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MAGAZINE



THE AGE OF THE MOTOR BUS (See page 232)



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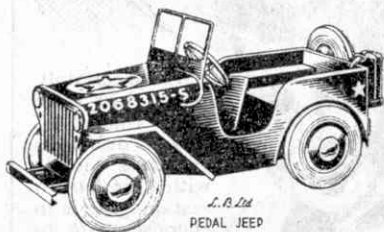
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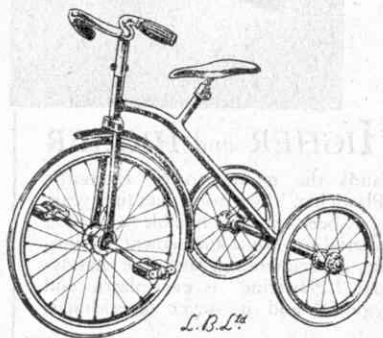
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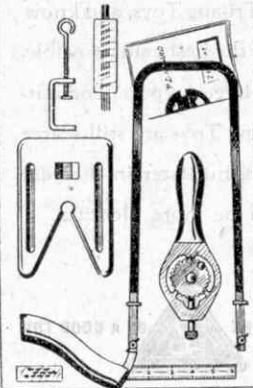
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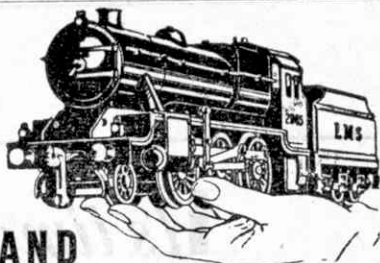


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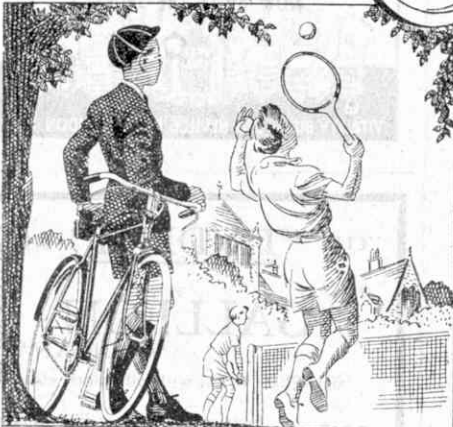
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Next Month: "THE STORY OF THE PADDLE STEAMER." By Frank C. Bowen

MECCANO

MAGAZINE

Editorial Office:
Binns Road
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Vol. XXXII
No. 6
June 1947

With the Editor

Atlantic Records

We have advanced a long way since Columbus took 70 days to cross from the Spanish Coast to the islands of the West Indies, and 41 days on the return voyage. At first progress was slow, and more than 300 years later, when the first regular steam packet sailings across the Atlantic began in 1816, the average time for the voyage was still about 40 days. During the period of the clipper ship the record was brought down to about 13 days, but in the meantime steam had stepped in and steamships were then actually making the crossing in 10 days, a wonderful advance from the 10 weeks of Columbus. As the years went by competition became very keen and first one famous vessel and then another cut down the time of the crossing until the "*Queen Mary*" and the "*Queen Elizabeth*," reigning supreme, brought it down to the present record of less than four days.

But the giant steamships have had to give way to the aeroplane as far as speed is concerned. When regular Atlantic services began, British Short flying boats and the clippers of Pan-American Airways crossed the ocean in about 12 hours, and now even these times have been halved, for on 27th April Capt. Powell in a "Constellation" flew from Gander to Foynes in 5 hrs. 23 min. This was a noteworthy achievement, although there was a strong following wind, but it is interesting to recall that the fastest flights yet made across the Atlantic were those of an R.A.F. "Mosquito" that flew from St. Mawgan, Cornwall, to Gander in 6 hrs. 58 min., and actually made the flight in the opposite direction in only 5 hrs. 10 min.

All these records may be surpassed in the coming months, and with them many others will be made. A "Mosquito" has

flown to Capetown in just over 21½ hours, knocking off 10 hours from the previous record for this distance, made by the R.A.F. Lancaster "*Aries I*" in January of last year.

The "Mauretania's" Speedy Run

When the "*Mauretania*" reached Liverpool on 12th May last, she had just completed the fastest crossing ever made by a ship of her class. Her average speed from the Ambrose Light, off New York Harbour, to Point Lynas, Anglesey, was 24.39 knots, and on her best day's run during the voyage her speed over a run of 575 nautical miles was 24.87 knots. The present "*Mauretania*," which set out on her maiden voyage in 1939, is not as large nor as speedy as her famous predecessor, which held the transatlantic record for so many years, but it is clear that she is a worthy successor.

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Meet the Tug Family

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

GREAT ports such as London, Liverpool and Glasgow require large fleets of tugs to assist in the manoeuvring and berthing of the many big ships which enter and leave the docks from day to day. These tugs are extremely handy little vessels and present a picture of never-ending interest as they tow their heavy charges through the docks and down the river to the sea. Their perpetual hooting and puffing, their fussy behaviour as they rush empty-handed to gather another liner into their charge, remind us of a very busy matron in an overcrowded school. Considering their size these "hefty urchins" are capable of carrying out an astonishing amount of work and possess great hauling power.

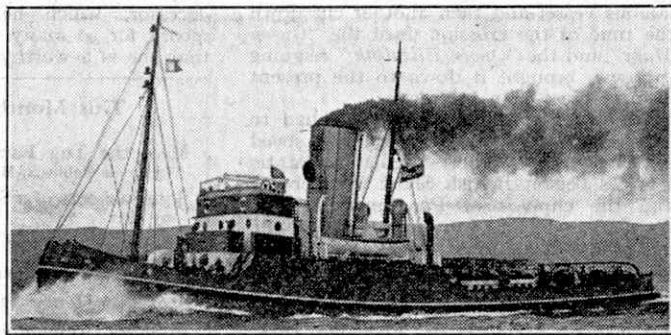
Customs vary in different countries, and in the U.S.A., the harbour tug, when engaged in berthing a ship, very seldom tows, but instead pushes, placing her stem against the ship to be handled and then driving ahead with all her power. The author well remembers a certain sunny day in July 1935 when, as he stood at the top of the Empire State building in New York, he saw a magnificent sight—the berthing of the "*Normandie*." The great French liner came majestically up the Hudson escorted by numerous tugs, blowing and puffing, churning and fussing, as they swung the monster into her berth. It was a splendid sight from a wonderful viewpoint, and little did one know, as the giant vessel came up to her berth, that she would finish her days so soon afterwards in that very port.

Let us turn back the pages of history, however, to the days when the steam engine first became practicable as a means of propelling ships. At that time it was generally considered that the steamship, as such, could be used only for very short trips, and that its only real value would lie in the towing of sailing ships into and

out of ports. There were many reasons for not taking the steamship more seriously. For one thing, it was not reliable and therefore could not go far from home; for another thing it had an exorbitant appetite for coal; and in addition these ships were built only in comparatively small sizes.

The first recorded instance of a steamship being employed for towing purposes dates back to 1801, and therefore the tug can put forward a reasonable claim to being the oldest specialised type of steamship.

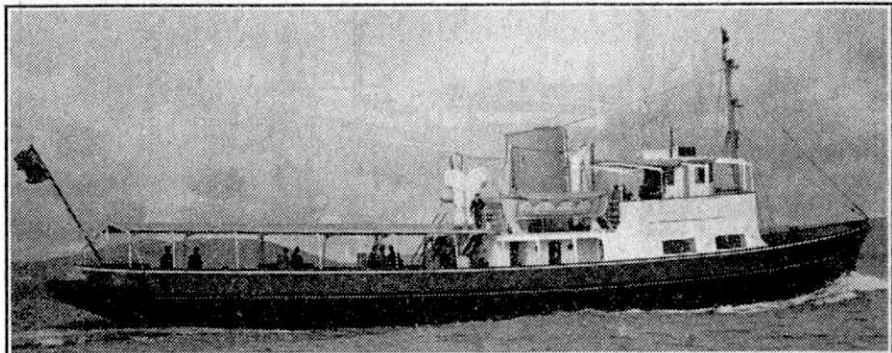
The early tugs were, of course, driven by paddle wheels, and the "paddler" was much preferred for many a long day, especially for sea work. The majority of the early screw tugs were very light in design, and with their shallow draught they found difficulty in holding the water when towing a heavy ship against the wind. The paddle tug, on the other hand could hold a ship remarkably well, and however hard the wind was blowing, or the sea running, she always had at least half her power in the water, while the screw-propeller might lift right out with consequent racing of the engine. It is



"John Dock," a modern and very sturdy tug.

claimed that the old time "paddlers" were really wonderful sea boats, and even for river work they were preferred by many experienced pilots long after they were considered completely out of date.

As time passed, tugs, quite naturally, were built with larger hulls and more powerful engines so that they could go farther and handle heavier hauls. A



"Duchess of Abercorn," an "all-purpose" tug.

particularly fine example of a modern and very sturdy tug is shown on the previous page. The twin-screw steam tug "*John Dock*" was built by Harland and Wolff Ltd., in their Govan shipyard for the South African Railways and Harbours Administration. A glance at the photograph of the "*John Dock*" will show that this vessel is capable of dealing with really heavy hauls. She has all the appearance of being a little giant of her type, and with her life-boats, wireless equipment, accommodation, navigation lights and so on, she is in reality a sea-going ship. The "bone in her teeth," as the bow wave of a ship is called in sailor's language, gives one the impression that this stout little craft means business and is going somewhere in a hurry and in a very determined manner.

It is fairly common knowledge that in addition to those tugs which seldom travel far from harbour there are ocean-going tugs which specialise in salvage work and in long-distance towage. It is not unusual, in fact, for such vessels to make a trip half-way round the world.

An early example of a long-distance haul is given by a tug named the "*Anglia*," which towed Cleopatra's Needle to London in 1878. The famous Needle was encased in a pontoon, and this pontoon had broken adrift from the steamer which was towing it from Alexandria, so it was taken into Ferrol by Spanish fishermen who found it abandoned. At Ferrol this awkward tow was picked up by the "*Anglia*" and brought safely to the Thames.

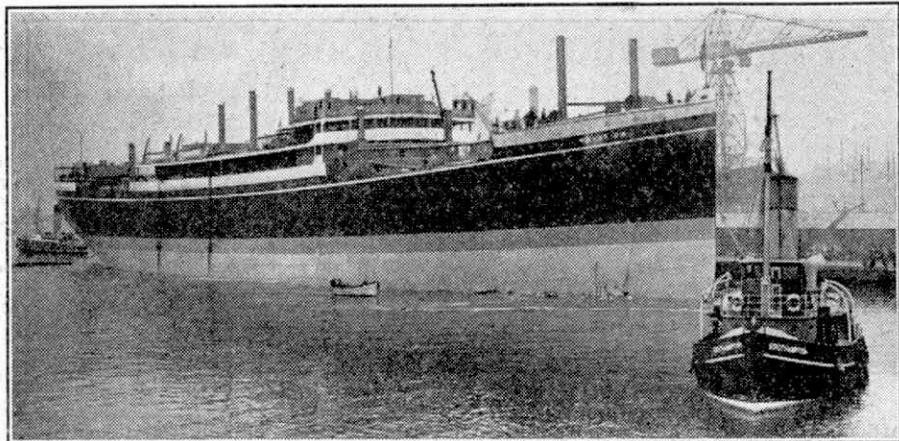
There are, needless to say, very many examples of long-distance sea-towing. A good example is that of the "*Tancarville*," an oil-hulk, which in 45 steaming days, during 1905, was towed a distance of

8,200 miles. The oil-hulk was taken by a tug named the "*Columbia*" from the Tyne to Portland and from Portland to North Sumatra by another tug named the "*Oceana*."

The Dutch have some very fine large sea-going rescue and salvage tugs, and one could detail *ad infinitum* many splendid achievements which these and other tugs have carried out on many occasions. During the two World Wars, as one might expect, there were numerous cases of heroic tows in the face of enemy opposition as well as rough and treacherous weather. Large floating docks have figured in the news when they have been towed from their ports of construction to the far corners of the earth. Landing craft have been towed from the United Kingdom to various foreign ports, and on "D" day hundreds of tugs of all sorts and sizes did an invaluable job of work in towing the Mulberry harbours in sections to France, as well as performing many other herculean tasks under extremely difficult conditions.

Tugs are also designed and built for carrying out special tasks. A good example of one of these interesting vessels is the "*Sir Hastings Anderson*." This attractive looking, yacht-like vessel was built by Harland and Wolff Ltd., in their Govan shipyard for the War Office shortly before the second World War and was intended for the unenviable task of target-towing!

The tug "family" includes vessels which, while designed primarily for towing purposes, are provided with special equipment for salvage work or for combating fires on ships or in warehouses along the water-side. The sturdy-looking little "*Duchess of Abercorn*" provides a first-class example of one of these interesting craft intended



A newly-launched vessel in charge of harbour tugs.

for carrying out a variety of work. This ship, shown on the previous page, was designed and built by Harland and Wolff Ltd., at Belfast for the Belfast Harbour Commissioners, and it is proposed to give a description of her in some detail because she has a number of noteworthy features incorporated in her little black hull. The "*Duchess of Abercorn*" is a tug, a fire-float, a passenger tender and a Harbour Commissioner's "flag-ship" or inspection vessel, all rolled up in one!

The main propulsion is diesel-electric and the engines develop their maximum power at constant revolutions while the propeller revolutions vary, depending upon whether the ship is towing or running free; the system gives great flexibility of power and has proved to be an ideal arrangement in service.

The main engines comprise two eight-cylinder diesel engines of 220 mms. bore and 370 mms. stroke, running at 550 r.p.m. and having their own self-contained pumps. Each diesel is directly coupled to a generator. The fire-fighting equipment includes a high-lift three-stage centrifugal pump. Current for the engine-room and ship services is supplied by two 45 kW. sets running at 700 r.p.m. and of the same general type as the main engines.

The two main generators referred to above are each 410 kW., 350 volts, running at 550 r.p.m., and supplying direct current to the two main propelling motors. The latter are situated right aft, are each of 500 shaft horse power and drive the two propellers through short lengths of shafting.

An interesting point to note is that the speed and direction of the vessel are controlled completely from the bridge—an ideal arrangement for this type of vessel. Normally, each generator drives its own propulsion motor; but when the vessel is on salvage or fire service, one main-generator supplies current for the salvage pump and the other supplies current for both propulsion motors. The latter can, however, even under these conditions, be operated quite independently of one another.

There is no doubt that such an installation as this may be somewhat more costly than a steam plant of equal power, but its immediate availability, its large bunker capacity and its manoeuvring flexibility make it a very attractive scheme—especially in times of emergency.

It should be added that this vessel has some beautifully fitted out accommodation and public rooms for the use of the Harbour Commissioners, and seldom, if ever, has the author seen such a variety of equipment so perfectly housed in a hull of such small dimensions. The squat motor-ship funnel, the

white superstructure and the two life-boats neatly stowed on port and starboard sides of the yellow funnel, give the "*Duchess of Abercorn*" an attractive appearance and tend to make one think that she is some wealthy man's private cruising yacht. The casual observer would never dream what a box-of-tricks she really is, or how many different and useful tasks she can so readily perform.

There are many other types of tug-boats busying themselves in ports, on rivers, or on the open seas all over the world. The author has watched the sturdy paddlers on the Rhine pulling trains of barges from the lower Rhine ports as far away as Switzerland to ports like Rotterdam, Amsterdam, Hamburg and Antwerp. The Rhine has screw-propelled tugs too, but these are smaller than the paddlers and are therefore used for handling smaller tows. A day, or even an hour, spent on the Thames Embankment will, as many readers know, provide plenty of opportunity for studying members of the tug family as they surge along with their barges up and down the river.

We have spoken of several different types of tugs in this article and of some of the jobs which they do. It might not be out of place to conclude by mentioning the harbour tugs which were referred to at the beginning of the paper, only this time they have another task to do—not berthing a homeward bound liner or assisting a big tramp steamer out to sea, but caring for the empty hull of a newly launched vessel. After the newly-built ship has slid down the ways and is safely waterborne, not a moment must be lost in getting ropes aboard from the waiting tugs, lest the wind or tide should take charge of the towering shell and run it into an adjacent wharf or on to some muddy river bank. After all, the newborn ship is helpless, she has no machinery, she may well have no propellers or rudder, and she is at the mercy of the elements. This is an occasion when the smart handling of the harbour tugs can be seen to best advantage.

The tug captain must be wary of any floating baulks of timber from the launchways, etc., lest he damage his propeller; he must keep a careful eye out for the movements of his fellow tug masters in their busy little craft; he must respond immediately to signals given by a distant wave of the hand, a shrill whistle or a shouted word; he must act as a member of a team, and above all he must tow at the right moment in the correct direction. The whole responsibility of the precious charge, which may well be worth £500,000, is in the hands of two or three tug captains.

Some Aspects of a Signalman's Job

By "Sax"

NO doubt during your railway journeys you have often wondered about the work of a signalman. I hope, however, that you have not had the same thought as the charming old lady who remarked how nice it was to have the job of watching the trains go by! In this article I endeavour to give some idea of the work of the railway signalman, "boxman" or "bobby" as his colleagues often call him, in friendly conversation.

The cardinal duty of the signalman is to keep traffic moving in safety, but to stop trains when it is necessary to do so. The diligence of the signalman and his close observation of each train may easily determine whether a train reaches its destination safely. This is quite apart from the duty of maintaining the principles of the Absolute Block system of signalling.

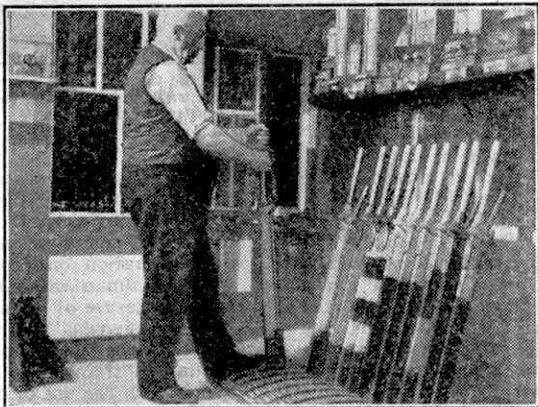
The railway is broken up into what are known as block sections, each controlled by a set of signals worked by the signalman who, subject to the Control Office, is responsible for the regulation of traffic passing his cabin. The object of the system is to prevent more than one train being in a block section between two signal boxes on the same line at the same time.

A clear and comprehensive knowledge is required of the regulations and rules on which the system of railway signalling is based. Also, the signalman must know just what to do in the many eventualities that may occur even on this great system of transport.

A clear understanding is called for of the various pieces of apparatus which help the signalman in his work. The most important are the block telegraph instruments, by means of which messages

are passed from box to box. They are indeed his friends, as by a glance at them he knows the state of the line at once. They are used in conjunction with an audible code of bell rings. A typical block instrument has two dials each with a needle that can indicate any one of three aspects, "Line Blocked," "Line Clear" and "Train on Line."

