Dulaim Camel Corps, bearing a tribal standard, shown on the 4 a. value of the Iraq issue of 1923. The stamp is illustrated on this page. The rich accoutrements of this cavalryman compare well with the cumbersome trappings of the sowar, or Indian cavalryman, in armour, shown on the 2a. value of Jaipur's 1931 issue, commemorating the investiture of H.H. the Maharaja of Jaipur. Although this illustration is of a modern trooper in the private service of an Indian Native State, it is typical of the earliest times, for the ceremonial dress of many of the smaller armies still retains its features of early days.

Readers who possess the Teutonic Knights series issued by Danzig in January 1939 will trace the similarity of accoutrement between the sowar and the cavalryman illustrated on the 5p. Danzig stamp. This series was issued to commemorate the 125th anniversary of Prussia's annexation of Danzig, and from it we have chosen two stamps for illustration. These are the 15p. and 25p. values, reproduced on the next page. The latter shows mediæval types of military uniforms in a scene depicting the retirement of Stephen Batori's troops from their defeat at the Battle of Weichselmünde in 1577.

Many famous early battles are illustrated on stamps. One that comes to mind is the Battle of Montijo, fought in 1444 in the course of the struggle for Portuguese independence. This is illustrated here on the 32c. value of Portugal's second Independence Commemorative issue of 1927. Another of Portugal's battles for independence is illustrated on the 32c. value of the first Independence Commemorative issue of 1926, which shows a scene at the Battle of Aljubarrota, fought in 1385.

The most famous battle stamp of all is Finland's design for the January 1939 Red Cross series. This shows the battlefield of Solferino, fought in 1859, where the state of the wounded was so pitiable that Henri Dunant was inspired to the idea of the International Red Cross movement. This event was dealt with in the stamp article in the *"M.M."* for April of this year.

The great advance of military science during the European War of 1914–18 and in more recent years has been a prolific source of inspiration to the stamp designer, and there have been many issues illustrating almost every phase of operations and every type of soldier. In 1934 Italy issued a complete series illustrating Alpine infantry, cavalry, artillery, and a sapper. Other designs in the same series showed the throwing of a hand grenade, an infantryman cutting his way through barbed wire entanglements, and a soldier of a medical unit in action.

In a Roumanian issue that appeared in 1931 to celebrate the centenary of the founding of the Roumanian Army, the 25b. value shows a realistic picture of an infantryman making a bayonet attack. In the same series the 1l. value shows infantrymen in the dress uniform of 1830, and on the 50b. value a soldier of 1870 is seen. An infantry charge is depicted on the 3l. value, and the 2l. stamp carries a portrait of King Carol I (1839–1914), in the full-dress uniform of Commander-in-Chief of the Roumanian Army.

There are innumerable portraits of famous generals to be found in our collection. Perhaps the most famous of all the great men portrayed is Marshal Foch, the Commander-in-Chief of the Allied Armies during the closing stages of the War of 1914–18, shown here on a recent French issue to raise funds for providing comforts for the French armies in the present war. With this stamp we illustrate the 65c. + 1f.10 charity issue of 1938, showing a French soldier in a trench. This was one of a series of two stamps extolling French infantry. The second value was 55c. + 70c. and bore the same design.

There are two or three British Empire issues that are worthy of special mention. New Zealand's Anzac issue of April 1936 shows a member of the Australian and New Zealand Army Corps at Anzac Bay on the Gallipoli peninsula. No stamp story of land warfare would be complete without the inclusion of this design. Two stamps were issued, a ½d. and a 1d. value, and the second of these is illustrated here.

Another illustration of the solidarity of our Empire is provided by two stamps from Jamaica's 1919 issue. The 1½d. value depicts the departure of the Jamaican contingent to assist the Empire Forces in the war of 1914–18, and the 2½d. value, shown here, illustrates the return of the contingent. The first issue of this 2½d. stamp showed the Union Jack on the left upside down. This was corrected in later printing.

New Collectors' Corner

Currencies on Stamps

It is very rarely that descriptions of stamp values spell out the currency names in full. To save space we usually refer to pence with the symbol "d"; to French centimes as "c."; and to Italian centesima and lira as "c." and "l." Consequently some of our readers are a little puzzled, and they wonder, for instance, why in some cases a capital letter is used, and

a small letter in others. The following notes on the currencies used in the British Empire and in certain foreign countries will help such collectors, and others will be given in subsequent issues.

There is really no difficulty in picking up an understanding of world currencies. Most British Colonies and Dominions use the English or sterling form of "£.s.d." for pounds, shillings and pence, but there are various exceptions. India, Aden and Burma use rupees (r.), annas (a.) and pies (p.). There are 16 annas to the rupee, and 12 pies to the anna. The Straits Settlements use a dollar ($) of 100 cents (c.). Kenya, Uganda and Tanganyika use pounds and shillings for their higher values, but divide the shilling into 100 cents. British Honduras and British Guiana both use a dollar currency, divided into 100 cents, as do Canada and Hong Kong.

It should be understood that the value of the dollar varies in different parts of the world. The Canadian dollar and those of Honduras and Guiana have a standard or par value of 4/2, so that the cent in these places is worth ½d. The Straits Settlements dollar has a par value of about 2/3.

Another British Colony with a coinage that differs from sterling is Cyprus, which uses the pound, but divides it into 100 piastres (p.). Egypt, Iraq and Trans-Jordan, which are usually grouped in the catalogues with the British Empire, but are independent sovereign States, also use different currencies. The Egyptian pound (£E) is divided into 1,000 milliemes (m.). Trans-Jordan uses similar currency (1,000 m. equals £P1), but Iraq uses 1,000 fils (f.) to the dinar (d.). £P is the Palestine pound, which in that country also is divided into 1,000 milliemes (m.).

There is not space here to provide a complete list of the various British and foreign currencies. The following notes will be of help, since they cover the principal European countries that have been in the news lately: Bulgaria: 100 stotinki (st.) equal 1 leva (l.). Czecho-Slovakia: 100 heller (h.) equal 1 Crown (kr.). Denmark, Norway and Sweden: 100 öre, always written in full, equal 1 kroner (kr.). Germany: 100 pfennigs (pf.) equal 1 mark (m.). Greece: 100 lepta (l.) equal 1 drachma (dr.). Roumania: 100 bani (b.) equal 1 leu (l.). Spain: 100 centimos (c.) equal 1 peseta (p.).

Stamp Gossip

and Notes on New Issues

Egyptian Child Welfare Issue

We illustrate here the delightful design of the recent Egyptian issue in aid of Child Welfare Funds. The portrait is of the infant Princess Ferial, daughter of King Farouk and Queen Farida. The stamp was issued on the day the Princess reached the age of 18 months.

Readers probably will notice the strange fact that the name of each member of the Egyptian Royal Family commences with the letter "F." The King's father, the late King Fuad, one of the greatest of the many royal stamp collectors, believed that this letter had a strangely happy influence on his life, and gave each of his children a name beginning with it. King Farouk has accepted the precedent, and has chosen for his children names beginning with the mystic letter. He carried the idea further, and required his Queen to adopt the new name Farida on their marriage in January 1938.

A New Balkan Stamp

At various times in recent years the countries forming the Balkan Entente, Greece, Jugoslavia, Roumania and Turkey, have issued stamps to commemorate their international Conferences and to demonstrate their solidarity. The latest issue, and one which, unhappily, may prove the last now that Roumania has felt compelled to align herself with the Italo-German group, has just appeared in Greece. The design, illustrated on this page, shows the arms of the four countries.

Pan-American Jubilee

In our last issue we described briefly some of the many stamps that have recently been issued by the American Republics in honour of the 50th anniversary of the founding of the Pan-American Union. We illustrate here the 9 boliviano stamp issued by Bolivia on this occasion. The design shows the draped flags of the American nations in full colours. In the original it is a rather gaudy production, although a striking example of the stamp printer's art.

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

Philatelic Aid for Red Cross

Every stamp collector, young or old, beginner or expert, can lend a hand to make a success of the stamp world's effort to raise funds to aid the Red Cross and St. John Fund. A great auction sale is to be held at the Mansion House in London on 6th November, and the Lord Mayor of London invites all stamp collectors to send donations of stamps to help the cause along. Gifts need not be of rare stamps, for common ones also are wanted in large or small quantities.

Gifts should be sent to the Lord Mayor's Red Cross and St. John Fund, Philatelic Section, Mansion House, London E.C.4. Acknowledgments will be sent by the Lord Mayor to every donor, and further acknowledgment will be made in the auction catalogue.

New Season's Catalogues

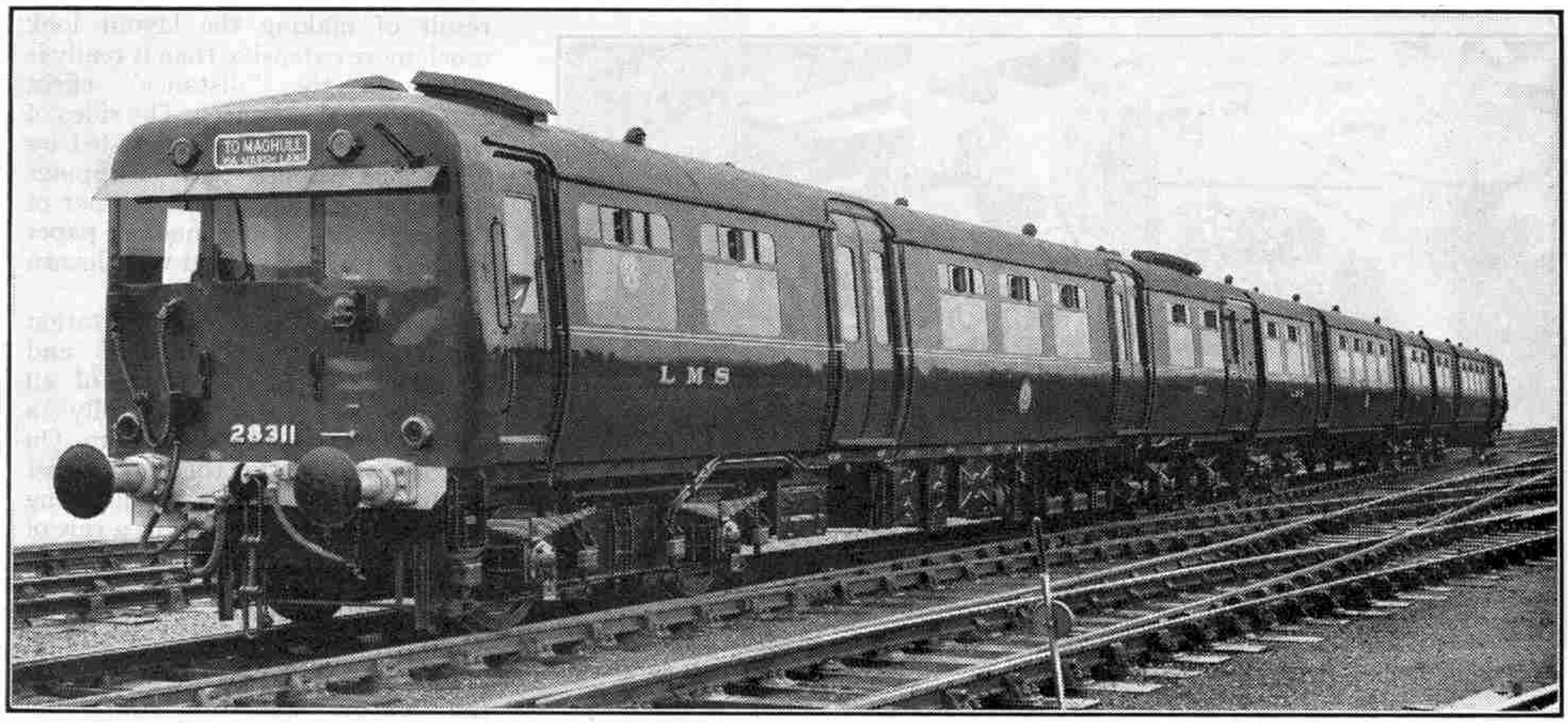
Stanley Gibbons Ltd. ask us to announce that their 1941 catalogues will be ready for issue on 3rd September. Owing to restrictions on the use of paper, fewer copies will be printed this year, and readers who wish to obtain either the "Big" catalogue or the "Simplified" edition must place their orders immediately, otherwise they may be disappointed.

The prices of the catalogues have been increased slightly to meet the higher costs of production. The Whole World edition of the "Big" catalogue will cost 18/6, the British Empire edition 7/6, and the Foreign edition 11/6. The "Simplified" edition will be priced at 6/6. The prices are subject to additional charges for postage if catalogues are ordered direct from Stanley Gibbons Ltd., 391, Strand, London W.C.2. These charges are 7d. for the Whole World edition and 6d. for each of the others. The foreign postages are 11d., 1/2 and

1/3 for the British Empire, Foreign and "Simplified" catalogues respectively.

* * * *

It is reported by the "*New York Times*" that the war has already given rise to 414 major and minor varieties of stamps. Revision of postage rates has been responsible for 294 of the new varieties, of which 112 have been created by overprinting.



