

VOL. XLIII. No. 7

JULY 1958

# MECCANO

## MAGAZINE

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MID-DAY SCOT

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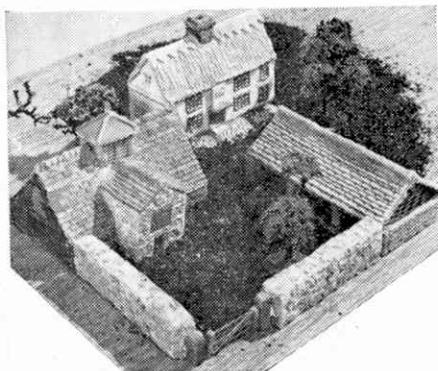
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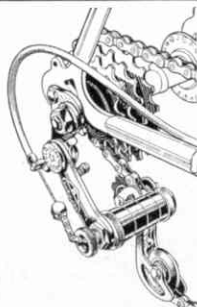


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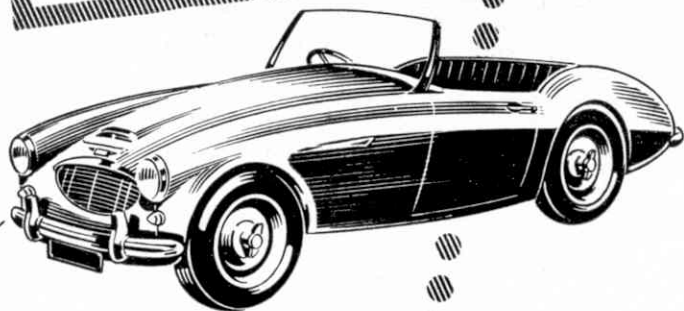
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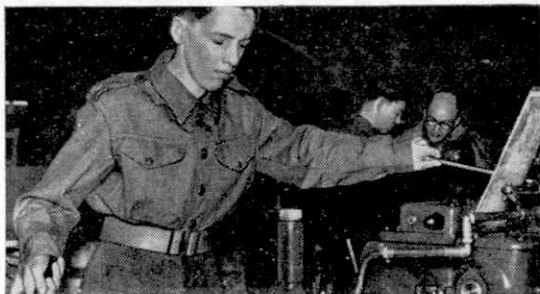
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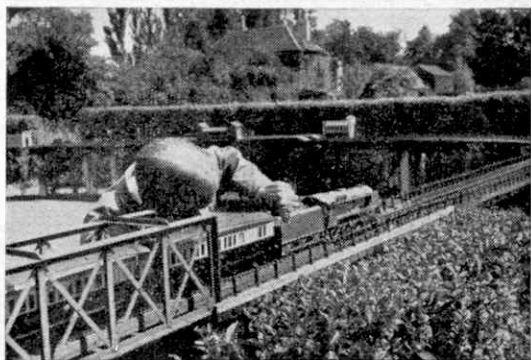
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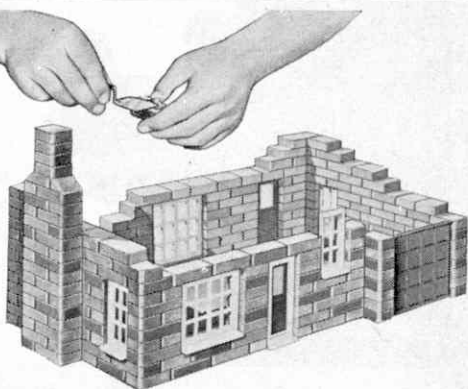
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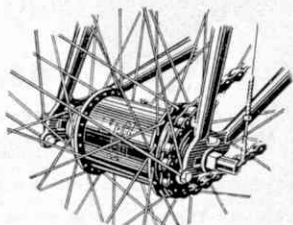
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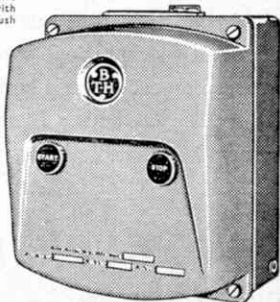
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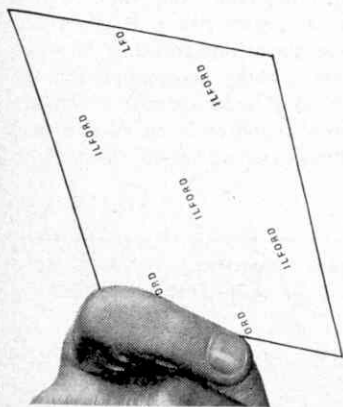
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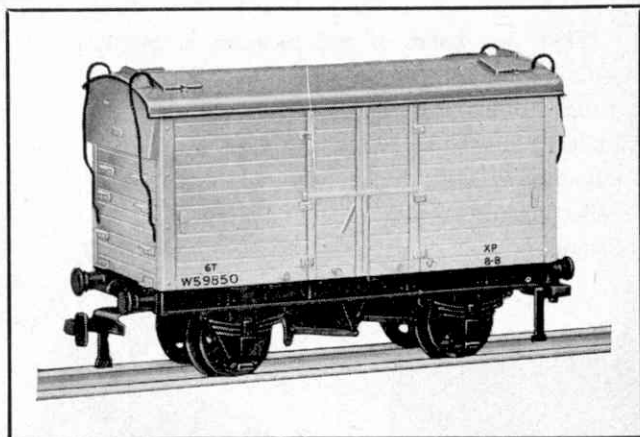
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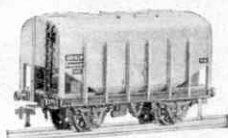
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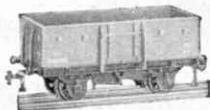


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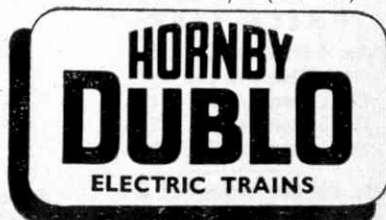
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# MECCANO

## MAGAZINE

Editorial Office:  
Binns Road  
Liverpool 13  
England

EDITOR : FRANK RILEY, B.Sc.

Vol. XLIII  
No. 7  
July 1958

### In Search of the Sun

As I am writing this, some time before the appearance of the issue in which it appears, the Sun is shining brilliantly, and altogether it looks as if summer has come. This reminds me that in a sense the next *M.M.* will be a

time you read this there should be an abundance of butterflies in Great Britain, at any rate on sunny days, although these will not include all the species that Mr. Newman encountered in Spain.



The man who sells sugar cane. He is a Spaniard, and the photograph was taken by our contributor, L. H. Newman, on the trip to the south of Spain in search of butterflies that is described on page 316 of this issue.

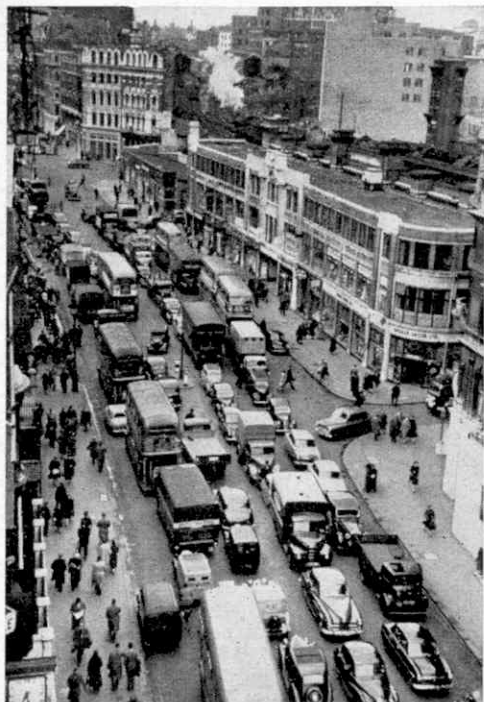
sunny issue, for it is one that will take readers south. The journey to the Sun really starts in this issue, indeed, as the photograph reproduced on this page and the article on page 316 suggest. Butterflies come with sunshine, and Mr. Newman got ahead of our English summer by visiting the Mediterranean shore of Spain. By the

The most famous way to the south from Great Britain is through Dover. So the cover of the August issue will strike the right note immediately, for it is a fine representation in colour of the Car Ferry Terminal at that port, which is now so busy with visitors to the Continent from our shores taking their cars with them, and of course with those returning from holidays abroad. An accompanying article will give readers interesting information on Dover Harbour generally as well as on the Car Ferry Terminal.

I must add a note about this month's cover. The scene is Central Station, Glasgow, and the happy youth enjoying a chat with Driver Bell is Derek Stephen, whose father, R. D. Stephen, Campbeltown, took the photograph on which the cover is based. Mr. Stephen is an experienced railway photographer whose earliest efforts, all superb pictures in great demand as illustrations of

books on locomotive and general railway history, were made with an ordinary box camera when he was a boy in Inverkeithing, near the Forth Bridge.

*The Editor*



## Quiet Please!

By

Leslie E. Wells

reach as high as 70 decibels, and that in an underground train 85. A group of typists will raise the noise level of an office to between 70 and 90 decibels. And a pneumatic road drill has a noise intensity of over 90 decibels!

Many people living near aerodromes have complained of the noise of aircraft and certainly not without reason. A modern four-engined piston aircraft creates a noise-irritation area three miles wide and thirteen miles long during take-off. But the take-off of a six-engined jet plane causes a noise-irritation area four miles wide and twenty-four miles long; and that of a four-engined turboprop plane gives one extending to over thirty miles.

The loudest man-made noise in fact seems to be the scream of jet engines, which often reach a noise level of 140 decibels. This terrific high-pitched sound will in time break down the tissue in a human being. Indeed, such small animals as rats and mice have been killed by noise of this intensity. The jet-plane pilot does not feel much effect from the noise because he is sitting well forward, so the big problem is how protection can be given to aerodrome ground and administration staff as well as to those living nearby.

It is encouraging to learn that the various airline companies who have ordered the new jet-engined aircraft have specified that some form of silencer must be fitted. Fortunately, the research work that has been done on this subject in Britain—largely sponsored by the Ministry of Supply—and in the U.S.A., the collaboration between Universities and industry, and between individual firms such as Boeing and Rolls-Royce who have signed an agreement to interchange all information on jet noise and its suppression, has produced sufficient information for a reasonable start to be made.

The first production silencer to go into

**T**ODAY we live in an atmosphere of noise that is not only irritating, but is also a serious threat to commercial and industrial efficiency and our personal health.

Nowadays most of us live and work in surroundings where the level of sound, in the words of the scientist, is 50 to 100 decibels. This is high enough to make us bad-tempered, cause irritability, create nervous tension and increase our blood pressure. This strain of living and working in noisy surroundings prevents the body relaxing properly, and the end of a day is reached in a state of fatigue. It also prevents our getting proper sleep as there is nothing to stop sound entering our ears—unless we insert ear-plugs, which have been used in very noisy areas with some success.

In normal everyday city life we are being subjected to an onslaught of vibration at a level of between 70 and 80 decibels, which means about a fifth more energy is required to do a job than if we worked in quiet, peaceful conditions. Our powers of concentration and judgment are affected too. The noise in a busy city street can



service on a jet aircraft is that on the Comet IV. It consists of a metal "corrugated" nozzle, with six corrugations extending inwards fitted to each jet. This has the effect of breaking the jet up into small portions, and spreading these out into a large area. The smaller the individual portions, and the larger the final area, the greater the degree of silencing that is obtained.

Some idea of the amazing effects of noise reduction may be gathered from the fact that in one factory where noise was cut from 100 to 75 decibels the accident rate was reduced by nearly half and production was increased by nearly 20 per cent. Recently the reduction of noise in a large motor works reduced the taking of headache pills to less than half.

At least one large American insurance company obtained more satisfactory results by reducing office noises. A drop of 8 decibels cut down typists' errors by nearly a third and those of machine operators by a half. Health was improved and absenteeism reduced. The staff were more contented and an efficiency increase of nearly 10 per cent. was achieved. The company claimed a saving of nearly 60 dollars per employee in the first twelve months.

Executives are particularly affected by noise. A large American telephone company estimates that a noise which lowers the efficiency of a routine worker by 5 per cent. will decrease the efficiency of an executive by as much as 30 per cent. Office noise alone is estimated to be costing American business about 4 million dollars a day.

British Railways have for some time been carrying out experiments aimed at reducing the noise of trains. One took place recently near the small village of

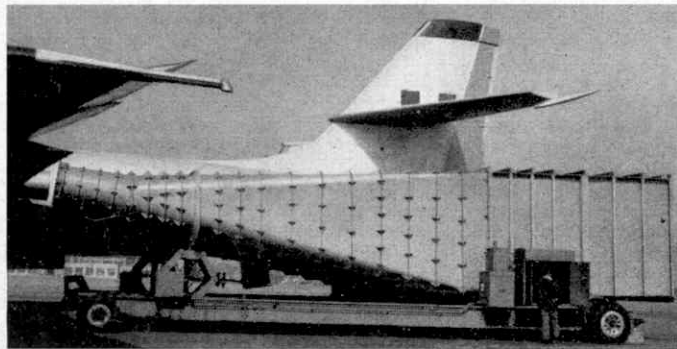


The most popular show in town! Pneumatic drills chatter as road repairs begin near the Marble Arch. This illustration and that on the opposite page are reproduced from Picture Post Library photographs.