On the lower dial is a needle that is turned by the signalman of the box where it is installed. This sends the indication given by the signalman to the next box, the indication being repeated on the corresponding instrument in that box. The needle in the upper dial, which is painted red, cannot be turned by the first man, but is controlled by the signalman in the next box working a companion instrument, and is the visual reminder to the first man that



"Giving the road." A signalman working the lever frame in his cabin. Photograph by Mr. Douglas Fear, Taunton, Somerset.

the other is taking the train into his section. So the instruments provide the signalmen at both ends of a section with a visual indication as to whether a train has been allowed to enter the section; and if it has they remind them of its presence.

The most familiar equipment of a signal box is the lever frame that works the various signals and points. This is governed by a system of interlocking that makes it impossible for a signalman to "pull off" a signal or signals when the road is not set correctly. The levers are painted certain colours so that they can be distinguished at once. Yellow is used for distant or caution signals, which are generally placed some distance from the box. There is a small indicator behind the lever to show whether or not the signal is off. Red levers are for definite

stop signals, such as home and starting signals. Black denotes points levers, and blue is for locking bars, which lock points that lie in the facing direction to trains travelling over them.

Black levers with white arrows indicate detonator placing machines, while the brown and blue levers seen in some boxes release the apparatus for working level crossing gates. A red lever with a white band indicates that the lever is controlled by the block needle of the box in advance, and can be pulled only on the needle being placed to "Line Clear," which means the acceptance of a train, or during the testing of the signal. Two distinct bell signals are used in either case to inform the signalman at the box in advance for what purpose the lever is required to be released.

Each lever has a number affixed and the numbers of any other levers which must be moved in order to release it are also shown. The track diagram in the cabin shows clearly which signals the respective levers control. In many cabins there are also track circuit indicators. These further help the signalman to know just where a train is, especially if it is detained at a signal some distance from the box and out of sight, in a large through station for instance, or where bridges or

tunnels obstruct the view from the cabin. The rails of a track-circuited section are insulated from one another. They carry a weak electric current, and when the circuit is completed through the wheels and axles of a train in that section an



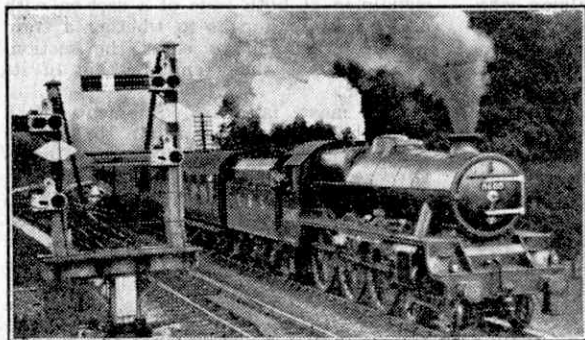
An important main line junction and the signal box controlling it. The signalman here is well placed to observe traffic movements on each route. Photograph by courtesy of the L.M.S.

indication is given in the signal box. The posts of the signals applying to such sections are normally distinguished by a white diamond-shaped plate for the guidance of trainmen, as shown in the lower illustration on this page.

The signalman must know when and how to make use of detonators, popularly called "fog signals," for he is informed in his regulations that the absolute block signalling of trains does not in any way dispense with the use of detonators whenever they may be required to protect an obstruction. When any emergency occurs, perhaps without any other notification to the signalman than the bell code ring,

the use of detonators can play a big part in avoiding mishaps. Their most familiar use is during fog or falling snow, when fogmen are employed at distant signals, and they help a great deal during such difficult days or nights. Your journey may be a little prolonged, but it is seldom that your train is cancelled.

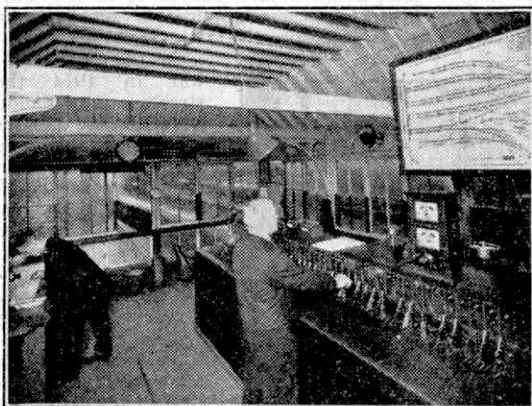
During shunting, for in most boxes there is the local coal train to deal with or other movements, there are regulations to be put in practice, hand signals to be given and



An L.M.S. express passing Dore and Totley. Note the track circuit indications on the signal posts. Photograph by courtesy of the "Sheffield Telegraph."

acknowledged and so on. These all have the same object in view, safety. There is booking of trains in the train register book—the time accepted, the time at which they enter the section and the time of passing the cabin, and finally the time of clearing the section.

In the lonely watches of the night turn, friends indeed are the lamps. There are the hand lamps kept in the cabin which by rule are always trimmed and burning during the hours of darkness. The signalman also has the lamps or rather the lights of signals to observe. Then there are engine headlamps which in their various positions indicate the class of train; and



The interior of a power-operated signal cabin. Note the block instruments and the track diagram. Photograph by courtesy of the L.M.S.

most important of all is the red indication of the tail lamp, which shows that the train is complete, and which must be observed before the signalman can give the "Train out of section" bell signal to the box in the rear. Failure to observe this may mean a collision with another train, especially in the event of a loose-coupled goods train becoming divided. A divided passenger train of course is automatically brought to a stop by the action of the Vacuum or Westinghouse brakes in each section of the train.

Permanent way work calls upon the signalman to exercise the various rules governing this branch of railway work, such as trolley or ballast train working, or track in course of renewal. It is during these times that the rules are worked in conjunction with the track ganger to protect the men on the line and the trains which will travel over the portion

of the line affected by the work. There may be tunnels in the section, where plate-layers' trolleys are treated as trains and are signalled on the block apparatus.

Sometimes a signalman works his section under the conditions of Single Line Working. When one line is obstructed, damaged or being relaid, traffic in either direction is worked over the one set of metals. This calls for a knowledge of extra rules and regulations to govern the exceptional working. Then the signalman works in conjunction with a specially-appointed "Pilotman." The rules governing this form of railway work constitute a very interesting subject in themselves.

What of the signals that control a block section? The signals form the "doors" as it were by which the trains gain entrance to the section under the signalman's command. First, like the front gate which can be opened by oneself, comes the distant signal denoted by a fishtailed arm. This is a warning signal and it can be passed when in the horizontal or "caution" position. The driver in doing so is prepared to find the home signal or front door at "danger." The home signal must not be passed when in this position, and the procedure when stopped here is to whistle, or as it were knock at the front door. Next is the starting signal at the station, or the back door through which the train leaves the section on the next

signalman accepting it. When the starting signal is moved to the clear position, the train goes to the next section to do the same thing all over again. Normally, on the train being accepted by the box in advance, the "gate and two doors" are opened right away, and in this case the train has a clear run right through the section.

I have used this comparison merely to make clear the importance of the signals to the signalmen working them and to the driver to whom they give their message and form the visible authority to proceed or stop. They are the silent sentinels of the track, and especially during the night hours, though all signals may be showing clear, the driver and fireman are always on the lookout in case of signals being put back to danger in an emergency.

It will be clear from this description that apart from watching trains, the signalman has quite an amount of work to do.

The Age of the Motor Bus

IN this modern age the motor bus reigns supreme. In our towns and cities splendid fleets of these vehicles provide transport for all, and beyond these limits the country is covered with a network of bus lines by means of which it is possible to travel almost from one end of it to the other. It is surprising to realise that this vast development has taken place within a comparatively short period. It is true that the first patent for a horseless carriage was applied for as long ago as 1619, that Trevithick built a steam road vehicle that attained 10 m.p.h. in 1801, and that in the thirties of last century there were actually steam carriages plying for hire in London. All of these were premature developments, however. Interest 100 years or so ago centred on railways, and very little was seen of road transport by horseless vehicles until the closing years of the 19th century, when various pioneers built weird and wonderful vehicles.

The chief obstacles in the way of the pioneers were removed in 1896, which saw the passing of the Act that abolished the need for a man to walk in front of a mechanically propelled vehicle on the road, and other restrictions. This set the stage for the development of road vehicles of all kinds. In the meantime the petrol engine had begun to make headway. For a time there was competition from steam, but eventually the petrol engine triumphed, and when regular bus services began it was with vehicles driven by petrol.

The first buses to be placed in service were vastly different from the sleek and comfortable ones to which we are now accustomed. Their engines were difficult and noisy, and the fumes from their exhausts were regarded as noxious and

overpowering. Vibration too was a problem. This is scarcely surprising, for most of the streets of that time were cobbled and roads generally lacked smoothness. In addition solid rubber tyres were in use. But with all their drawbacks they began the triumphal march of the bus. Their engines became more reliable and less offensive. Modern equipment began to make its appearance, and to add to comfort and efficiency; this included destination indicators and electric headlamps. Pneumatic rubber tyres too came into use, their application providing a great step forward.

On the outbreak of war in 1914 the streets of London were already famous for the motor buses that operated on them in large numbers, although the old horse buses were still to be seen struggling away in a few corners. Suddenly London's motor buses achieved world-wide fame, for they were hastily pressed into service in transporting the expeditionary force that went to France in the early days of the conflict.

The motor bus came more fully into its own in the years between the two world wars. Apart from London, tram-cars were prominent in most cities to begin with, and motor buses were used for opening up new routes, while country lines also were being developed by enterprising individuals. The ease and speed with which buses could move large numbers of passengers soon became apparent and it was realised that they had a further advantage in not being confined to rail tracks. They were free to pass through crowded streets; their routes could readily be varied when necessary, and the breakdown of one vehicle did not mean that all those following it were brought to a standstill. Thus the struggle



Leyland buses, one a single-decker, in service at Hull. The illustrations to this article are reproduced by courtesy of Leyland Motors Ltd.



A Leyland double-decker in Glasgow.

between the tramcar and the bus gave ever-increasing advantage to the latter, and in many cities tramcars have been entirely superseded by motor buses, which now provide a speedy and flexible service.

The earliest motor buses had bonnets of the usual motor car type, with the driver seated in a cab placed behind it. This gave way to the forward position cab, the type that is now in almost universal use. Placing the driver's cab at one side of the engine increases the space available for passengers.

The single-decker was followed by the double-decker, and designs were continually being improved in order to give ample and comfortable seating within the limits imposed by regulations. The regular use of giant pneumatic tyres and improved springing also led to increased comfort, and an interesting innovation was the introduction of the torque transmitter by Leyland Motors Ltd. In this, the drive of the engine was transmitted by means of oil, and the Leyland buses marked "Gearless Bus" on the radiators were noted for their smooth starting, a feature that was highly desirable for a vehicle making frequent stops to pick up and set down passengers.

A further development was the introduction of the oil engine in place of one using the lighter

and more expensive fuel petrol. The new Leyland "600" oil engine is an excellent example of this modern type. It first appeared on Leyland goods vehicles, and has now been adapted for a new series of buses, including single and double-deckers. The engine derives its name from its cylinder capacity, measured in cubic inches. It has six cylinders, with direct injection of fuel, and it is mounted as a unit with the clutch and gear-box, which is of the synchro-mesh type. A new flexible link mounting is employed to support the unit, and it eliminates the transfer of vibration from the engine to the chassis. The engine develops 125-130 b.h.p. at 1,800 revolutions a minute, the speed at which it is governed.

In recent years various schemes have been tried out to improve accommodation, to speed up entry and exit of passengers, and to increase the safety of bus travel. The general practice is to have the loading platform at the rear, but many designs have had a special door at the front, for use in emergencies and for unloading at terminal points. Buses with central doors too have been given trials. These have the great advantage that passengers have shorter distances to walk in order to reach the seats farthest from the doors—an interesting safety point, as this movement often has to be carried out when a bus is starting. Trials have been made also of buses in which the fares are collected as passengers enter. This is a development that will be welcomed by all who have experienced discomfort in a crowded bus when the conductor has had to force his way

(Continued on page 262)



A new Leyland bus of the Rochdale Corporation that has been fitted with sliding doors.

Air News

By John W. R. Taylor

Transatlantic "Halifaxes"

Ex-R.A.F. Handley Page "Halifaxes," some of which carried out as many as 90 bombing missions during the war, are being used as transatlantic passenger air liners by the French Air Force. Starting from Bordeaux, the machines regularly fly the arduous 5,500 miles to Rio de Janeiro by way of Rabat and Dakar. A similar "Halifax" service is run between Bordeaux and Dakar, a distance of 2,300 miles, and a third service to Lagen in the Azores. Six flights each way are made each month on the Dakar route, a total of well over 1,000,000 miles to date. The aircraft cruise at 180 m.p.h. at between 5,000 and 10,000 ft., and show a petrol consumption of less than a gallon a mile.

No fewer than 32 people, including the crew, are carried on the two shorter runs, while eight passengers are accommodated on the transatlantic run. At the moment passengers are chiefly French officials and their families, and as the seating consists of 12 wicker chairs and a number of rest seats, some of them have to stand or sit on the floor on the short trips. This is certainly a very "utility" arrangement, but reliability and performance are more important than mere comfort when a lot of people have to be moved quickly, and the "Halifaxes" are giving very fine service. Each passenger on the transatlantic run is allowed 220 lb. of personal luggage and, in fact, more than 34 tons of baggage, freight and mail is carried in a pannier which fits into the bomb bay, similar to that on BOAC's "Halton" freighters. This pannier is easily removed and replaced; thereby reducing loading time and facilitating rapid "turn round" between flights.

Other "Halifaxes" of the French Air Force are being used by a bomber squadron, whose crews are being trained for future long-distance meteorological reconnaissance flights. The French are delighted with this British equipment, and quote an instance of a fully-loaded aircraft that flew from Dakar to Rabat in 6½ hrs. on three engines—not bad for an old-timer!

New Martin Transports

Most popular of all the new American air liners are the three transports being built by the Glenn L. Martin Company, of Baltimore. The prototype Model 202, the first of the series, flew last November, and work is now in hand on the first batch of production machines. Altogether, orders for several hundred Model 202s and the later Models 303 and 304 have been placed with Martins, although these may have to be reduced, as many airlines have discovered that their estimates of American airmindedness were very much too optimistic, and contracts for several types of air liners have been cut down or cancelled.

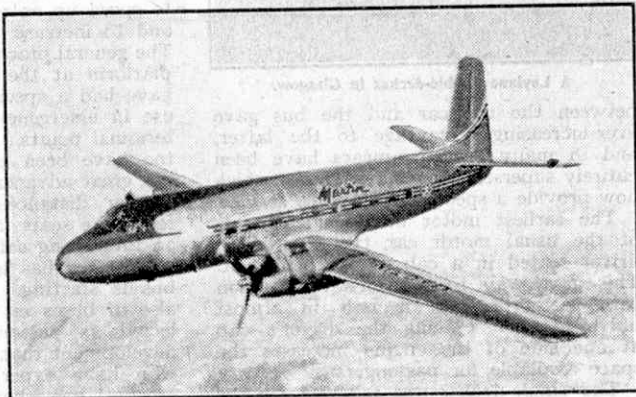
The Martin 202 is illustrated on this page. It is a medium-range transport, rather larger than the British "Viking," with a wing span of 92 ft. 9 in. and accommodation for 36 to 40 passengers. Entrance

to the comfortably-furnished passenger cabin, which has a large window for each pair of seats, is through two doors just behind the cockpit. There is a door for luggage aft of the wing, and a retractable ramp under the rear fuselage for passenger exit—a novel but extremely practical feature. The machine is fitted with two 2,400 h.p. Pratt and Whitney "Double Wasp" engines, and is intended for a normal range of up to 700 miles at a speed of 263 m.p.h.

The Model 202 is also available as a freighter with a capacity for some eight tons of cargo. A refrigerated version is planned for perishable goods, and in this form the machine has a range of 1,790 miles. The 202 will eventually be superseded by the Models 303 and 304, which correspond to the passenger and freight versions of the Model 202 respectively, but use the exhaust from their motors to provide supplementary jet-thrust. In addition, the cabin of the Martin 303 will be pressurised.

"Constellation" News

A tribute to the reliability of the Lockheed "Constellation" air liner is the fact that in the United States there has not been a single fatal accident in "Constellation" operations during four years of



The Martin 202 medium-range transport described on this page. Photograph by courtesy of The Glenn L. Martin Company, U.S.A.

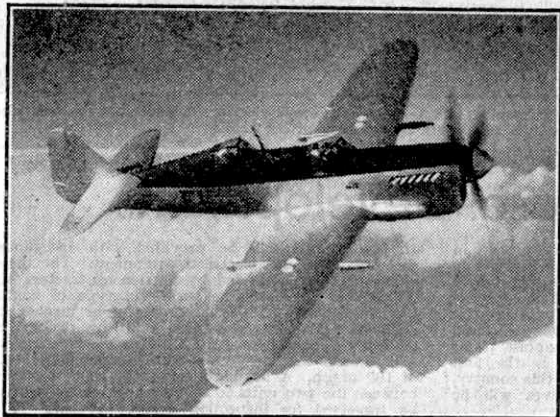
military and commercial work. Altogether 67 aircraft of this type have now been delivered to major airline operators, and between them they have flown a total of well over 625,000 passenger miles. This year more than 90 per cent. of all travellers crossing the Atlantic by air will make the flight by "Connie," as the type is in service with BOAC, KLM, Panair do Brasil, Air France and Venezuelan Airlines as well as the three American transatlantic operators.

The American Civil Aeronautics Administration has just certified the "Constellation" for take-offs at a loaded weight of 102,000 lb., as opposed to the old figure of 90,000 lb. This means that it can now carry sufficient fuel for non-stop flights between New York and London, Paris or Amsterdam. At the same time cruising speed has been increased from 300 to 328 m.p.h.

An instrument which will contribute to more accurate navigation, and thus reduce the danger of crashes, is the new British Sperry "Gyrosyne" compass. It is an electrically driven directional gyro with a magnetic "sense," which makes feasible a standard of navigational accuracy never before possible. Accurate indications of magnetic heading are given in all conditions, without northerly turning error, oscillation or swinging.

The "Firefly" Trainer

In recent "Air News" pages I described the two-seat trainer versions of the "Hurricane" and "Spitfire" fighters. One of the first of these two-seat trainer conversions was the "Firefly" Trainer illustrated on this page, which is basically similar to the well-known "Firefly" naval fighter. The chief difference is that an instructor's cockpit, complete with dual



A striking view of the Fairey "Firefly" two-seat trainer.

controls, has been placed where the observer usually sits; this seat has been raised to give a clear view for take-off and landing. In addition, its armament has been reduced to one 20 mm. cannon in each wing. With its top speed of 305 m.p.h. this new trainer possesses performance and power characteristics almost up to front-line operational standards. Not only does it make it possible to assess quickly the ability on high-speed aircraft of newly-joined pilots, but it also eases the transition difficulties of comparatively inexperienced pilots unused to powerful engines and flying at speeds some 200 m.p.h. above those of their previous training machines.

The prototype has now completed extensive official flight trials and has proved itself admirably suited for its new job. As a result, the Admiralty has placed an order with the Fairey Aviation Company for a substantial number of production machines, and work on these has already started at the firm's Stockport factory.