L.M.S. Electric Train Improvements

Higher Speeds on Liverpool and Southport Lines

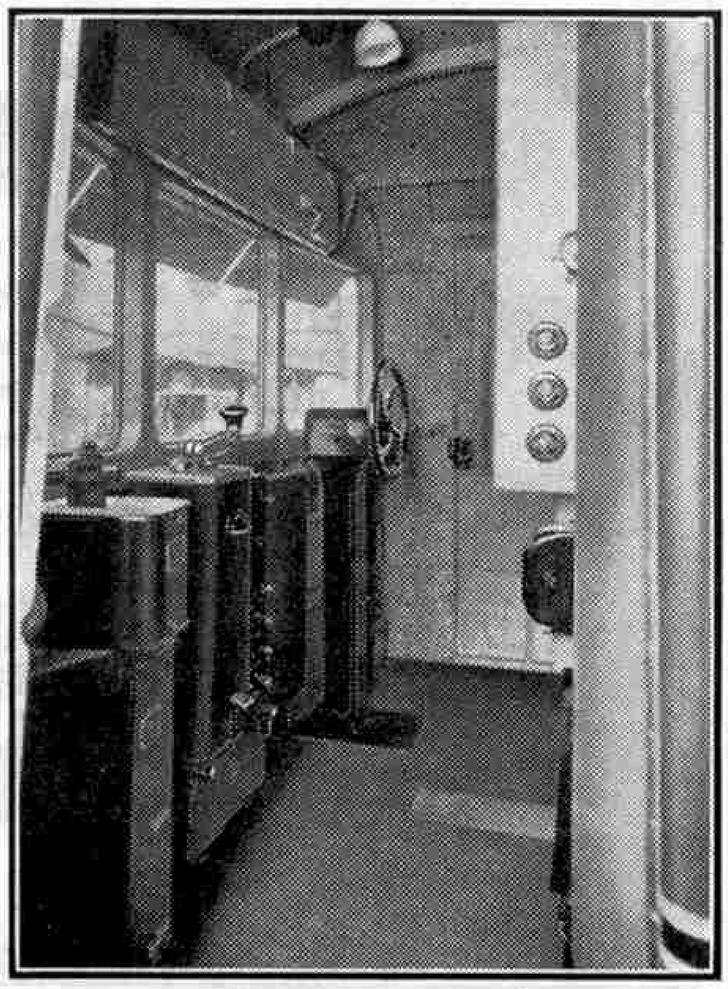
THE illustration at the head of this page shows a three-coach set of the new rolling stock that has been constructed in the Derby Carriage and Wagon Works of the L.M.S. for use on the electrified lines between Liverpool and Southport. These lines formed part of the former Lancashire and Yorkshire Railway, and were electrified in 1904–10. Many of the vehicles until recently in use were over 30 years old, and are now being replaced by the new trains.

Altogether 152 coaches have been built. These are made up into 34 trains of three coaches and 25 two-coach units. Each three-coach train includes a motor coach, a 3rd class trailer and a composite driving trailer; while the smaller units consist of a motor coach and a trailer. Of the two-coach trailers 16 are 3rd class and nine are composites. The use of three-coach and two-coach sets makes it possible to provide trains of any number of coaches from two upward. Two-coach units are used in conjunction with those of three coaches during the rush hours, when trains with six coaches also are in service; and generally the trains are made up to suit traffic requirements.

The introduction of the new trains has allowed the service to be speeded up. On the line over which they are used there are stations at an average distance apart of a little less than 1¼ miles, and with an allowance for a stop of 20 seconds at each intermediate station a schedule speed of about 30 m.p.h. will be maintained by fully loaded trains. Express services also are provided, and in order to meet the demand for these the trains have been made capable of a maximum speed of over 70 m.p.h.

The electrical equipment of the trains has been made by the English Electric Company Ltd. to the requirements of Mr. C. E. Fairburn, Deputy Chief Mechanical Engineer and Chief Electrical Engineer of the L.M.S. Each motor coach is fitted with four traction motors, which have a continuous rating of 184 h.p. at 580 v., and a one hour rating of 285 h.p. In their design special attention has been given to the reduction of weight and size, while maintaining robustness of construction; and the weight of each, complete with gear case, gear wheel and pinion, is 4,484 lb. They are ventilated by means of clean air drawn through louvres at the top of the coach and carried down through ducting and flexible bellows. The purpose of this is to avoid the introduction of dirt and brake dust, and thus to reduce the amount of maintenance required.

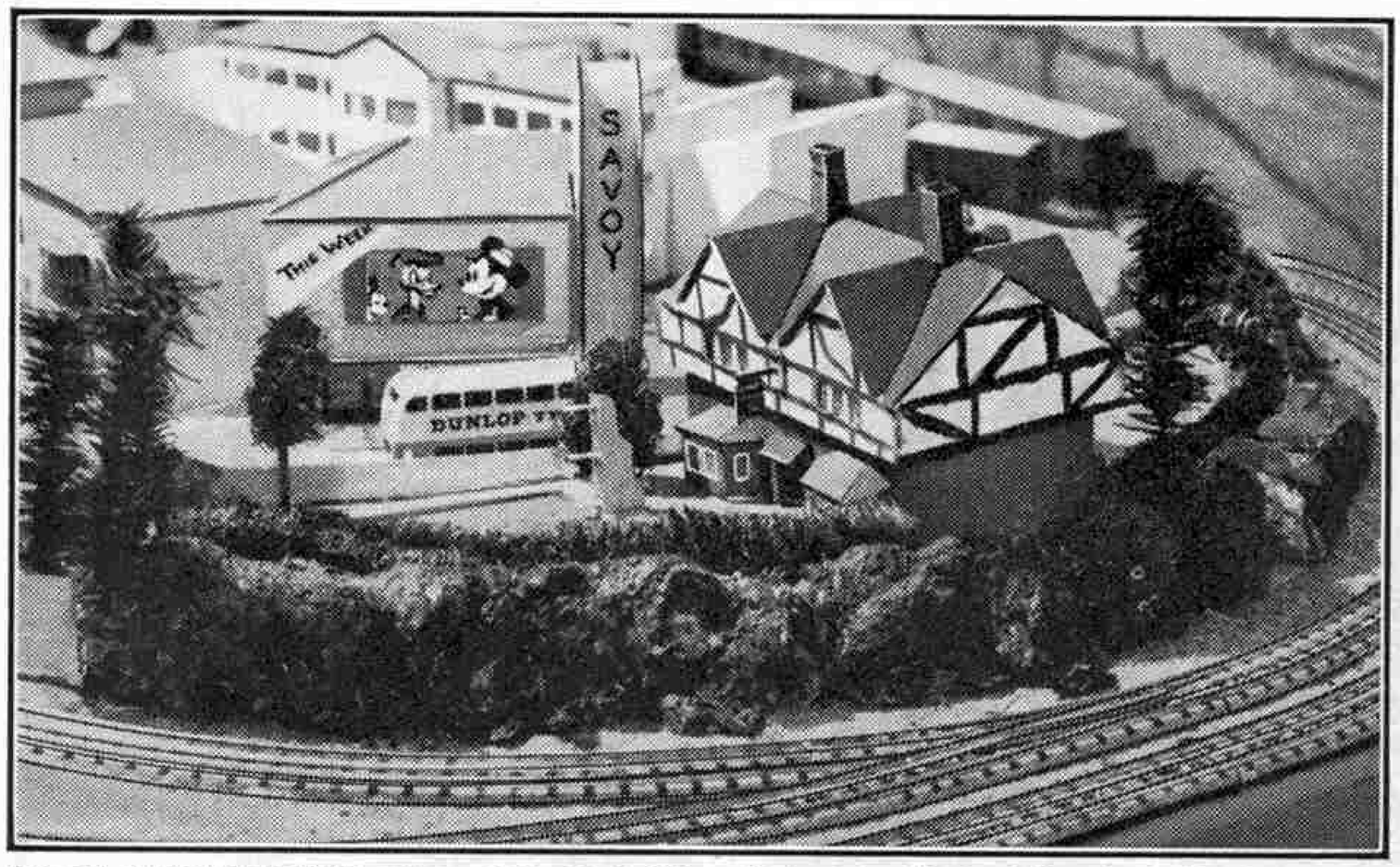
There are two separate control equipments for each motor coach, each set controlling one pair of motors. All the main parts of the equipment are carried underneath the coach, and smooth and rapid acceleration is a special feature of the trains. The drivers' cabs are roomy and give an excellent view ahead. Their interiors are sprayed with asbestos to afford the driver some protection from excessive heat, and a wiper operated by compressed air is mounted over the left-hand window. An adjustable upholstered seat is provided for the driver, and this swings out of the way automatically when it is not in use.



In the driver's cab of one of the new coaches.

The body frames of the new coaches represent a new departure for the L.M.S. The practice previously followed was to build underframes of steel and top frames of timber with steel panels. For this stock it was decided to turn over to the construction of steel bodies. This involved the provision of new plant, principally press tools and spot welding machines, and the new policy has been effective in assisting to realise the aim of combining light weight with rigidity. The use of welding also has contributed to this end. All the underframing and body framing parts are arc-welded together, and electric spot welding has been introduced for the first time on the L.M.S. for attaching panels to the body framing and in other parts of the structure. High-tensile structural steel was used in the construction of the underframe parts.

The coaches have double doors that slide back into the side walls of the body. These are operated by compressed air, the control being in the hands of the guard. Push-buttons are provided on the doors by means of which the passengers may open the doors themselves, if the guard has previously pressed a control button in his box. A switch operated by the opening and closing of each door allows the driver's signal bell to be sounded by the guard only when all the doors are properly closed.



One end of the Hornby-Dublo railway of Mr. W. A. Gittoes, Basingstoke. The track diverging inside the main line is one of the sidings referred to in this article.

A Hornby-Dublo Railway with Scenic Effects

THE interesting Hornby-Dublo railway described on this page has been built up by Mr. W. A. Gittoes, of Basingstoke. The complete system is mounted on a board measuring 6 ft. 6 in. by 3 ft. 6 in. and it gives a good idea of what is possible in a small space.

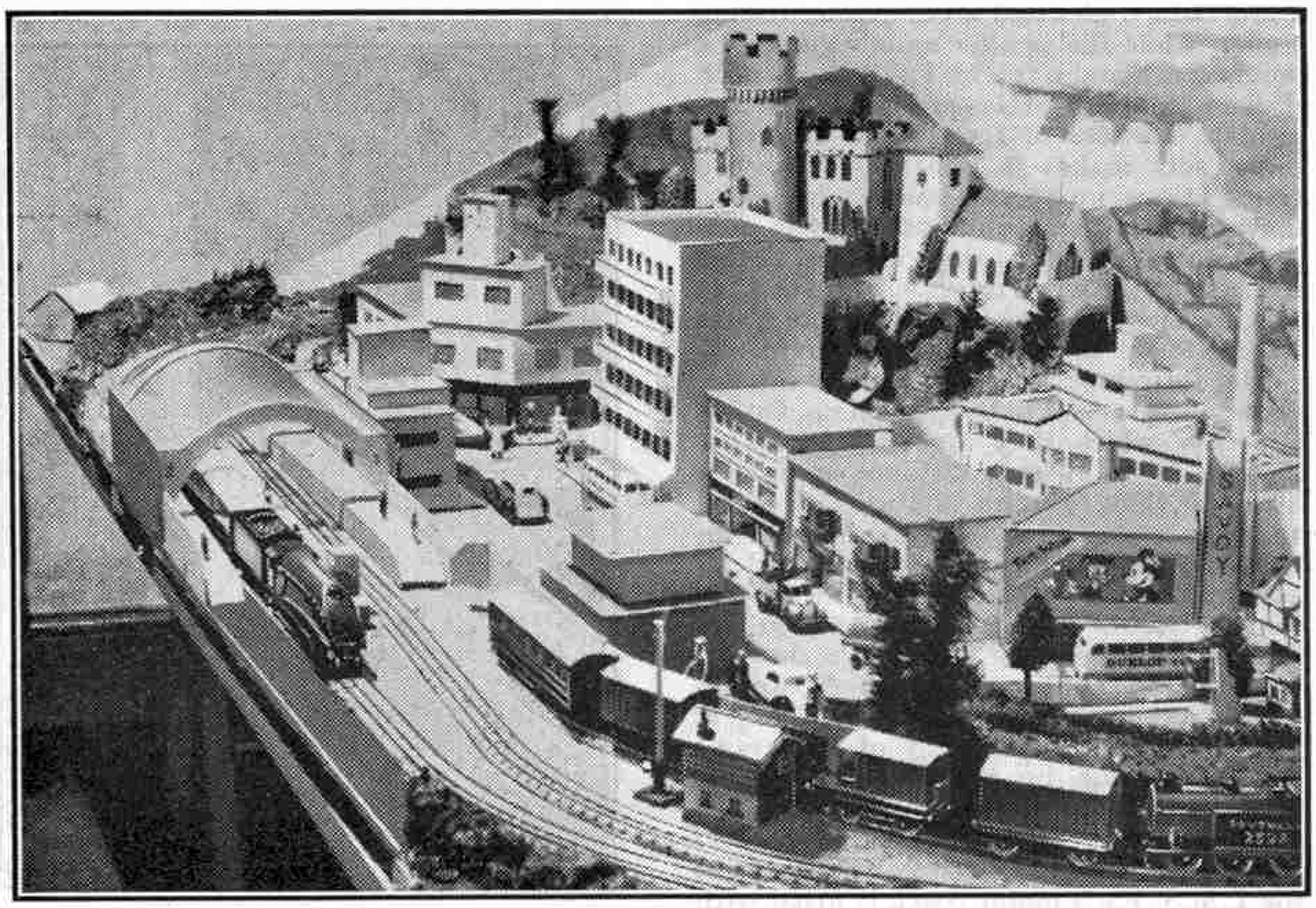
When the system was first contemplated it was decided to lay the track on a raised foundation, and to adopt a continuous oval main line of double track. This was made simple by using the Hornby-Dublo large radius Curved Rails in conjunction with the standard curves. Two sidings were also constructed for the storage of rolling stock, and in order that at least one of these should be a good length it was decided to lay this line diagonally across the baseboard, ending in a "fly-over" at the corner of the board opposite to the points where this siding started. The other was laid in the form of a branch line coming off inside the curve at one end of the main line, as can be seen from the illustrations on this page, and terminating outside the main station.

Electricity was adopted for the motive power, and a Hornby-Dublo EDP1 Passenger Train Set and the EDG7 Goods Train Set were purchased. To add to the interest the Goods Set was obtained in Southern Railway colours, thus making the line a joint L.N.E.R. and S.R. affair. Various extra items of rolling stock were also added. Test runs showed the trains to be extremely satisfactory and the layout itself to be quite suitable, and it was now decided to commence the building up of the scenic effects. To begin with, a three-ply back board was erected behind the layout and on this scenery was painted. This had the result of making the layout look much more extensive than it really is owing to the "distance" effect obtained in the scenery. The sides of the track were then surrounded by very fine stones and chippings sprinkled on glue. At one corner of the track also a bank made of paper maché suitably coloured was thrown up.