Cropredy in Oxfordshire, where the usual 100-ft. rails were welded into 300-ft. lengths. At the site they were further welded into 600-ft. lengths of line. The noisy click-click of the wheels over the points was reduced, and wear and tear also became less. The work will be continued elsewhere and may in time cover the whole of Britain. But that would mean a cost of several million pounds.

Most of us, after a day's toil in the city office or factory, would welcome a little more peace and quiet at home. But how can we go about getting it? Well here are a few suggestions.

Set aside a room or an area in your house as a "quiet place." Study your dwelling, to see which part of it can most easily be cut off from outside noises. Radio, television, and other noisemakers can



Silencing a jet engine on test. Photograph by courtesy of the Gloster Aircraft Company.

be removed to another section of the house. Such a quiet place, used for rest, study, and reading, will go toward removing family tension.

Many simple methods of sound insulation can be applied in your home. Perhaps the most obvious is the use of rugs and draperies. Bare floors and stairs resounding to the tramp of feet can set up a startling

city in the world it is odds on you would answer New York or London. But you would be wrong. After a lengthy survey Tokyo has been labelled the Noisiest City in the World.

This claim to fame is chiefly due to the noise of its traffic, its inefficient traffic system, the impatience of its motorists, and the stubbornness of its pedestrians.

Although much smaller than New York, the Japanese capital is estimated to be about four times noisier. By comparison London is a haven of peace. Piccadilly Circus at the peak period is almost silent compared with the clanging, banging, roaring, hooting and blaring of any one of Tokyo's main thoroughfares.

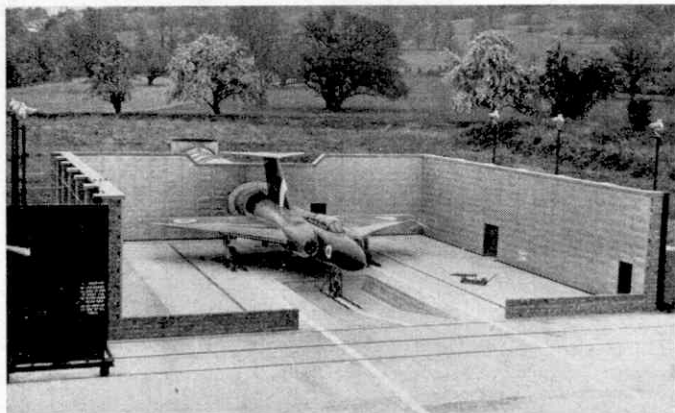
Any person who has walked along the Tokyo streets without contracting a

headache has, indeed, a most sturdy constitution. Japanese physicians claim that the perpetual din is the cause of an alarming increase in the number of nervous breakdowns among the inhabitants. Dr. Koki Sato, head of the Japanese Acoustic Society, is so sure of this that he has given a specific name to the condition. He calls it "urban sickness."

Dr. Sato declares that victims of the ailment in its extreme form are so unnerved by the noise that they are unable to walk a straight line, and they have difficulty in speaking coherently. In its final stages "urban sickness" can induce schizophrenia. Its effect is similar to chronic over-indulgence in strong drink, but the stupor is longer lasting and more insidious. It is caused by the inability of the brain and nervous system to absorb any more noises.

At almost any time of the day or night noise comes from all directions, but the chief offenders are those on the roads. With its cars, taxis and big unwieldy diesel buses, the Japanese capital city is a veritable nightmare on wheels. And in addition to the ceaseless horn-blaring, the streets reverberate

(Cont. on page 354)



This mobile silencer for jet engines is in use at the Weybridge airfield of Vickers-Armstrongs (Aircraft) Ltd. It was the first ever made, and Valiants now undergo engine runs without disturbing people at work within the airfield perimeter.

amount of noise in a house. This is particularly noticeable when the noise is overhead. Window draperies cut down echoes and will even soften sounds that enter from the outside.

You might replace a flimsy door with a sturdy one to screen noise from a room. Better still, put an insulating strip similar to weather stripping around the door, since more sound goes around a door than through it.

Sometimes the slamming of a door each time it is closed will keep you on edge all day. You may notice that your muscles tense to each impact. Why not fit a mechanical door check? It will pay for itself many times over in calmer nerves.

In South London, tenants are gladly paying a shilling a week extra on the rent to have their flats sound-proofed. Bristol City Corporation re-housed 2,000 families, a few at a time, while their homes were treated to defeat noise. New houses too are being built with layers of seaweed, cork or glass wool between walls and floors to reduce the "neighbour noise" of radios, babies, cisterns and chatter.

If you were asked to name the noisiest



The Fairey Rotodyne, the world's first vertical take-off air liner. H.R.H. the Duke of Edinburgh is seen talking to the pilot, Sq. Ldr. R. Gellatly, and Mr. Richard Fairey, during his visit to White Waltham aerodrome, near Maidenhead, last March, when he saw the Rotodyne in flight. Illustrations by courtesy of The Fairey Aviation Company, Limited.

THE Fairey Rotodyne is the most exciting aeroplane flying anywhere in the World. At a time when some fighters and bombers are cruising at more than twice the speed of sound, and when 150-seat air liners will soon link London and New York in under seven hours, this may seem rather a sweeping claim for an aircraft that will carry only 48 passengers at under 200 m.p.h. But, whereas the others are simple developments of conventional types of aeroplane, the Rotodyne is entirely new—the first vertical take-off air liner ever to fly.

To find out why this is so exciting, let us imagine that we want to fly from London to Paris. We should probably begin our journey today at the West London Air Terminal, from where we should take a 40-min. coach ride out to the Airport. An even longer coach ride would await us at the other end, so that we should spend far more time in coaches on the ground than in our aircraft in the air. That is why the actual journey time for the 200-mile London-Paris service, from city centre to city centre and not counting time spent in passing through Customs and other formalities at the airports, is about  $3\frac{1}{4}$  hours. In other words, although we may fly in a 300 m.p.h. Viscount, we

average only 61 m.p.h. for the entire journey.

Now let us take a peep into the future, to see what will happen when the Rotodyne is in service.

As a start, there will be no need to ride out to the airport, because this will be in the heart of the city. We do not know where, or even what it will be like; but the ideal would be a big platform built over the top of a railway station. Let us assume that it is over Waterloo, which would be

perfect, as this station stands on a hill, so that the sound of the aircraft landing and taking off would be kept as far as possible from the people in

the streets, who expect a certain amount of noise from railway stations in any case.

From the ground, we see little but a big flat reinforced concrete deck, like a lid on the station. A lift carries us quickly up to the ultra-modern passenger handling buildings nestling under one side of the deck, where we pass through the usual Customs and Emigration checks. Then, up a short escalator and we seem to step straight into the world of science-fiction writers.

Lined up on the flat deck in front of us are the Rotodynes, one bound for Paris,

## The Fairey Rotodyne

By John W. R. Taylor

another for Brussels, and a third for Dublin. At close quarters they look enormous bigger than any helicopter we have ever seen before, and it seems impossible that they can operate from a platform only 400 ft. long and 200 ft. wide.

What makes the whole business seem even more unreal is that they look so much like ordinary fixed-wing air liners, with neat businesslike lines that contrast sharply with the ungainly appearance of most helicopters.

The reason is, of course, that the Rotodyne is only part helicopter. It can best be described as a twin-engined air liner in which the wings have been cut back to half the usual span, the missing portions being replaced by a 90 ft. diam. four-blade rotor. Together, the wings and rotor give all the "lift" needed in cruising flight; while the rotor enables the aircraft to take off and land vertically. As a result, the Rotodyne can operate from city-centre sites too small for any other fixed wing aeroplane, and yet can cruise faster than any other large helicopter.

Let us take a closer look at it. To do so, we need none of the usual flights of steps, because the forward door of the cabin hinges down and has three steps built into it. No more are needed because the cabin floor is only 41 in. above the ground.

At the invitation of the pilot, we turn left, through a small door into the roomy flight deck. There are seats for the pilot and copilot, with dual controls. Once again, the layout is more like that of a fixed-wing aeroplane than of a helicopter, although the crew have a much better view than usual, through big windows in front, to each side, above and below them. Over the main instrument panel is a smaller one carrying blind-flying



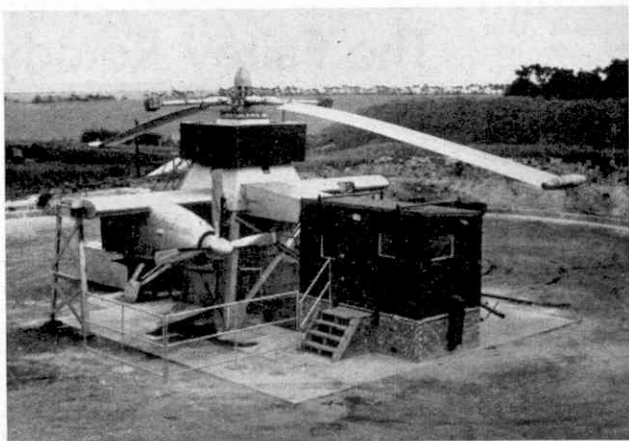
Squadron Leader Ronald Gellatly, A.F.C., Fairey's Chief Helicopter Test Pilot.

instruments, because the Rotodyne can operate by day or night in all weathers. In fact, its ability to hover and inch its way slowly in any direction makes it the safest aircraft ever flown when conditions are bad, especially as it can fly on one engine.

Back now into the main cabin, with its 48 comfortable seats in pairs on each side of the central aisle. The fine large oval-shape windows are tremendously popular with passengers, because the Rotodyne cruises at lower altitudes than ordinary air liners, and the high-set wing does not spoil the downward view.

There are the usual galley, toilet and baggage compartments fore and aft of the cabin; while the entire rear end of the fuselage consists of two sideways-opening doors. When these are open, bulky freight and baggage can be loaded straight into the cabin from lorries. As a result, when only a few passengers are to be carried, the rear seats can be taken out, a partition put up across the cabin, and the tail end filled with cargo to make up the load.

What is more, the cabin is so big that motor cars can be driven in through the rear doors, up a ramp, enabling the aircraft to be used for car ferry services.



The Rotodyne rotor on the spinning rig at the Ministry of Supply's Aircraft and Armament Experimental Establishment, Boscombe Down, Wilts. The entire propulsive system was tested here prior to the Rotodyne's first flight.

As passengers, we are most concerned with the cabin; but technically the wing is far more interesting. Spanning 46 ft. 6 in. it carries the two 3,500 h.p. Napier Eland turboprop engines and the tall rotor pylon. Inside it are fuel tanks, pipes and air ducts, so that it forms a complete self-contained power plant-rotor unit, which is attached to the fuselage by only four bolts. Apart from the controls which run from the flight deck to the engines, rotor and tail, everything else is in or on the wing.

The rotor, unlike that of most helicopters, is not shaft driven, but spins freely on top of the pylon. The blades are hollow, with fuel and air lines running inside them to streamlined pressure-jet units on the tips. To the rear of each engine is a separate air compressor... but there's no time to see more now. We must take our seats.

All aboard. Doors closed. Seat-belts fastened. Already the two turboprops are filling the air with a soft whine. With a whoosh and a muffled roar the big rotor starts to turn. What is happening at this stage is that the Elands are being used to drive the separate air compressors, which are pumping compressed air along ducts inside the wings, up through the rotor pylon, along the hollow blades to the pressure-jets. There the air is being mixed with kerosene fuel and burned, and the jets are turning the rotor. Sufficient power is being put into the propellers only to enable them to assist directional control during take-off.

No need to waste ten minutes taxiing out to the runway, as we should in an ordinary air liner. Gently and smoothly, the Rotodyne lifts itself straight up from the ground and, almost before we realise it, the landing deck over Waterloo Station is getting smaller and smaller beneath our silver wings.

We're at nearly 1,000 ft. now, and the Rotodyne begins to move forward, still

working like a helicopter. Gradually its speed increases, and before long we are cruising towards France at about 180 m.p.h. Although we have not realised it, the Rotodyne has changed in the meantime from a helicopter into an autogyro. The separate compressors behind the turboprops have been de-clutched and the engine power is now being put into the two propellers. With air and fuel supplies cut off, the pressure-jets are no longer working and the rotor is windmilling freely in the



This view gives a good idea of the great sweep of the Fairey Rotodyne's powerful 90 ft. diam. four-bladed rotor.

airflow. In other words, the aircraft is now flying like any other twin-engined air liner, except that its lift comes from both the fixed wings and the rotor.