Douglas "Skyraider" Fighter-Bomber

The Douglas Aircraft Company, of Santa Monica, California, describe their new AD-1 "Skyraider" attack-bomber as "an airborne arsenal of unprecedented striking power in its size and type range." It is certainly formidable, for it can carry nearly three tons of bombs, rockets or torpedoes and can dive at speeds approaching 500 m.p.h. There are two fixed, forward-firing cannons in the wings, and these, combined with a load of two 12 in. "Tiny Tim" rockets and

twelve 5 in. rockets, give the "Skyraider" a greater fire-power than the broadside of a cruiser. "Tiny Tim," which weighs 1,300 lb., is the largest rocket carried by aircraft and will slice easily through three inches of armour plate. It equals the destructive force of a 12 in. naval shell. If required, radar or extra fuel tanks can be carried instead of rockets or bombs.

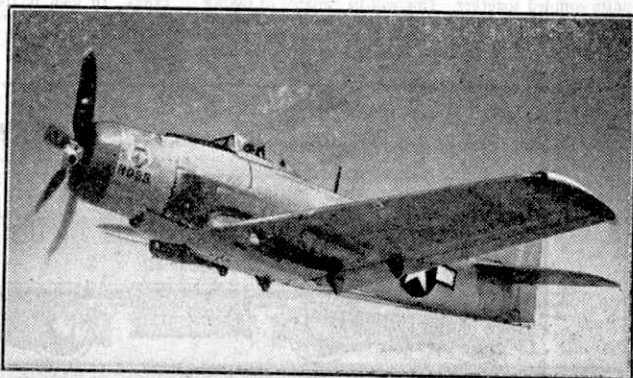
Powered by a 2,100 h.p. Pratt and Whitney engine, the single-seat "Skyraider" is a large aircraft with a wing span of just over 50 ft. It is of orthodox all-metal construction, and as it is intended for operation from aircraft carriers, it has folding wings and a deck-landing arrester hook. An unusual and interesting new type of dive brake has been designed to enable the bomber to pull out of dive-attacks from 20,000 ft. It consists of three large flat panels hinged to the sides and bottom of the fuselage just behind the wing. When opened these slow down the aircraft sufficiently for an easy pull-out even at a force of 7G, or seven times the pull of gravity. The "Skyraider" is in production for the U.S. Navy in Douglas's El Segundo factory.

Sweden Buys British

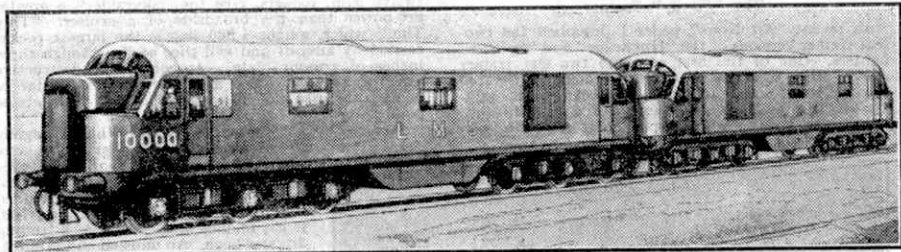
Just over a year ago the Swedish Government signed contracts with the de Havilland companies for the purchase of a large number of "Vampire" fighters powered by "Goblin" jet engines, also for a further supply of these engines and for the licence to manufacture the "Goblin" in Sweden.

The Swedish Air Force has already gained considerable experience with "Vampires" in a variety of operating conditions, including service within the Arctic Circle, and they are so pleased with them that they are now going to build the "Vampire" under licence in Sweden. In addition the Swedish Government has bought several of the larger de Havilland "Ghost" jet engines and will build these under licence as well as the "Goblins." In fact, several new Swedish aircraft at present in the design stage are being developed with these powerful British engines.

These contracts are not only a great tribute to British technical supremacy; they represent millions of pounds worth of export trade to help our finances, especially as the raw materials and many components will be supplied by British firms.



The Douglas "Skyraider," which can carry nearly three tons of bombs, rockets or torpedoes. Photograph by courtesy of Douglas Aircraft Company, Inc., U.S.A.



An artist's impression of what the experimental L.M.S. twin-unit diesel-electric locomotive will look like. Illustrations to this article are by courtesy of the L.M.S.

L.M.S. Diesel Developments

IN "British Locomotives of the Near Future" in last month's "M.M.," Mr. O. S. Nock referred to the L.M.S. decision to introduce diesel-electric motive power for main line and other services. Diesel-electric locomotives are under construction for experimental purposes in passenger and other traffic working, including the most important through express trains between London and Scotland. This is the first instance of experiments on these lines in this country, and the performance of the locomotives will be watched with the greatest interest.

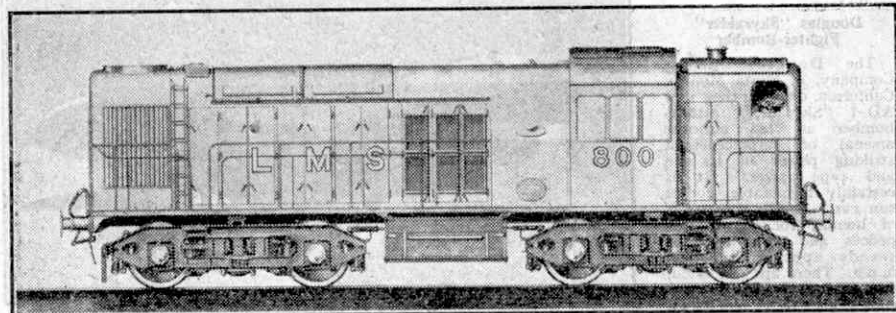
This L.M.S. decision is a logical step in the development of diesel motive power with which the company made pioneer experiments some 15 years ago. After extended trials with various patterns of diesel locomotives on shunting duties, a standard design was evolved in 1936, and there are now 40 of these handy and efficient units in L.M.S. service. They have proved extremely successful in continuous 24 hr. operation required in important traffic centres such as the marshalling-yards at Toton, Willesden, Crewe, Carlisle and Liverpool (Speke). It is this ability to perform continuous service that offsets the high initial cost of these somewhat complex locomotives. A further ten of them are under construction and it is intended to put into service 100 of them during the next six years.

The illustrations on this page show an artist's impressions of what the two new L.M.S. diesel designs will look like when complete. In the upper illustration is a 3,200 h.p. locomotive composed of two 1,600 h.p. units coupled together. This will be capable of taking the heaviest trains between London and Glasgow or, alternatively, light high-speed expresses comparable to the pre-war "Coronation Scot." Each of

the twin units will be provided with 16-cylinder diesel engines and electrical equipment. The diesel engine is to be provided by outside contractors but it will be based on the successful type of engine used in the L.M.S. diesel shunters. The mechanical parts of both units are being built by the L.M.S. at Derby. The weight of the complete twin locomotive will be some 220 tons and it will be capable of speeds of 100 m.p.h. A flexible gangway is being provided between the two units so that a whole locomotive can be traversed for inspection during the run. It is intended to put the first locomotive into service between Euston and Glasgow in competition with modern 4-6-2s.

The use for separate work of each of the two units composing the express locomotive will be the subject of further experiments. Each 1,600 h.p. unit is to be tried in suburban and semi-fast passenger train service and in hauling medium-weight freight trains, duties on which the large 2-6-4 steam tanks are employed at present. Typical duties will include outer-suburban work between London and Bletchley on the Western Division and London and Luton on the Midland Division. Mixed traffic operations in the Stoke, Nottingham, Derby and Leicester areas also will be the subject of tests.

The lower illustration shows the type of 800 h.p. diesel-electric locomotive that will be capable of secondary passenger and freight services and shunting. Actually it will be used on duties comparable to those undertaken at present by the small 2-6-2 tanks. In view of its probable use on shunting duties in addition to ordinary train running, the engine will be of the single-cab type, giving the driver a clear view fore and aft.



The single-unit 800 h.p. diesel-electric locomotive. This will be tested on branch line and cross-country work, both passenger and freight.

Engineering Notes

A Fine New Machine Tool

The machine shown in the illustrations on this page drills and reams 10 holes at once in a special component, and it may be adapted for other forms of work if required. The rotating table carrying the work is brought automatically into the correct positions first for the drilling, then for the reaming, and finally for the removal of the finished part and the insertion of another blank, so that a series of components are undergoing drilling and reaming continuously.

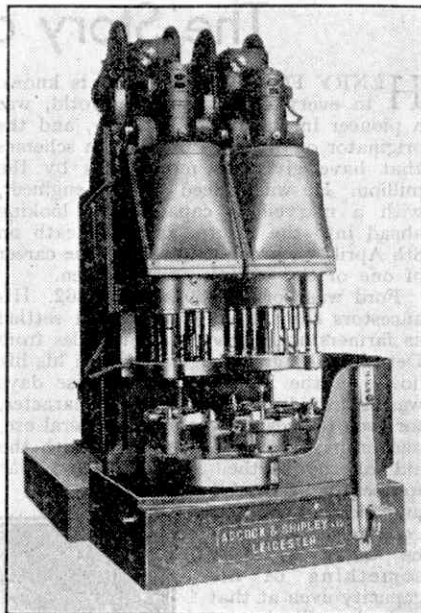
The operator starts the action by means of a foot pedal, which unlocks the table and positions it, after which the feed to the drilling and reaming heads commences. These bring the drills and reamers rapidly down to the work. Then a separate adjustable cutting feed speed comes into operation, and finally the heads return rapidly to the rest position. At the end of the return movement a switch cuts off the power to the head feed mechanism until the foot pedal is again depressed. Power for all these operations is provided by separate electric motors.

Water Power Development in Canada

The Shipshaw No. 2 hydro-electric power station on the Saguenay River in northern Quebec has now been completed, and its construction brings to an end one of the heaviest rock excavation jobs carried out in recent years. The Saguenay River had to be diverted through a canal 7,500 ft. long to a head-block situated on a ridge of rock. Six shafts were sunk in this rock and connected with six horizontal tunnels that were driven from the foot of the ridge to carry the water to the turbines in the power house. The power house contains 12 generating plants with a combined capacity of 1,200,000 h.p.

Tree Felling by Electricity

An American electrical engineer has worked out a novel scheme for trimming and cutting down the trees at his home in the State of New York. When he wishes to fell a tree he wraps a loop of nichrome wire around it. The metal of which this wire is made



The drilling and reaming machine described on this page. This illustration and the one below are reproduced by courtesy of Adcock and Shipley Ltd., Leicester.

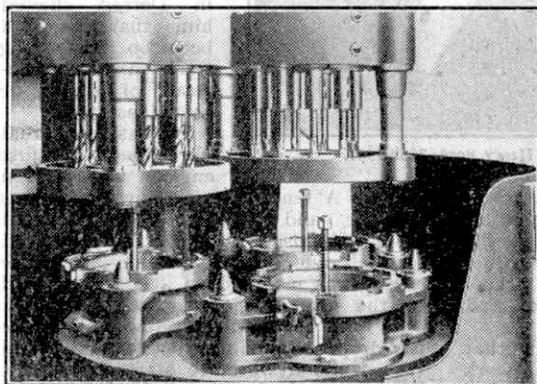
contains nickel, and has the remarkable property of keeping its strength when it is red hot. The loop is heated by passing through it a current of low voltage and high amperage, and it then quickly burns its way through the trunk. Woodland can be cleared by dragging the loop through it.

This ingenious electrical engineer runs his wire along the base of his garage doors in winter. When the doors stick with frost all he has to do is to turn on the current and the ice soon thaws.

Gigantic Power Prospects in China

The first record of the use of water power is found in ancient Chinese literature. This is a description of a waterwheel for irrigating rice fields, and horizontal waterwheels made of wood have been used for centuries in China for grinding corn and making incense powder from wood. Now it is realised that the great rivers of China provide possible sources of electric power on a gigantic scale, and in times to come many millions of horse power may be generated there and put to use in driving machinery of all kinds.

In the course of the Yangtze below Chungking, the capital of China during the war years, there are gorges where it would be possible to build a hydro-electric plant to produce 10,500,000 kW. Plans have already been drawn up for the erection of a giant dam, the greatest in the world, at this point. The great river also falls rapidly above the city, which is 1,350 miles from its mouth. In these upper reaches there are splendid possibilities of power production. The Yellow River also could be made highly productive.



A close-up view of the drilling and reaming heads and the indexing table of the machine shown above.

The Story of Henry Ford

HENRY FORD, whose name is known in every country in the world, was a pioneer in the motor industry, and the originator of the mass production schemes that have given us motor cars by the million. He was indeed a great engineer, with a marvellous capacity for looking ahead into the future, and his death on 8th April last brought to an end the career of one of the world's greatest men.

Ford was born on 30th July 1862. His ancestors came from Ireland, and settled as farmers at Dearborn, a few miles from Detroit. The great engineer began his life down on the farm, which in those days was far from being mechanical in character, for even the reaper was not in general use, and crops were still gathered in with the aid of the scythe. At school he was

frequently in trouble and received many a good spanking, but he began to show something of his capacity even at that early age. Clocks and watches gave him the opportunity of showing his bent for mechanical matters. He repaired these for neighbours for the sheer interest of the task, in spite of his father's angry injunction that he should not do anything for which he did not get paid.

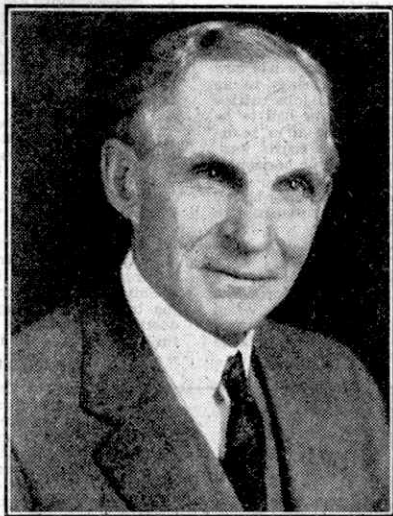
Apart from this he played games just as other boys did, and indulged in many pranks. Once he rigged up a drive for a coffee mill from a waterwheel sunk in a ditch, which he dammed to create the necessary flow, but he forgot to demolish the dam on leaving, and the entire area became flooded. On another occasion he blew up part of his school while experimenting with a boiler and turbine.

Ford soon came to the conclusion that there was too much hard manual work on the farm, and his interest in mechanical things took him to Detroit, to his father's

surprise and annoyance. He lost his first job after only six days because the older hands were angered by the speed with which he worked. Then he became an apprentice at a foundry and machine shop, where his wages were so small that he had to supplement them by repairing watches at night, and later he went to work for the Dry Dock Engine Co., with the idea of learning as much as he could about engines. Even then he was thinking on mass production lines, for he worked out a plan to make watches in large numbers at a very small cost each. He abandoned the scheme, becoming convinced that it would be impossible to sell as many watches as 2,000 a day, the figure that he had in mind for production.

Then came a further period of work on the farm, where his help was needed, particularly in the operation of threshing engines. During this period he married. Fortunately Mrs. Ford was deeply interested in his experiments, for he devoted all his spare time and money to them for years. He built a farm locomotive and steam road carriage. Then a gas engine that he saw in Detroit showed him that he had been on the wrong track, and that instead of steam he should use petrol.

It was now that Ford made his first engine to run on petrol. A length of gas pipe served as cylinder, and the house electric light system furnished the necessary current for his crude ignition system. The whole engine was mounted on a board clamped to the kitchen sink for its first trial. Mrs. Ford adjusted the screw that let the fuel drop into the intake while her husband turned the flywheel to start the engine. The contraption ran, with flames shooting out of the exhaust and the sink shaking



Henry Ford, 1862-1947.

with the vibration.

It is characteristic of Ford that he was satisfied to know that the engine would run. He did not waste time playing with it, but started work straightaway on a two-cylinder engine intended to propel a bicycle. At that time only two Americans had actually run vehicles driven by internal combustion engines, and very little of what was done was known to Ford, so that his work was almost entirely experimental. In a shed he built up his new engine, making parts himself on his lathe, often from scrap metal, while the crankshaft was forged for him. He gave his vehicle four bicycle wheels, and for a seat he made use at first of a bicycle saddle.

Later he substituted a seat for two taken from a buggy.

This first Ford car was too large to pass through the door of the shed in which it was built, and Ford in his eagerness to see if it would run just knocked out bricks from the back wall until he could get his creation out. In pouring rain he started the engine, climbed on the seat and pulled back the lever that gave him the lower of the two speeds available, and off went the car.

Ford sold his first car for \$200 and then set about designing and building another. He now had clear ideas of what he wanted. His aim was a light and economical machine, with simple controls. A group of business men backed him in his schemes, but production was delayed while he improved the "mixer," or carburetter, to use the modern word. Ford refused to be hurried into making something that would not work, and in the end he parted company with backers.

Now Ford himself appeared in an entirely new role, that of motor car racing driver. He built a new car for the sole purpose of entering it in a 10-mile race that Alexander Winton, then America's best known and most successful driver,

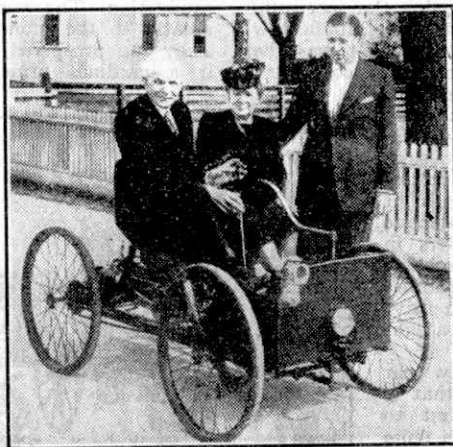
was expected to win. When the time came for the race Winton and Ford were the only entrants. At the end of seven miles the former led by half a mile, and it was clear that Ford was an amateur at the racing game, for he could not take the curves and corners in the same way as

the more experienced Winton. But overheating slowed the larger Winton racing machine, and Ford then took the lead and finally won easily.

Now that he was the racing track champion of the United States Ford had no difficulty in finding new backers, but again disputes arose. Ford clung to his idea that a low-priced car was what was wanted, while his backers aimed at large and expensive productions, and

this effort also came to an end before production began. Another racing interlude followed, but this time the driver of the racing car that Ford built, a giant that developed 80 h.p., was Barney Oldfield, a famous bicycle racer from Salt Lake City. Six cars were entered in this race, and Oldfield took the lead at the start and won by half a mile. Later Ford himself drove his car over a measured mile on the ice of Lake St. Clair in 36 sec., repeating the run a few days later in 39 $\frac{3}{8}$ sec., which was accepted as a world record.

In the meantime Ford had again found support for his schemes. This time no difficulties arose. Those who put up the money required to form the new Ford Motor Company had complete faith in the inventor and designer, and it was not long before the first Ford factory was in operation, a barn-like affair only 250 ft. long and 50 ft. wide. The first model produced created a new style in the motor industry, which by this time was getting well under way. It had an 8 h.p. engine with two cylinders, horizontally opposed to each other, and tiller steering. Simplicity was the key note throughout, in accordance with Ford's expressed ideas.