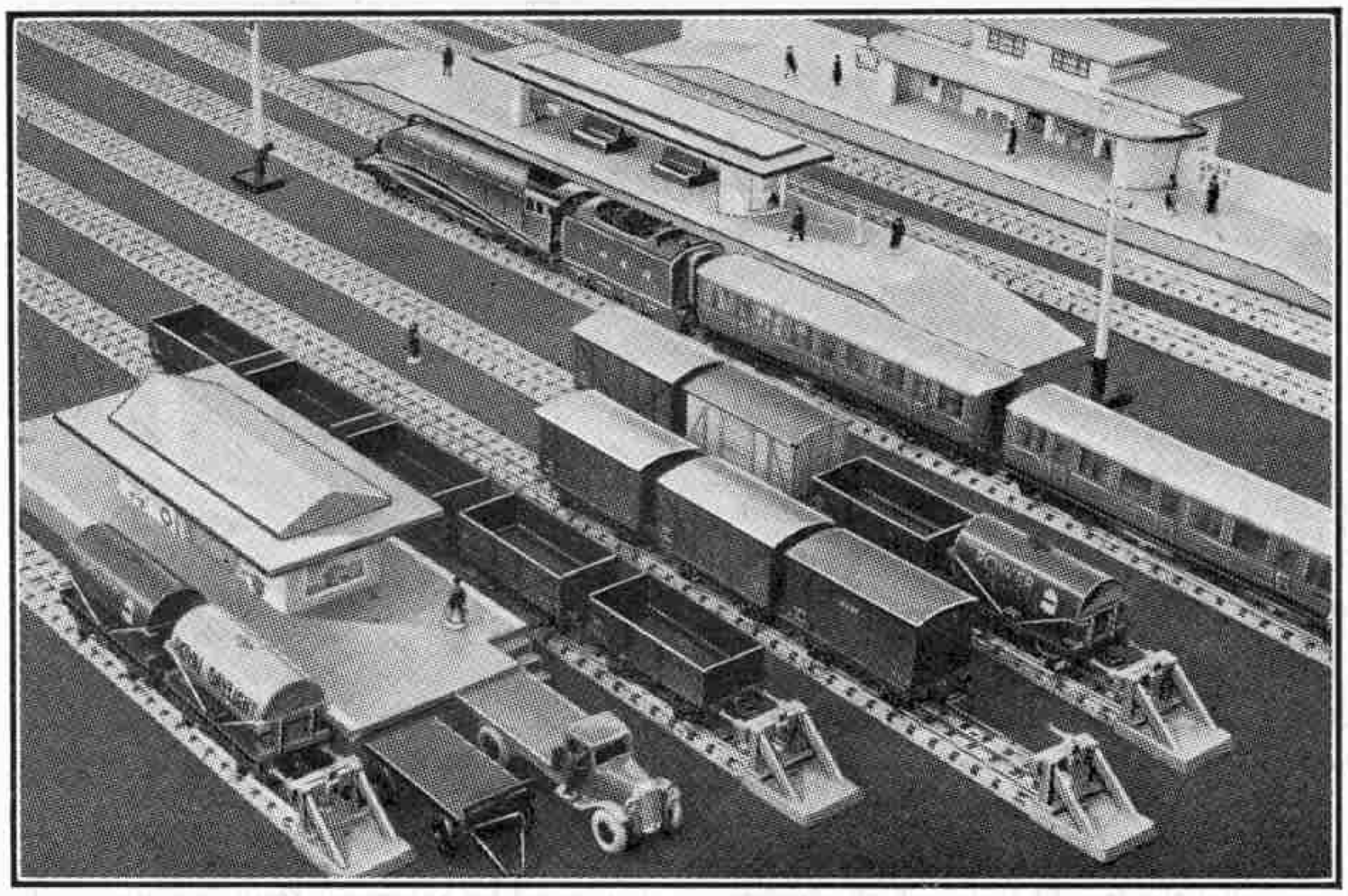
A Hornby-Dublo City Station Outfit was then purchased and installed; this is the centre of all activity and quite naturally a miniature town has sprung up. On the opposite side of the main street to the City Station is an imposing block of flats, together with a row of shops. Further along the road is an up-to-date motor showroom where all the latest Dinky Toys Cars are on view. No town in these days is complete without a super cinema, and the "*Savoy*" was duly contracted for and built.

A piece of "waste ground" is occupied by a barrage balloon and Dinky Toys Anti-Aircraft Unit. Belisha Beacons have been placed in appropriate positions and a Dinky Toys Traffic Policeman in a white coat adds to the orderly scene. Dinky Toys Buses, Taxis and about every type of motor vehicle add to the realistic effect, and give the town an air of movement and prosperity.

All the buildings, which are made of cardboard, are fitted with electric lighting which, when seen through the cellophane glazed windows, gives a picturesque effect. The cinema also is lighted internally and at night time is floodlit.



A general view showing part of the town served by the railway. The through station shown is assembled from the Hornby-Dublo City Station Outfit.



A Hornby-Dublo express composed of a single Corridor Coach, followed by a Two-Coach Articulated Unit, passing a local goods yard. The selection of goods vehicles shown is typical of those seen in many real yards of the smaller kind.

Fun with your Hornby-Dublo Railway

Rolling Stock and its Use

IT is always thrilling to add one or two more vehicles to the rolling stock already in use on a Hornby-Dublo railway. In this article we show how to select the right vehicles and how to use and run them so that the best results are obtained.

We will commence with freight vehicles owing to their greater variety. As a rule the first stock of this kind on the line is that contained in the EDG7 or DG7 Goods Train Set—an Open Wagon, a Van and a Goods Brake Van, which together form the simplest possible goods train. Each of them is necessary on any line and each is supplied in the correct style and colour according to whether the engine is an L.M.S., L.N.E.R., G.W.R. or S.R. model. The Wagon and Van represent the commonest vehicles seen in actual practice, the Wagon actually being a model of the standard 12-ton truck in use on all groups.

The Vans are used for general goods, the nature of which requires them to be protected from the weather, unlike the cargoes carried in the open type of vehicle, which as a rule are of the rougher kinds. A Brake Van of course is necessary on any freight train, and this should always be of the right type according to the railway whose practice is represented in the miniature system. It is but rarely that an engine of one company hauls a train terminated by a brake van belonging to another line, even on a joint system.

It is not practicable to manufacture every different type of wagon or van used for special kinds of traffic, and the Hornby-Dublo Series includes only a selection of the better known types. Actually the variety of types available is wide, so that a representative train is easy to make up, using one vehicle of one company, two of another, and so on. Any isolated examples, such as a single S.R. Meat Van in an L.M.S. meat train, can be supposed to be conveying a through load for transfer to the owning company.

Similarly, certain traffics are specially identified with particular companies, hence the modelling of the fine L.N.E.R. High-Capacity Wagon for the carriage of bricks. This Wagon is specially suitable for railways representing the L.N.E.R. Several kinds of special stock can be included on the same system, however, provided that care is taken not to mix them without discrimination in the same train. It would not be correct, for instance, to have several Coal Wagons mixed up in a train consisting otherwise of Vans for perishables such as meat or fish.

Trains conveying perishables in vans all of one kind are usually of the type known as "fully-fitted," that is made up of vehicles provided with automatic brakes throughout. More variety in stock is usual with "partially-fitted" trains, made up of a number of brake-fitted vehicles and the rest non-fitted. Such a train is seen in the lower illustration on this page. Here the vans supposedly representing the "fitted" stock are marshalled next to the engine. The "Royal Daylight" Oil Tank Wagon represents the first of the ordinary non-fitted vehicles.

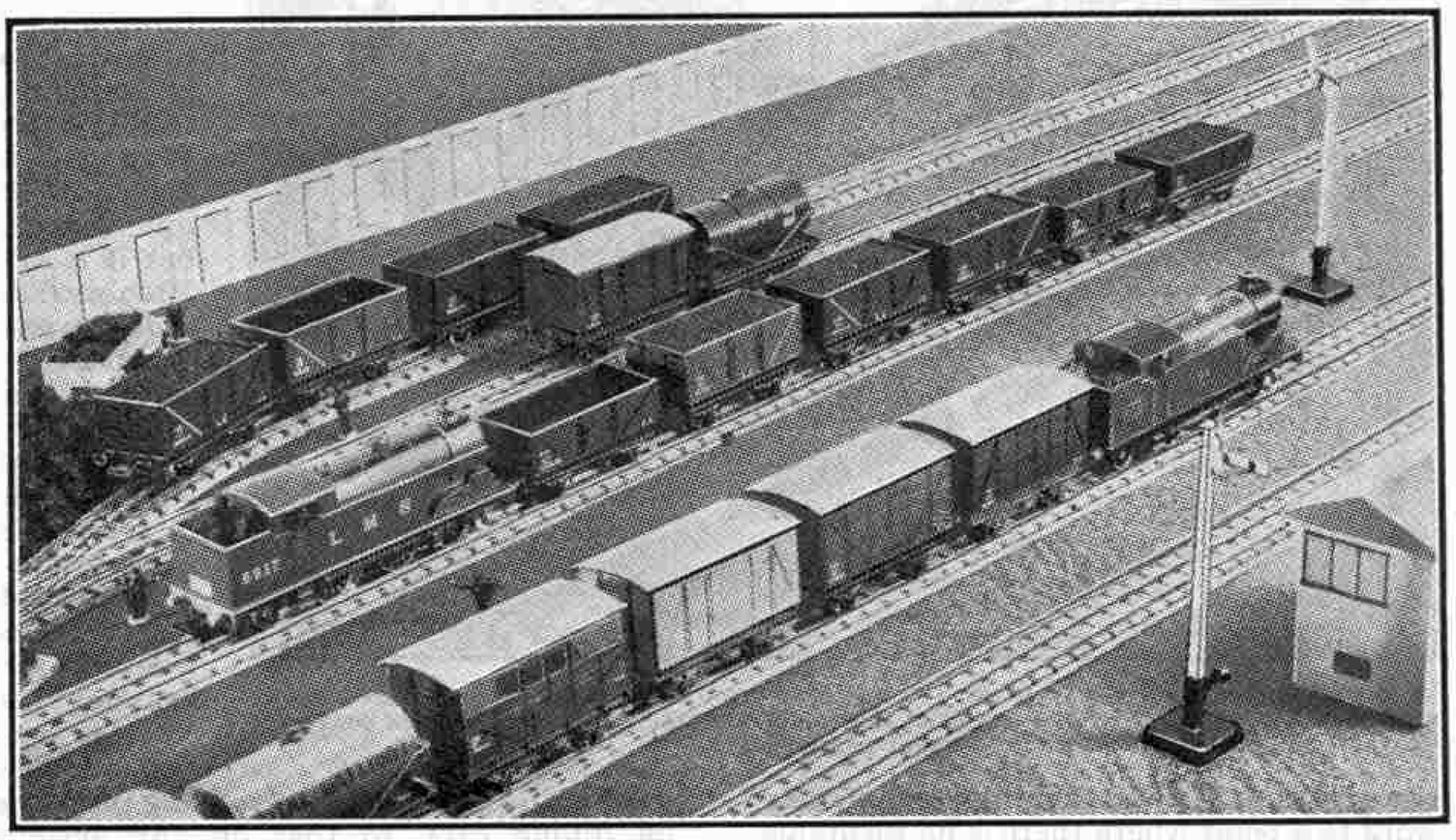
For passenger trains there is the familiar L.N.E.R. Two-Coach Articulated Unit and the similar single Coach, which together make up quite a smart express train. Several separate coaches can be used together if desired, and a further scheme is the use of the Articulated Unit for local traffic as suggested previously in these pages. With these vehicles almost any combination or variation can be employed according to the requirements of traffic.

There is little need to point out to Hornby-Dublo railway owners the splendid running qualities of their rolling stock. The effects of a spot of oil on the axle ends lasts a long time, but enthusiasts who are keen on running programmes are apt to forget that periodical attention to stock is necessary, especially when the "mileage" run is high.

If the performance of the stock becomes sluggish, therefore, examine the wheels and axles. Dirt between the wheel faces and the axle-guards can usually be removed with a sharpened matchstick, or fine paint brush, according to its nature. The wheels should be revolved while the match or brush is held between the wheel and its frame. Any dirt or "mud" on the wheel treads should be removed with a clean rag.