When the time comes to land in Paris, the procedure will be like that for take-off, but in reverse, with the pressure-jets again turning the rotor.

Because there is a limit on the speed at which rotors can move through the air without running into aerodynamic troubles, even the Rotodyne cannot fly faster than 200 m.p.h., but this matters not at all. By flying direct from the centre of London to the centre of Paris, our total journey time is about 1½ hrs., instead of 3½ hrs. by coach and 300 m.p.h. fixed-wing air liner. Our average speed has more than doubled, from 61 m.p.h. to 125 m.p.h. Nor does it cost us any more, for over this kind of distance the Rotodyne costs about the same to operate as a fixed-wing air liner of the same size.

(Continued on page 354)

# Road and Track

By Peter Lewis

**WHAT** a magnificent performance British cars have been putting up this season in the World Championship. The victory of Stirling Moss in the British Grand Prix just twelve months ago has been followed by a succession of British triumphs that have astounded the world and confounded Sig. Enzo Ferrari.

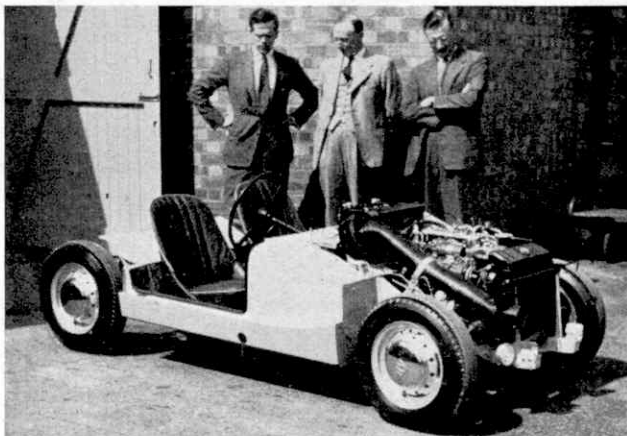
Just look at the early part of this season. In the Argentine G.P. victory went to Stirling Moss, driving Rob Walker's Cooper-Climax—a lone British car ranged against nine Italian machines.

At Monaco, British cars occupied the first two rows of the starting grid, having put up some astonishing times in practice, and it was Rob Walker's car—this time driven by M. Trintignant—that humbled the Ferraris yet again. At Zandvoort three Vanwalls occupied the front row of the grid and it was Moss's car that won the race by 47 seconds, put up fastest lap and lapped the Ferraris.

The secret is stamina—the ability of a racing car to go fast and to keep on going fast. Perhaps the new minimum length of World Championship F.I. races—two hours or 300 kilometres instead of three hours or 500 kilometres as in 1957—has helped us indirectly, but the fact still remains that Vanwall, B.R.M., and Cooper have found a greater measure of reliability than in previous seasons.

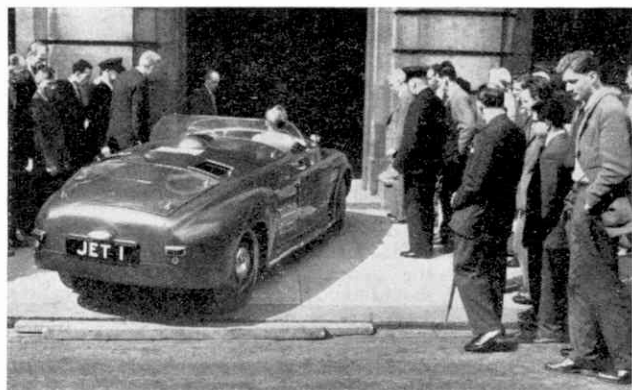
With race after race showing faster average speeds than in 1957, with British drivers dominating the scene (and we must not forget Hawthorn and Collins in the Ferrari team), and with British cars so evenly matched on our own Silverstone circuit, I predict that on 19th July at the Northants circuit we are going to see one of the most closely fought British G.P. ever held in this country.

Do not overlook the fact that almost all the top flight drivers in this fifth round in Europe of the 1958 championship are British. Years of hard slogging in 500 c.c. racing cars, in sports cars, and in unreliable or underpowered Formula 1 and 2 racing cars has brought its just reward at last. The green Formula 1 cars can now match the superlative skill of our best drivers and I wonder whether the British victories in 1958 have set the wheels in motion once more in the Mercedes-Benz Racing Department.



The Austin Healey Sprite has a stressed steel shell with rigid sections around the scuttles and wheel boxes. Steering is by the well-proved Morris Minor rack and pinion type.

Incidentally, although the points system for the Drivers Championship remains unchanged in that 1st, 2nd, 3rd, 4th, 5th and 6th places take 8, 6, 4, 3, 2 and 1 points respectively, a driver can only gain points this season if he drives the same car throughout the race. This is a good rule, but it undoubtedly sets a few teasers to team managers. For instance supposing a Number 1 driver is leading the race and blows up his car. Does the team manager call in another driver, who may be quite well placed, so that his best driver can go back into the race. If he does, neither driver gets any championship points. The situation is further complicated by the new Manufacturers F.I. Championship.



The Rover Jet 1 enters the South Kensington Science Museum.

### The Austin-Healey Sprite

Twenty years ago, as a direct result of racing successes, a 747 c.c. Austin Seven sports car with a power output of 24 b.h.p. at 5,000 r.p.m. was marketed. It was a modified version of the famous racing Ulsters and cost £185, or £225 with a supercharger, which produced 33 b.h.p. at 5,000 r.p.m.

In July 1957, at Montlhery, an Austin A.35 was driven continuously for seven days and nights at an average speed of nearly 75 m.p.h. Last August, at Utah, a supercharged experimental car averaged 118 m.p.h. for 12 hours and set up 53 new American and International long-distance records.

This activity was a prelude to the announcement a few weeks ago of the inexpensive little brother of the Austin-Healey 100, the Sprite. Here is a sports car that should become as popular with the present generation as those race-proved Ulsters and Nippys, and as much sought after when the Sprites eventually change hands.

This delightful, nimble little car with a tuned version of the Austin A.35 engine is everything that it should be so far as road-holding is concerned. It sits on the road as firmly as an express train on rails and can be driven hard and, what is more important, with confidence up to

its maximum of just over 80 m.p.h. The combination of roadholding, rack and pinion steering, remote control gear lever and excellent brakes make this a car that really handles.

The engine has twin carburettors — as against the single unit on the A.35 saloon — together with stronger valve springs, and big end and main engine bearings of the robust copper lead type. With the normal B.M.C. compression ratio of 8.3 to 1, the 948 c.c.

engine develops 42.5 b.h.p. at 5,000 r.p.m. as against the 34 b.h.p. at 4,750 r.p.m. developed by the A.35 saloon.

The Sprite weighs only 11½ cwt. less fuel, and with such a high power/weight ratio one expects sparkling performance and is not disappointed. From 0 to 50 m.p.h. in 14 seconds presents no difficulty at all.

### Jet 1

At the Science Museum in South Kensington one of the most recent additions is the world's first Gas Turbine car. For ten years Jet 1 has played an important part in Rover's automobile gas turbine research programme and it was in 1952, on the Jabbeke Motor Road in Belgium, that the car covered the flying mile at 151.196 m.p.h. and the standing (Cont. on page 354)



Scotchlite in use on a portable warning sign and by a traffic controller.

# Hunting Butterflies in Spain

By L. Hugh Newman, F.R.E.S.

I HAVE collected butterflies in many parts of Europe at different seasons of the year, and every trip has been an adventure. In high summer I have caught Camberwell Beauties in their native haunts, the pine forests of Finland; in late autumn I have watched Pale Clouded Yellows and Mountain Ringlets high above Chateau D'oex in Switzerland feeding from the last of the alpine flowers, and have awakened next morning to find the slopes I climbed the day before already thick with snow, the butterflies having undoubtedly perished overnight.

But if you had told me that in mid-

touch down at Madrid airport, a cold and windy plateau, has really nothing to do with my story, but it did give me the pleasure of a day flight across the Southern half of Spain. Then I could judge for myself the appallingly arid conditions of the mountainous countryside, which of course accounts for the poverty and underdevelopment of much of Spain.

Stepping out of the plane at Gibraltar on to the air strip that juts out into the sea was like plunging into a bath of warm milk, to mix the metaphors. But despite the balmy air one could have thought that a freak snow storm was in progress, even though the sky was blue and the sun brilliant, for floating in the air everywhere there appeared to be vast numbers of giant snowflakes. In reality they were merely the familiar Cabbage White butterflies.

The following day, as we motored along the coast, these "summer snowflakes" met the eye through every vista. I can only conclude that what I saw was an early migration from the North African coast, that misty Continent I had glimpsed from the heights of The Rock, when I was interviewing the Gibraltar Apes for my young listeners on the B.B.C. Nature Parliament programme.

Stopping on one occasion to take a photograph, I noticed a tiny blue butterfly flitting from one flowering spurge plant to another. It was only *icarus*, the Common Blue, and nothing strange and new, but I found pleasure in a sight so familiar in the English

countryside at haymaking time.

After dining in true Spanish fashion long after my normal bed-time, the Mediterranean moon beckoned me into the hotel grounds. The perfume of the night-scented stocks was almost overpowering as I made my way down the terraced garden to the bank of flowers. I had other things in mind, for the night air was filled with a faint whirring sound as phantom forms darted from flower



Shady stone stairway leading to the Church in Marbella, where the bells chimed out "tickle-me, tickle-me".

winter on the Costa del Sol, in Southern Spain, that I should find butterflies in such profusion that I would not know which species to net first, I doubt if I should have believed you.

While you no doubt sat cosily before your fires on a night in early February, I boarded the night plane for Gibraltar, expecting to reach The Rock before dawn. The fact that engine trouble developed so that we had to





The orange harvest is gathered in large circular baskets, which are carried on the head by old men.

to flower. But these too were only old friends. I pin-pointed one, the beady eye, the long curved tongue probing deep into the flowers and the outspread "tail" showing me that these were Humming-bird Hawks, those little grey moths with yellowish-orange hind wings that visit the shores of Britain from time to time and deceive people into believing they have seen an exotic bird!

My journey took me to Marbella, and on my first morning there I was awakened by a cacophony of bells, rung with such fervour that it sounded as though the two churches in the village were competing against each other. Faster and faster they were rung until their clanging merged into a discordant jangle of sound, the louder bell seeming to repeat again and again the phrase "tickle-me, tickle-me, tickle-me."

After a meagre roll and coffee breakfast—I'm a porridge, eggs and bacon man—I came out into the blinding sunshine and noticed in the distance several dark winged insects floating over the flowers. I knew them by their flight. They were Red Admirals come for the morning feast of nectar, and here I was watching them at least four months before I would normally see them in my garden in Kent.

This was only the beginning, for by mid-day I was bemused and

astonished by all I had seen by then in this winter paradise for butterflies.

Many pictures come to my mind as I recall my sunny sojourn in Spain. In one a fresh little Small Copper butterfly that had settled on a pebble by a stream and flashed into the air to attack any passing fly or bumble bee that entered its territory.

In another the yellow Brimstone hastened by, not pausing a moment to refresh itself from flowers, as though in search of some remote El Dorado. Then there was a field of wild marigolds where countless Clouded Yellows flitted from flower to flower, settling now and then on the petals they so closely resembled in colour, and an ancient cherry tree in full bloom against the backdrop of the Blue Mediterranean, with scores of Red Admirals flitting between the branches.

Yet again I think of a rocky cliff where periwinkle grew in crevices and a magnificent yellow and orange-flushed Cleopatra, queen of butterflies, fed and sunned itself. And down by the waterworks, the first brilliant yellow Orange-tip, with the quaint name of *euphenoides*, darted through the spray and up the steep cliff out of sight into the blue.



The municipal dust cart in a Spanish village on the Costa del Sol; both boy and donkey seemed surprised at being asked to pose!

All pretty sights, you will agree. But there is a discordant note that it would be unfair not to record. There appears to be a law in Spain that you must hoot twice at every cross-road—the Spanish motorist always plays for safety and literally “drives on his horn”. And what a variety of mechanical noises the cars possess. The local bus is undoubtedly the worst. It almost blasts you out of bed every morning on its first run through the village. Gabriel’s trumpet could do no more to awaken the dead tired traveller! I was glad to find that at least the municipal dust cart in Marbella was not power driven. In fact, it was pulled by a donkey and the boy in charge could not have been more than twelve or thirteen years old.

It was a good thing there were plenty of cars for hire, for my adventures did not really begin until I left the coast and made my way up into the mountains on the Ojen road in a fast American Buick. The journey was the usual nightmare affair of hairpin bends, between steep rocky cliffs and dizzy drops. In the terraced orchards the orange harvest was being gathered and old men with huge circular baskets plodded up the steep hillsides. Speckled Wood butterflies in pairs chased each other along the road and over the low walls, to pop up again a few yards further on, then about turn and back again. There is no doubt at all that butterflies play hide and seek, or “Chase me Charlie” or whatever you like to call it!