Henry Ford with Mrs. Ford in the first Ford car. Alongside is his grandson, Henry Ford II.

Ford went steadily ahead with his schemes, and before long began the design of the dream car that he had always had in mind, a light four-cylinder touring car of not less than 20 h.p., capable of transporting five passengers. Some of his colleagues disagreed strongly with his scheme, and even left him when he persisted in abandoning the successful model already in production. But the new car was an instant success. It was the famous Model T, a car that conquered the world by its simplicity and its ability to stand up to hard wear. It was in every way an original design, Ford's own dream of motorizing for the million. In it he introduced the practice of casting the cylinders in one block, with a detachable cylinder head, and another innovation was the extensive use of vanadium steel, a light but strong alloy.

Orders for the new car rolled in so rapidly that it was impossible at first to keep up with them, in spite of the move to a new and much larger factory at Highland Park. The "flivver" established its reputation in its very earliest days by winning a race across the North American Continent from New York City to Seattle. One of the two Fords entered indeed was the only competing vehicle to complete the course, crossing the Rockies and the Cascades, in spite of snow drifts and other obstacles. Ford decided to concentrate entirely on this model, and in spite of ridicule and prophecies of disaster he did so, with the result that in 19 years no fewer than 15,000,000 descendants of the original car left the assembly lines of the Ford factory. To design a car that could be produced over such a long period, and in such enormous numbers, was a stupendous feat.

The success of the venture must be attributed to Ford alone. It was he who produced the original ideas, and he planned production and kept ahead of all competitors throughout the years. One of the greatest of his achievements was the introduction of the assembly line. He made car construction simple by careful division of labour, lightening the task of each individual and arranging matters so that each component, and finally the car itself, gradually took shape

step by step as it passed along a conveyor belt of some kind. Every man on an assembly line had a limited range of tasks to perform, and his work was repeated time after time.

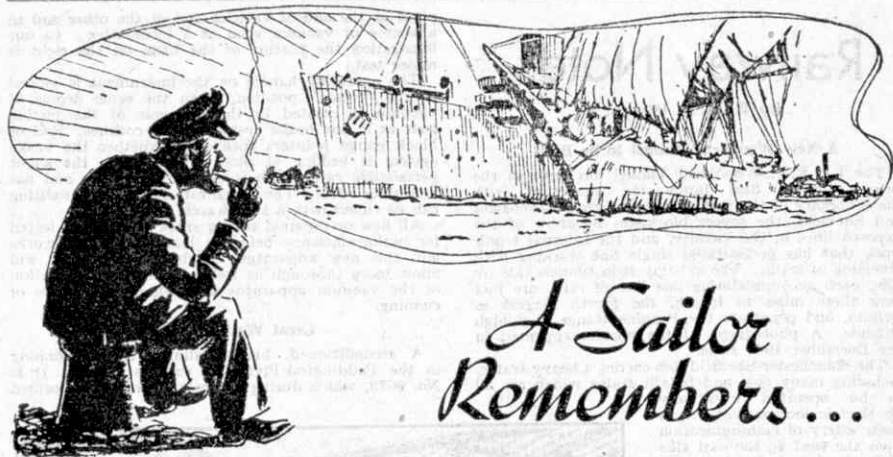
Line assembly proved vastly cheaper than the methods previously used, and lent itself to astonishing increases in production. The workmen did not object greatly to the monotony of their tasks. They too prospered, for Mr. Ford made it a cardinal principal to keep hours



A Ford car of 1903, with the inventor at the wheel. The illustrations to this article are reproduced by courtesy of the Ford Motor Co. Ltd.

down and wages up. He led the way in this when he instituted a minimum of \$5 a day, practically double the old rate. Later he decided on an eight hour day. It seemed clear to the American business world that the reduction of hours would lead to bankruptcy, but all forebodings proved wide of the mark. Production at Highland Park surged to more than 1,000 cars a day, following on the announcement of the new scheme, and five months later the number had become 1,100.

When the 15,000,000th Model T rolled off the assembly line it had just been decided to stop its production. It had been brought up to date continuously by successive improvements and additions, but now the time had come to replace it by a new design. This was Model A, which had sliding gears instead of the planetary device characteristic of Model T, and otherwise was completely modern in general style. The change from Model T to the new model was estimated to cost \$100,000,000 and occupied six months. Model A was followed later by the production of the V-8 (Continued on page 262)



A Sailor Remembers ...

Trouble with Sea Lions

By Capt. H. H. Neligan

MOST boys have read stories of the South Seas, with their bright sunshine, palm trees, fruit and flowers, and wished they could have been there on one of the white-sanded coral beaches, and bathed in the crystal blue water.

But there are other islands in the South Pacific Ocean which are anything but delightful. Not far south from the Equator, and off the coast of Peru and Chile, are many islands of the opposite type— islands on which not a drop of rain falls. As the wind from the S.E. comes over the Andes it is robbed of all its moisture, and within a hundred miles of the coast no rain has ever been known to fall.

The rocky islands have been the home of millions of sea birds, and this fact, together with the absence of rain, has caused the islands to be a depository for all the refuse left by the sea birds. This has been blown into the valleys by the wind, and in the course of centuries has grown into a huge mass known as guano. Early last century it was discovered that this was an excellent fertilizer, and ships went there to load it and bring it home.

When I was a boy I went there and laid at anchor for 16 weeks loading out of small lighters. Sunday was our only day for any recreation, and we would take the small ship's boat and sail down to a little bay to have a bit of a picnic. We would bring food and wood and light a fire and make tea, and of course have plenty of bathing in the warm crystal-

clear water on the white coral beach. Then a long pull back to the ship before sunset.

Another way to our small bathing pool was to sail round the outside line of rocks, and then down all along the island. On the outer rock of all the great sea lions would be basking in the sun and making a great noise as we sailed past. One Sunday we took some small stones with us, and as our boat sailed past the rock, with five big sea lions basking in the sun—they were as big as bulls—boylike, and up to mischief, we pelted them with the stones. The creatures immediately dropped into the water, and as we turned our boat to run before the wind, they appeared at the stern, making a terrible noise and evidently trying to get at the boat.

It was the rudder we were frightened of, for if they had damaged that we should have been caught. Every time a head appeared with its great tusks we jabbed at it with an oar. But they still came on after the little boat, which managed to keep ahead of them, but fighting them away all the time.

We had nearly a mile to go before we could reach shallow water, enough to float the boat but too little for the sea lions to swim in. At last we reached it and sailed through a small break in the rocks, clear of everything. What a relief it was to us boys after our half hour's run to safety. We always left the sea lions alone after that.

Railway Notes

By R. A. H. Weight

A New Woodhead Tunnel to be Built

The L.N.E.R. Woodhead Tunnel has been in the news a good deal lately in connection with the centenary of the first railway between Manchester and Sheffield, the severe blockages by snow of the exposed lines in the vicinity, and the internal repair work that has necessitated single line working with diversion of traffic. The existing twin tunnels side by side, each accommodating one line of rails, are just over three miles in length, the fourth longest in Britain, and penetrate the Pennine Range at a high altitude. A photograph of the portals appeared in our December 1946 issue.

The Manchester-Sheffield line carries a heavy traffic, including many coal and freight trains which are all to be operated eventually by electric locomotives. As a main artery of communication from the west to the east side of England and elsewhere, the tracks were kept busy night and day during the recent war, so that there was little opportunity of carrying out the urgent repair work that has since been put in hand.

The company announce that although these emergency measures of restoration to the structure will be satisfactory for the time being, experts have advised that a great deal of work would still have to be done to put the tunnels into perfect condition. This would be very costly, as well as necessitating the complete closing of each tunnel for long periods. In the circumstances the somewhat momentous decision has been made that the only satisfactory course is to drive an entirely new double-line tunnel, parallel with the existing tunnels. All traffic for many years to come can then be accommodated. Though modern machinery will enable excavation of the peaty moorland earth, as well as the drilling through the rock beneath, to be carried out much more expeditiously than 100 years ago, the undertaking will be the largest of its kind that has been tackled in this country for a good many years, apart from London "tube" railway extensions.

Detecting and Measuring Brake Leakages

Most passenger trains as well as certain express freight ones in Britain are controlled by the automatic vacuum brake system. A "vacuum" in the train pipes is maintained by a steam ejector on the locomotive; the destruction of this vacuum by the admission of air at atmospheric pressure, causes the brake blocks on the wheels of the engine and carriage or van to be applied to a full or partial extent, under the control of the driver.

Readers may have observed occasions when there has been some delay on account of "brakes leaking on," that is when a certain amount of air is leaking through and preventing free running of the wheels. To avoid the likelihood of such troubles, and to facilitate testing of rolling stock in sidings or waiting at a station for air leakage in the brake gear, L.M.S. research engineers have invented the simple, portable instrument shown on the opposite page. This can be manipulated by one man. It is attached to the brake

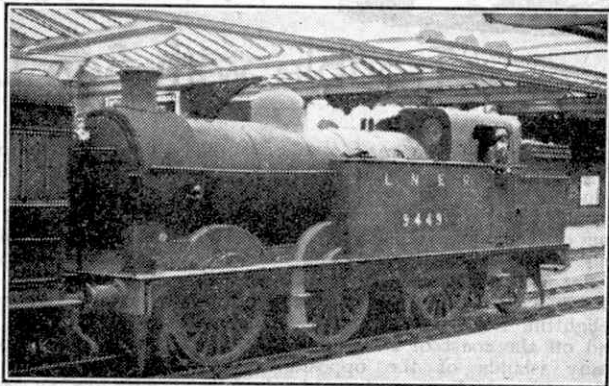
pipes at the end of vehicles and at the other end to a source of vacuum such as a locomotive. In our illustration the portion of the train on the right is under test.

The operating handle on the instrument is moved to the "create" position, when the same degree of vacuum is created in the reservoir of the testing gear as in the brake system of the coaches. Red or black gauge pointers then show whether the brake system is leaking at more or less than the slight permissible rate which is often unavoidable and has no serious effect. The actual rate of leakage if existing can be timed with a stop watch.

All new or repaired rolling stock is carefully tested for brake efficiency before it leaves the main works and this new apparatus, weighing only 16 lb. will allow more thorough as well as quicker examination of the vacuum apparatus between normal spells of running.

Great Western Tidings

A reconditioned, historic dining car is running in the Paddington-Plymouth express service. It is No. 9673, which during the recent world war formed



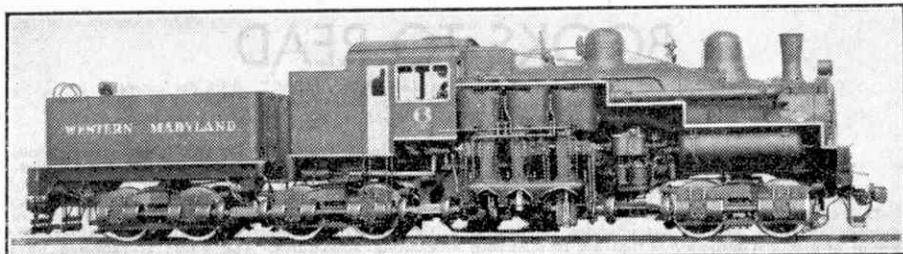
L.N.E.R. "N1" 0-6-2T, renumbered 9449, at Keighley. Our photograph, taken by H. C. Casserley, shows the engine without condensing apparatus.

part of the special train signalled by the secret code word "Alive," which was used by Mr. Winston Churchill, Members of the British Cabinet and American and British Service Chiefs in Great Britain, France, Holland and Germany.

We are informed by the G.W.R. that a quarter of a million letters and parcels are collected, sorted and transmitted by rail, sea, and to a certain extent by dispatch riders, free of charge! This is the extent of the domestic mail passing between Head Offices, District Headquarters, stations, depots and yards. To ensure smooth working of the Company's mail service, the whole system is divided into 37 areas, each of which has a separate number, much as districts of London and other large cities have postal numbers to facilitate sorting. On the railway these numbers indicate a strategically situated town or junction that is the centre for a large surrounding district, and at which the letters or packets are finally sorted or bundled for their final destinations. As on all our railways, the passenger train guards are mainly the initial letter sorters; during a journey they sort and distribute the bundles of staff correspondence they receive for conveyance, into small racks in their vans, ready for delivery at stopping places.

Salisbury Observations

From Mr. G. O. P. Pearce comes an interesting list of locomotive variety recorded at the important junction station of Salisbury in April. Seven "Merchant



An unusual American mineral locomotive, with external vertical cylinders. A description of the engine appears on this page. Photograph by courtesy of Lima Locomotive Works Inc., Lima, Ohio.

Navy" and seven "West Country" 4-6-2s were seen with only one "Lord Nelson," seven "King Arthurs," one "Schools," from Brighton, eight mixed traffic 4-6-0s, twelve L. & S.W. 4-4-0s, three "U" 2-6-0s, only one 0-6-0 of early vintage, and several "M7" and "T1" 0-4-4T. On the Great Western side were seen a famous "Castle," No. 5000 "Launceston Castle," four "Hall" type 4-6-0s and a "Grange" 4-6-0, as well as representatives of the 2-8-0, 2-6-0, and the ubiquitous 0-6-0 pannier tank classes. This indicates that engines larger and of different types from those usually observable up to a few years ago are now traversing the Westbury-Salisbury cross-country line of the G.W.R.

An Unusual American Mineral Locomotive

In the vast continent of North America one may find examples of almost every known locomotive type or method of propulsion, at any rate of the larger or more modern styles. Many indeed are very large! There are also examples of unusual design, such as the unconventional coal hauling engine illustrated on this page. This was built by the Lima Locomotive Works, Ohio, U.S.A., for the Western Maryland Railway. It operates on a standard gauge section near the Potomac River, where steep gradients and sharp curves abound. The wheels are of 4 ft. diam., and they are all driven by the pistons of three vertical cylinders mounted on the right hand side of the locomotive, as seen in the photograph, together with the drive shaft. This transmits its power to the

three four-wheel trucks under engine and tender. The cylinders are of 17 in. diam., with 18 in. stroke; the total wheelbase is 48 ft. The maximum hauling capacity on the steepest gradient is 254 tons. Boiler pressure is 200 lb. per sq. in. and there is a large grate area of 48½ sq. ft. and the total heating surface, including superheater, which is of liberal area for a slow engine of this type, is 2,278 sq. ft.

The left hand side of the locomotive presents quite a different appearance, being clean-cut and boxed-in. Mr. Wilfred Ashworth, B.Sc., sends these notes and the photograph, which we are glad to reproduce.

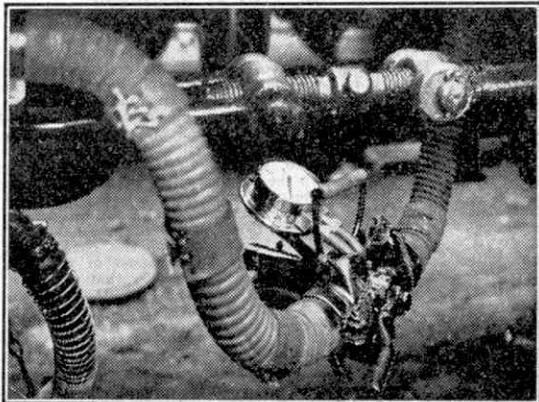
L.N.E.R. Locomotive News and Notes

The first of the "N1" class of 0-6-2T has been withdrawn for scrapping. It is No. 9438, previously No. 4558, of the non-condensing series in use in the West Riding area of Yorkshire and was previously stationed for many years at Hornsey, London. Like others of the class it was frequently seen working freight trains on to the Southern system. All those operating in London are fitted with condensing apparatus, but this is not needed in the West Riding of Yorkshire, where the photograph of a sister locomotive was taken.

The "N1s" were the first six-coupled passenger tanks on the former Great Northern Railway. They were introduced in 1906 and multiplied to the extent of 56 engines by 1912. They have done excellent work and are still performing useful service, a number having been superheated.

Among the new "B1" 4-6-0s built recently at Darlington are No. 1017, "Bushbuck"; No. 1018, "Gnu"; No. 1019, "Nilghai"; and No. 1020, "Gemsbok," continuing the "Antelope" series. More without names numbered 11xx are under construction at the works of the Vulcan Foundry Ltd., and also of the North British Locomotive Co. Ltd. No. 68, "Sir Visto," 4-6-2, although painted green and recently overhauled at Doncaster, is still "A10" with 180 lb. per sq. in. boiler pressure and 20 in. cylinders.

On account of numerous speed restrictions at places where drainage and relaying of the track is in hand, following severe weather and floods, time recovery on the G.N. section is difficult, though the drivers try when circumstances permit. Green "A3" No. 39, "Sandwich," working the first part of the up Sunday Scotsman with about 410 tons from Grantham to King's Cross, suffered over 20 min. delays, including a signal stop, but only dropped 7 min. on schedule overall. The similar No. 107, "Royal Lancer," on a faster booking also with a 12-car train, on the shorter run from Peterborough to London, had to make six severe slowings as well as run at caution for a good many miles, yet was only 9 min. late.



Instrument for detecting and measuring leakage in the automatic vacuum brake system of railway vehicles. The form illustrated is the lighter one for routine inspections. The part of the train being tested is that on the right. Photograph by courtesy of the L.M.S.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, and certain others that will be indicated, these should be ordered through a bookseller.

"SOME OUTS OF SCOUTING"

By "LONE WOLF"

(Brown, Son and Fergusson 3/6 net)

The object of "Lone Wolf" is to interest Scouts in outdoor activities, and he has provided them with a store of practical outdoor lore that will be read with eagerness not only by Scouts, but also by all who have any interest in country life.

We begin with the weather. The Scout should be able to forecast this in his vicinity with some accuracy, and therefore should know something of the atmosphere, cloud formations and the appearance of the sky, wind and rainfall, and be able to record day-to-day details. These points are well explained and the section ends with weather rhymes and the behaviour of birds, animals and insects, as far as this helps to give indications of changes in weather.

Next we turn to forestry, with descriptions of trees, how to fell them and how to use them as fuel. Here again the story is very well told, and the reader who has mastered what the author has to tell him has gone a very long way towards getting to know trees. Finally we come to signs and tracks. Besides giving information on the tracks of animals and those of men, the author deals with such topics as trail signs, smoke and flare signals, the Indian sign language and picture writing.

The story is told concisely and effectively, with excellent drawings and charts.

"THE FORDELL RAILWAY"

By J. C. INGLIS and F. F. INGLIS

"The *Forde* Railway" is a story of the last Scottish wagonway, the only one to boast an unbroken existence of nearly 180 years. It followed traditional stages of development, for it was laid down in the first instance as a wooden-railed wagonway about 1770 for the transport of coal by horse haulage from the pits to the sea coast. Then it was converted to an iron railway on which horses were still used. Finally there arrived steam locomotives on steel rails. The gauge always remained odd—4 ft. 4 in. against the standard 4 ft. 8½ in.