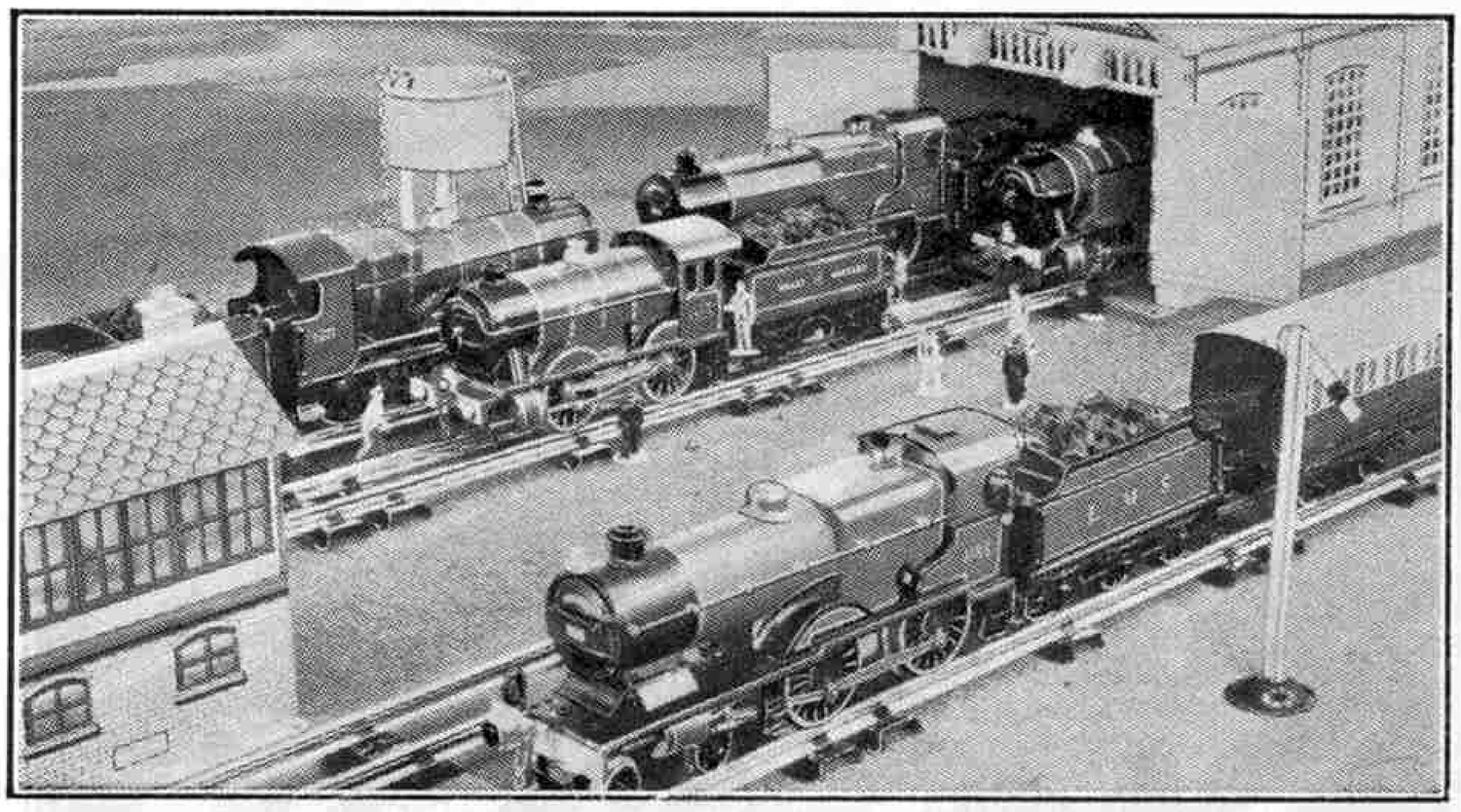
In re-oiling the bearings, the smallest drop of the special oil supplied for Hornby-Dublo Locomotives is sufficient. It should be applied by means of the dip-stick supplied with each bottle of this oil. A heavier oil should never be used, as it will add to the resistance rather than assist the passage of the train.

Finally, in overhauling, the couplings always should be examined and adjusted if necessary. A small pair of pliers is useful for this work. Couplings should have no excessive bends, but should be set that they ride over one another easily and without shock.



A through freight train passing a coal train being shunted. The vans supposed to be fitted with automatic brakes are marshalled in the correct position, next to the engine of the through train.

Here and There on a Hornby Railway

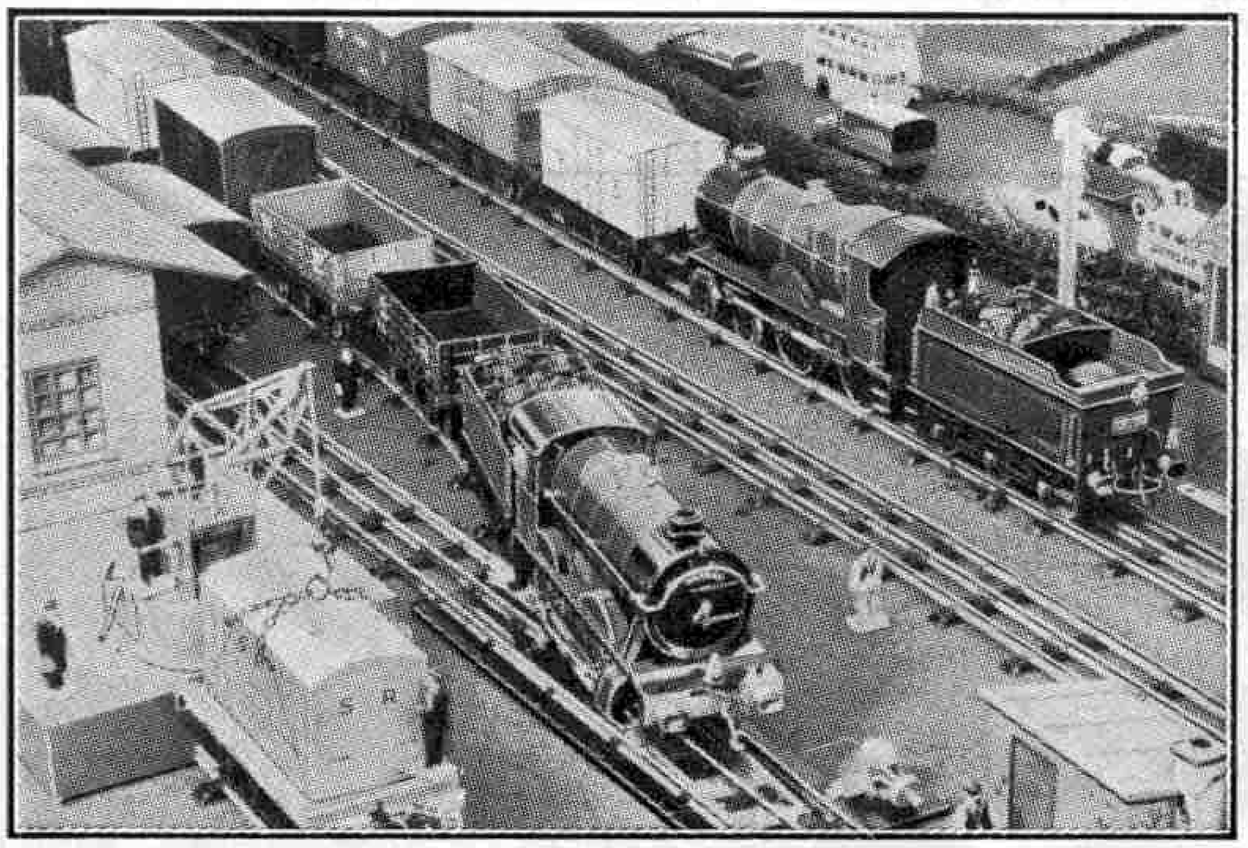


Joint working on a Hornby Railway. L.M.S. and G.W.R. engines together at the Engine Shed, with an L.M.S. engine and G.W.R. train passing in the foreground.

WHEN making a railway journey, or even just watching the trains at some handy local spot, the keen miniature railway owner will often notice interesting details of operation that he can follow out on his own line. The development of schemes in this way adds a great deal to the realism of working, especially when the reasons for the adoption of particular methods in real practice are known.

As an example take the question of locomotive duties. Sometimes we are surprised to see a big express engine on quite an unimportant train. Frequently, however, such trains are made use of by the locomotive running authorities in order to "exercise" engines that have been under repair and that need "running in" before they can undertake the heaviest duties again. At other times the reason may be that the slow train provides a handy means of returning an engine to its home station, otherwise it might have to wait some time before it could secure a return trip.

There is no reason why similar working should not be followed in miniature. The express engines on a layout cannot always be hauling "crack" trains, and to give them a turn on a local or even a train of empty stock adds to the variety of operations. The appearance of passenger engines on fast freight trains is nowadays fairly common, and this fact can be made use of by the "Running Superintendent" of a model system in order to make the best use of his motive power. The lower illustration on this page shows a G.W.R. "*County of Bedford*" on a fast freight train, and special interest is added by the fact that the engine is running tender first. Sometimes with an engine for a special being urgently required, turning is out of the question; at other times an engine may work to a point where there is no turntable or else one not large enough to turn it for its journey back.



An interesting Hornby Railway scene. The G.W.R. "County of Bedford" Locomotive running tender first has been pressed into service at short notice to take a fitted freight train conveying urgent perishables.

In the illustration just referred to the idea is that the freight train, which consists of No. 0 Vans—Refrigerator, Meat, Fish and so on—required immediate despatch with its perishable load; so the first engine available was pressed into service. The inclusion of specials of this kind as a sort of "surprise" item in the running programme provides more fun and gives the operator a chance to show his skill at improvising engine workings at short notice.

A point that is missed by some model railway "Managers" is the loading and unloading of the various items of freight that are carried. Sometimes this is difficult to do; a dummy load of coal glued on to a false wagon bottom cannot be handled in the orthodox manner. On the other hand, Cable Drums and Hornby Containers, usually carried on the useful Flat Truck, can be lifted on and off by the Platform Crane at the goods depot. Miniature sacks, cases and other items too can be loaded at the goods "bank." Younger members of the railway staff are specially keen on this sort of thing, and it is a welcome change from the routine of operations for the "Manager" to direct their work.

Many railways have a Hornby Gas Cylinder Wagon among their rolling stock, but it is not often used in the correct manner. The real gas tanks convey compressed gas from the company's plant to storage tanks at large stations where the "gassing" of stock is carried out. The gas is still largely used for cooking purposes on dining cars, so that on any system boasting such vehicles arrangements should be made for the regular running of the Gas Cylinder Wagon to supply points. It can be conveyed by passenger train as convenient, and left in a handy siding until it is required to proceed elsewhere or to return to the gas plant.

There are no actual dining cars in the Hornby Series, but quite a good substitute is found in the No. 2 Saloon Coach. If a strip of tracing paper is fitted inside between the two window openings at one end and the celluloid glazing strip, it will imitate quite well the frosted windows generally used in the kitchen section of restaurant vehicles. For the remaining windows the table lamps printed on the celluloid strip give just the required touch for a car of this kind.

Quite often two or more miniature railway owners combine their equipment and stock to form a large layout and specially interesting working is then possible. More often than not different railways will be represented by the equipment of each individual owner, so that a jointly worked system can be operated. This can either be based on the working of an actual joint line, or imagination can be brought into play to explain the presence of the engines and stock of several companies.

If the stock belonging to each member of such a "syndicate" is all of the one company, equally good fun can be obtained by each member having a Division or Section under his charge. On an L.M.S. layout, for instance, one boy might operate the Western Division, another the Midland, and another the Northern or Scottish. In this way real connections between the three could be maintained.

A scheme that is followed by S.R. enthusiasts is to mark up one or two of the route discs that are supplied with the E420 and No. 4C "*Eton*" locomotives with an appropriate duty number. These numbers are allocated to the various locomotive depots and can be observed on real S.R. locomotive discs. For Hornby engines with which discs are not supplied, quite good discs can be made from white card; ordinary postcard will do, and if circles are cut approximately three-eights of an inch in diameter they will be quite suitable. A small loop of stiff paper should be fixed at the back of each disc by Seccotine so that the discs can be attached to the brackets on the engines. Duty numbers can be marked on these discs with Indian ink, using a mapping pen.

The Kingswood Electric Railway

A Layout in the Roof

THE illustrations on this page show parts of the "Kingswood Electric Railway," a Gauge 0 layout that is arranged permanently in the roof of the house of the two owners. For the illustrations and the following details of the railway we are indebted to Mr. V. Boyd-Carpenter. As the name given to the railway suggests, the line has been an electric one from the start, having commenced with the purchase of a Hornby Electric Train Set. So many miniature railways, of course, start as clockwork systems and then gradually develop through various stages, where they are worked partly by clockwork and partly by electric engines, into fully-fledged electric layouts.

In its earliest form the line used to be laid down on the drawing room floor when required. This arrangement however proved far from satisfactory so the bold plan was adopted of making a "railway room" in the roof space above the top floor ceiling. This was duly boarded to form a floor and side walls. The advantage of this arrangement was the large area available for the system which gives a continuous run of 155 ft. In addition there is a total siding length of 90 ft. and a further elevated section now under construction will add another 70 ft. to the track "mileage."

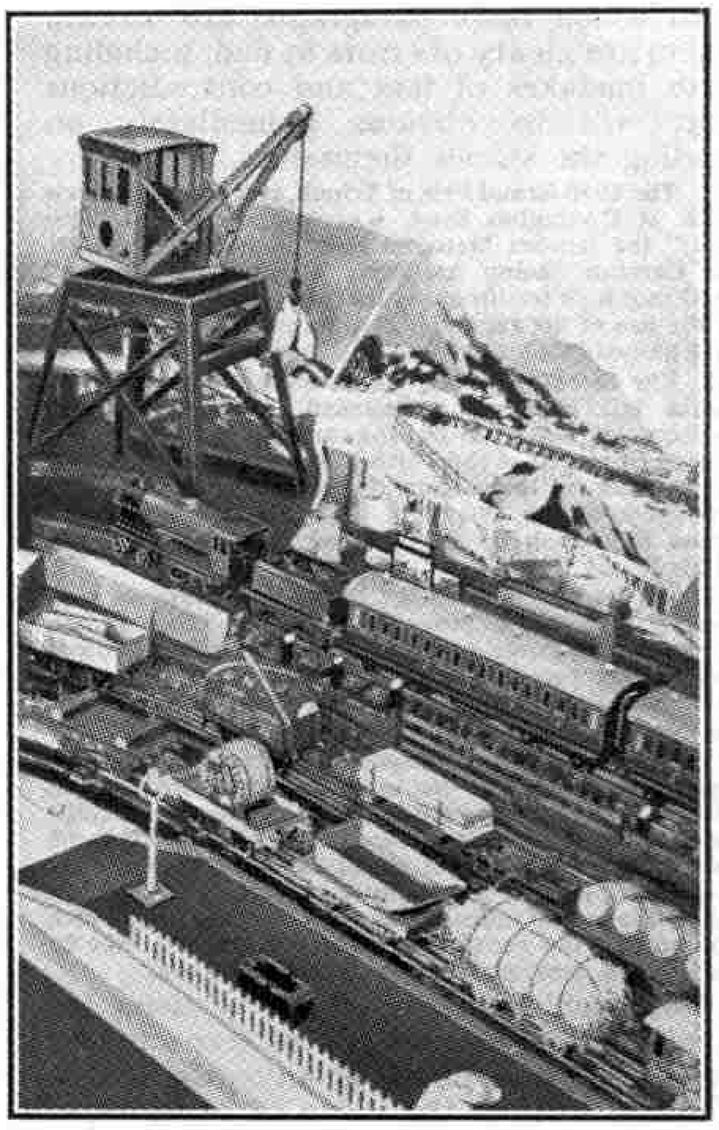
The track itself which follows the walls of the room consists of a double main line thus affording continuous running in either direction. Originally the whole system was laid with Hornby Tinplate Rails but these are being replaced gradually by miniature permanent way. The points have actually been made up in this material by one of the owners of the line, and some of them are operated electrically.