I made my way down a steep, wooded pathway towards a river bed, and under the cork oaks I spotted a tiny purplish butterfly and swept it up into my net. To my delight I found it was a species of Hairstreak I had never seen before. I did not know it existed in Europe. On reaching the river bank I found the ground starred with wild flowers, and darting about were brown Skippers, Small Coppers, Small Heaths, all familiar to me.

Then something strange attracted my attention—the flight of the butterfly that was new to me. When it settled I saw it was a Copper, but the underside was mottled in green. In my excitement I did the wrong thing, trying to sweep it off the flower-head when I should have “dabbed” on top of it. Of course I missed it, and it was gone in a flash.

Wandering on I met an old goatherd, or

Zagala, his clothes in tatters, his face carved into a thousand wrinkles. To my surprise he showed great enthusiasm for the hunt, and it was he who first spotted the rare Large Tortoiseshell floating down along the course of the stream. I had a great chase after it over slippery stepping stones, but had to give up, exhausted. The butterfly was too wild for me, and it had the sharp eyes of all *Vanessa* butterflies, which know



The old goat-herd or Zagala, who pointed out the Large Tortoiseshell butterfly to me.

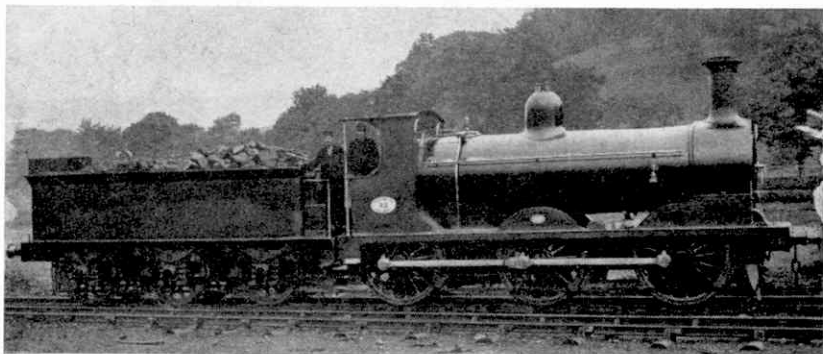
very well how to avoid danger, especially, it seems, from a man with a butterfly net.

My new friend beckoned me on, repeating the words “blanco, blanco,” all the time. “More Cabbage Whites,” I thought, but I was wrong, for when we had climbed over a ridge and looked down into a narrow, sunny gorge, I saw a number of Whites. And they were Bath Whites, one of Britain’s great rarities! I soon had half a dozen perfect specimens, quite enough for a small representative collection of the district.

On another trip along the coast road to the fashionable resort of Fuengirola, we stopped and bought a length of ripe sugar cane for about a penny. Splitting this lengthways, buyers suck the sickly juice from the hard pith. It only makes one more thirsty than ever, but the local boys love it and the sugar-cane vendor did a roaring trade.

# From Our Readers

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



## A DRIVER ON THE N.B.R.

My great grandfather, a former driver in the North British Railway Company, lived in Peebles in the closing years of the last century. He then earned £1 a week, which was the standard wage for most trades at that time.

Drivers took great pride in the appearance of their locomotives in those days. He, with others, would rise early every morning to have time to polish every nook and cranny in his cab.

In the upper illustration my grandfather, who is nearest the tender is seen on the footplate with his fireman.

The rules under which railway men worked have changed very much since my grandfather's time. For example, the North British Railway warned or dismissed its drivers for letting off steam without cause or reason.

Many interesting classes of 0-6-0 goods engines, designed and built by such famous locomotive engineers as Dugald Drummond, Wheatley and Holmes,

date from the closing years of last century. Many of them survived until well into the days of the L.N.E.R., and there are some still in service. The engine illustrated seems to have been designed by Matthew Holmes, and to have been one of a class now extinct.

A. SANGSTER (Aberdeen)

## A CHURCH WITH A SEPARATE TOWER

The accompanying picture shows the church of St. Mary the Virgin at Marston Moreteyne in Bedfordshire. This church is well known because it is one that possesses a tower that is separate from the church.

The tower itself is a three-storied building with diagonal buttresses, and a stairway in the thickness of the wall, leading to the bells. It stands more than 70 ft. from the north wall of the chancel. This is an exceptionally long distance for a separate tower. Usually such a structure is connected with the remainder of the building by cloisters, but the tower of St. Mary is completely detached.

The most acceptable explanation for a separate tower is that it had to be built later than the rest of the church, owing to a lack of funds. The chancel and vestry of the church date from the early fourteenth century, whereas the tower appears to have been built some fifty years later.

There are few churches that can boast a separate tower, and as that of St. Mary is such a good example, it is well worth a visit.

C. A. RUSSELL  
(Henlow, Bedfordshire)



The church of St. Mary at Marston Moreteyne, Beds. Photograph by C. A. Russell, Henlow.

# Air News

By

John W. R. Taylor

## Amphibious Helicopter

Safety regulations decree that single-engined helicopters must follow the course of a river into large cities, whenever possible, so that if they suffer an engine failure they can alight on the water. To make this possible, the Vertol company have designed special flotation gear for the tandem-rotor Model 44 helicopters that they have supplied to New York Airways and Sabena.

As shown in the illustration above, this gear consists of three streamlined nylon fabric floats, covered with rubber and divided internally into separate compartments, so that the aircraft would continue to float even if some punctures were incurred in an emergency landing.

Tests have shown that the Vertol 44 can touch down safely in the water at a forward speed of 35 m.p.h., can taxi through the water at up to 10 m.p.h. and take off again without difficulty. The fuselage is sealed to keep out the water; but the floats are intended only for emergency use. For regular operation from water, the fuselage would need to be redesigned with separate flotation compartments, bilge pumps and other equipment.

## Russia Plans Atomic Aircraft

The famous Russian nuclear physicist, Peter Kapitza, is head of a design team that hopes to put the world's first atomic-powered aeroplane into the air this year. Few details are yet available, but the aircraft is said to be an experimental development of the four-jet bomber known in the West as *Bison*. The reactor and shielding of the atomic aircraft are said to weigh 125,000 lb.



Vertol 44 tandem-rotor helicopter taking off from a river. The water is pouring out of the little cages that protect and shape the aft floats and from the fairing around which the forward float fits.

## Proteus Progress

The Bristol Proteus 705 turboprops fitted in B.O.A.C.'s fleet of Britannia 102 air liners are now authorised to run for 1,300 hrs. between major overhauls. This is equivalent to flying round the world about 18 times, and it is believed that no other aero engine has ever been permitted such an overhaul life—the measure of an engine's reliability—within 13 months of entering service.

## Promising French Prototype

Although the day of the first-line fighter and bomber is drawing to a close, there is likely to be an even greater demand for general-purpose observation and ground attack aircraft for use in limited local campaigns. The French have always been noted for their skill in producing such machines, and the new Morane-Saulnier M.S.1500 Epervier, illustrated below, is no exception.

Neat, sturdy, yet simple in design and cheap to build, it is an all-metal two-seater with a bulged cockpit hood to give an excellent all-round view for observation and artillery spotting duties. Its cockpit is armoured against ground-fire, and it can carry under its wings an assortment of machine-guns, small bombs, rockets or anti-tank guided missiles.

The Epervier is designed for operation from rough forward airstrips with a minimum of maintenance, and has a fixed undercarriage. The prototype has a 400 h.p. Turbomeca Marcadau turboprop, but production aircraft would have a 750 h.p. Turbomeca Bastan. With the latter engine, they would have a top speed of 200 m.p.h. and would be able to take off in only 140 yards. Wing span is 42 ft. 8 in., length 34 ft. 7 in. and loaded weight 7,050 lb.

## First of the New Comets

After four years of redesign and research, the de Havilland Comet is in the news again. G-APDA,



The new Morane-Saulnier M.S.1500 Epervier, a two-seat general-purpose observation and ground-attack aircraft. It has a fixed undercarriage.



**G-APDA, the first of 19 de Havilland Comet 4's for British Overseas Airways Corporation. It is half as large again and twice as powerful as the earlier Comet.**

the first of 19 Comet 4's for B.O.A.C., made its maiden flight on 27th April last. A few days later came confirmation that the Argentine airline, Aerolíneas Argentinas, has ordered six similar machines at a cost of more than £10 million.

This new order brings the total sales of the new Comet to 31, because B.E.A. are also buying six Comet 4B's to meet the competition of their continental competitors who will fly twin-jet Caravelles. In doing so, they are getting the most thoroughly-proven new air liner in history, for all the experience of more than 50,000 hrs. of test and operational flying are built into the Comet 4, which is half as large again and twice as powerful as the early Comet. It also carries about twice as many passengers twice as far, more economically, faster and in greater comfort.

B.O.A.C.'s Comet 4 spans 115 ft., is 111 ft. 6 in. long, weighs 156,000 lb. fully-loaded and can carry 56-71 passengers up to 3,000 miles at 510 m.p.h. The B.E.A. Comet 4B is intended for shorter ranges, the emphasis being on great load-carrying capacity and higher speed at lower altitudes. So the wing span has been reduced to 107 ft. 9½ in., and the fuselage lengthened to 118 ft. to seat 84-99 passengers. The 4B will make money on any route from 300 to 2,300 miles long, cruising at 532 m.p.h. at 23,000 ft. Both versions have four 10,500 lb. thrust Rolls-Royce Avon R.A.29 turbojets.

It is expected that B.O.A.C. will introduce Comet 4's on to their South African route next February.

#### U.S. Research on Faster-than-Sound Glider

Latest idea being investigated by the Bell Aircraft Corporation under U.S.A.F. contract is the use of hypersonic (over-3,000 m.p.h.) piloted gliders for military reconnaissance. The gliders would be fired to a great height by means of a missile-type booster rocket and would then complete their mission in a glide before returning and making a normal landing at their base.

#### New International Airport

Britain has had another international airport since 30th April last, when Customs facilities became available at Squires Gate Airport, Blackpool, to meet the requirements of Silver City Airways' new Blackpool-Ostend service. First international service ever operated from Blackpool, it costs less than the air trip from that city to Jersey and takes only 2½ hours. It is operated with 36-seat DC-3's, which leave Squires Gate at 3.15 p.m. and return from Ostend at 8.45 p.m. every Sunday.

#### P.1 Gets Its Punch

The striking picture at the foot of this page shows the English Electric P.1B interceptor complete with its formidable armament of two de Havilland Firestreak air-to-air missiles mounted

on pylons on each side of the fuselage. The "pencil-point" noses of the missiles contain infra-red devices which home on to the hot exhaust of their target.

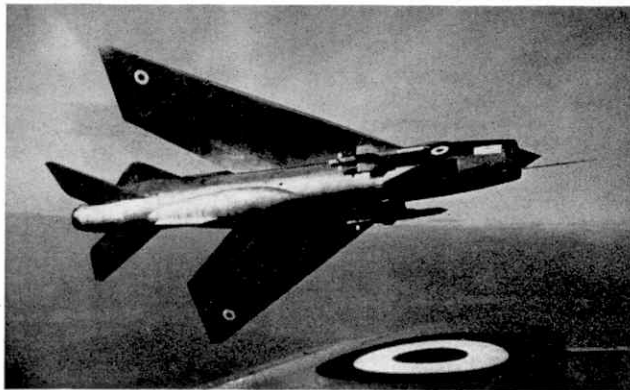
Also visible is the fairing which production P.1B's will carry under their rear fuselage. This can contain extra fuel to extend the fighter's range, or a Napier Double Scorpion two-barrel rocket motor to turn it into a mixed-power interceptor. Using the power of both the Double Scorpion and the two Rolls-Royce Avon turbojets inside its fuselage, the P.1B is expected to have a top speed of about 1,500 m.p.h. and to climb to jet-bomber cruising heights in about two minutes.

\* \* \* \* \*

During recent performance trials, a Vickers Viscount 810 reached a speed of more than 500 m.p.h. in a shallow dive. This is nearly 140 m.p.h. faster than this version is designed to cruise in normal airline service.

\* \* \* \* \*

The Handley Page Victor, third of Britain's great V-bombers, has now entered squadron service with the Royal Air Force. First deliveries were made to No. 10 Squadron at Cottesmore, Rutland, in April of this year.



**The English Electric P.1B interceptor, showing it armed with two de Havilland Firestreak air-to-air missiles, one on each side of the fuselage.**



The "Day Continental" bound for Harwich is here passing Stratford, hauled by 4-6-2 No. 70002 "Geoffrey Chaucer." Photograph by C. R. L. Coles.

## Railway Notes

By R. A. H. Weight

### Aboard the "East Anglian"

On a fine May day this principal Norwich-London express departing at 11.45 a.m., formed a handsome 9-coach maroon train including restaurant cars. Running on the 2 hr. 10 min. quickest southbound timing for 115 miles with one stop, we enjoyed clear signals all the way, slowed twice north of Ipswich where bridges were under reconstruction, but after a most comfortable fast trip arrived at Liverpool Street 4½ min. before time!