With the author we can trace in detail the development of this unique wagonway through each of these phases. Every detail is accurately worked out, and there is a wealth of information on methods of working at all times as well as on changes on the line itself and its extensions. The little railway played its part in stimulating coastal and foreign trade in coal. In more recent times this has declined, however. The little St. David's harbour on the coast of the Firth of Forth and the southern part of the railway then became unnecessary, and so in August 1946 the last load went down the line to the coast. The redundant part of the system was dismantled, but the northern section and the exchange sidings are still in operation.

The story is well illustrated by photographs, with reproductions of old drawings and plans, and a folding map is included. Any reader who is interested in railway history, and particularly in the details of industrial lines such as this, should certainly get a copy of the booklet, which can be obtained from Dr. Inglis, The Colony, Larbert, Stirlingshire, price 4/6 post free.

"PIRATES OF THE LAGOON"

By WING-COMMANDER S. C. GEORGE
(Warne. 6/- net)

In this colourful and exciting yarn we travel eastward, in the early years of last century, in the "Warren Hastings," a 1,200 ton ship of the British

East India Company. With her should have sailed Dick Jameson, the hero of our story, but at Portsmouth he falls into the hands of the press gang, and instead sails in H.M.S. "Gloucester." By a strange fate, however, he eventually finds himself back on the "Warren Hastings," in time for a series of exciting adventures. The vessel is captured by a French pirate, but our hero is among those who escape. Then comes a perilous career of adventure in which Malays, Dyaks and Chinese pirates and traders pass by in almost bewildering variety. Dick is able to give valuable assistance to Stamford Raffles, a senior officer of the company, and the story ends with the founding of Singapore, the great monument to the wisdom and foresight of that statesman. A coloured frontispiece depicts an exciting moment in the sea fight that begins Dick's adventures.

"NAMEPLATES OF THE L.M.S. LOCOMOTIVES"

Compiled by FRANK H. A. BURRIDGE
(Sydenham & Co., Bournemouth. 2/-)

This is a companion volume to that on S.R. nameplates reviewed in the "M.M." for August 1946. Although the nameplates carried by L.M.S. locomotives belong broadly to three different types there is plenty of variety, and there are several instances of unusual plates on particular locomotives, especially on those bearing regimental and similar titles, examples of which are illustrated. Each class of named engines is listed in turn, and typical examples of each class are shown. Interesting notes too are given on the disappearing name styles of former Highland and L.N.W.R. engines.

The illustrations include both modern engines and "old timers" such as the Highland "Ben" and L.N.W.R. "George the Fifth," "Precursor" and "Prince of Wales" classes. Two pages are devoted to the well-known "Coronation" of the L.N.W.R., always distinguished by its special nameplate.

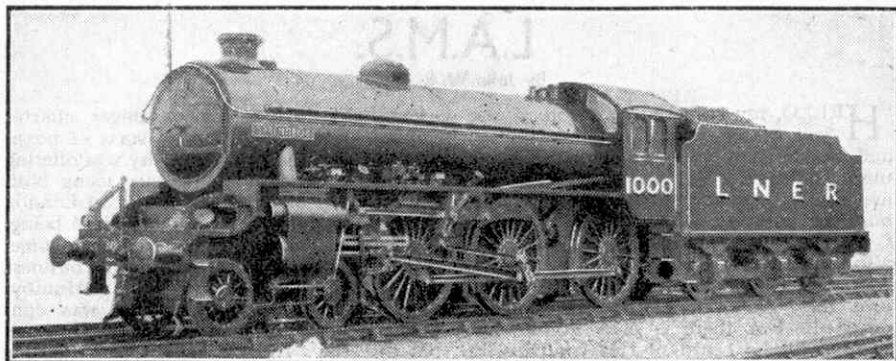
Copies of the booklet are obtainable from the publishers at Oxford Road, Bournemouth, 2/2½ post free.

"THE STORY OF AUSTRALIA"

By MARGARET N. PEARSON
(Harrop. 6/- net)

This is a delightful book for our younger readers. It tells the story of Australia as children like to hear it, in large type, easy to read and with many illustrations in colour. The illustrations also are by the author. They are often amusing and all of them are brilliantly adapted to the story, to emphasize and make clear in a most interesting manner the details referred to.

We start with the discovery of the land, and learn something of the great explorers, including Dampier, the pirate turned explorer whose adventures helped to inspire "Robinson Crusoe" and "Gulliver's Travels," Flinders and Cook, who claimed the country for Britain. Then we follow the fortunes of the little colony, peopled mostly by convicts, that settled in New South Wales, and see how in spite of troubles the tiny band of settlers grew and spread over the country, to discover such wonders as its great gums and its marvellous animals. We read how the great sheep industry began with the flock imported by McArthur, take part in the exciting days of the gold rush and accompany the great explorers who crossed the island continent in spite of incredible hardships. How the separate settlements at length joined up to form the great Dominion is simply explained. Finally we learn something of the men who have made the name of Australia famous by their inventions and achievements.



L.N.E.R. Class B1 4-6-0 No. 1000, an illustration from "Locomotives of the L.N.E.R." reviewed on this page.

"LOCOMOTIVES OF THE L.N.E.R."

By O. S. Nock B.Sc. (L.N.E.R. 2/6)

Mr. Nock is no stranger to "M.M." readers, and his extensive experience with L.N.E.R. engines well qualifies him to deal with the subject of this interesting and comprehensive booklet.

As an introduction, the L.N.E.R. system of engine classification is briefly explained and the general locomotive policy followed under the Gresley regime from the time of grouping in 1923 up to the war is considered. Wartime and subsequent difficulties necessarily brought about changes in plan and in locomotive working, and the newer developments are then dealt with in some detail. These are the days of the general-utility locomotive, and for such types that are to be provided in large numbers two-cylinder drive has been standardised. Under the company's "Five Year Plan" good use also is being made of certain existing classes by reboiling, reconstructing and general lining up with modern requirements. Excellent illustrations of the nine classes forming standards for the future are given, together with useful diagrams and details of the leading dimensions, and non-standard types that are to be maintained also are illustrated.

A table of L.N.E.R. locomotive classes correct to the end of October 1946, a summary of the locomotive re-numbering scheme, and a list of named engines form useful appendices to the main account. L.N.E.R. locomotive enthusiasts particularly will find much to interest them and the book will appeal generally to the engine lover whose interests go a little deeper than the noting of names, numbers and wheel types.

Copies are obtainable from L.N.E.R. station book-stalls; and on application to the L.N.E.R. Advertising Manager's Offices, at 26, Pancras Road, London W.1, at York and at Waverley Station, Edinburgh, price 2/9½ post free.

"THE BOOK OF BRISTOL AIRCRAFT"

Edited by D. A. RUSSELL, M.I.Mech.E.
(Harborough Publishing Co. Ltd. 18/6 net)

This excellent book is on the same lines as "The Book of Miles Aircraft" and "The Book of Westland Aircraft" reviewed in our September 1945 and November 1944 issues respectively. It relates the story of the famous Bristol Aeroplane Company from its beginning in 1910 to the present day. This fascinating history is lavishly illustrated, and the many fine photographs themselves form an impressive record of the progress and achievements of the company.

The greater part of the book is devoted to a brief history of every type of aircraft produced by the company. As usual in these books each account is supplemented by a short specification, at least two photographs and a page of 3-view scale drawings of the machine concerned. Finally there is a very useful

summary of Bristol aircraft type numbers and of the designs to which they refer.

"THE WATCH REPAIRERS' INSTRUCTOR"

By F. W. BRITTEN (Technical Press Ltd. 7/6 net)

This practical handbook is based on a previous work by P. N. Hasluck that had gone through many editions. It has been entirely re-written and many new illustrations have been added in order to make sure that it is abreast of current practice and as useful as possible to students and watchmakers generally.

The book is well and simply written. It begins with an absorbingly interesting section on early time measurers and the development of modern watches. It then explains how to take a watch mechanism apart, to examine and clean it, and to reassemble it. Details of actual repairs and adjustments follow, with sections dealing with tools and materials, wristlet watches, timekeeping variations, and the use of the watchmaker's lathe.

"TOMAHAWK"

By T. C. HINKLE (Lutterworth Press. 5/- net)

Tomahawk's mother was a wild, fighting horse captured when Tomahawk was only a colt. Later she was allowed to go, but Tomahawk stayed on the Arnold ranch, where he had become friendly with Dan Arnold, with whom he spent many happy days. Then he was stolen by rustlers, but their efforts to master him proved unavailing and finally he escaped from them, to live alone and perilously in the wild west. He and Dan eventually found each other, and Tomahawk was able to save his young master's life when he was attacked by a maddened longhorn.

This story of a horse is full of interest and there is real excitement in many episodes, among them a stampede of thousands of frenzied cattle in the waters of a swollen stream.

"THE A.B.C. OF L.M.S. LOCOMOTIVES"

By IAN ALLAN and A. B. MACLEOD
(Ian Allan Ltd., London. 2/-)

This newest "A.B.C." follows the usual plan of providing in numerical order a complete list in their respective classes of the locomotives of the line concerned, in this case the L.M.S. Separate numbered lists of named engines also are included, and notes are given on the locomotive numbering scheme adopted on the formation of the L.M.S. and subsequent developments, with a list of motive power depots and other useful and interesting details. Numerous illustrations show examples not only of the principal standard classes, but also of older engines of pre-grouping origin.

Copies of the book are obtainable from A.B.C. Locomotive Books, Mail Order Department, 33, Knollys Road, Streatham, London S.W.16. Price 2/2½ post free.

L.A.M.S.

By John W. R. Taylor

"HELLO, my name is Patterson. I saw you taking photos of our 'Halifax' and wondered if you would like to know more about it." We said that we would and that is how this story started. It was our first meeting with Squadron Leader C. E. S. Patterson, D.S.O., D.F.C., and also the first time we had heard of London Aero and Motor Services (L.A.M.S.), who own the "Halifax" we had just photographed. But there is little doubt that plenty will be heard of this company in

few light 'planes for passenger charter flying. This opened up all sorts of possibilities, and soon the company was offering a unique door-to-door service using both the aircraft and the cars. And so London Aero and Motor Services came into being, with its headquarters at Elstree Aerodrome.

While this new branch of the business was being developed, Dr. Graham Humby, the firm's managing director, was conceiving an even more ambitious scheme. With the three Government airline

Corporations already operating regular and comprehensive passenger services to all parts of the world, there seemed little future in large-scale expansion of passenger charter flying. On the other hand nobody had ever tried private freight carrying in bulk by air, and this appeared to offer great possibilities, especially in the case of perishable goods such as soft fruit. So, disregarding the sceptics who prophesied that air freight carriage would never pay, Dr. Humby



Refuelling and loading "Halifax" G-AHZL at Heath Row.

the years ahead.

At first we had regarded the "Halifax" rather wistfully; not because it was parked unobtrusively in a corner of the concrete parking apron at Heath Row as if ashamed to class itself with the glittering "Constellations" and "Yorks," but because it was carrying a huge cargo of British woollen goods to Denmark. We thought of our empty clothing coupon books But we were soon assured that LAMS are by no means engaged only on export work. In fact it is quite likely that some of the fruit that decorated your sideboard last Christmas was flown from Italy or Spain in one of their "Halifaxes."

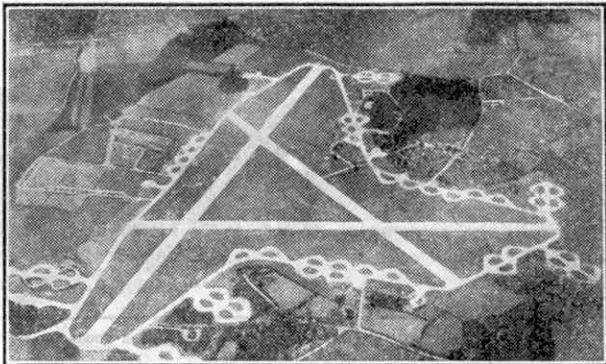
The company was formed originally in 1937 as the Grosvenor Square Garages Limited, operating a fleet of hire-cars. The venture proved so successful that, when the ban on private flying was lifted last year, they decided to apply the same sort of idea to air travel and bought a

decided to take a chance and began to look for suitable aircraft. Fortunately there were available at that time a large number of "Halifax" VIIIs which had been built for the Royal Air Force but, with the end of the war, had become surplus to requirements. They were in brand-new condition, and with their ability to carry seven tons of payload for 900 miles were ideally suited for the job.

That was only a start, for Dr. Humby believes that passengers and freight cannot both be handled efficiently at the same aerodrome. This is logical, for railway goods wagons are not unloaded at Waterloo Station, and he did not want his "Halifaxes" to be kept waiting around to make way for passenger air liners, as goods trains have to give priority to passenger expresses in normal times. What he had in mind was an airport for the exclusive use of freight-carrying aircraft.

Elstree was obviously too small, but about four miles east of Bishops Stortford, in Essex, there was the fine large airfield of Stansted, which was built during the war for the USAAF. Since the departure of the American bombers it had been idle, but LAMS planned to change all that. With a lot of surplus wartime aerodromes on their hands, the Air Ministry were glad to lease Stansted to the company, as this ensured that it would be kept in first-rate condition ready for any possible future emergency. As a result LAMS began to move in last December. Unfortunately, it has not yet been possible to get a Customs post installed at the airport, and so, at the moment, it is being used by LAMS only as a headquarters and maintenance base, but they plan to transform it as quickly as possible from a derelict airfield to an efficient, busy terminus for British air freight traffic.

Stansted is almost ideally situated, much better in fact than London Airport itself,



Aerial view of Stansted Airport, headquarters of L.A.M.S.

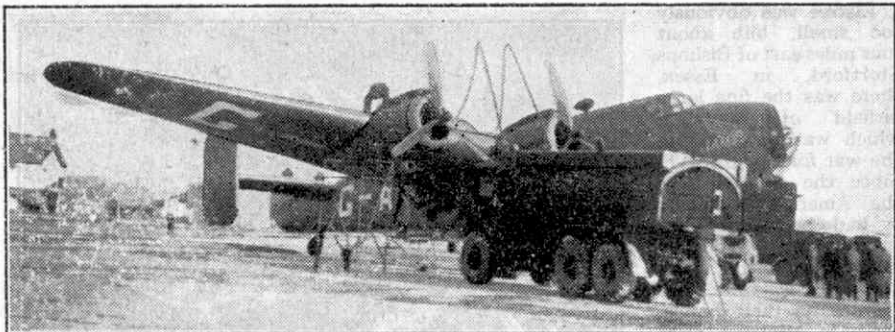
pattern and are big enough to cater for any present-day aircraft, ranging from 2,000 yards to 1,500 yards in length. Comprehensive radio installations are available, including a Standard Beam Approach system, and landings and take-offs will be controlled from a runway control van, known in the R.A.F. as a "circus." When it is in full operation, there is little doubt that a large number of British and foreign companies will join LAMS at Stansted, and even British European Airways are interested in this unique project. At the moment accommodation consists of only the buildings left by the USAAF. But LAMS have plenty of enthusiasm and enterprise, and plan to cut through the maze of official red tape as soon as labour and materials are available, to make the airport a completely self-contained community with its own houses for their staff, a hospital, cinema, clubs and bus service.

Until Stansted is ready, LAMS are operating their freight services from Heath Row and Northolt—hence our meeting with Squadron Leader Patterson, then the company's operations manager, and "Halifax" G-AHZL. The latter is one of the six original machines bought by LAMS and has since been named "Port of Naples." Each "Halifax" is to be named after a famous international port, the selection including London, Marseilles and Oslo; they are all painted royal blue and carry the LAMS winged wheel symbol on each side of their nose.



Squadron Leader C. E. S. Patterson (left) with the crew of G-AHZL.

as it is well clear of the fog belt. It is only some 30 miles from London, but just far enough to ensure that aircraft flying in from Northern Europe, Scandinavia and Ireland do not have to pass over the Capital. The three main runways are laid out to the usual R.A.F. triangular



L.A.M.S. "Halifax" aircraft loading up with woollen goods for Norway, and being refuelled.

Dr. Humby's optimistic view of the prospects of aerial freight-carrying has been more than justified, for since they went into service the "Halifaxes" have flown well over 200,000 miles on charter flights to Europe, North Africa and the Middle East. Of course, things have not always gone smoothly. One aircraft had to be ditched off the Belgian coast last September and was lost, while another had to be "cannibalised" to keep the remainder flying, as spare parts were virtually unobtainable. But the venture has proved so successful that a further 10 "Halifaxes" are being added to the LAMS merchant air fleet. They can be chartered at a rate of 10 shillings per aircraft mile, which is reasonable enough to attract a wide variety of customers. For instance, importers find it very profitable to fly perishable goods such as tangerines and grapes from Spain and Italy, while a British radio manufacturer was able to get some 10 tons of his wireless sets into the Belgian shops in time for Christmas. Other cargoes have included silk stockings for Norway, medical supplies to Bulgaria and mails to Greece. On one occasion a remarkable long-distance charter flight was completed in 18½ hrs. by a "Halifax" flown by Capt. K. Thiele, D.S.O., D.F.C., the company's chief pilot. It took off from Heath Row at 2 a.m. and reached Vienna 5½ hrs. later. The aircraft then flew on to Belgrade, and by 8.30 in the evening it was back again at Heath Row.

Most flights are quite uneventful, but occasionally something of special interest occurs. For example, on 21st November last a LAMS "Halifax" made history when it arrived at Barcelona Airport, for it was the first British civil aircraft to land there since the outbreak of war. To celebrate the occasion it was "intercepted"

on the way in by a Messerschmitt 109G of the Spanish Air Force which escorted it to Barcelona, where the crew were given a civic welcome.

The company's most ambitious flight so far started on 23rd April when the "Halifax" "*Port of Sydney*" left Standed on the first stage of a round-the-world tour. Working on the same lines as a tramp steamer, the aircraft will visit North America, New Zealand, Australia, India, and the Middle East, picking up cargoes on the way. Usually these will be arranged on the spot at each port of call, but in some cases the "Halifax" will be met by a representative of the company. The exact route will be decided by the destinations of the various cargoes picked up, and it is impossible to say how long the trip will take. "*Port of Sydney*" is being flown by Capt. Thiele, who is standing next to Squadron Leader Patterson in the picture on page 247, while Dr. Humby is flying as second pilot.

Most LAMS aircrew personnel saw service during the recent war with the Royal Air Force. A crew of four is usually carried by each aircraft, consisting of a pilot, navigator, radio operator and flight engineer. Squadron Leader Patterson persuaded the crew of G-AHZZL to line up in front of their aircraft for our benefit—hence the photograph on the previous page. They were obviously very keen on their job and considered the camera much more of an ordeal than their forthcoming 650 mile trip to Denmark. At any rate, while England was in the throes of fuel cuts and covered with a blanket of snow a few months ago, LAMS aircrews were cruising through the blue skies of the Mediterranean. There was little doubt who had the best job then!