The station from which the railway takes its name, "Kingswood," has four platforms two of which are served by the through roads of the main line. This station, like many other buildings on the line, and indeed the actual raised foundation that carries the system, was constructed by the owners. The engine sheds at this station are however of the well-known Hornby pattern and in addition Hornby Sheds are used for the accommodation of coaching stock as well. The locomotive yard incidentally is provided with a Hornby Water Tank.

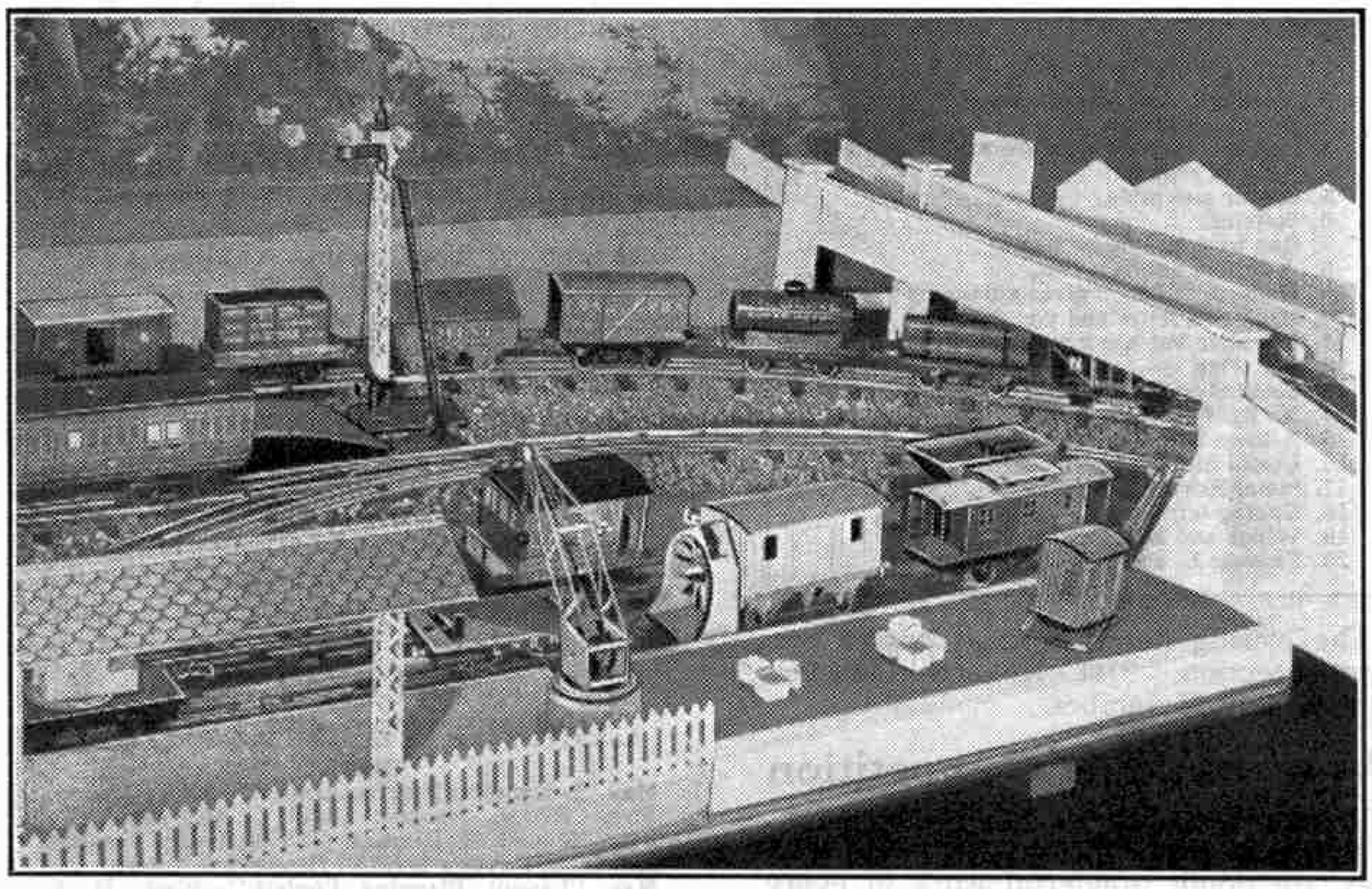
The other main line station is "Castlemount" which is a Hornby Island Platform. Here is the principal freight depot on the line, with an extensive marshalling yard and a Hornby Goods Platform.

Power is supplied to the track from Alternating Current mains supplies through transformers, the voltage at the rails being 20. The elevated branch section is supplied through a separate Hornby 20-volt Transformer and Hornby Controllers are used throughout the system. Electric lighting is provided at stations and yards and the current for this is also obtained from transformers. Various electrically-operated accessories are in use including some upper-quadrant signals, the lamps of which are electrically lighted too.

Traffic is worked by engines of various types and makes, and they are all stationed at the depot at Kingswood. A Hornby E120 Special 0–4–0 Tank is a useful member of the stud and the principal engine for express traffic is one of the well-known "Standard Compound" 4–4–0s of the L.M.S. E220 Special variety. An interesting veteran is a Hornby L.N.E.R. 4–4–0 of the old No. 2 type which has been converted from a clockwork model. Provided with an electric motor and with a No. 2 Special Tender attached to it, it makes a smart and useful engine for secondary duties, especially on passenger trains. For main line goods work and for shunting respectively there is a 0–6–0 tender and a 0–6–0 tank locomotive, these two also being in L.N.E.R. colours.



A busy corner on the Kingswood line. Appropriate loads for different vehicles are a feature of the practice of this system.



Part of the Kingswood Electric Railway showing numerous items of Hornby Rolling Stock. This railway is owned by Mr. F. Blundell and Mr. E. R. Martin, of Worksop, Notts.

Passenger traffic is catered for by a set train of four Hornby L.N.E.R. No. 2 Corridor Coaches which make a very effective unit for main line work. There are also three L.M.S. corridor vehicles and a brake van of other makes. The van has a special lighting pick-up and so is run on all trains after dark in order to provide for their illumination, in cases where they are fitted with bulbs and wiring.

For freight work there is a varied assortment of some 24 Hornby vehicles. A Hornby Snow Plough is provided in case of heavy weather. Most of the wagons are fitted with actual loads, including Hornby Cable Drums and Containers on some of the Flat Trucks. Some specially-detailed wagons and vans are in use, and there is also a 6-wheeled open wagon that was constructed in the "shops" of the "Kingswood Company."

Scenic features have had special attention and the surroundings of the line generally are most effective. Good use has been made of Hornby Hedging and Trees and of course there are Meccano Dinky Toys in great profusion to provide "life."

Visitors to the railway sign a Visitors' Book, and the system has been the means of raising quite reputable sums in aid of the North Eastern Cottage Homes.

COMPETITIONS! OPEN TO ALL READERS

Howlers

Below we give four remarkable stories, each of which is full of mistakes or howlers. We ask our readers to pick out the errors with which these paragraphs are strewn. There are plenty of errors to find, including both mistakes of fact and contradictions that will be obvious immediately on reading the stories themselves.

1. The 1940 Grand Prix of Tripoli, run on the concrete track at Donington Ring, was won easily by "Blue Bird," the famous Mercedes-Benz owned by Nuvolari, the German racing motorist. The winner averaged 69.37 m.p.h., a terrific speed that was only made possible by the use of the supercharger. Second and third places were gained by Chiron in an M.G. and Riley in a Dixon.

2. The defeat of Julius Cæsar at the battle of Alexandria left England undefended, and the country was quickly overrun by the ancient Britons. They crossed by means of the Forth Bridge, and the storms of arrows shot by them from the security of their tanks overwhelmed the defenders of the Great Wall built across the Wash by the Chinese Emperor, who lost all his jewels there.

3. The Indianapolis '300,' Italy's most famous road race, was held this year on 31st April. The winner, G. Shaw, who drove an Alfa-Romeo renamed a "Boyle Special," averaged the excellent speed of 114.227 m.p.h. Shaw had won the race on two previous occasions, and his third victory entitles him to the Nobel Prize.

4. The Arctic Snow Cruiser is a vehicle built for Polar exploration, and will be used by Amundsen in his attempt to reach the North Pole. It is driven electrically, and current is collected by means of a pantograph instead of a third rail. It is not expected to reach the Pole itself, owing to the presence of water, and the crew will fly the last 50 miles of their trip in a seaplane, which will land on the aerodrome constructed at the Pole by the Russian airmen who recently stayed there.

There will be the usual two sections, for Home and Overseas readers respectively. In each section prizes of any products of Meccano Ltd. to the value of 21/–, 15/–, 10/6 and 5/– respectively will be awarded to the readers who submit the four longest lists of genuine errors discovered in these four paragraphs. In the event of a tie neatness or novelty will be taken into consideration. Entries must be addressed "*Howlers Contest*, Meccano Magazine, Binns Road, Liverpool 13." Closing date in the Home section is 31st August, and that in the Overseas section is 30th November.

August Photographic Contest

This month we announce the fifth of our series of photographic competitions for 1940. The conditions ruling in this contest are very simple. Competitors are asked simply to submit photographs in each contest, and the prizes will be awarded to the best sent in. Entries may be outdoor scenes, or examples of indoor photography, but in each case an appropriate title must be written on the back of each.

War conditions have brought certain restrictions on outdoor photography. These apply to military, naval and Air Force subjects, and readers should take care to avoid photographing such things as docks, barracks, aerodromes and troops on the march.

Each month's entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. In each section prizes of Meccano products or photographic material to the value of 21/– and 10/6 respectively will be awarded. There will be two similar sections with prizes of the same value for Overseas readers.

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

COMPETITION RESULTS

HOME

"June Photographic Contest."—First Prizes: Section A, W. Barr (Birkenhead); Section B, G. H. Moss (London S.E.22). Second Prizes: Section A, L. Nash (Coventry); Section B, J. Mathews (Aylesbeare Common). Consolation Prizes: A. Harvery (Appleby Bridge); T. Hill (Bolton); T. Kelly (London E.13); P. G. Lund (Leicester).

"June Crossword Puzzle Contest."—1. T. Hill (Bolton); 2. T. D. Tasker (Barnsley); 3. G. Patterson (Manchester 8); 4. L. T. A. Bern (Portsmouth). Consolation Prizes: J. A. Blunsden (Cheltenham); A. Elvey (London S.E.9).

OVERSEAS

"March Drawing Contest."—First Prizes: Section A, T. A. Wade (Johannesburg, S.A.); Section B, G. McDermid (Dunedin, N.W.I, N.Z.); Second Prizes: Section A, F. Jowett (Ontario, Canada); Section B, J. Brown (Sydney, Australia). Consolation Prize: R. Hunter (Capetown, S.A.).

"March Crossword Puzzle Contest."—1. E. Chircop (Cospicua, Malta); 2. E. A. Mallia (Cospicua, Malta); 3. H. W. Glasgow (Taranaki, New Zealand); 4. J. Peterkin (Barbados, B.W.I.).

Competition Closing Dates

HOME

August Howlers Contest ...	31st August
August Photographic Contest	31st August

OVERSEAS

May Advertising Slogans ...	31st August
May Photographic Contest ...	31st August
June Crossword Puzzle Contest	30th September
June Photographic Contest ...	30th September
July Doublets Contest... ...	31st October
July Photographic Contest ...	31st October
August Howlers Contest ...	30th November
August Photographic Contest	30th November

HORNBY RAILWAY CONTESTS

Special Note: *This month and in future issues railway contests will be open to all readers, whether they are H.R.C. members or not.*

An Unusual Engine Names Contest

In the panel on the right are 20 short sentences or phrases, each of which is a clue to the name of a well-known British locomotive. Competitors are asked to find the 20 names, and to give the name of the Company owning each of the engines included in the list. Every reader, whether a member of the H.R.C. or not, will find the task of solving the puzzle very interesting indeed.

In order to make sure that our younger readers will have a fair chance of winning a prize this contest is divided into sections for readers under twelve years of age, and twelve years or more respectively. Entries must be addressed "*H.R.C. Names Contest*, Meccano Ltd., Binns Road, Liverpool 13." Do not forget to give your age as well as your name and address.

For each section there will be two divisions, for Home and Overseas readers respectively, and in each division three prizes of any products manufactured by Meccano Ltd., to the values of 15/–, 10/6 and 5/– respectively will be awarded. There will be several consolation prizes for other good efforts.

CLUES.

1. **In engine shed and theatre.**
2. **Before all others.**
3. **Suggests tropical sand storms.**
4. **Voici la réponse!**
5. **Colour and pride.**
6. **Spiteful.**
7. **One by day; one by night.**
8. **A certain suit is a clue.**
9. **History; "1066," gives a name.**
10. **Replace a letter and you travel.**
11. **Not alive but has head and colour.**
12. **We often ——— our feelings.**
13. **Coupled with laughter.**
14. **No light in this water.**
15. **A town and a game.**
16. **Useful find on a picnic.**
17. **Metal Royal.**
18. **Golfing term.**
19. **Wings and Edinburgh.**
20. **Famous L. and Y. engine class.**

The closing dates in this contest are: Home section, 31st August; Overseas section, 30th November.

Word Building Competition

We all know that "BRITISH RAILWAYS ARE CARRYING ON," and that they are doing wonderful work in every possible way during the great national effort. The phrase describing their work is the basis for an interesting names building contest, for which every "*M.M.*" reader is eligible. All that is necessary is to use the letters occurring in the phrase in building up names of British locomotives.

Any letter used twice or more in the phrase may be used more than once in forming the engine name, but no letter must be used more often than it appears in the statement. Names of locomotives now run by the four companies are admissible, and the name of the owning company must be given in each case. Each competitor is asked to send us a complete list of the engine names he has made up in this way.

There will be two sections in this Contest for Home and Overseas readers, and in each prizes of products of Meccano Ltd. to the value of 21/–, 15/– and 10/6 respectively will be awarded. Entries must be forwarded to "*Engine Name Building Contest*, Meccano Ltd., Binns Road, Liverpool 13." Closing dates: Home section, 31st August; Overseas, 30th November.