The locomotive was not a Britannia Pacific, as customary in recent years, but the nearly new diesel-electric 1,250 h.p. mixed traffic locomotive, A1A-A1A No. D5507, stationed and manned at Stratford. This modestly powered machine was master of the situation and maintained steady averages over a sharply undulating course.

Ipswich was reached just within the 51 min. allowance for the first 46½ miles, after a sustained maximum of 78 m.p.h. down the gradual descent from Stowmarket between the two extra slacks. Many passengers joined there. Passing times on to Chelmsford, more than half-way, were nicely kept, with speeds varying between 58 and 70 uphill and down, apart from the necessary slowing over Colchester curve. Through the electrified area, with a 57 m.p.h. minimum at the top of Brentwood bank and then maxima of 75 near Romford and Seven Kings, time was gained. The 64½ miles to passing Stratford were covered in 65½ min. and then we went more gently into the London terminus.

Similar achievements and higher maximum speeds have no doubt been recorded behind steam locomotives since the much faster services were introduced when sufficient Britannias became available on this and other Great Eastern Section main lines, but this happened to be my quickest run of its kind so far. The *East Anglian* returns from Liverpool Street at 6.30 p.m. The 3.30 *Broadman* is faster and is the quickest on the G.E. Line, often attaining well over 80 m.p.h. between Ipswich and Norwich, for example, as do other expresses at times.

### Locomotive and Running Shed News

Locomotives lately added to stock were numbered and allocated as follows: class 9 steam 2-10-0, Nos. 92176-7, to 36A, Doncaster Shed; and Nos. 92163-5 respectively to 15B, Kettering, 15C, Leicester and 21A, Saltley. Nos. 92190-1 go to 41A, Sheffield (Darnall).

Diesel-electric 1C-C1, 2,000 h.p. English Electric, type 4, Nos. D200-1 to 30A, Stratford (also running trials on G.N. Section), A1A-A1A Nos. D5507-8 to 30A, Stratford, and Bo-Bo No. D8204 to 1D, Devons Road, London. Standard shunting series: Nos. D3417-8 to 65B, St. Rollox, Glasgow, Nos. D3429-30, 3503-6 to 82B, Bristol, St. Philip's Marsh, and No. D3431 to 84B, Wolverhampton, Oxley.

Other diesel allocations are Nos. D3488-9 to 34E, Peterborough, No. D3490 to 34A, King's Cross, No. D3491 to 31B, March, and Nos. D3652-6 to 55B Stourton.

Diesel-mechanical 6-wheeled shunting engine No. D2017 to 31A, March, No. D2018 to 34D, Hitchin, No. D2270-1 to 55B, Stourton, and Nos. D2272-3 to 55A, Leeds. The 4-wheeled shunting locomotives Nos. D2900-1 go to 1D, Devons Road.

Commemorating the bi-centenary of the Regiment, V2 2-6-2 No. 60964 has been named *The Durham Light Infantry*.

There were over 200 4-4-2 or Atlantic express engines in Britain 20 years ago, mainly on the L.N.E.R., including 50 of the Z (L.N.E.C7) class graphically described in the *May M.M.* Two ex-G.N.R. pioneer examples are in York Railway Museum. Though totalling only 11 locomotives, the London, Brighton and South Coast-Southern 4-4-2s were hard working and popular for many years. Class H2, No. 32424, *Beachy Head*, was their final Atlantic and the last in service.

On a special farewell run from London, with a lighter replica of the Continental boat trains once handled so well, *Beachy Head* last April attained speeds up to 72 m.p.h., reaching Newhaven Harbour only 1 min. late after a gallant effort, although halted twice by signals and suffering several other checks.

E.R. changed shed code numbering is as follows: main Peterborough depot, 34E, Peterborough, Spital Bridge, 31F; Grantham, 34F; Retford, 36E; Frodingham, 36C; and Colwick (Nottingham) and Boston respectively 40E and 40F. Mexborough, Barnsley, Staveley (ex-G.C.R.), Langwith and Tuxford become in that order 41F, 41G, 41H, 41J, 41K.

### Fine Castle and King Runs on the W.R.

A number of excellent performances by expresses to and from Paddington, recorded and kindly reported to me by D. S. M. Barrie and G. Tibbett, included a mile-a-minute start to stop run from London to Oxford

on a 7-coach special, despite a slowing at Reading and signal stop outside Oxford, by Castle class No. 7017 *G. J. Churchward*. With a similar load the 1.15 p.m. from Paddington in charge of No. 5048 *Earl of Devon* kept the very fast 99-min. allowance for the 106½ miles to the first stop at Bath, although pulled up by signals 2 miles from the start and then suffering two further slacks.

In the opposite direction, along the largely level Bristol route, No. 7015 *Carn Brea Castle* also suffered signal delays near junctions, but converted a late start from Swindon into a punctual arrival at Paddington, running like the *Bristolian* for part of the way with speeds up to 85 m.p.h. though with a considerably heavier 11-coach train, less one slipped at Reading while passing at reduced speed along the platform line. This was the up evening *Merchant Venturer*, worked like the last named express by Bristol depot.

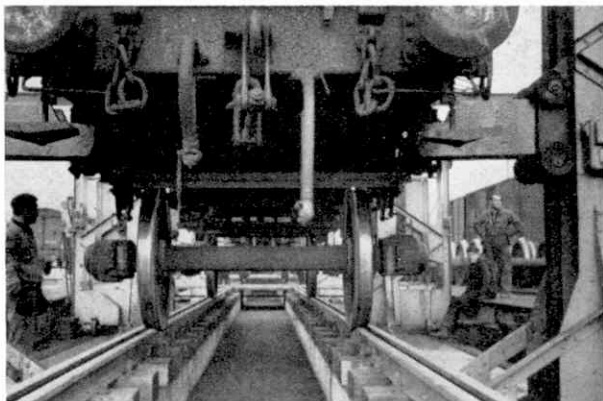
Also heading for London in the evening, the *South Wales Pullman*, 8 cars, say 335 tons, behind No. 7012 *Barry Castle* climbed out of the Severn Tunnel at between 26½ and 39 m.p.h., and was to time at Badminton summit, 100 miles from Paddington. That terminus was reached from there in 99 min., with two signal slowings, the overall being 3 min. early, with a time of 143 min. overall for the 133½ miles from the last stop at Newport (Mon.).

The larger No. 6025 *King Henry III*, with double chimney, in heavy rain with winter load of 8, not more than about 270 tons, on the 9.30 a.m. Paddington-Plymouth express with stop at Reading, easily reached the next booked halt at Taunton within the 106 min. allowance for 106½ miles after averaging 64½ m.p.h. over an undulating course for 96 miles with maxima around 75-78 m.p.h. This fine effort was to recover the serious effect of a 2½-min. stop due to a temporary hitch with a freight train ahead, less than 11 miles after Reading start.

Although timed more easily and with a considerably greater load, the Taunton driver on No. 7013 *Bristol Castle* nearly equalled the weekday fastest schedule just mentioned from Reading, and brought the 5.0 p.m. Sunday express from Paddington (to Plymouth) into his home station 15 min. before time!

#### Overland Transport from Spain

International through freight conveyance has been



Spanish goods vehicles can now complete through journeys between Great Britain and Spain by the Train Ferry ships, as their wheels and axles can be changed at the Spanish frontier. Their standard gauge wheels and axles are seen ready to receive the van body after the broad gauge wheels have been removed.

Photograph by courtesy of Transfesa.



The last Atlantic locomotive in traffic, No. 32424 "Beachy Head", on its final run to Brighton for withdrawal from service. Photograph by J. C. Beckett.

greatly increased and facilitated in recent years to and from Britain by Train Ferry ships operating from Harwich and Dover carrying through loaded wagons that run on Continental railways as well as our own. Fruit and vegetables from warmer climates are much in demand here. They constitute a considerable proportion of such traffic, being received speedily and in good condition not only from, say, France or Italy, but also from Spain where the rail gauge is 5 ft. 6 in. compared with 4 ft. 8½ in. in France, Britain, etc.

Near the Franco-Spanish frontiers at Hendaye and Cerbere, an ingenious installation consisting of two groups of four gantries or stages shown in the lower photograph, enables wheels and axles under the ventilated or refrigerated wagons to be changed from wide to narrow gauge, or vice versa, within 10 minutes and on 2 vans simultaneously. Thus we may see Spanish vehicles, as I have done, on the main line between Dover and London, for example, belonging to the Transfesa company of Madrid, as well as those from other European countries operating with the same gauge as ours.

#### The Summer Timetable

In the Eastern Region the *Essex Coast Express* provides a faster business service from Clacton-on-Sea to Liverpool Street, returning in the evening; other timings on this route are being improved. There are quicker schedules from King's Cross to Peterborough and Grantham, and over that very fast Darlington-York stretch, among other accelerations.

On the West Coast Anglo-Scottish route two extra high speed *Caledonian* trains provide early (down) and late (up) services between London, Euston, and Glasgow, Central, in 6½ hrs., stopping as well as at Carlisle, at Crewe northbound and at Stafford southbound, making good Midlands connections.

# How Zeta Works

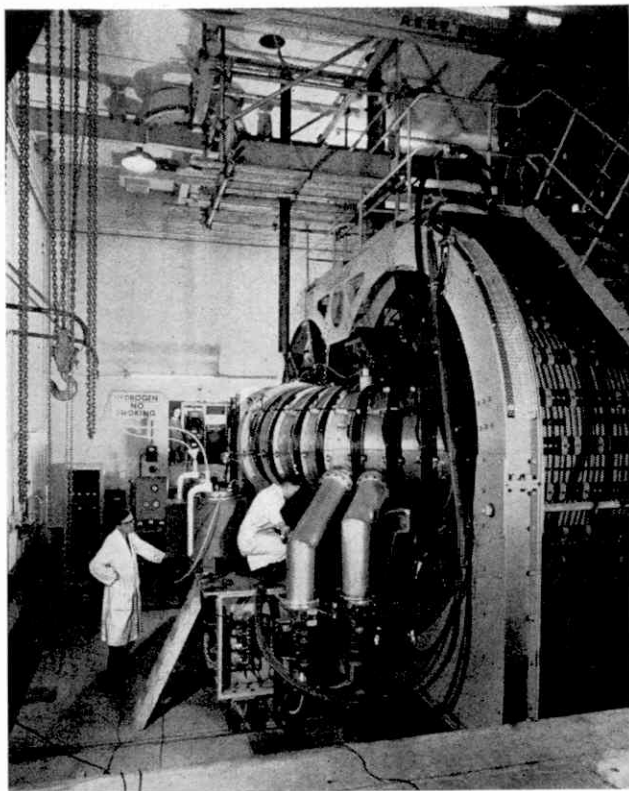
## A Star Performer at the Harwell Research Station

By the Editor

ZETA appears to have started active life at Harwell in August of last year. What it was going to do nobody seemed to know exactly, but it did better than was expected, and what it has done, in fact, has created something of a sensation. This is not altogether surprising, for inside the main tube of the assembly with this extraordinary name a temperature of 5,000,000 degrees Centigrade was reached, and this is the kind of temperature ordinarily reached only in the interior of a star.

It is believed that the interior of the Sun is about 20,000,000 degrees Centigrade, and in fact the changes that take place in Zeta when in operation are very much like those that are taking place slowly within the Sun. So now there seems a good prospect that when, as it is hoped, Zeta is developed to give us even higher temperatures than the 5,000,000 degrees Centigrade already reached, we shall be able to get energy directly from what we might almost call a miniature Sun created on Earth.

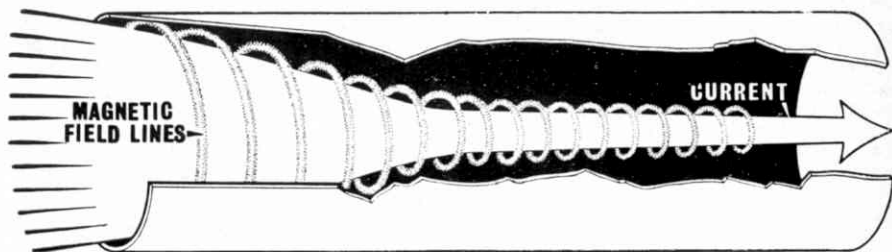
This is exciting in many different ways. The first is that the gas inside the main tube of Zeta is one that can be obtained from sea water, so the quantity of this raw material available is stupendous. This is highly important because our coal reserves



are dwindling, and with our oil wells are not likely to last more than about 150 to 250 years; and even the radioactive materials that we use in such power stations as that at Calder Hall cannot provide us with energy for more than a few centuries. But there is little prospect of our being without power for millions of years ahead if Zeta does show us the way to produce it from sea water.