Photography

Summer Pictures Round and About

MANY amateur photographers are inclined to think that all the most interesting camera subjects are to be found everywhere but in their own localities, and because of this they confine their operations to taking "snaps" of friends, and think of landscapes only when visiting the seaside or country during the annual holidays. Now I think this is all wrong, for it is my experience that every neighbourhood contains interesting and worthwhile subjects for the photographer who has eyes to see them. I suggest therefore, that it is

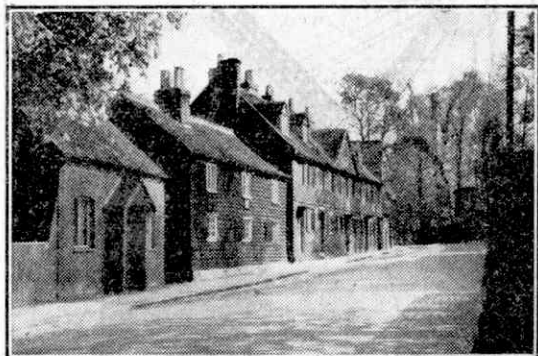


Pine Trees and Cows. F. Barr, Birkenhead.

Other interesting pictures are provided by old gateways. Sometimes these are attractive in themselves, but more often it is the view seen through them that makes them such popular subjects with photographers.

The only point that requires special attention is the lighting of the subject. Usually the best pictures are those taken in bright sunshine, provided that the sun is not shining directly on to the building, but to one side. If figures are included in the picture make sure that these fit in with the rural character of the subject. A farm labourer in his working clothes is a better accessory to a picture of this kind than a city dweller

leaning against a motor-cycle or a party of tourists in a sports car.

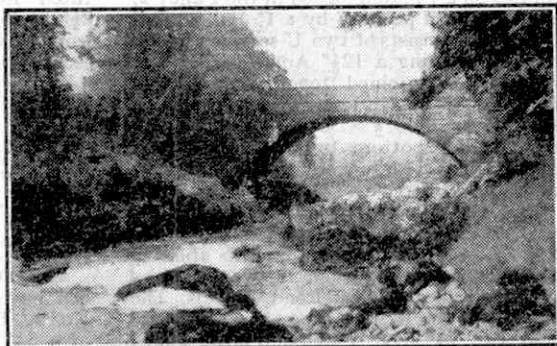


"Fourteen Miles from London." F. G. Reynolds, Sidcup.

a good plan to "prowl around" one's own neighbourhood, either on foot or bicycle. By keeping one's eyes open, and by being prepared for every chance that comes along, every such excursion should produce a crop of interesting and pleasing pictures.

It is not possible to give more than a general indication of the kind of subjects to look for as everything depends on the character of the neighbourhood in which the photographer lives, but in nearly every locality pictures of the type shown on this page can be obtained.

Among the most pleasing subjects for pictures are old buildings such as cottages.



Beaver Bridge, North Wales. R. Atkins, Eccles, Manchester.

New Meccano Models

Fine Subjects for Outfits Nos. 2 and 5

THIS month we describe two models that have been specially designed for construction from specified Outfits. The first is a fine mechanical shovel that can be built from the parts in Outfit No. 5, and the other is a simple dumping truck designed for Outfit No. 2.

In building the Mechanical Shovel, which is shown in Fig. 1, it is best to start with the tractor unit. The sides of this consist of $5\frac{1}{2}'' \times 1\frac{1}{4}''$ Flexible Plates strengthened by the $5\frac{1}{4}''$ Strips 1. They are connected by four $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips, and a $2\frac{1}{2}'' \times 1\frac{1}{4}''$ Flexible Plate is bolted to each end. A 3" Pulley Wheel 2 is secured to the inner pair of Double Angle Strips. The 1" Pulleys forming the travelling wheels are locked on $3\frac{1}{2}''$ Rods, and Driving Bands represent the creeper tracks.

The cab is built up by bolting a $5\frac{1}{2}'' \times 2\frac{1}{4}''$ Flexible Plate and a Flanged Sector Plate to each side of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. The Sector Plates are extended by Flat Trunnions and in these a 4" Rod 3 fitted with a 1" loose Pulley is journaled. The roof consists of two $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates overlapped and fixed to Strips 4 by Obtuse Angle Brackets. The $2\frac{1}{2}''$ Strips 5 are bolted to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate and a $3\frac{1}{4}''$ Rod journaled in their end holes supports the jib. The cab rotates on a $1\frac{1}{2}''$ Rod locked in the Pulley 2, and is held in position by a 1" Pulley.

The jib consists of two U-section girders, each comprising a $12\frac{1}{2}''$ Angle Girder and a $12\frac{1}{2}''$ Strip joined together by Angle Brackets. The Girders are joined at the top by a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip, and at the bottom by a $2\frac{1}{2}''$ Strip. A Semi-Circular Plate bolted to each girder forms the jib head.

The shovel arm is made by connecting two $12\frac{1}{2}''$ Angle Girders together with $2\frac{1}{2}''$ Strips. It pivots on the jib about a $3\frac{1}{2}''$ Rod passed through the centre holes and held in place by Road Wheels. The shovel is built up from two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ and two $2\frac{1}{4}'' \times 1\frac{1}{4}''$ Flexible Plates joined together by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip

and Angle Brackets. The back consists of a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate.

One end of a length of Cord is fastened to the Rod 6 in the jib head. It passes around Rod 3 and around Rod 6, then over Rod 3, and finally is secured to a Cord Anchoring Spring on the Crank Handle. A length of Cord is tied at one end to the Rod 7, taken around the $\frac{1}{2}''$ Pulley on the shovel and over the 1" loose Pulleys on Rods 7 and 3. It is then fastened to a 4" Rod locked in the Bush Wheel. A Threaded Pin is fitted to the

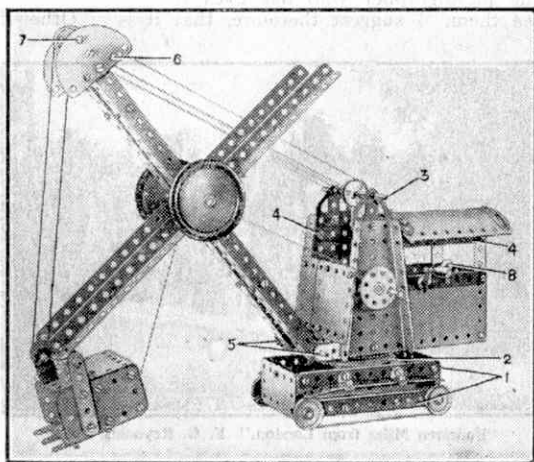


Fig. 1. This fine Mechanical Shovel can be built from Outfit No. 5.

Bush Wheel as a handle. The shovel is tilted for unloading by means of the $2\frac{1}{2}''$ Strip 8. A length of Cord extending from this Strip is passed over the jib and secured to the back of the shovel.

Parts required to build the model Mechanical Shovel: 2 of No. 1; 10 of No. 2; 9 of No. 5; 4 of No. 8; 3 of No. 10; 12 of No. 12; 2 of No. 12c; 4 of No. 16; 2 of No. 17; 2 of No. 15b; 2 of No. 18a; 1 of No. 19g; 1 of No. 19b; 5 of No. 22; 2 of No. 22a; 1 of No. 23; 1 of No. 24; 14 of No. 35; 85 of No. 37; 5 of No. 37a; 1 of No. 44; 1 of No. 48; 8 of No. 48a; 1 of No. 52; 2 of No. 54; 2 of No. 90a; 5 of No. 111c; 1 of No. 115; 2 of No. 126a; 1 of No. 176; 1 of No. 186; 1 of No. 186a; 2 of No. 187; 4 of No. 188; 2 of No. 189; 4 of No. 190; 2 of No. 191; 2 of No. 192; 1 of No. 200; 2 of No. 214; 2 of No. 215.

The Dumping Truck shown in Fig. 2 can be built from the contents of Outfit No. 2. The platform of the truck consists of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate extended by a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate overlapping two

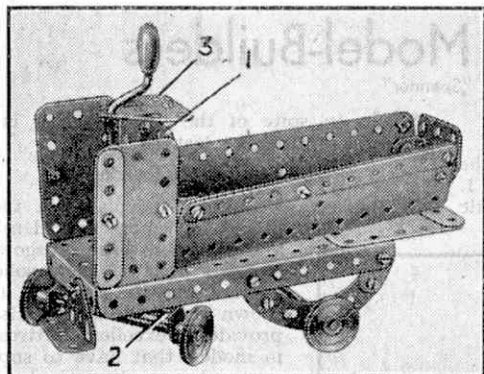


Fig. 2. A simple Dumping Truck. All the parts used in this model are contained in Outfit No. 2.

holes. It is strengthened by a $5\frac{1}{2}$ " Strip along the centre of the platform and by a $2\frac{1}{2}$ " Strip at the rear. A $2\frac{1}{2} \times 2\frac{1}{2}$ " Flexible Plate 1 is secured to a $2\frac{1}{2} \times \frac{1}{2}$ "

Double Angle Strip and bolted to the Flanged Plate.

The sides of the loading hopper are made up from two $5\frac{1}{2} \times 1\frac{1}{2}$ " Flexible Plates bolted to the Flexible Plate 1 by Angle Brackets. The end of the hopper consists of a Flat Trunnion bolted to the sides and platform by three Angle Brackets.

The rear axle bearings are built up as shown in the illustration and bolted to the sides of the Flanged Plate. The front axle consists of a $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip 2 fitted to a Bush Wheel. A Crank Handle passed through a Flat Trunnion 3 and the Flanged Plate is locked in position by a Cord Anchoring Spring and a Spring Clip.

Parts required to build model Dumping Truck: 3 of No. 2; 3 of No. 5; 4 of No. 10; 7 of No. 12; 2 of No. 16; 1 of No. 19g; 4 of No. 22; 1 of No. 24; 1 of No. 35; 34 of No. 37; 4 of No. 38; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 1 of No. 126; 2 of No. 126a; 1 of No. 176; 2 of No. 188; 2 of No. 189; 2 of No. 190.

Prizes for Models Built from Outfit No. 1

Last month we announced the first of a new series of Meccano "Outfit" Model-building Contests. In this contest, which is still open for entries, prizes will be offered for the best models made entirely from the parts contained in Outfit No. 1. Readers who possess larger Outfits may of course enter provided that they use only parts that are contained in the No. 1 Outfit. It is of course not necessary to use all the parts contained in the Outfit.

Competitors may build any kind of model they like, and the more original the subject the better will be its chance of winning a prize.

Entries will be divided into two Sections—A, for models built by competitors living in the British Isles; B, for models built by competitors living Overseas. Each Section is open to readers of all ages.

Competitors should send either a good photograph or sketch of their models, and each illustration

submitted must bear the competitor's age, name and address on the back. Each competitor must enclose with his entry a complete list of the parts required to build the model. Failure to observe this condition will cause the entry to be disqualified.

Envelopes containing entries should be addressed "Meccano No. 1 Outfit Contest, Meccano Limited, Old Swan, Liverpool 13."

The closing dates for this competition are as follows: Home Section, 30th June; Overseas Section, 30th August.

The following prizes will be awarded in each Section. First, cheque for £2/2/-. Second, P.O. for £1/1/-. Third, P.O. for 10/6. There will also be in each Section five consolation awards of 5/- each, and Certificates of Merit.

Prize-winning entries become the property of Meccano Limited, but unsuccessful entries will be returned if a stamped addressed envelope is enclosed.

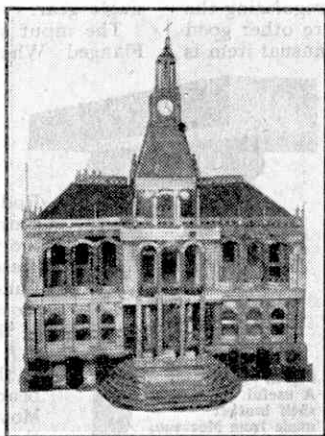


Fig. 3. An attractive model of Ipswich Town Hall, built by R. J. Hilling, Ipswich.

Among the Model-Builders

By "Spanner"

Spanish Boy's Interesting Model

J. Gallardo, Barcelona, has built the model automatic loom shown in Fig. 1. Its main characteristic is an automatic

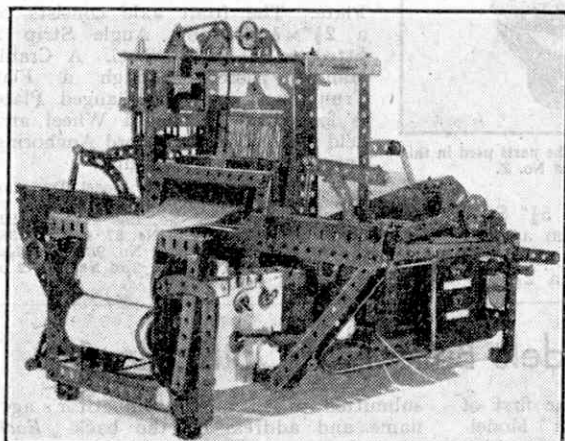


Fig. 1. A fine model loom built by Mr. J. Gallardo, Barcelona.

shuttle change mechanism which permits the weaving of squared patterns, such as the tartan of Scottish plaids.

Automatic mechanism for winding the shuttle reels and devices for regulating the force of the shuttle throw, are other good features of the model. An unusual item is an electric lighting installation, which is fed by a small transformer built into the model. This also supplies energy to various relays and the driving motor.

Gallardo says that he has been keen on Meccano from the time he received his first Outfit, a No. 00, at the age of five! He has built several looms of different types, and although he is modest enough to think that many English boys could give him lessons in loom construction, he has brought his model to my notice in order to show that enthusiasm for Meccano still lives on in

Spain, in spite of the difficulties of his country during the last 10 years.

A Useful Shelf Bracket

Shelves are always in demand in the home workshop or "den," and R. Johnstone, Glasgow, suggests that a good solid bracket may be built up as shown in Fig. 2. It will also provide an excellent buttress in models that have to support a heavy superstructure.

The right-angle portion of the bracket consists of two $5\frac{1}{2}$ " Angle Girders, and the curved strut is formed from two $5\frac{1}{2}$ " Curved Strips overlapped seven holes. A $3\frac{1}{2}$ " Strip bolted to the middle hole in the overlapped Curved Strips provides a tie.

A Gearless Reversing Device

One of the problems met by model-builders with only small Outfits is that of providing a compact reversing motion without the use of gears. Fig. 3 shows one method of solving the problem, and the mechanism illustrated provides forward, reverse and neutral motions without the use of a single gear.

The input shaft 1 is fitted with two $\frac{3}{4}$ " Flanged Wheels, and a Driving Band transmits the drive from these to a $1\frac{1}{2}$ " Pulley 2 that is free to slide on the Rod 3. Two $1\frac{1}{2}$ " Pulleys, each fitted with two $\frac{3}{4}$ " Bolts, are also loose on this Rod, and are prevented from sliding by Collars. The drive to the output shaft is taken from these two Pulleys by Driving Bands, one of the Bands being crossed to reverse the direction of the drive.

A Small Fork Piece is secured to the lever 4 so that its prongs bear on the rim of the Pulley 2. Movement of the change lever thus slides the Pulley until its holes engage the Bolts fitted to either the forward or reverse Pulleys.

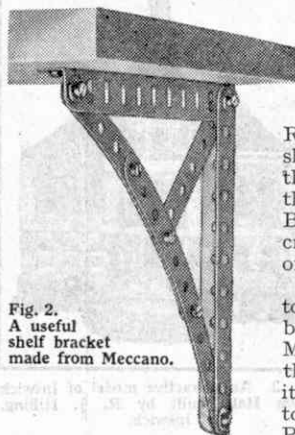


Fig. 2. A useful shelf bracket made from Meccano.

A Simple Loom

It is not necessary to possess an elaborate loom such as that illustrated on the opposite page in order to experiment in fabric production. It is possible to weave a strong belt of material from string or cord using a few simple Meccano parts. Primitive weaving of this kind is great fun, and it is done in a manner similar to the arrangement used by South American Indians, in whose machines bamboo plays an important part.

The model is made by bolting 12 $2\frac{1}{2}$ " Strips at their ends to 12 $\frac{1}{2}$ " Strips to form a frame. The cord is then cut into 24 lengths, each piece being approximately the length of the material required.

These cords are then knotted together at one end, and afterwards are separated into two layers. Each cord of one layer is passed through the centre hole of one Strip, the cords of the other layer being passed one between each pair of Strips. The Cords are then knotted together at their remaining free ends. The $2\frac{1}{2}$ " Strips form the head frame:

A frame built up from Angle Girders and Strips is used to support the cords, which are held taut by attaching them to the frame with Springs at each end. When the head frame is pressed up or down, the layers of cord forming the warp or longitudinal threads are separated and the weft may be threaded across. Each weft is then pressed tightly in position and the

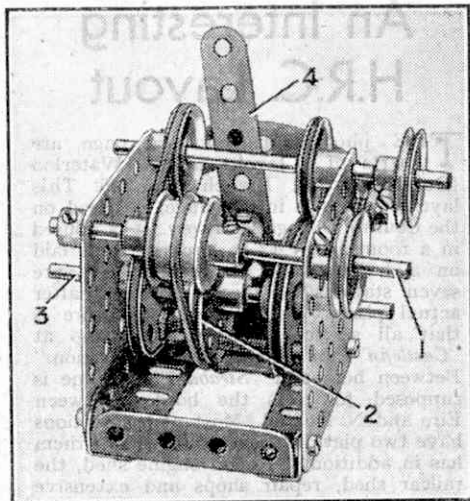


Fig. 3. A gearless reversing device.

head frame is moved in the opposite direction so that the second weft may be threaded through.

Meccano Competition Results

FINE MODELS FROM THE "WINTER" CONTEST

A remarkably fine lot of models was submitted in the Home Section of the "Winter Model-Building Competition," and it is evident that model-builders are still as keen as ever in pitting their skill against each other in these competitions.

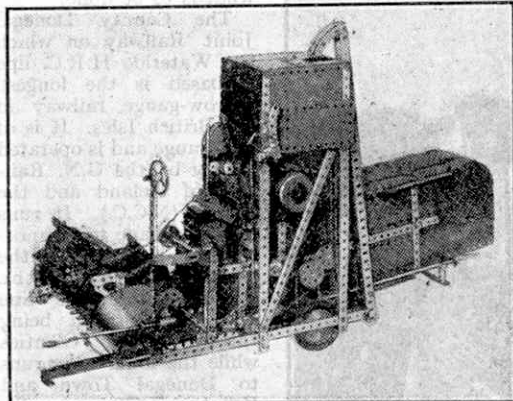
The list of prizewinners is as follows: 1st Prize, Cheque for £2/2/-: P. D. Hancock, Edinburgh 9; 2nd, Cheque for £1/1/-: E. Streather, Deenethorpe, Nr. Kettering; 3rd, P.O. for 10/6: R. J. Hilling, Ipswich.

Consolation Prizes: J. E. Matthews, Fillongley; D. Ashley, Wellingborough; H. D. Wyatt, Wilmslow; P. James, Carmarthen; J. M. Turner, Hull; G. Cuffley Hill, Goffs Oak, Nr. Waltham Cross.

First Prize was awarded for a fine model of a destroyer, a drawing of which was reproduced on Page 211 of last month's issue. The model is 4 $\frac{1}{2}$ ft. in length and is wired for electric lighting, the current being supplied by a battery housed in the hull. An exceptional amount of detail is incorporated, and clever use is made of standard Meccano parts in representing the various deck fittings.