H.R.C. COMPETITION RESULTS

HOME

May "Locomotive Progress Contest" (Senior Section).—First: R. M. Arnold (31111), Ballymena, Co. Antrim. Second: E. Oldham (43390), Hyde, Cheshire. Third: D. L. Fytche (69275), Haslington, Crewe.

May "Layout Planning Contest."—First: D. G. Coakham (28368), Dublin, Eire. Second: J. H. Cann (64767), Ilford, Essex. Third: T. Hill (70419), Bolton, Lancs. Consolation Prizes: P. Lea (69472), London S.W.19; N. Ross (70326), Wembley Park, Middx.; D. L. Fytche (69275), Haslington, Crewe; M. Holt (63336), Colchester, Essex; C. J. Hampton (70338), Arbroath, Scotland; R. B. Hunt (68933), Bexleyheath, Kent.

THE MECCANO MAGAZINE

R·A·F RADIO FUND

Have you sent your donation ?

A Message from the Editor

RADIO SETS FOR THE R.A.F.

The object of this Fund is to provide portable radio sets for the isolated units of the R.A.F., who are in urgent need of this means of keeping in touch with current events and hearing the programmes of the B.B.C. These units, which include the Observer Corps and outlying detachments of all kinds, are on watch unceasingly, day and night, for enemy activities. The conditions in which they work cut them off almost entirely from any form of amusement, and their off-duty hours are apt to become very monotonous. For these units a radio set will come as the most welcome of all gifts.

The Fund is in direct association with the R.A.F. Comforts Committee, and all money received will be forwarded to this Committee *without any deduction whatever for working expenses*. The Committee will buy suitable radio sets, and distribute them where they are most needed.

I appeal to every one of you to look on this Fund as your own special way of making things more cheerful for the men of the R.A.F. Tell your parents, uncles and all other relations about the Fund, and gather in their subscriptions.

Readers, this is our very own Fund. Help me to make it a resounding success!

THE EDITOR.

The sum of £75 has already been sent to the R.A.F. Comforts Committee, and with this money the Committee have purchased and issued to R.A.F. units 16 portable wireless sets.

Last month we sent the Committee a further cheque, for £20, bringing the total amount sent to £95.

THIRD LIST OF DONATIONS

	£	s.	d.
Previously acknowledged ...	77	15	0
George H. D., Birmingham 17 (2nd contribution) ...	0	2	6
Firth B. W., Dorking ...	0	3	0
Jones N. K., Bristol 3 ...	0	0	6
York M. C.	0	5	6
Malvern (Johannesburg, South Africa) M.C. ...	1	1	0
Oglethorpe E. W., Northwood	0	5	0
Chambers B. K., London W.3	0	2	0
Morris B. D., Coventry ...	0	0	6
Felton D. F., Birmingham 9 (4th contribution) ...	0	0	9
Hart G., London N.11 ...	0	2	0
Henniker A., Kingston-on-Thames	0	2	0
Hopkirk P., Southwold ...	0	1	2
Acton M.C. and Branch H.R.C.	0	6	6
Smart I. H., London S.W.	0	0	6
Hodgson I. S., Farnham ...	0	10	0
Huntington R., Leyland (5th contribution)	0	1	0
Watson K., Wembley ...	0	2	6
Barrie D. S., Watford ...	0	5	0
Hayward J., Nr. Faversham	0	2	6
Norton P. A., Coventry ...	0	2	0
Bourn R., Birmingham 23...	0	2	0
Sherren I., London N.W.7...	0	1	0
Barrie G. M., Glasgow S.1...	0	2	6
Dobinson I., Cummersdale	0	0	6
Parker D., Croes Yokin ...	0	3	6
Aldridge E., London N.W.8 (2nd contribution) ...	0	1	0
Morison Memorial M.C., Clydebank	0	10	0
Redhouse P. J., Basingstoke	0	3	6
Meccano Staff F.C., Liverpool	5	0	0
Cole K., Leighton Buzzard (2nd contribution) ...	0	2	0
Blundellsands M.C. ...	1	4	4
Smith P. H., Holmes Chapel	0	0	6
Totnes M.C....	3	2	0
Mr. Macnamara, Totnes M.C.	2	0	0
Dale G. E., North Vancouver, Canada	0	2	6
Davies J. M., Oakhill, Stoke-on-Trent	0	0	9
Felton D. F., Birmingham 9 (5th contribution) ...	0	1	0
Phelps C. W., London N.W.8	0	1	0
Huntington R., Leyland (6th contribution)	0	1	0
Barry R., Ennis, Co. Clare	0	2	6
Acton M.C. and Branch, H.R.C. (2nd contribution)	0	4	0
Jones J., Sliema, Malta ...	0	1	0
W. R., Bloxwich	0	5	0
	£95	2	6

All envelopes containing contributions should be addressed as follows: The Editor, R.A.F. Fund, "Meccano Magazine," Binns Road, Liverpool 13.

FIRESIDE FUN

UP-TO-DATE

"Please, sir, could I have to-morrow afternoon off—"
"Your grandmother, I suppose!"
"Exactly, sir. She is making her first parachute jump."

* * * *

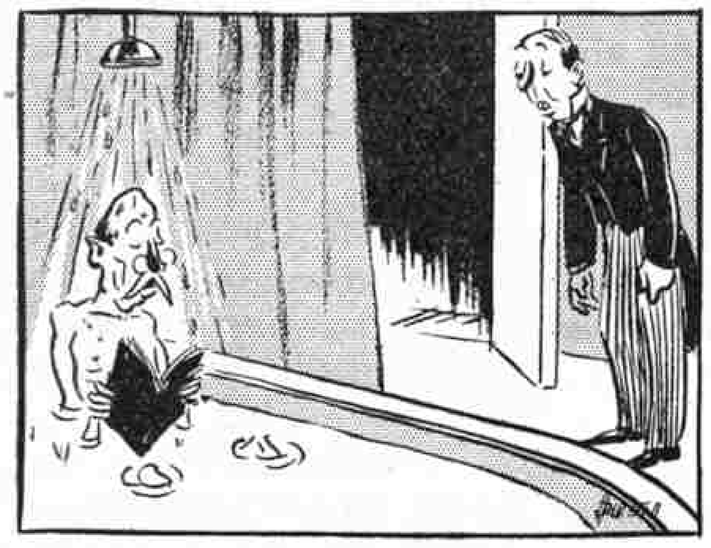
"Did I tell you about the time Mac and Sandy went fishing? They had an agreement that the first one to catch a fish would buy the other one ounce of tobacco. They'd been fishing for two hours before they both discovered that neither of them were using any bait."

* * * *

Servant: "The doctor is here, sir."
Professor (absent-mindedly): "I can't see him now; tell him I'm not well!"

* * * *

SHOWERY



Servant: "You rang, Sir?"
Absent-minded Professor: "Yes, Perkins. Bring my umbrella."

* * * *

The silence was shattered by a sound of an uproar from the kitchen. Voices were raised in indignation; there were loud and violent arguments and much bumping and banging about. The mistress hurried down to investigate. "What on earth is all this shouting about?" she demanded.
"If you please, mum," replied the panting housemaid, "me and cook's not speakin'."

* * * *

Old Burglar: "Don't trouble to reckon how much we've pinched, Bill. It'll be in the papers in the morning."

* * * *

St. Peter: "How did you get up here?"
Latest Arrival: "Flu."

* * * *

Uncle: "Who's the most popular boy in your school?"
Boy: "Last term young Jones was. He gave us all measles."

* * * *

Musician: "Let me tell you I'm a very good musician. I've got a diploma."
Pupil: "Go on, then, let me hear you play it."

* * * *

Two Swedes were walking on a railroad track when a train came along behind them. One of them was lucky enough to jump off the track in time; the other not being so fortunate. The survivor told about it later:
"After I yump," he said, "I run a leetle vay, and then I go back to see 'bout Jan. Putty soon I come 'cross an arm on the track, an' soon I see one of Jan's legs. Nex' t'ing I see Jan's head. Den I say, 'Goodness, somet'ing must a' happened to Jan'!"

* * * *

A member of a London club had the habit of taking his soup in a boisterous fashion. One day when the offensive sounds were at their loudest, another member strode towards the culprit and said:
"May I help, sir?"
"Help!" said the diner. "I don't need any help."
"Sorry," said the other, "I thought perhaps you might wish to be dragged ashore."

* * * *

Convict 99: "No cards, no billiards, no dominoes!"
Warder: "No—no games at all!"
Convict 99: "Why, a bloke'd be better off at 'ome!"

* * * *

The vicar told one of his flock that he should give a small donation for a fence around the cemetery, to which the villager replied: "I don't see any use in a fence around a cemetery. The folk inside can't get out, and those outside don't want to get in."

* * * *

"Why did ye tell him there was plenty of fishin' when there aren't two trout in the stream?"
"Well! The fewer fish, the more fishin' to get 'em."

* * * *

"Gargle with salt water three times daily, my man," said the doctor to the seaman who complained of a sore throat.
"What, after being in the water for five hours after being torpedoed," gasped the sailor.

* * * *

Two departments of a works had an argument as to which could play football better, so they borrowed a football ground and had a match. The score was 6–0 at half time, and the goalkeeper of the losing side was asked why he hadn't even tried to stop them. The scratch goalie replied. "Try to stop them when they were kicking their hardest? Not me, that's what the net's for."

MRS. MALAPROP

"I went to Wales three years ago," said Mrs. Malaprop, discussing the holiday question. "I remember seeing that tubercular bridge across the Menai Straits."

* * * *

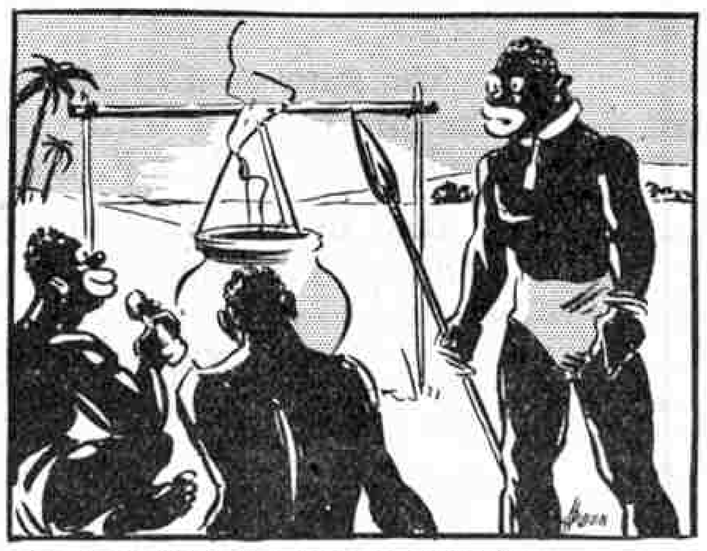
Two travellers arrived at the hotel and were shown a rather dingy room.
"What," said one, "does this pigsty cost?"
Promptly the proprietress replied: "For one pig, thirty shillings; for two pigs, fifty shillings."

* * * *

It was the final of the local cup tie and feeling ran high among the spectators. One of the home team supporters was continually drawing the referee's attention to infringements of the rules apparently committed by the visitors, but the ref. wasn't having any. Finally, in the middle of the second half, when the noisy spectator had almost made himself speechless with his shouts of "Foul!" a train on the railway about a hundred yards away whistled loudly.
"There you are, ref.," shouted the man excitedly. "Even the driver saw that one!"

* * * *

POT LUCK



1st Cannibal: "Is I late fo' dinner?"
2nd Cannibal: "You is—Eberybody's eaten!"

* * * *

The agent for a soap contest called on Mr. Jones. "Good morning, sir!" he said. "I am happy to tell you that you have won the big competition in our contest. The prize is £5,000 cash, £5 a week for life, a world cruise and a pet dog."
"Oh," said Mr. Jones. "What breed?"

* * * *

A lady motorist was driving along a country road when she saw a couple of repair men climbing a telephone pole.
"Look!" she exclaimed, "they must think I never drove a car before."

* * * *

"I've just been congratulating Colonel Blaze," said a guest at a banquet. "He's been appointed governor of a prison."
"Really?" asked his pretty neighbour. "Now, for a job like that does one need influence, or does one just start as a convict and rise from the ranks?"

* * * *

Hingley, never a good golfer, was playing an atrocious game.
"I'm quite out of practice," he said, hoping for a compliment from the caddie. "I've been travelling for the last six months."
"Then ye've played afore, sir?" said the caddie.

* * * *

Young Wife: "I want a cigar for my husband."
Clerk: "Fairly strong?"
Young Wife: "Yes, please. The last one broke in his pocket."

* * * *

Office Boy, nervously: "Please, sir, I think you are wanted on the telephone."
Employer: "You think! What's the good of thinking? Don't you know?"
Office Boy: "Well, sir, the voice at the other end said, 'Hello, is that you, you old idiot'?"

* * * *

THIS MONTH'S HOWLER

A widow is a woman who lived with her husband so long that he died.

THE ALTERNATIVE

"Mose," said the judge, doubting whether the witness knew the nature of an oath, "do you know what will happen if you lie on the witness stand?"
"Yessuh, Jedge, Ah 'spects you'll send me to jail."
"You're right. And what if you tell the truth?"
"We'll lose dis trial sho, Jedge."

* * * *

First Neighbour: "I hear Mrs. Jones has completely lost her voice."
Second Neighbour: "Poor dear! I must call on her. I've been wanting to have a good talk with her for a long time."

* * * *

Tom: "I hope you've got your home-work sums right. Teacher said she'd give us the cane if we didn't."
John: "Yes, that's why I haven't done any—I always get them wrong."

* * * *

A teacher pointed out to his class that a surname often indicated the trade of the ancestors of those who bore the name. He gave several simple examples, such as Smith, Baker, Taylor, Saddler and, turning to one boy said, "What do you think your ancestors were, Webb?"
The boy thought for a moment, then answered, "Spiders, sir."

* * * *

A Glasgow merchant arrived at his office one morning and found a young clerk writing a letter in rather a flourishing hand.
"My man," he observed, "dinna mak' the tails o' yer g's and y's sae long. I want the ink tae last the quarter oot."