The picture of Zeta on this page is a very interesting one. On the left can be seen part of what is obviously a ring-shaped horizontal tube, something like a doughnut. This tube is described as a torus, and there is a drawing showing its shape on page 326. In it is a gas called deuterium, which sounds very mysterious. Actually it is a special form of the light gas hydrogen, which is one of the constituents of water, and is also known as heavy hydrogen. It is under low pressure in the torus, and the two bent pipes seen descending from the tube are connected to the pump that reduces the

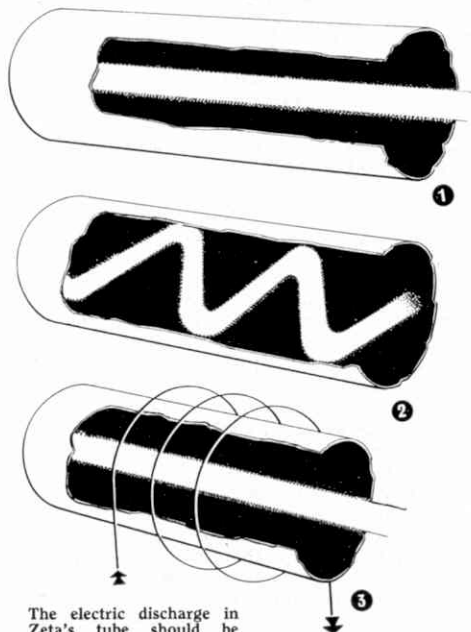




Passing a heavy current through the gas in the tube of Zeta draws it into a thin filament away from the walls, as shown above. For this and the other illustrations to this article we are indebted to the U.K. Atomic Energy Authority.

pressure within it.

In the interior of the Sun there are many strange changes taking place, which yield the energy that maintains its temperature. One of these arises when there is a collision between two deuterium nuclei, that is atoms of deuterium that have lost their electrons, while moving at very high speeds. When this happens they may fuse,



The electric discharge in Zeta's tube should be straight, as in 1 above. It wriggles as in 2, however, until it is straightened out by applying an electro-magnetic field.

or join up, to yield a helium nucleus and neutrons, a process in which energy is released.

It was hoped that this change could be made to take place in the tube of Zeta. The only way in which the deuterium nuclei could be given the tremendous speeds required for this purpose was to pass a very heavy electric current through the gas. The current wanted is obtained in a very interesting way. Round the tube in the picture of Zeta you can see electric windings over magnetic cores, and the drawing on page 326 shows how these windings are related to the torus. When a heavy current is passed through the windings an induced current is produced in the deuterium in the tube. The latter in fact forms the secondary of a transformer of which the primary winding is that in the two surrounding coils.

When Zeta is in operation the result of doing this is the production in the tube of an electric discharge. The gas is kept in the centre of the tube by the magnetic effect of the current, giving what is called the "pinch effect." Ideally the line of the discharge should run straight down the axis of the tube, but actually it wriggles, as shown in the middle of the three drawings in the lower illustration on this page. To straighten it out another set of magnets is introduced. These are electro-magnets that consist of windings round the tube through which an electric current is passed, and the rings carrying some of these windings can be seen in the picture of the assembly on the opposite page.

In this way we get an enormous temperature achieved within the torus, with the hot glowing gas pinched into a ring running round the centre of the tube. It must do this in order to achieve a really high temperature, for if the gas touched the walls of the tube it would be cooled too much.

The current passing through the tube is not continuous. Actually Zeta works in a

series of pulses. The primary current flowing through the windings round the tube comes from the discharge of electricity stored in large electric condensers. When the switch for this is closed a current of up to 200,000 amperes flows through the windings for a period up to only 5 thousandths of a second, a duration that is described as 5 milliseconds, and this current pulse is repeated every ten seconds.

With Zeta in action, a large collector, suspended from a crane, is moved around in order to detect the discharge of the sub-atomic particles called neutrons, for the emission of these is an indication of what is taking place inside the torus. From these and other measurements it is believed to be almost certain that the change that takes place in Zeta is the same as that in the centre of the Sun. Further experiments and calculations will be made to make absolutely sure on this point.

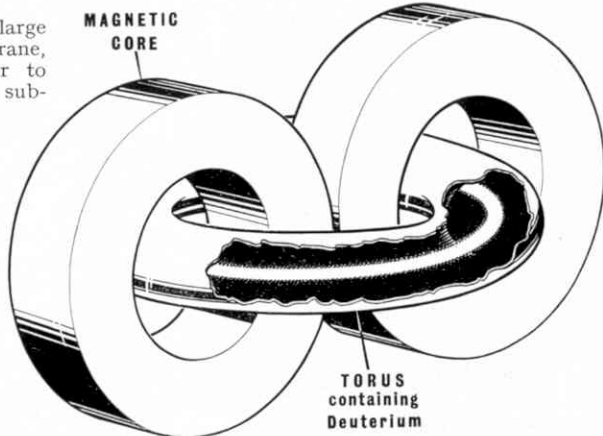
The heat output of Zeta is very small compared with the electrical input. In other words, very little energy is produced in comparison with the amount of energy that is put in. That is why the present thermonuclear reactor is described as Zero Energy. To break even, that is to produce as much energy as is put in, would require temperatures of as much as 300,000,000 degrees Centigrade, and Zeta's successor will be designed in order to get nearer to these very high temperatures. The high temperatures already achieved, and the relatively long duration of the period during which the hot gas has been isolated from the tube walls by the pinch effect, are very important experimental results. For a useful power output it will be necessary perhaps to isolate the hot gas from the walls of the tube by as much as several seconds, but there do not appear to be any reasons why the problem of doing this cannot be solved.

Zeta is to be modified to make further experiments, and a successor, to be known as Zeta II will be built with the aim of reaching the higher temperatures of the break-even point. It is expected that it will take about four years to design and

build Zeta II.

It must not be supposed that the production of electric power by the fusion method used in Zeta will be achieved in a short time. Such practical applications are not likely to be attained for 10, 20 or even 50 years.

Another point to be borne in mind is that although the raw material will be in



The tube of Zeta is encircled over part of its length by the iron cores of a large electro-magnet, which produces the "pinch" effect.

abundant supply it does not follow that fusion electricity will be cheap. Five gallons of water yield about a gram of deuterium gas, and the energy in this quantity of deuterium is equivalent to that stored in several tons of coal, but at present it is impossible to forecast what it will cost to extract the necessary deuterium from sea water.

For these reasons it is unlikely that the researches at present in progress will have any effect on the nuclear power programme of the United Kingdom for at least 20 years. Even if by that time fusion reactors are developed, fission reactors of the type now being erected in Great Britain may still be required. Perhaps the ideal, for a time at any rate, will be to use fission reactors along with the newer fusion reactors.

Another possible development for the future is the use, not of deuterium alone, but a mixture of this gas with a third form of hydrogen called tritium. The advantage of the use of such a mixture is that the temperature required in the nuclear apparatus using them will be only about 40,000,000 degrees instead of 300,000,000.

# MECCANO MAGAZINE



The photograph of St. Lawrence's Gate, Drogheda, reproduced above was taken by Alan T. Newham, Dunlaoghaire.

THE appearance in a recent issue of the *M.M.* of a picture of the Landgate at Rye led Alan Newham to send along the accompanying illustration of a fine gate in Ireland. This is one of ten formerly set in the walls of Drogheda, Eire, and is known as St. Lawrence's Gate. As the picture shows, the gate is in a good state of preservation. Its two tall circular towers are connected by a loop-holed wall, through which St. Lawrence Street runs. There was also a moat, with a drawbridge, in the days when the wall was complete. This was a mile and a half in circumference. The gate is one of the most perfect specimens of its kind that can be found in Ireland.

Today there is increasing interest in the photography of birds and animals, and it is certainly better that they should be hunted with cameras instead of with guns. I wonder how many of you have thought of taking up the hobby?

One who has taken an

## Junior Section

excellent bird photograph is R. V. Henday, although he used an ordinary camera instead of the more expensive special equipment that most nature photographers employ. The lower picture on this page shows this effort. The bird is a shag, one of the cormorant family that normally is to be found only in certain

coastal regions of Great Britain, but when this particular specimen had its portrait taken it was near the centre of Cambridge. Perhaps it had been blown there during the bad weather that had been experienced about the time that the photograph was taken. An excellent effort on the part of this *M.M.* reader!



A shag visits a University city. Photograph by R. V. Henday, Cambridge.

# Easy Model-Building

Spanner's Special Section for Juniors

## A Simple Model Tractor and a Biplane

OWNERS of Outfit No. 0 will have all the parts needed to build the simple Tractor shown in Fig. 1. To start construction of it bolt an Angle Bracket to one end of a  $5\frac{1}{2}$ " Strip. Now bolt another Angle Bracket to the end of a second  $5\frac{1}{2}$ " Strip, and join the two Angle Brackets together by passing a bolt through their free lugs. This bolt, which can be seen at 1 in the picture of the model, passes also through the apex hole of a Flat Trunnion 2 that forms the front of the model. Now bolt two  $2\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Double Angle Strips 3 to the Flat Trunnion, and to the lugs at their inner ends bolt a second Flat Trunnion 4. At the rear end of the model bolt in place on each side two  $2\frac{1}{2}$ " Strips 5, and to each of these in turn bolt a further  $5\frac{1}{2}$ " Strip 6. These Strips must be curved slightly as shown, but the bending must be carried out gently and carefully. The Strips can be re-straightened when the model is dismantled by placing them between two pieces of wood and hammering on the upper piece.

The driver's seat is a Trunnion held by a bolt 7 to two Angle Brackets fixed to the upper ends of the Strips 5.

The rear wheels, 1" Pulleys with Tyres, are mounted on a 2" Rod passed through the lower end holes in the Strips 5.

The single front wheel is a Bush Wheel fixed on the shank of a bolt 8. This is passed through the apex hole of a Trunnion that is attached by means of a Fishplate 9 to one of the  $5\frac{1}{2}$ " Strips forming the chassis.

A  $3\frac{1}{2}$ " Rod is mounted in a Fishplate bolted to the Flat Trunnion 4 and also in the Flat Trunnion at the front of the model. It is held in place by Spring Clips. The mudguards are stepped Curved Strips held

on  $\frac{3}{8}$ " Bolts and spaced from the frame by Spring Clips on the Bolts.

A list of the parts required to build this model is given at the end of this article.

### Biplane

The fuselage of the Biplane shown in Figs. 2 and 3 is made from four  $5\frac{1}{2}$ " Strips. The two top  $5\frac{1}{2}$ " Strips 1 are bolted together

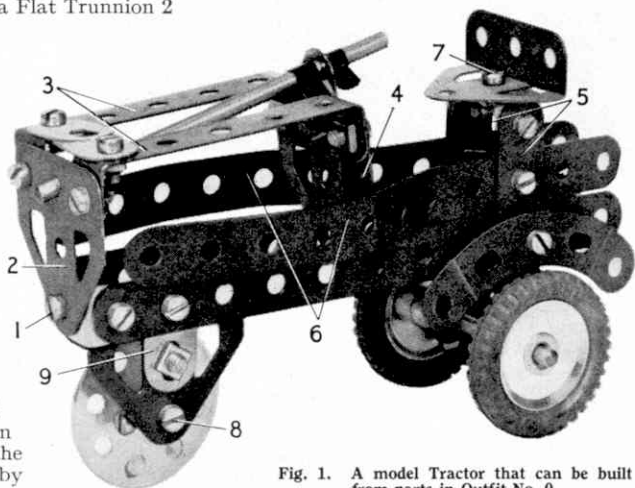


Fig. 1. A model Tractor that can be built from parts in Outfit No. 0.

at the rear end and the bolt 2 that joins them also holds a Flat Trunnion and a  $2\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Double Angle Strip. At the front the  $5\frac{1}{2}$ " Strips 1 are each bolted to a Flat Trunnion 3.

Each side of the fuselage is a  $5\frac{1}{2}$ " Strip connected by an Angle Bracket to the top as shown. A  $2\frac{1}{2}$ " Stepped Curved Strip is bolted to each side-member of the fuselage, and at the rear the two sides are joined together by a  $\frac{3}{8}$ " Bolt 4. A Fishplate is also held on the  $\frac{3}{8}$ " Bolt.

The wings of the biplane are  $5\frac{1}{2}$ "  $\times$   $1\frac{1}{2}$ " Flexible Plates. The lower wing is connected to Angle Brackets 5, which are bolted to each of the  $5\frac{1}{2}$ " Strips that form the sides of the fuselage. A  $2\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Double

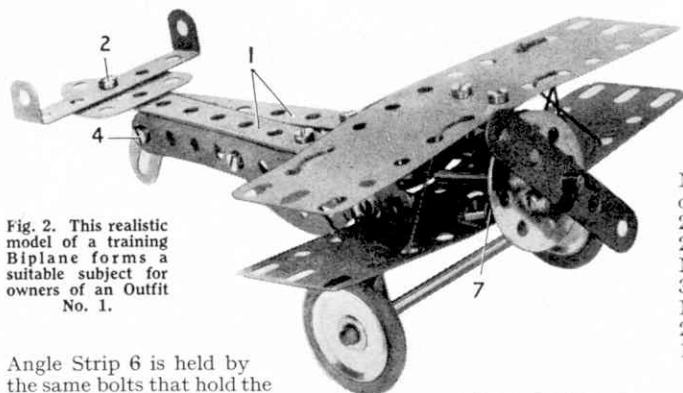


Fig. 2. This realistic model of a training Biplane forms a suitable subject for owners of an Outfit No. 1.