A working model of a Combine Harvester won the Second Prize. It reproduces all the essential movements of an actual machine of this kind and is powered by a No. 1 Clockwork Motor. The model is illustrated on this page.

Third Prize was awarded for a model of Ipswich Town Hall which is illustrated on page 251 of this issue. The model is built mainly from Strips and Angle Girders, and skilful use of these parts has resulted in a well-balanced and pleasing representation of the original building.



This working model of a Combine Harvester was built by E. Streather, Deenethorpe, Northamptonshire. It won Second Prize in the "Winter" Model-Building Competition.

An Interesting H.R.C. Layout

THE photographs on this page are parts of a layout of the Waterloo (Dublin) H.R.C. Branch No. 295. This layout, which is in 00 gauge, is based on the County Donegal Railway. It is housed in a room about 12 ft. square and is laid on a baseboard 3 ft. high. There are seven stations on the line, named after actual places. An interesting feature is that all services make a long stop at "Castlefyn" for "Customs Examination." Between here and "Strabane" the line is supposed to cross the border between Eire and N. Ireland. Most of the stations have two platforms each, and one of them has in addition the main engine shed, the railcar shed, repair shops and extensive sidings.

Hornby-Dublo Tank Locomotives are in use but most of the services are operated by railcars of which there are five. These railcars haul a small light type of covered wagon, and also when required a passenger trailer. The rest of the rolling stock is made up of seven coaches and 30 wagons. The locomotives are painted red and the coaches and railcars scarlet and cream.

Current for the line is supplied by two transformers, and all buildings, signals and point lamps are fitted with electric lighting.

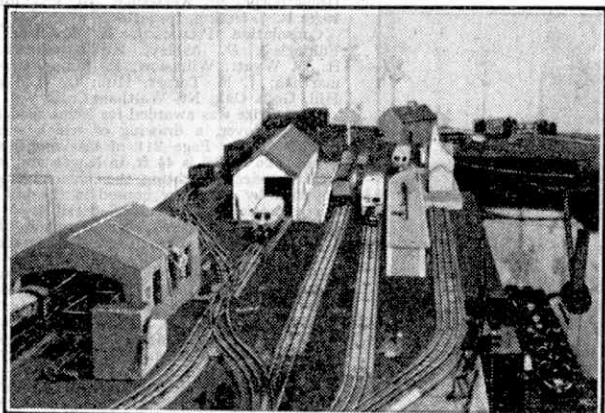
The most striking feature of the railway



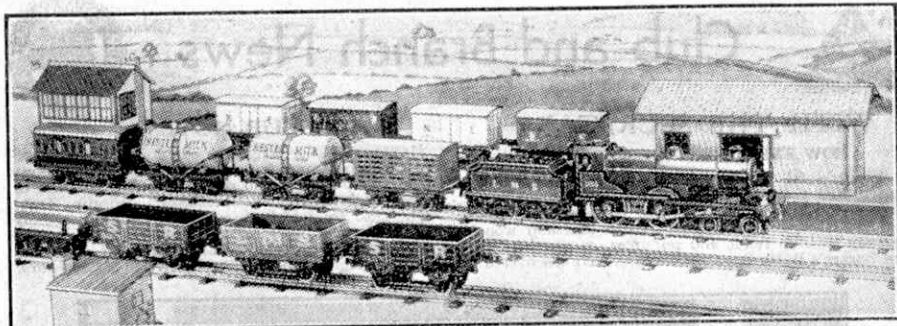
Mr. S. J. Carse, Manager of the Waterloo (Dublin) H.R.C. Branch at the switchboard controlling the Branch layout.

is the completeness with which the running programme is worked out and operated. Samples of the working time tables that we have seen are planned on excellent lines and it is evident that the railway "Management" are determined to secure the utmost possible realism. The instructions to the staff are very complete and show that a great deal of thought is given to the planning of the running operations. Special notices are prepared to cover any unusual working so that all concerned know exactly what is to be done.

The County Donegal Joint Railway on which the Waterloo H.R.C. line is based is the longest narrow-gauge railway in the British Isles. It is of 3 ft. gauge and is operated jointly by the G.N. Railway of Ireland and the L.M.S. (N.C.C.). It runs from Strabane to Stranorlar, the latter being the headquarters of the system. Here the line divides, a branch being thrown off to Glenties while the main stem runs to Donegal Town and Killybegs. There is also another branch from Donegal to Ballyshannon.



A general view of "Stranorlar" Station on the H.R.C. Branch layout described on this page.



A "milk special" on a Hornby Railway at a local depot. The Hornby Guard's Van completes the train, as suggested on this page.

The Use of Hornby Rolling Stock

THE "Operating Oddments" that formed the subject of one of last month's Hornby Railway articles in the "Meccano Magazine" were mostly concerned with actual running. This month we give some attention to the uses of various vehicles from the point of view of train make-up. The present-day shortage of rolling stock in miniature as in real practice, makes it necessary for the model railway operator to make the best use of whatever stock he has. Alternative uses can nearly always be found for a particular vehicle and if we lack an individual wagon for a certain job, we can probably provide a substitute.

For instance, on a small line there may not be a brake van to complete our goods train. Rather than run the train without it, which is not permissible on the main line anyhow, we use therefore a standard passenger type Guard's Van. This type of van can be seen on ordinary goods trains at times and it is particularly appropriate for an express or fitted goods train. For a milk train or any other kind of perishable traffic, the standard Hornby Guard's Van will do nicely. Milk in churns and numerous other goods often travel in passenger guards' vans in actual practice. This is the situation shown in the accompanying illustration where a milk train on a Hornby railway includes a Guard's Van at the rear.

Sometimes similarities in the design or construction of different vehicles make it possible for us to use one or the other as required. Both the Hornby No. 1 Milk Van and the Cattle Truck have slotted

openings in the sides but those in the Cattle Truck are found in the upper part of the vehicle only. This, however, enables us to use the cattle truck as a substitute milk van and vice-versa. This can be quite a useful scheme if we are planning to operate a particular kind of traffic.

At this time of the year particularly, we may wish to run one or two "Fruit Specials." In actual practice the vans vary according to the nature of their cargo but in miniature, fortunately, we need not be so particular. We can use our Milk Van again for this purpose while meat and refrigerator type vans can also be included in the train. At a pinch even the ordinary No. 1 Luggage Van can be employed in this way and the useful No. 1 Guard's Van referred to previously can again bring up the rear of the train.

Probably very few miniature railways do not include at least one or two Hornby Wagons. These open vehicles can be used for almost any kind of traffic that does not require special accommodation. In addition to their normal use for rough loads such as coal, stone and so on, lengths of timber can be carried and these look very effective when loaded over one end of the vehicle and possibly covered with a miniature wagon sheet. It should carry a tail lamp to show the train is complete.

Another scheme is to use Meccano Rods to represent pipes or tubes, the wagon then doing duty as a tube wagon. Real tube wagons, however, are usually longer than the ordinary vehicles.



Club and Branch News



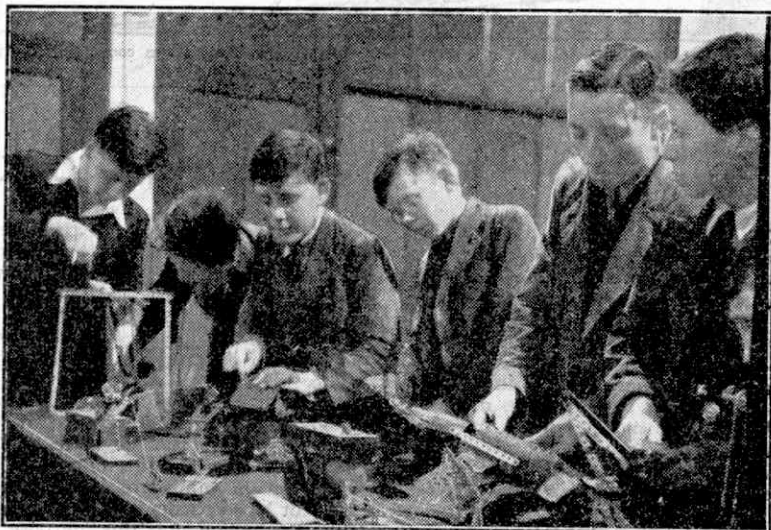
WITH THE SECRETARY

HOW EXHIBITIONS AID PROGRESS

A successful Exhibition is good for any Club. Apart from the satisfaction it gives to members and their friends, its publicity value is very high, and it is excellent for recruiting. It can also add wonderfully to Club funds and resources, as members of the Barker's Butts Boys' School M.C. have discovered.

CLUB NOTES

HENLEAZE M.C.—Regular model-building continues, and the programme has also included a Film Show, a Quiz on popular radio programmes and a Visit to the Bristol Telephone Exchange. Hornby Train Nights also are a feature, and members are becoming more efficient in operation. Debates and impromptu speeches have completed a fine programme. The Club Stamp Exchange is flourishing. Club roll: 15. *Secretary:*



Members of the Huntingdon M.C., Leader, Mr. J. C. Deaves, Secretary, P. Papworth, with models built for a recent Shopping Week in Huntingdon. An electric Hornby Train layout also was operated by Graham Kemp. The display aroused the keenest interest, and the skill, ingenuity and originality of those responsible were highly applauded. The Club was affiliated to the Meccano Guild in October 1945. It has prospered under Mr. Deaves' energetic guidance, and now has a membership of 30.

Mr. F. Batten, Leader of this Club, and his colleagues planned this year's Annual Exhibition so well, and carried out their ideas so efficiently and attractively, that they attracted an attendance large enough to yield £10, the proceeds of small admission fees. This sum will be put to very good use in increasing the stock of material for model-building and other hobbies.

The Huntingdon M.C. provides another example. During a recent Huntingdon Shopping Week one of the attractions provided for visitors to the town's shopping centre was a display of working models built by members, together with an electric Hornby Railway. The success of this display was unbounded, a report in the "Hunts Post" speaking enthusiastically of the models and of the eagerness with which visitors crowded round to watch them in operation and to follow the running of the trains on the electric railway. The publicity value of the display must have been enormous, and there should be a useful flood of new members to join in the activities that Mr. Deaves, Leader of the Club, so efficiently directs.

Next Winter should see an increase in the number of displays of all kinds arranged by Meccano Clubs, and a consequent increase of enthusiasm.

M. E. Frost, 32, Oakwood Road, Henleaze, Bristol.

BOSTON M.C.—Membership continues to increase. A large model of Eiffel Tower, complete with lift and electric lighting, has been built. Model aeroplanes constructed by members have been flown. Cricket is now being played. An enjoyable visit was made to motor cycle races at Cadwell Park. Club roll: 13. *Secretary:* P. E. Luff, 103, Woodville Road, Boston.

BARKER'S BUTTS BOYS' SCHOOL M.C.—The Club's Exhibition, its most important event of the year, was very successful. There was a fine attendance and Club Funds were increased by £10, which is to be devoted to increasing the Club stock of Meccano Parts. Preparations are now being made for a display at the Annual Exhibition of the Coventry Model Engineering Society next Autumn. Club roll: 71. *Secretary:* D. L. Eyre, 55, Balsford Road Coundon, Coventry.

HUNTINGDON M.C.—Recent activities have included Social Evenings and Radio Section meetings. An Exhibition of models and an Electric Hornby Railway were organised as part of the Huntingdon Shopping Week arrangements. Club roll: 30. *Secretary:* P. Papworth, 15, East Chadley Lane, Godmanchester.

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.

EXETER'S MEDIAEVAL ROAD

During the summer months, and indeed throughout most of the year, many thousands of visitors pass along Exeter's busy main street; yet very few realise that within a few yards of the present Fore Street runs a quaint old pack-horse road, now known as Stepcote Hill. From Roman times, until the present main thoroughfare was constructed, this was the road along which all traffic from the West would pass. At its foot stood the West Gate of Norman times. In mediaeval times, merchants with their pack-horses, after crossing the ford over the River Exe, would enter the city by this gate, and wend their laborious way along the quaint old thoroughfare to the wool market.

The accompanying photograph shows the cobbled highway with its steps on each side, and one can easily picture the merchants of the middle ages passing up and down the steps while their loaded pack-horses kept to the cobblestones in the centre.

At the bottom of this street is the ancient Church of St. Mary Steps. Above the clock on its tower are three recessed figures. At each stroke of the hour the middle figure nods his head; the other two strike the quarters on the bells. Local tradition has it that this central figure is Matthew the Miller, who used to own a mill nearby. He was always so punctual that people in the vicinity would set their clocks by him.

A FAMOUS SOUTH AFRICAN TRAIN

The accompanying photograph of the "Blue Train" pulling into Cape Town station is interesting. This express runs between Cape Town and Johannesburg. The run ceased in July 1942 and did not begin again until the beginning of 1946. The train carries a capacity load of 92 passengers and covers the distance of 956 miles from Johannesburg to Cape Town in little over 29 hours. The return journey takes a little longer.

The train derives its names from its coaches, which are blue lined in gold. Where an ordinary first class compartment takes four passengers, that of the "Blue Train" takes two as well as being much bigger. There are twin dining coaches and all the kitchen

fittings are of stainless steel. A cocktail bar is also included. According to passengers it is quite a sensation being in a cocktail bar in the middle of the Karroo.

The engine seen in the photograph is No. 3219 of the Henschel 4 8-2 class 23. These Henschels are German engines and weigh 240 tons, although the track gauge is only 3 ft. 6 in.

The "Blue Train" helps to show that we in South Africa have a railway to be proud of. Although the railways were hard hit by the war they are recovering quickly.

A. E. MOLLER

(Bonnie Vale, Cape).

A LOVELY VILLAGE

Not far from Ventnor in the Isle of Wight is the lovely English village of Bonchurch, lying snugly beneath the high downs. The cottages and houses of the village are so mingled with trees that from above it is difficult to pick them out at all, and the sparkling English Channel is not far away.

Grey stone buildings comprise the lower part of the village, with many delightful gardens and steep tree-covered banks abounding. By the roadside, sheltered by tall trees, is a long pond on which there are swans. A steep hill and a flight of 100 steps lead to the upper part of the village on the slopes of the down above. The whole place has a warm drowsy feeling of complete peace.

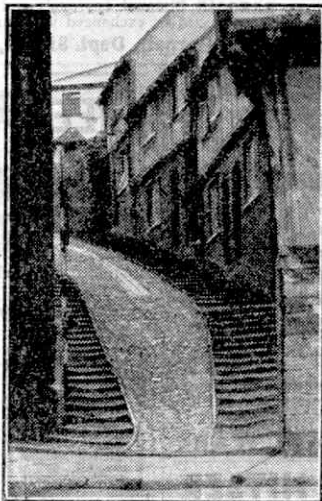
The Romans had a station here and many ancient urns have been unearthed in the neighbourhood. It has been suggested

that they had a considerable settlement here, a spa or health resort. This is quite likely, for the climate is extremely warm and sunny and the sheltered position of the place unequalled.

The early Norman Church is only 48 ft. long and is one of the smallest in England. It is dedicated to St. Boniface, who is supposed to have preached to fishermen here, and stands on the site of an earlier Saxon building. Surrounding it is a very beautiful churchyard sheltered from the sea winds by many noble trees. On a warm summer day the church seems to be lost amid luxurious and fragrant trees and flowering shrubs, while from far away comes the sound of the surf.

It is to be hoped that this village will long remain an unspoiled place of peace and contentment.

P. NORRIS (Cwces).



The ancient High Street, Exeter. Photograph by J. H. Atkinson, Exeter.



South African Railways "Blue Train," which runs between Cape Town and Johannesburg. Photograph by A. E. Moller, Bonnie Vale, Cape.

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Stamp Collecting

The Stamps of the Rhodesias

By F. Riley, B.Sc.

THE name Rhodesia commemorates Cecil Rhodes, the great apostle of British rule in South Africa. Cecil Rhodes made a fortune in the diamond fields of Kimberley and eventually became Prime Minister of what was then Cape Colony. While he was Prime Minister a pioneer column started out from Kimberley and on 12th September 1890 hoisted the British flag on the site of Fort Salisbury, which later became the capital of Southern Rhodesia. The territory had been formally ceded to the British South Africa Company by the ruling Matabele chief Lobengula and it was Rhodes who had negotiated the cession and formed the British company that was to develop the new lands.

The Matabele were a fierce warrior tribe who had broken away from the Zulus and had migrated north, to take possession of what is now Southern Rhodesia. At first they were unruly and hostile, and they made several risings, which in 1896 flared up into a great rebellion. The small British forces in the country had great difficulty in restraining them, and one British column was massacred. Rhodes then carried out the most courageous of the many great acts of his career. He ventured unarmed into the Matappo Hills, the stronghold of the Matabele, and remained there un molested for six weeks. Then he was invited to a native council, at which he received from the Matabele a promise of peace. This brought trouble with the natives to an end, and since that time there has been steady peaceful development.

The dividing line between the two Rhodesias is the great River Zambesi, notable for the Victoria Falls, the most remarkable and gigantic cataract in the world. There the river when in full flow has a width equal to the distance between the British Museum and the Marble Arch. Its waters plunge down into a gigantic rift or chasm deep enough to engulf St. Paul's Cathedral, with a roar that can be heard 10 miles away, and spray rises to a height of 700 ft.

The story of Southern Rhodesia is told in its stamps.



Responsible Government began in 1923, and stamps were issued in the following year. These were portrait stamps. Their design shows King George V

in naval uniform, and they have become known as the yachting cap issue, a name that the portrait explains. Seven years later there came two stamps, 2d. and 3d. in value, picturing the Victoria Falls, part of an issue that also included new portrait stamps. The Falls had previously figured on a stamp of the period when the British South Africa Company held sway, and they continued to adorn Southern Rhodesian stamps. The 1931 example was followed by another and larger one in the following year. Then came the Silver Jubilee issue of 1935, in the design of which a giraffe, elephant, lion and other Rhodesian animals disport themselves in front of the Falls; and the Coronation issue of 1937, on which the picture included the railway bridge built below the falls as well as the cataract itself. Yet another was added in 1940, on which there was a fine view of the famous arch bridge across the Zambesi.

This last Victoria Falls stamp, which is reproduced on this page, was one of a fine series of outstanding interest issued to commemorate the Jubilee of Rhodesia. In this issue there were eight stamps. One of them, the 4d. value, bears the arms of the British South Africa Company, which had controlled the country from 1890 to 1923. The 1d. value gives a picture of the hoisting of the flag on the site of Fort Salisbury in 1890, the beginning of British rule.

In the early days, before the railway was pushed north from Kimberley into the heart of Rhodesia, mails were carried to and from the South by stage coaches with mule teams, and the arrival of one of these at Fort Victoria is shown on the 2d. stamp, where the still existing tower of the old Fort also can be seen. An interesting feature of this stamp is the introduction at the sides of the figures of two pillars with birds resembling eagles on them. The originals of these were discovered in the ruins of the buried city of Zimbabwe, evidence of a great civilisation of the past.