* * * *

Motorist ('phoning garage after accident): "Hello! Can you send me any help? I've turned turtle."
Voice: "Sorry, sir. This is a garage, not a zoo."

* * * *

Youngster: "Ha'penny's worth of brandy balls, and please wrap them up in a clean piece of paper, 'cos mother wants to write to Aunt Jane, and she hasn't any notepaper."

* * * *

An old lady was being shown over a submarine for the first time.
After inspecting the interior of the vessel she came out on deck again and noticed the long gun.
"And doesn't that cannon get awfully wet when you submerge?" she asked her guide, a Cockney sailor.
"No mum," he replied. "When we submerge two sailors are told off to hold umbrellas over it."

* * * *

Teacher: "What is an island, Ruth?"
Ruth: "A place where the bottom of the ocean sticks up through the water."

* * * *

Teacher: "George, who defeated the Philistines?"
George: "I don't know, sir, 'cos I only follows the First League."

* * * *

Guest: "Waiter, just look at this piece of chicken; it is nothing but skin and bone."
Waiter: "Yes, sir. D'you want the feathers, too?"

* * * *

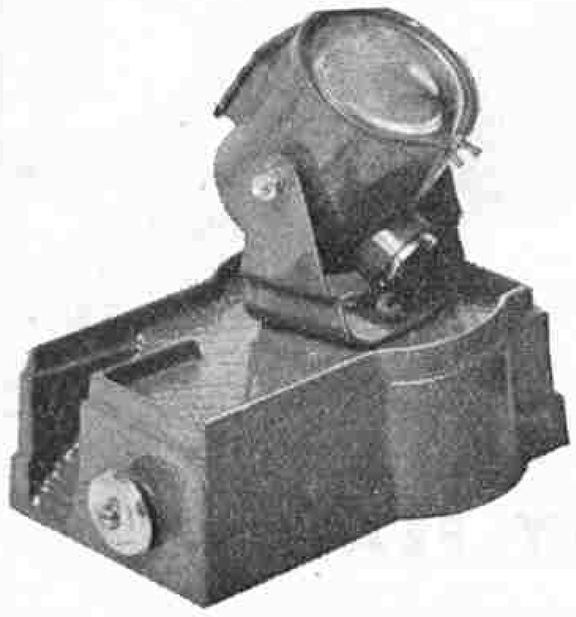
A GRAVE WARNING

Patient (to Doctor's small son): "Where did the Doctor get that?"
Son: "Oh, he's had it a long time. I think it was his first patient."

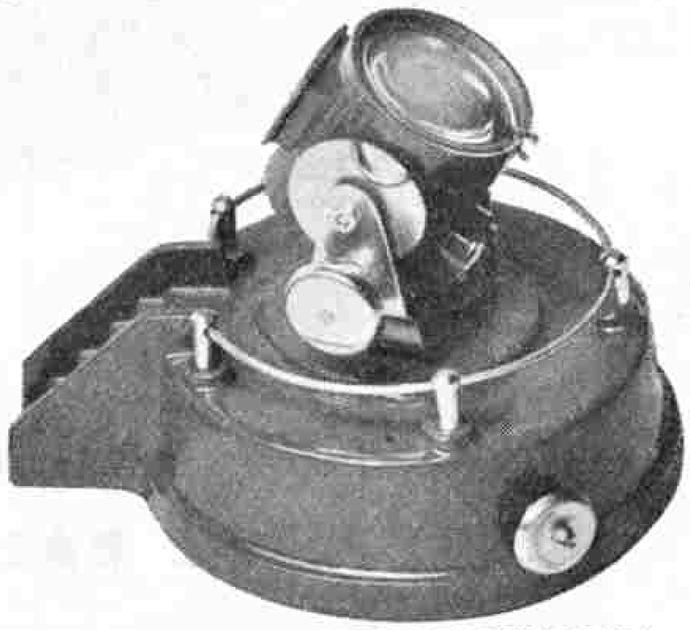
BRITISH MADE ASTRA TOYS OF QUALITY

3 POWERFUL MODEL SEARCHLIGHTS

MINIATURE SEARCHLIGHT
CATALOGUE No. 16
Projector swivels and elevates and throws a powerful beam. Fitted with clips for attaching to flash lamp battery. Height 2¼ in.
PRICE, less battery, **2′6**



STANDARD SEARCHLIGHT
CATALOGUE No. 14
A very popular model. Projector swivels, elevates and throws a concentrated beam of light. Height 3½ in.
PRICE, complete with battery, **4′6**



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CATALOGUE No. 15
Beautifully finished and fitted with elevating gear, this searchlight throws a very penetrating beam. Height 3½ in.
PRICE, complete with battery, **6′6**

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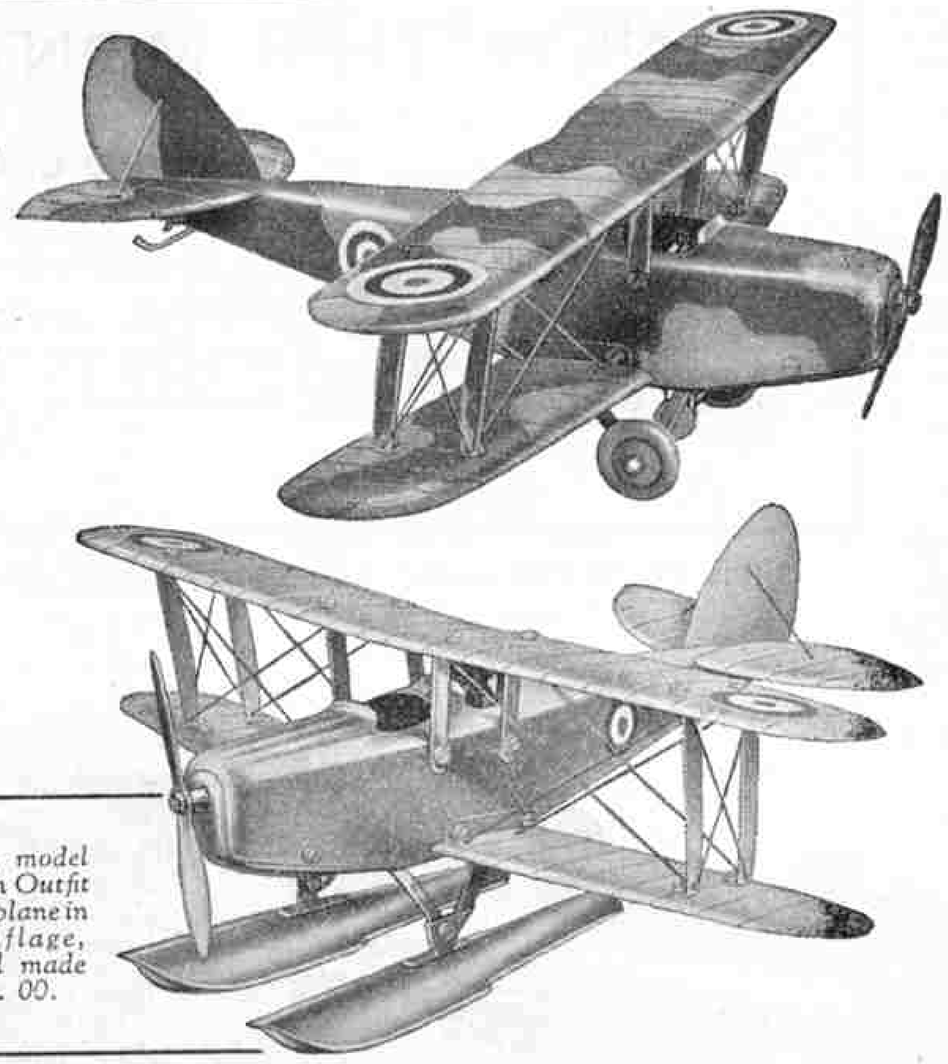
SPECIAL NOTICE

The No. 00 Outfit is now available in Camouflage as well as in Blue and White. The No. 0 Outfit is supplied in Service Grey as well as in Red and Cream.



On the right is a model seaplane made with Outfit No. 0. The light biplane in Service camouflage, above, is a model made with Outfit No. 00.

No. 0 Aeroplane Outfit

PRICES OF OUTFITS

No. 00 Aeroplane Outfit, Blue and White	4/3
No. 00 ,, ,, Camouflaged	4/6
No. 0 ,, ,, Red and Cream	5/9
No. 0 ,, ,, Service Grey	5/11

The above prices are subject to change without notice

MECCANO LTD. - BINNS ROAD - LIVERPOOL 13

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GAUGE 'O'

This is the Hornby E220 Special Electric Locomotive L.N.E.R. "The Bramham Moor" hauling a train composed of No. 2 Corridor Coaches.

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Boys! Everything you see on a real railway you'll find, in perfect miniature, in the Hornby Train System. That is why there is nothing to touch Hornby models for realism and thrills. You can start your Hornby Railway with a passenger locomotive, a few coaches and a guard's van. You can add a goods train made up of all kinds of wagons and vans. You can then put on a crack passenger service with a wonderful model of a famous express, such as "The Flying Scotsman" or "The Bournemouth Limited." To make the realism of your railway complete you can keep adding Hornby signals, stations, engine sheds, level crossings, turntables and many other wonderful accessories that are included in the Hornby system—the most perfect miniature railway system in the world.

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NEW THIS MONTH!

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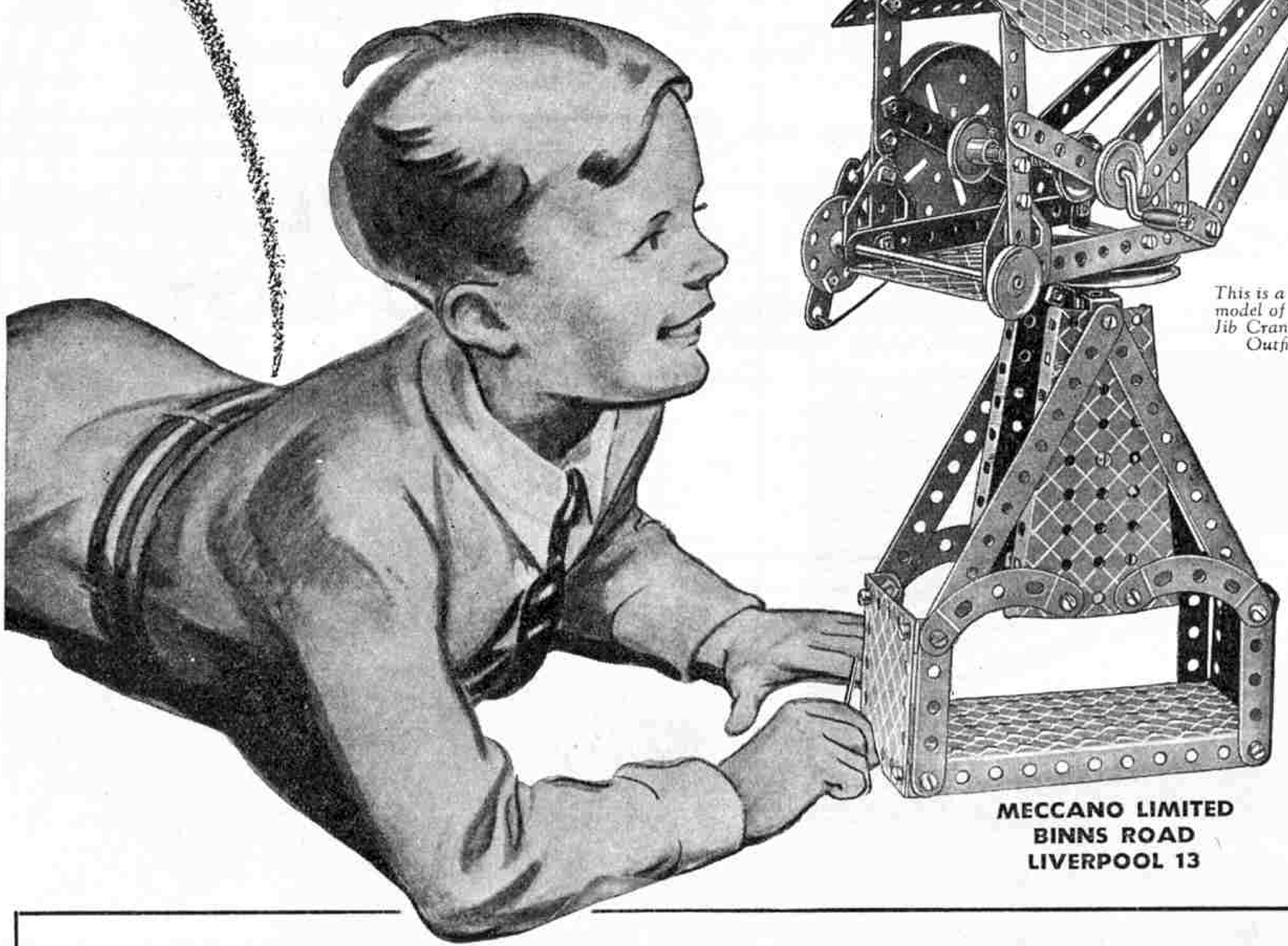
The No. 0 Meccano Outfit costs 3/6. There are ten other outfits available numbered 1 to 10, priced from 5/- to 280/-.

Prices subject to alteration without notice



This is a fine working model of an Elevated Jib Crane built with Outfit No. 4.