Angle Strip 6 is held by the same bolts that hold the wing in position. The upper wing is bolted to a  $\frac{1}{2}$ " Reversed Angle Bracket and to a Fishplate, which is joined to the upper lug of the  $\frac{1}{2}$ " Reversed Angle Bracket. At the bottom the Reversed Angle Bracket is bolted to the remaining free hole of the Flat Trunnion 3.

Two Fishplates are bolted to the lugs of the  $2\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Double Angle Strip 6 and a  $3\frac{1}{2}$ " Rod journalled in the free holes of the Fishplate has two 1" Pulleys with Rubber Rings mounted on it. This structure forms the undercarriage and wheels of the plane.

A Trunnion is bolted to the front or leading edge of the lower wing and a Bush Wheel is bolted to the upper hole of the Trunnion. A 2" Rod held in the boss of the Bush Wheel passes through the lower hole of the Trunnion 7. The propeller, consisting of a  $2\frac{1}{2}$ " Strip, is mounted on the 2" Rod and is free to rotate on it.

The model can be given a more realistic appearance if the Strip forming the propeller is twisted slightly to imitate the pitch of a real propeller. The Strip can be re-straightened by hammering it between two pieces of wood.

The Biplane is an attractive subject for anyone owning an Outfit No. 1, which contains all the parts needed to construct it.

*Parts required to build the Biplane:*

4 of No. 2; 1 of No. 5; 4 of No. 10; 4 of No. 12; 1 of No. 16; 1 of No. 17; 2 of No. 22; 1 of No. 24; 1 of No. 35; 25 of No. 37a; 24 of No. 37b; 5 of No. 38; 1 of No. 40; 2 of No. 48a; 2 of No. 90a; 1 of No. 111c; 1 of No. 125; 2

of No. 126; 2 of No. 126a; 2 of No. 155; 2 of No. 189.

*Parts required to build the Tractor:* 4 of No. 2; 2 of No. 5; 4 of No. 10; 2 of No. 12; 1 of No. 16; 1 of No. 17; 2 of No. 22; 1 of No. 24; 4 of No. 35; 20 of No. 37a; 18 of No. 37b; 2 of No. 48a; 2 of No. 90a; 2 of No. 111c; 2 of No. 126; 2 of No. 126a; 2 of No. 142c.

### An Attractive Model Loading Shovel

*(Continued from page 343)*

front of the lowest side of the bucket and then taken to a suitable position in the driving cab.

*Parts required to build the model Loading Shovel—*  
2 of No. 1a; 2 of No. 1b; 1 of No. 2; 5 of No. 2a; 1 of No. 3; 4 of No. 4; 6 of No. 5; 9 of No. 6; 9 of No. 6a; 19 of No. 12; 4 of No. 12b; 2 of No. 12c; 4 of No. 15; 1 of No. 15b; 3 of No. 16b; 1 of No. 17; 2 of No. 20a; 2 of No. 21; 2 of No. 24; 124 of No. 37a; 120 of No. 37b; 37 of No. 38; 1 of No. 40; 4 of No. 48a; 1 of No. 52; 12 of No. 59; 1 of No. 63; 2 of No. 63d; 4 of No. 64; 1 of No. 80b; 2 of No. 111a; 2 of No. 111c; 2 of No. 115; 1 of No. 124; 3 of No. 125; 6 of No. 126; 3 of No. 126a; 8 of No. 133a; 2 of No. 142a; 2 of No. 142d; 1 of No. 160; 1 of No. 185; 7 of No. 188; 2 of No. 190; 1 of No. 192; 4 of No. 199; 4 of No. 212; 2 of No. 215; 4 of No. 221; 2 of No. 222; 2 of No. 226.

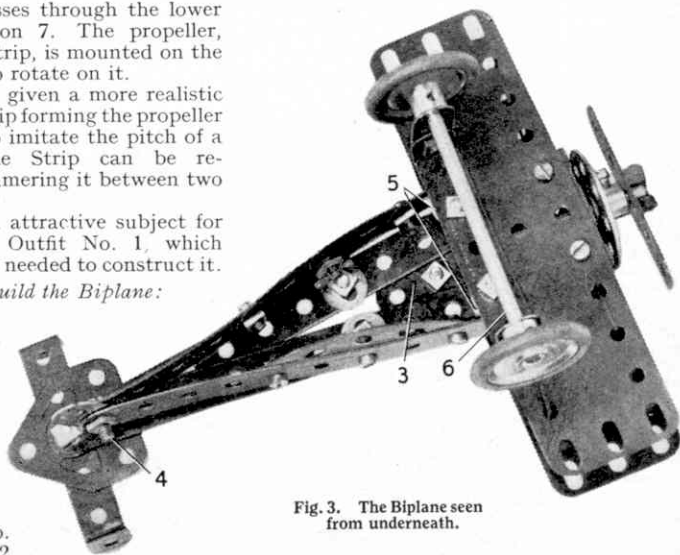


Fig. 3. The Biplane seen from underneath.



# DINKY TOYS NEWS

By **THE TOYMAN**

**Y**OU may remember that last month I mentioned a Dinky Toys collector who has built up a really extensive collection of Army vehicles that he uses to plan battle actions and military formations of various kinds. Just before I began to write these notes I learned of another collector who also has a large collection formed with a special purpose in mind, but of a different character. His name is Derek Beeker and he lives at Crowland, near Peterborough. Derek's interest is in the circus and he has assembled a travelling circus complete with "big top" and several smaller tents, seating, cages for the animals, and various other items usually associated with travelling shows of this kind.

Derek's *Greatest Show on Earth*, is shown



This is Bryan Harvey, St. Mary Cray, Kent, a member of the Dinky Toys Club.

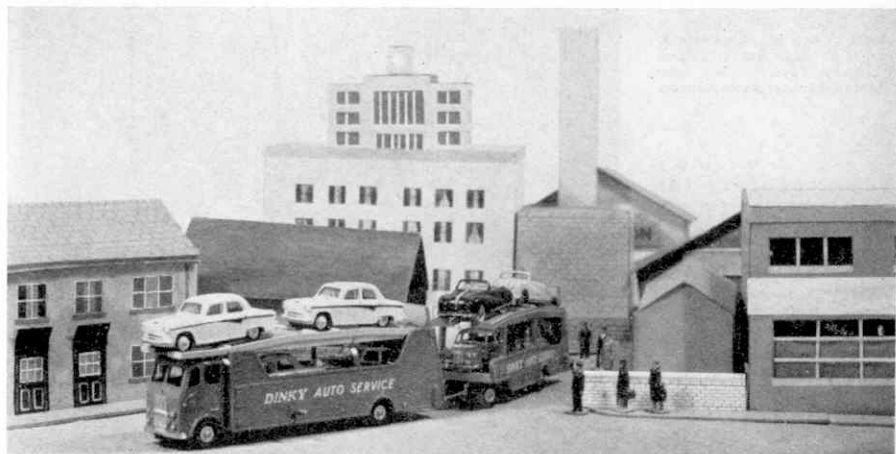
fully assembled in the lower picture on this page, and the interesting feature from a Dinky Toys collector's point of view is that the entire circus can be dismantled and moved to a new site by means of a grand fleet of Dinky Toys lorries and vans. Derek tells me that it is great fun loading the dismantled tents and other props on to the vehicles and then transporting them to another "town" for re-erection, and he has found that having a real plan and object in his play schemes has given more fun and pleasure from his Dinky Toys collecting than

he had thought possible. Well done, Derek!

In the Dinky News pages last May I included a picture of a Dinky Toys town layout scene in which many errors had been deliberately made in the placing of the

This circus layout provides Derek Beeker, Crowland, Peterborough, with plenty of scope for using his Dinky Toys cars and lorries for transporting the tents and other "props" from one "town" to another.





The new Dinky Supertoys Car Carrier and Trailer, Dinky Supertoys No. 983.

various vehicles, road signs and other items, and I offered a few small prizes to readers who could spot the most errors and send me their lists before the end of June. The number of entries sent in has greatly exceeded my expectations, but I hope to announce the prize winners next month. So make sure you do not miss the August issue.

Now I want you to come with me on a long, long journey to see how some of our Dinky Toys friends in far-off New Zealand are getting along. We will drop in on Mr. Harding Brown at his home in Sumner, where I think we will be sure to find his young son Sheldon, who is a very keen Dinky Toys collector, busily playing at being a motor garage proprietor surrounded by Dinky Toys cars and vehicles of all types.

If you look at the picture reproduced at the foot of page 332, you will get some idea of the equipment Sheldon has available. It includes a cardboard garage

structure, which was obtained in sheet form and only required the various parts to be cut out and glued together. Have you ever tried making cardboard buildings in this way? If you haven't I advise you to have a go. It is quite easy and great fun and wonderfully realistic results can be obtained without much expense or trouble. Here is a fine idea for passing away a spell indoors on a showery day. Try it next time the weather clerk decides to turn the water on just when you want to have a game of cricket!

And now for a few details of the splendid new Dinky Supertoy that has made its appearance in the shops this month. Perhaps you have already seen it and in any case I am sure that you will want to have as much information as you can get concerning it. This latest addition to the range is Dinky Supertoys No. 983, Car Carrier and Trailer, and it is an excellent reproduction in miniature of a typical Carrier and Trailer



This illustration shows how the Carrier and Trailer are arranged for loading.

Nigel Thorogood (right) and John Sorrell (left), both of whom live at Chelmsford, seen with their fine collection of Dinky Toys. They also operate a Hornby-Dublo railway.

used by car manufacturers for transporting new cars from their works to distributing agents or to the docks for shipment overseas. The Carrier and the Trailer together form the complete Dinky Supertoys No. 983, but each of the items is available separately. The Carrier alone is Dinky Supertoys No. 984 and the Trailer is Dinky Supertoys No. 985

In the picture at the top of page 331 you can see the Car Carrier and Trailer setting out from the works with a full load of eight cars. You can have terrific fun loading and unloading the vehicles and to show you how the loading is carried out, I am including a special picture on the previous page.

To load the combined Carrier and Trailer, the Trailer is placed with the tow-bar projecting straight ahead, with its end on the ground. Then the Carrier is pushed slowly and firmly into contact with it, as seen in the picture. This locks the two vehicles firmly together. Next the upper

deck of the Carrier is lowered by means of the handle at the side and the rear loading ramps are lowered. This gives a continuous runway along the upper decks of the two vehicles, so that Dinky Toys cars can easily be loaded on them, after which the upper deck of the Carrier is raised. To unload you just do all this the other way round.

The Car Carrier and Trailer are finished in bright red and grey, with grey wheel hubs, and the lettering on the sides of the vehicles in rich cream. The Car Carrier and Trailer when loaded and coupled ready for a run make a most attractive sight.



Sheldon Brown, Sumner, New Zealand, owns a big collection of Dinky Toys which he uses in conjunction with the garage shown.







"Tommy Dodd" writes about:

## Fun with Branch Lines

OUR talk last month finished up with some notes and a picture of a layout on the floor being worked by a Hornby enthusiast and his sister. Now at the top of the next page we have another Hornby railway on the carpet. This gives its young owners, Victor and Robin Steblina, of Greetland, near Halifax, some really good fun. These happy little chaps are obviously thrilled with their trains and I know that the scene shown is an everyday one in their home. They have various Hornby engines and a selection of wagons, or trucks as I expect they call them, and these must put in a lot of happy mileage.

They have sidings as well as a main line, just as real railways do, and they have Buffer Stops—how little boys love "the Buffers"—to finish off the sidings correctly. Here engines and trains run in after their journeys and you will see in the picture that a No. 20 Locomotive and a Coach, but no Tender, have arrived.

A railway of this kind is always of interest, even to the older enthusiast, who, after all, had himself to learn the right way to do things when he began his railwaying. Where space allows, it is surprising how quickly the beginner will start to amuse himself with a system that perhaps looks

odd, but which takes advantage of the site where his railway can run. There may be the chance of taking a branch or a siding off the main track and perhaps this has to include a curve or two in order to miss some obstruction. Even the Engineer of a railway on the floor has his problems to face! In this way the youngster gains experience, finding out what it is possible to do with his Rails and learning to avoid

the type of track layout that prevents the traffic from moving freely.

Branches from the main line always provide good fun and quite often one finds that the branch track provides a splendid opportunity of using

what is always a popular accessory, the Level Crossing. Level Crossings are real railway features, and I think the gates that can be opened and shut for road or rail traffic, and the fact that road and rail cross one another, add enormously to their tremendous attraction. Only recently I mentioned a method of fixing the Crossing in the track that should prove useful to many owners.