It was only natural that a portrait of Cecil Rhodes should be included in the commemorative issue of 1940, and we find it on the 14d. value. The 3d. value shows the famous council between Rhodes and the Matabele chiefs that ended the rebellion of 1896. Another stamp in the series, the 1/- value, show Lobengula's kraal on the one side in contrast with a view of Government House, Salisbury.

An interesting feature of the stamps of Southern Rhodesia is that they have no watermarks. In this respect they differ from the stamps of Northern Rhodesia, which have always carried the multiple scrip CA mark. These have been of the same design throughout, portrait stamps, first of King George V and then of King George VI, with pictures of typical big game animals of the country below.





RHODESIAN ROYAL VISIT FREE

We will send you **ABSOLUTELY FREE** this lovely green and black two-colour stamp, which shows both of our Royal Princesses (Princess Elizabeth and Princess Margaret Rose). This very beautiful stamp was only issued in April 1947, to commemorate the Royal Visit to **SOUTHERN RHODESIA** during the African Royal Tour.

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Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

COLLECTORS of modern colonial stamps are having a rare run for their money these days. There are lots of bright new stamps, but not too



many, and not the least popular of these issues will be the forthcoming Norfolk Island set, which we mentioned last month. These stamps are being produced in Australia. The design seems attractive enough, but we are not too sure that the colours will show off the stamps, as such stamps should be shown off. Dealers are also worried about the centering of the stamps, for Australian produced stamps are very moderate in this respect. Anyhow the issue will be out 10th

June, though supplies may not reach Great Britain until towards the end of the month.

We are illustrating another attractive stamp issued for French Equatorial Africa. The wonderful hairdressing of the lady depicted will interest at least some collectors! With the franc so low, a very nice show of French Colonial stamps can be made with very little cash.

For some time modern foreign stamps were in the doldrums, for there were so many, and collectors had no real guide as to their value. The advent of the new Gibbons, the first section of Part II, has altered that as far as European stamps are concerned, and dealers advise a greatly increased demand for these issues. They have a lot in their favour; they are cheap and so attractive on the whole that they are bound always to prove of interest. They are hardly likely to turn out half as good an investment as the colonial stamps of the present reign, and that point should not be overlooked by collectors. If you like beautiful stamps, and don't mind their cost, by all means collect modern foreign stamps. If you want issues which have a good resale value, stick to our own colonial stamps, preferably KG VI issues, but don't expect a profit as soon as you have bought them. Stamp investments generally take several years to mature.

We are illustrating the last set of South African Royal Visit stamps, from Southern Rhodesia. They were hardly worth waiting so long for. The design is commonplace and it is as well that only two stamps, 1d. and 1c., were issued. On the whole the six sets of stamps issued in honour of the visit of the Royal Family to South Africa have had very little to commend them. The designs were uninspired and as trite as stamp designs can be. When collectors see many sets of the same design they naturally get very tired of them. The design of the Crown Colony "Victory" stamps was not too bad, but they have become boring already, so it is to be

hoped that we will see no more of these issues for some time.

One of the most interesting stamps which Newfoundland has issued recently is the 4c. with the portrait of Princess Elizabeth brought up to date. This stamp was issued on 21st April, very appropriately, for this was the day when the heir to the throne came of age.

The American papers have given a good deal of prominence to the discovery of the "Victory" stamp of Kathiri State that was found with the overprint inverted. A British dealer evidently had a whole sheet with the inverted overprint and as far as is known this is the only one. Alas, he did not notice the error until all had been sold. Apparently some went to the U.S.A. and these stamps would be cheap at £20 each. Somebody was lucky.

There is no doubt about it that modern British Colonial stamps are the second choice for most American collectors, so we must not grudge them the spot of luck over the "Victory" error. The American market is very large, and the demand there for our colonial stamps will go a long way towards high prices for stamps that have become obsolete, and collectors over here who have similar copies certainly won't grumble about that.

America itself continues to turn out its modest commemoratives and these have a great following over here. The latest is a 3c. stamp issued in honour of that great Hungarian journalist Joseph Pulitzer.

By the time these words are in print, no doubt the British Colonial section of Gibbons catalogue will have appeared. Unfortunately there will not be enough copies to go round. Moreover, it has been so long in the press that already some of the prices will be out of date, but it will be very welcome to the lucky few who get a copy. Paper is scarcer than ever,

and the writer of these notes is often asked where it is possible to get any papers devoted to postage stamps. Of course there are several, but most of them are fully booked up and cannot take new subscribers. There is one stamp paper, "The Stamp Collector's Forthnightly," which apparently can take a few more readers, however, and it will be found that this is very good for collectors of modern stamps, particularly for KG VI issues.

There is a great deal of agitation just now for a pictorial set of stamps for Great Britain. One would have thought that it would have been obvious to the authorities that such an issue would be very advantageous.

Last month we illustrated the 4c. "Bell" commemorative of Canada. A few used copies of this stamp should be well worth putting away, as its life may be very short, according to reports.



The Age of the Motor Bus—*(Continued from page 233)*

through in order to get his fares, and it will be greeted with even greater enthusiasm by the conductor. The latest idea is to instal a ticket issuing machine at the doorway, usually placed well forward, similar to those in use in the pay-boxes of picture houses and theatres.

A safety move of special interest is the introduction of sliding doors, one effect of which will be to prevent passengers jumping on or off while the bus is in motion. A good example of this is a new Leyland bus put into service by the Rochdale Corporation, designed with the idea of reducing the number of platform and staircase accidents. This has an entrance forward of the central position, with sliding doors operated by compressed air that can be opened and closed by either the driver or the conductor. A warning light over the driver's head tells him whether they are open or closed, a very useful guide to the moment when he can start his bus with complete safety. The advantages claimed for the forward position of the doors are that the driver can see the entrance more easily, and can open and close the doors when the conductor is not there. Another is that the top of the staircase, which begins opposite the door, rises to the centre of the upper deck, so that passengers from the ends of the vehicles have only short walks. In addition, the further forward the entrance, the less the danger of a passenger getting under the rear wheel if he falls while the bus is in motion.

Henry Ford—*(Continued from page 240)*

car, and year after year production continued in millions. The 27,000,000th Ford car actually came along in the early years of the war, as the defence programme of production got under way.

It is impossible in a short article to detail all the tremendous strides forward that the Ford organisation took after the amazing success it achieved with Model T. The Highland Park plant, enormous as it was, proved too small, and most of the operations were transferred to an even larger plant on Rouge River when Model A came on to the production lines. This plant has been described as man's greatest industrial achievement since the pyramids. It comprises blast furnaces, steel mills and a power house gigantic enough to serve a city as large as Manchester. Outside the plant there were branch factories in various parts of the United States, and in Great Britain the gigantic Dagenham plant was created. In the North of Michigan there were holdings from which came timber, and the company also became the owners of vast coal mines to supply the fuel needs of the great plant, and of an entire railway with a main line 454 miles long.

When the second World War came the gigantic Willow Run plant was added in order to produce great bombers. On the airfield of this alone 153 acres of concrete were laid. Parts were being made at one end of the gigantic plant when the far end had not been roofed, and on the anniversary of the breaking of the ground for building the factory a full size bomber crept along the assembly line, the first of a stream to be turned out by up-to-date line assembly methods, with the aid of mile-long conveyors, gigantic cranes and other mechanical aids.

By the time that Willow Run was built Mr. Ford was almost 80 years of age. He was still actively interested in every branch of the company's work,

and indeed he had become president again on the death of his son Edsel Ford in 1943. He remained vigorous and healthy, and his mind continued to be as alert and productive as at any time throughout his long and busy life. In making his wonderful strides forward in engineering methods and in all his operations as the head of a large and growing industrial concern, he always showed the greatest humanity. He led the way in raising the standard of living of the workpeople of the United States, and he demonstrated his interest and care for human progress in countless other directions.

Competition Results**HOME****FEBRUARY DRAWING CONTEST**

1st Prize: R. Wilson, Newton-le-Willows. 2nd Prize: D. Sutherland, Glasgow N.W. 3rd Prize: D. Warner, Kineton. Special Consolation Prizes: P. D. Hancock, Edinburgh 9; M. Allan, Glasgow. Consolation Prizes: M. Cornes, Widnes; J. Hyde, Burnham-on-Sea; Pte. S. Spires, Sutton; J. S. Clark, Galashiels; G. E. Johnstone, Canvey Is.



A Beechcraft AT-11 bomber trainer converted for aerial photography and survey work. This snapshot was taken at Invercargill Airport, New Zealand, by our reader J. E. Petrie, and won second prize in the Overseas section of our December 1945 Photographic Contest.

FEBRUARY SIGNALLING CONTEST

1st Prize: T. Harris, Blaby. 2nd Prize: R. Thompson, Market Harborough. 3rd Prize: R. Smithson, Liverpool 20. Consolation Prizes: M. J. Poulter, King's Lynn; R. Athay, Cheddar; G. Davies, Ammanford, A. Perch, St. Albans.

MARCH CIRCLEWORD CONTEST

1st Prize: D. H. Earle, Wembley Park. 2nd Prize: A. Smedley, Swinton. 3rd Prize: J. Williams, Pontypool. Consolation Prizes: M. G. Littlejohn, Glasgow S.2; D. J. D. Gilbert, Bromley; J. M. Taylor, Glasgow W.1.

MARCH WAGONS CONTEST

1st Prize: P. Matthews, Liverpool 4. 2nd Prize: T. H. Harris, Blaby. 3rd Prize: J. D. Norton, Liverpool 22. Consolation Prizes: F. Mills, Kearsley; E. Beven, Peterborough; T. Beasley, Bath.

MARCH PHOTOGRAPHIC CONTEST

1st Prize, Section A: W. C. Brown, Hove 4; Section B: J. Bridger, London E.4. 2nd Prize, Section A: W. R. H. Temple, Upminster; Section B: R. F. Bigg, Bristol. Consolation Prizes, Section A: H. G. Brown, Winchester; T. Mahoney, Dundee; H. E. Smith, London N.W.10; J. H. Taylor, Aberdeen; P. Duffy, Portunna. Section B: D. A. Brockles, New Eltham S.E.9; C. M. F. Randall, Loughton; D. T. Jones, Bridgend.

Competitions! Open To All Readers

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

How Many Mistakes are there Here?

Below are descriptions of some imaginary journeys. These begin with the remarkable statement that Paddington Station was built by the Midland Railway! This is clearly an error, and there are more to follow. How many mistakes can you find?

"Arriving at Paddington, which as most people know was built by the Midland Railway, I boarded the 'Royal Scot' for York. The new coaches looked fine in the varnished teak livery of the G.W.R. Our engine for the journey was a four cylinder Compound of the 'Princess Royal' class, which made a very sound run and arrived on time. On the way the train passed over several fine bridges and viaducts, a notable one being Runcorn Bridge completed in 1870 by Brunel. The automatic signalling installation on the route from Doncaster to Wakefield is a great aid to traffic working.

"At York station several historic old engines are on exhibition on the platforms, among those I saw being Trevithick's 'Rocket', a Stephenson 4-4-2, 'Highflyer' and Hackworth's 'Locomotion'.

"Another day I travelled on the Cheshire Lines Railway from Crewe to Chester. The coaches on this railway are painted green, and our engine was a former Great Central 2-10-0 'Pacific,' a class which, with its very small wheels, is an ideal type for fast passenger trains on this steeply graded route. At Chester I saw many fine engines, including Great Western 'West Country' and Southern 'Castle' 4-6-0 classes.

"Travelling from Carlisle to Blackpool by the Great Northern via Taunton, I happened to have the good luck to ride in one of the new streamlined diesel

trains, which are very fine. On the way we passed Penzance, where the 2-4-0 engine 'Hardwicke' of the L.N.W.R. is preserved."

When a competitor is satisfied that he has discovered all the mistakes, a neat list of these should



Up Scottish mail in Northumberland, headed by former N.E.R. 3-cyl. "Atlantic" No. 718. Photograph by O. S. Nock.

be made, and addressed to "June Errors Contest, Meccano Magazine, Binns Road, Liverpool 13." The competition is divided into two sections, for Home and Overseas readers respectively, and in each there will be prizes to the value of 21/-, 15/- and 10/6, with a number of consolation prizes. When entries are being judged neatness and originality will be taken into account.

Closing dates: Home Section, 31st July; Overseas Section, 31st January 1948.

Bus Drawing Contest

The cover of this month's issue shows a street scene in which buses figure prominently, and on page 232 there is an article surveying the development of the motor bus, which is to-day such a prominent feature everywhere. This month therefore we are inviting our readers to take part in a drawing contest, with the motor bus as its subject. There is no restriction in regard to the kind of bus that may be drawn by competitors. This may range from a little single decker to a giant articulated bus of the kind that make long distance journeys on the Continent and in the United States, and historic old buses can be included as well as the most up-to-date examples. Colour may be used if desired, but the judges will take the merit of the drawing itself into account in making their final decision. Competitors must state their ages on their entries.

As usual in these competitions there will be separate competitions for Home and Overseas readers, and in each of these there will be two sections, A for competitors of 16 years of age, and B for those under 16.

Prizes of 21/-, 15/- and 10/6 will be awarded.

Entries should be addressed "June Drawing Contest, Meccano Magazine, Binns Road, Liverpool 13." Closing dates: Home Section, 31st July; Overseas Section, 31st January 1948.

June Photographic Contest

This month's contest is the 6th of our 1947 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of the print must be stated exactly what the photograph represents. A fancy title may be added if desired.

Entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. They should be addressed "June Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13." There will be separate sections for Overseas readers, and in each section prizes of 15/- and 7/6 will be awarded. Closing dates: Home Section, 30th June; Overseas Section, 31st December.

Fireside Fun

"How is it the eggs are sometimes very soft and at others very hard, Mary?"

"I'm sure I don't know, mum. I always put them in when the down train passes and take them out when the clock strikes eight."

"Now what you want is a £10,000 policy in favour of your wife," said the insurance agent brightly.

"I'm not married," replied his victim.

"But you will be as soon as the news gets around."



"Want it pressed, Sir?"

"No! Just shine it up to match the seat of the trousers."

"What's wrong with you to-day, Johnny?"

"Palpitation, anaemia and insomnia."

"Good heavens! You can't be suffering from those."

"It isn't suffering. It's spelling."

"A horse is the most curious feeder in the world, isn't it?"

"I don't know anything wonderful about it. Do you?"

"Yes. It gets on best when it hasn't a bit in its mouth, doesn't it?"

"This is a snap I took of a bird."

"But I can only see its tail on the edge of the picture."

"Yes. You see, I didn't want the click of the camera to frighten it, so I coughed to drown the sound and it flew off."

"Look, there's a notice here says tourist trips over the mountains."

"Silly ass. Why didn't he look where he was going."

Bored Diner: "Waiter, have you ever been to the Zoo?"

Waiter: "No, sir."

Diner: "You should. You would enjoy seeing the tortoises whizzing past."

"A strong healthy man like you ought to find work and not go begging."

"Perhaps so, mum, but I'm the unhappy medium."

"Unhappy medium! Whatever's that?"

"Too heavy for light work, mum, an' too light for heavy work."

THIS MONTH'S HOWLER

Chink is an expression meaning Chinese money.

BRAIN TEASERS

STILL GOES, BUT ONLY JUST

Jones had a clock that lost 55 minutes every hour. He was disgusted with its rate of progress, and was about to throw it out when he suddenly realised that after all it could be very valuable to him. How did he propose to make use of it? B.I.N.

FIND THE SOLDIER

Below is an unusual word square. The 10 clues lead to words of seven letters each, and the 10 letters of the middle column then give the name of a famous soldier. Who is this?

1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

The clues are as follows: 1, Something simple to begin with; 2, To place upon; 3, The early part of the day; 4, Fixed or decided; 5, A tiny curl; 6, An American Indian baby; 7, Tradesman in demand after frost; 8, Draw out; 9, A fish; 10, Given to fun and games.



"Is that what the horses eat their hay with?"

SOLUTIONS TO LAST MONTH'S PUZZLES

The locomotives named in our first puzzle last month are Cardiff Castle, Black Watch, Impala, Blue Star, Victory and Charterhouse.

To get one gallon of oil at the garage referred to in our second puzzle all that was necessary was to fill the third vessel from the first, so that the three vessels then held 4, 3 and 3 gallons respectively, and then to fill the middle-sized vessel from the smallest. Two gallons are required for the latter of these operations, so that just one gallon of oil is left in the smallest vessel.

The stations represented by remnants of label names in our third puzzle are: Mytholmroyd, Oldham, Dauntsey, Scorton, Kinneg, Alston, Waterloo and Tanfield. Possibly some readers may have been able to achieve a similar result with other station names.

The largest diamond in the Duchess's brooch is worth £450.

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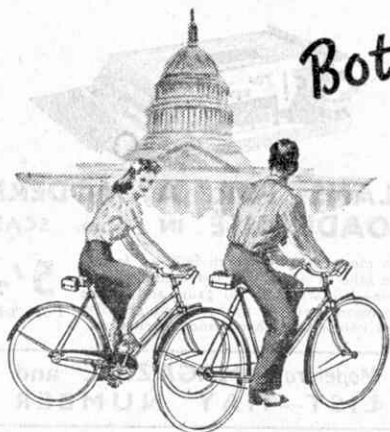


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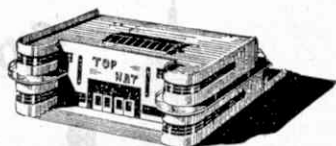
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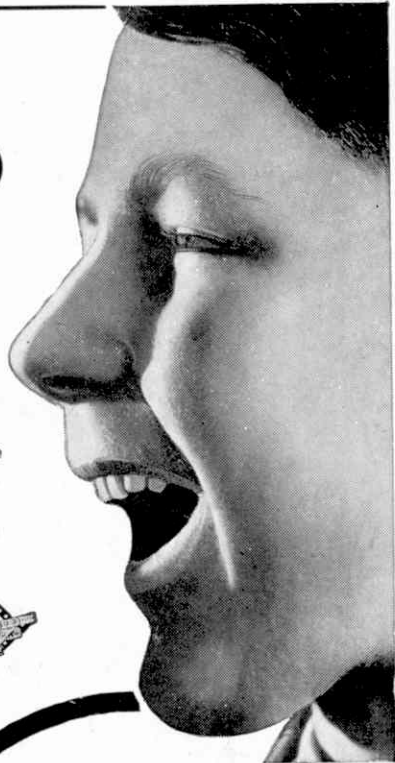
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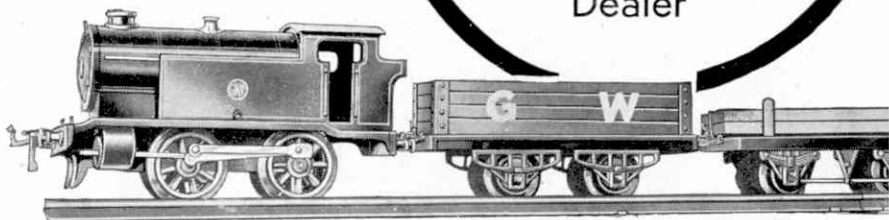


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