MECCANO LIMITED
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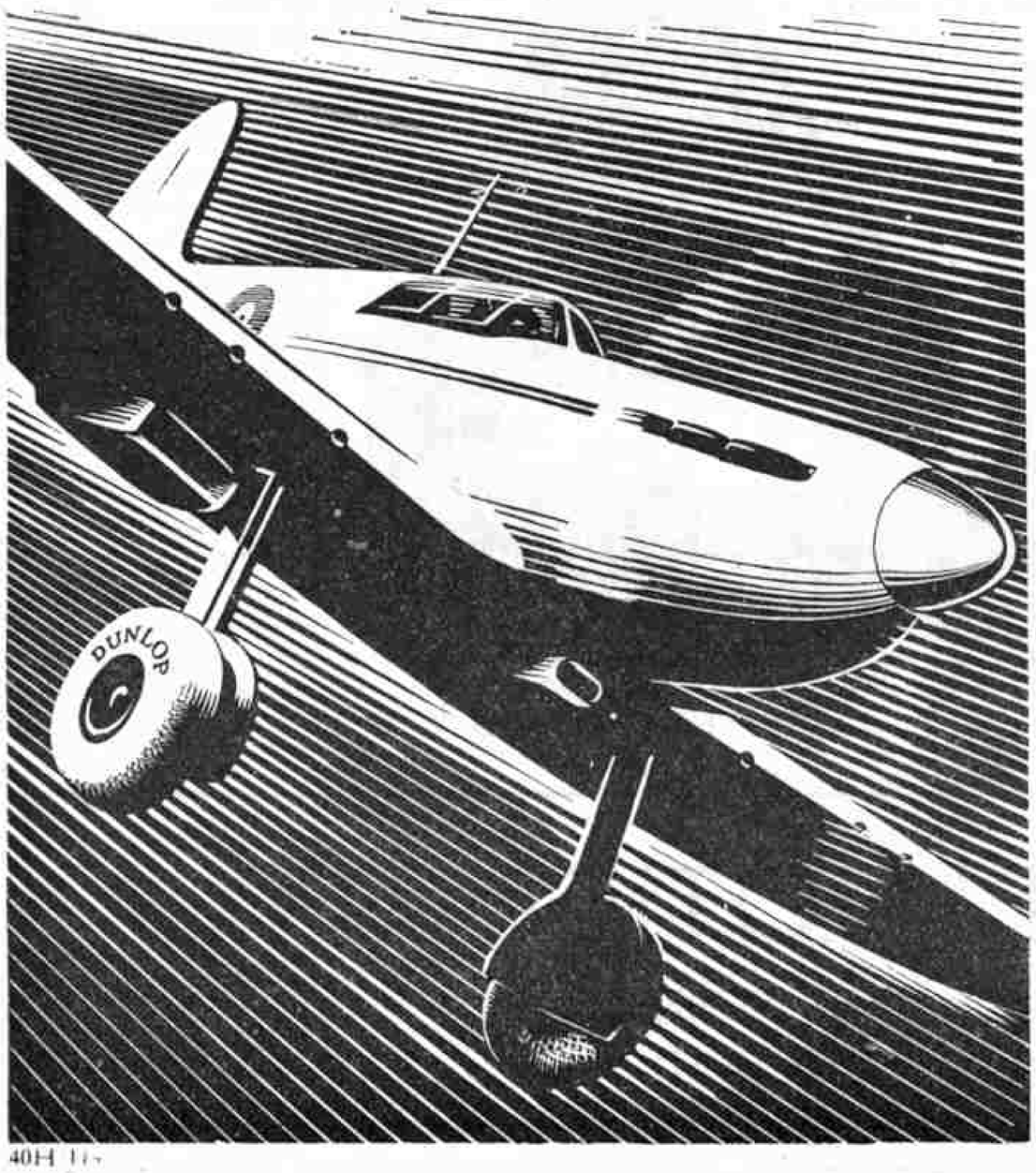
IMPORTANT NOTICE

THE MECCANO PART-EXCHANGE SCHEME
HAS BEEN TEMPORARILY SUSPENDED

DUNLOP TYRES

do their Duty!



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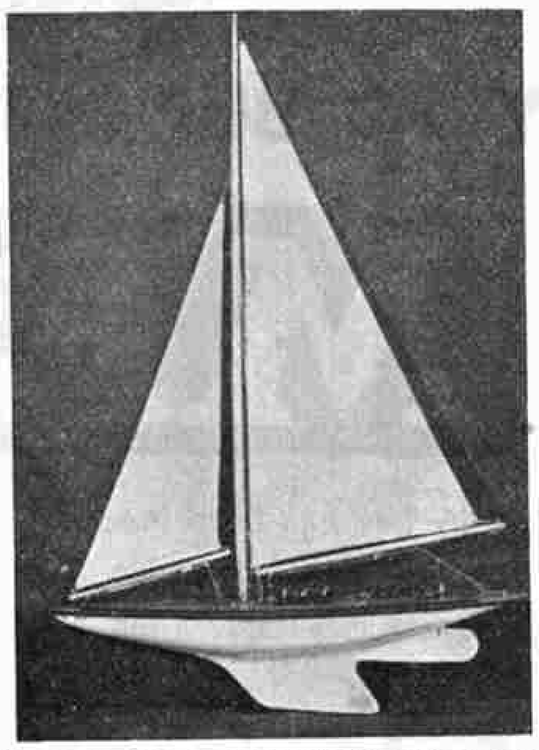
"Endeavour" Yachts



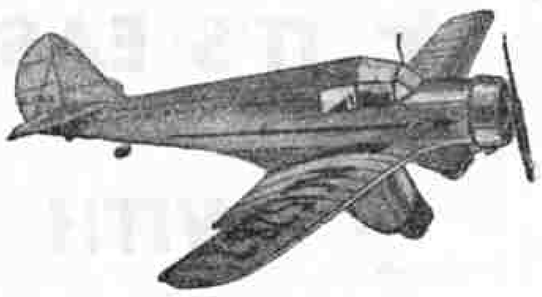
These new Yachts are the latest thing for fast racing work. All of the hulls are hand made in best yellow pine. Cabin skylight extra.

Prices:

17-in. Yacht with automatic rudder ...13/10
21-in. Yacht with automatic rudder ... 21/3
27-in. Yacht with Braine type steering... 45/5
36-in. Yacht with Braine type steering... 86/3

Carriage extra.

Megow Balsa Flying Kits



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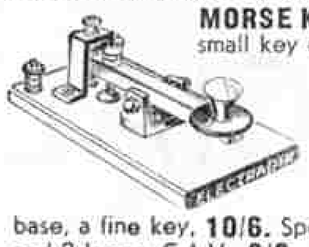

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This Month's Special Articles

	Page
A Battleship Goes into Action ...	372
Air News	376
Canada's Indian Population	374
Competitions	402
Engineering News	382
Facts About British Railways	387
Fireside Fun	404
From Our Readers	383
Guild and H.R.C. News	392–3
High Speed Surface-Craft	386
Hornby Railway Company Pages ...	398–402
How Science Aids the G-Men	370
Life-boat Thrills in Wartime	379
L.M.S. Electric Train Improvements ...	397
Meccano Summer Competition, and Competition Results	391
New Meccano Models	388
Of General Interest	380
Photography	378
Railway News	384
Stamp Collecting	395
Stamp Gossip	396
With the Model-Builders	390

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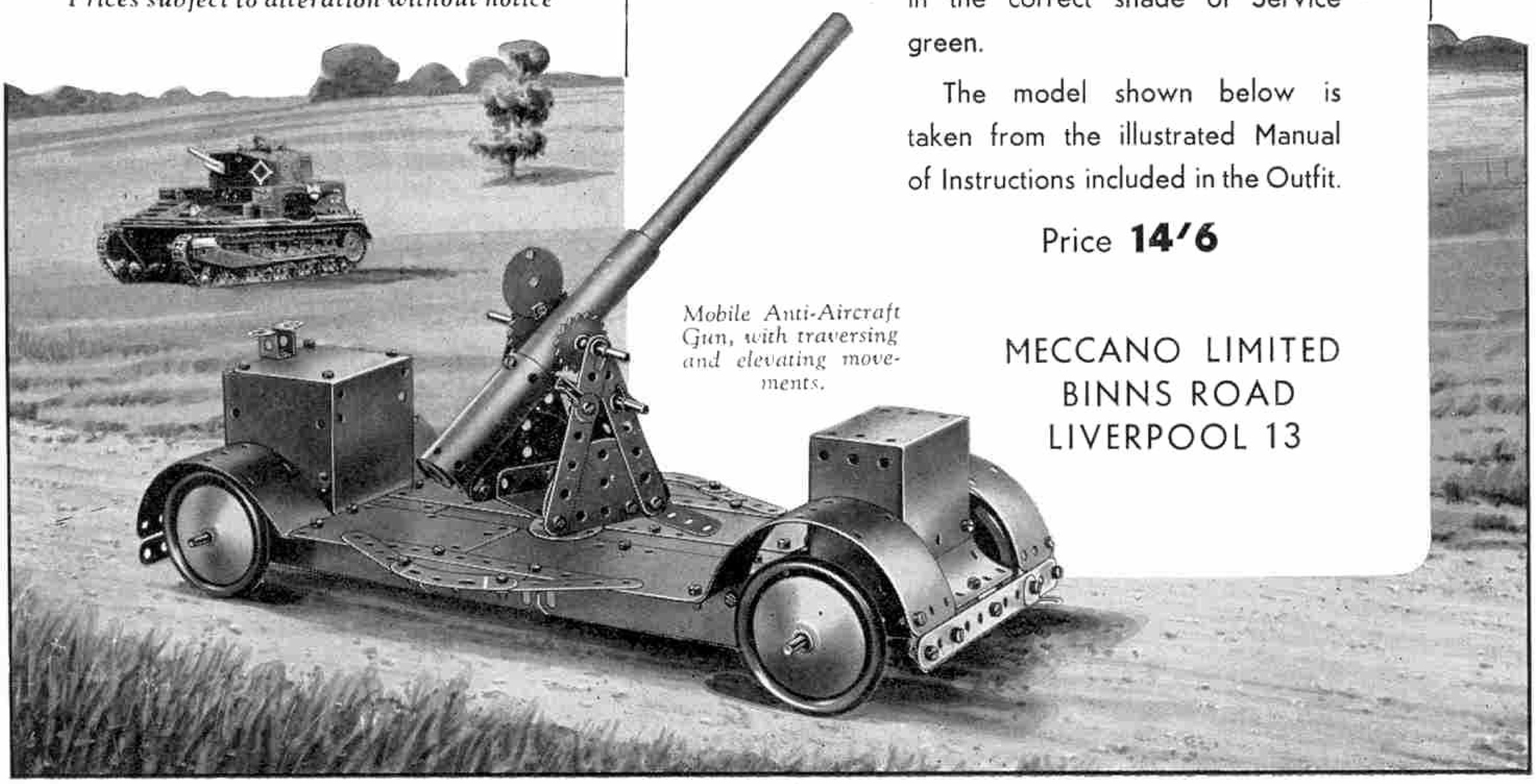

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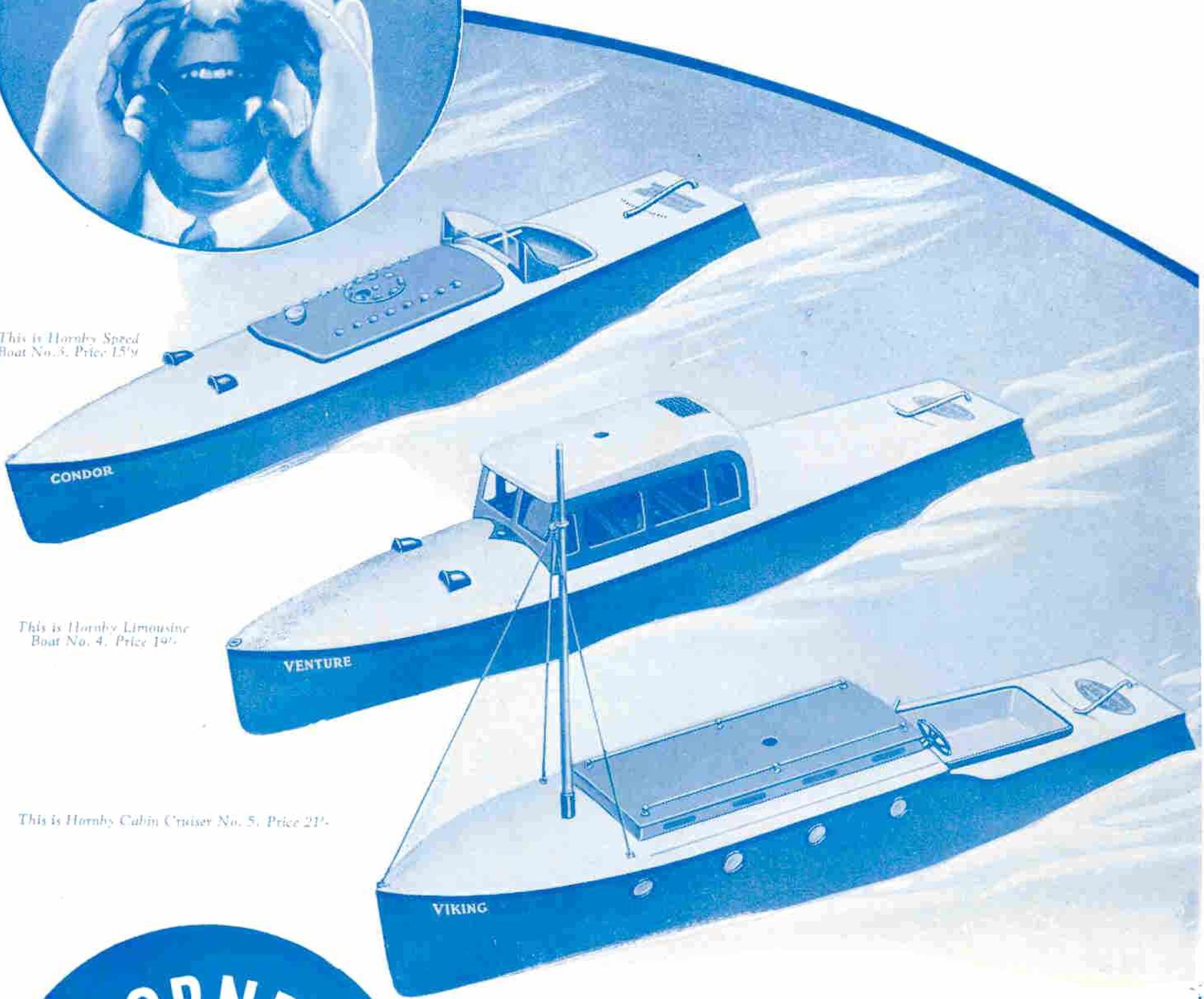

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