There is another point in connection with a Level Crossing that really needs special mention. It is that the gates should always be locked in position, whether for road or

Above, a road vehicle, Dinky Toys No. 418 Comet Wagon, waits while the local goods on a Hornby Railway pass the Level Crossing. This represents the simple type of crossing where the gates are worked by the road users themselves.



Victor and Robin Steblina have fine times with their Hornby Trains, as is evident from this picture of them with their railway on the floor.

for rail traffic, by means of the drop pins in the ends of the gates themselves that can be fitted into holes in the base of the accessory in order to hold the gates firm. Therefore the "Crossing Keeper," if there is one on the staff, or the Dinky Toys motor driver who may have to work the gates if there isn't, should always make certain that they have been left in a safe position. Otherwise a mishap is sure to take place and we don't want that to happen. It spoils the game, to say nothing of the possible damage it may cause.

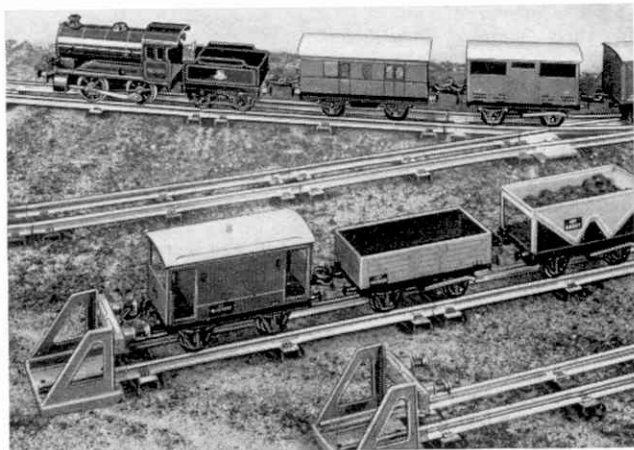
Branch lines normally involve some passenger and goods trains of various kinds, although on some of them the latter only are to be seen nowadays. In miniature, for example, a short one might serve a goods platform, perhaps, or a warehouse that the Hornby railway owner has made up.

So take every opportunity of reaching out, if for only a short distance. There may be some special industry in your own district that means traffic for the real railway and you can do something like this in miniature on your own line. The nature of the traffic will govern the type of vehicle used, but you may have to provide something

rough loads then Open or perhaps Hopper Wagons will be needed.

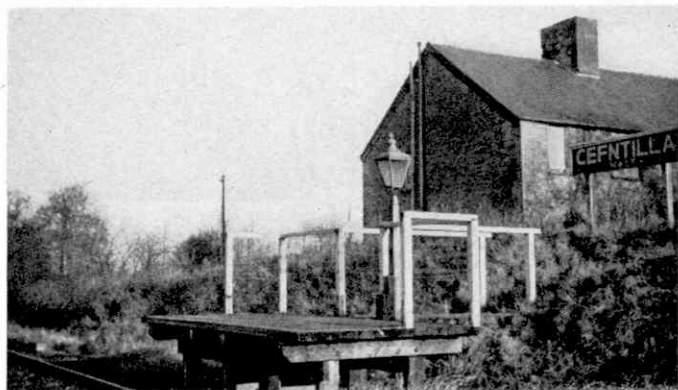
A scheme of this kind can provide the opportunity for making up some suitable loads, either for actual transport in open type Wagons, or simply to make the loading platform, warehouse building or lineside yard "look right".

Perhaps your siding or lineside reaches the place where the traffic starts—many factories have their own sidings—but if not you can easily organise a road service between the building or plant and the railway. This is fine, for then you can use your Dinky Toys motor vehicles on your layout.



The mixed freight takes the branch line that turns away from the main track by means of Points. Various No. 50 vehicles appear in the foreground.

## Of General Interest



Was this the smallest railway halt in Britain? The photograph and notes on the halt have been contributed to the "M.M." by A. T. Day, Bristol.

HERE above is a picture of what must surely have been one of the smallest "railway stations" in the British Isles. It was of course officially just a halt, with a platform only four yards long. It is the Cefntilla Halt, which stands beside the Monmouth and Pontypool Road of the Western Region.

There was no room to put the nameboard on the platform itself. There had to be a lamp, because Cefntilla was a request stop and the trains ran through if the guard could see no one waiting on the platform. Passengers were asked to give a hand signal if they wished to board the train.

The halt came into use in 1954 and had a life of only a few months, for passenger service on the branch ceased in May 1955. It still stands in excellent condition.

Few of you will fail

to recognise the subject of the Meccano model shown in the lower picture on this page. When the film *The Bridge over the River Kwai* was being shown in Worcester the Meccano dealers, Albion House, arranged a competition in which entrants were asked to build models of the bridge, and here is the winning model.

It was built by Robert Sergeant, of Worcester, who in the picture is seen explaining its points to the Manager of the Odeon, Worcester, where the model was exhibited during the run of the picture. It is certainly a very fine effort, and this was the case also with the second prize-winner, entered by David Houghton, of Himbleton, near Droitwich.



Robert Sergeant, Worcester, explains constructional points of his model of the bridge over the River Kwai to the manager of a picture house where it was exhibited. Photograph by courtesy of Berron's Newspapers Ltd., Worcester.



## My Canal Journey

### The First British Waterway Construction for 50 Years

By the Editor

IT is more than 50 years since any new canal section was cut in Great Britain. It was therefore with real interest that I learned of the recent completion of a new stretch of canal. This came as a timely reminder that many of our waterways are still giving valuable service, and when I had an opportunity to go along and not only see the new canal length, but also travel over it, naturally I took it eagerly.

The new section of canal is on historic ground, for it is part of the Trent and Mersey Canal. It is at Marston, near Northwich, and it was built to replace a length of the original canal that threatened to disappear underground!

Down below the surface of this part of Cheshire is an immense salt bed, which has been mined for something like 300 years. When a mine was worked out water entering the workings soon dissolved the pillars of salt that had been left in to support the roofs of the galleries, with the result that the ground above gave way. Later the practice arose of flooding the mines and pumping out the brine then formed from which to extract the salt. This had similar results, and the subsidences caused damage not only to buildings, but also to the canals.

The picture at the top of the page shows narrow boats on the new section at Marston of the Trent and Mersey Canal. This section is the first to be cut since 50 years ago, and its construction became necessary because the section it replaced was affected by subsidence due to salt mining. Illustrations by courtesy of British Waterways.

Very near the canal at Marston there is the shaft of a salt mine long abandoned. This was never properly sealed, with the result that water entered the mine and caused the ground above it to fall as the salt was dissolved away. The top of the shaft indeed became a large crater that threatened to extend over the canal itself, in which case an entire stretch of the waterway would have been laid bare. In the end it was realised that the only way

to avoid a disaster was to cut a new canal to form a diversion.

Work on this was started in the late summer of 1957 and was completed in March last. The diversion is 1,750 ft.

long, with a width at the normal waterline of 40 ft. The depth of water is 5 ft., and the bed of the canal is 20 ft. wide. Thick concrete waterway walls line the waterway, and behind the walls are clay puddle cores 3 ft. thick, made by ramming in wet clay to provide a seal.

This stretch of canal was officially opened in May last. I was in one of two launches that on the occasion approached the beginning of the diversion—the old waterway of course was by that time completely sealed off—where a white ribbon was stretched across from bank to bank. This was cut by Lord Rusholme,

Chairman of the Board of the London Midland Region of British Railways, after which the two cruisers moved on throughout the whole length of the new stretch.

This was interesting enough, but after traversing the new cut the launches did not stop. Instead they went on along the canal to Anderton, where there is the remarkable lift described and illustrated in the *M.M.* for March 1949. By means of this lift barges are raised and lowered between the levels of the Trent and Mersey Canal and of the Weaver Navigation. The Trent and Mersey Canal is one that accommodates only narrow boats, but the Weaver Navigation can take larger vessels, and it was interesting to see there, in the heart of Cheshire, seagoing vessels of up to 600 tons.

Before making my way to the new cut at Marston I had been to see the remarkable lock shown in the lower picture on this page. This differs considerably from an



The new canal section has concrete walls on each side, with puddled clay behind them. Here workmen are seen pressing the clay down.

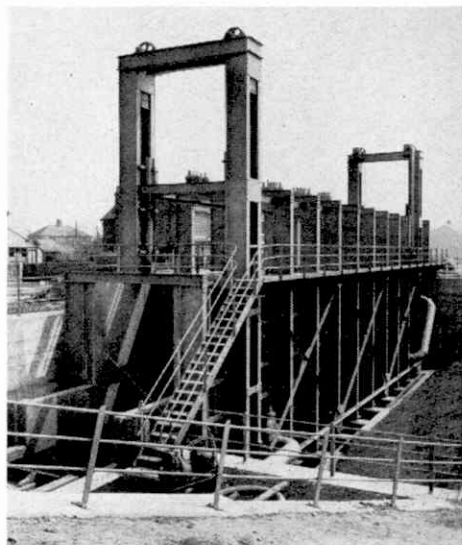
ordinary lock in appearance, for it is constructed entirely of steel.

The reason for building this form of lock, which is at Thurlwood, near Sandbach, was the same as that for cutting a new section of canal at Marston—subsidence due to the working of salt mines. Here this has been very severe and many buildings in the neighbourhood have been so greatly damaged that they have had to be demolished. The original lock at Thurlwood had suffered so severely and continuously by the fall of the ground beneath it that every effort to keep it in a fit state for navigation by the usual methods of building up had proved unavailing. Finally it was resolved to build a great steel lock resting on concrete beams, so that if further subsidence took place the lock as a whole would be lowered and could then be restored by jacking it up.

The upper and lower ends of the lock are sealed in a bed of clay, rammed hard between the steelwork and the concrete abutments. The sluice pipes are fitted externally, and two of them can be seen in the picture of the lock. Altogether there are four of them, two to fill the lock and two to empty it. The length of the tank is 72 ft. and its depth 18 ft. Overall the lock measures 106 ft. with an overall height of 45 ft.

After arriving at Thurlwood and walking round the lock to examine its features, a launch was seen approaching from the north.

(Cont. on page 354)



A new lock built entirely of steel at Thurlwood, on the Trent and Mersey Canal. It has been designed to allow possible effects of subsidence of land in the area to be overcome by jacking it up.

# The 1958 Empire Games

## Wales Welcomes Her Commonwealth Visitors

By L. Bruce Mayne

FOR the athletes of the Commonwealth all roads lead to Wales this month. From the four corners of the world they are coming to compete in the sixth British Empire and Commonwealth Games.

The story of the Games began in August 1891 when a Mr. J. Astley Cooper wrote to a number of influential newspapers and periodicals suggesting a "Pan-Britannic Festival," a sporting event that would also be a sort of giant family party in which the countries of the Empire would take part. The suggestion aroused great interest at the time, but like so many other ideas it slowly dropped out of most people's minds and was virtually forgotten.

It is interesting to remember that Mr. Astley Cooper's plan was formulated five years before the Olympic Games were revived after a lapse of 1,500 years.

The next step in the Empire Games Story brings us to the year 1911. King George V had been crowned in Westminster Abbey and, as part of the celebrations, a series of exhibitions and entertainments was held in the grounds of the Crystal Palace under the title *The Festival of Empire*. One of its features was a sports meeting in which athletes from Canada, Australia and South Africa competed with those of Britain. The sports included boxing, swimming and wrestling besides the track and field events of normal athletics meetings.

Whether this meeting in 1911 was the first Empire Games is a matter of opinion. Most authorities say that it wasn't, but few will not agree that it is an ancestor and a very worthy one. The first *official* Empire Games were held in Hamilton, Ontario, Canada, in 1930, after a meeting of the Empire countries, at the 1928 Olympics in

Amsterdam, had decided that a sports meeting between them would help to bring closer together the different members of this family of nations.

Although pressed for time and pressed for money, each country that sent a team and the Canadian organisers triumphed by sheer enthusiasm and determination. At the first Games eleven countries took part. They were Canada, England, Ireland, Scotland, Wales, Australia, New Zealand, South Africa, Newfoundland, Bermuda and British Guiana, and they were represented by 400 competitors. When the last race had been run, and the athletes were preparing to return to their homes, the administrators decided that similar meetings should be held every four years, in between



The Empire Swimming Pool, Cardiff, nearing completion. Here the swimming and diving events of the 1958 Empire Games will take place.

the Olympic Games.

The year 1934 saw the second Empire Games at the White City Stadium, London, where 500 athletes representing sixteen countries competed. And in 1938 the third Games were held in Sydney, Australia. Australians had been firm supporters of the Games from the earliest days and when they acted as hosts to the Empire their enthusiasm and vigour ensured complete success. It was at Sydney that Decima Moore, an Australian girl, won

five gold medals, for two sprints, the long jump and both relays, a record that stands today.

The war put an end to the Games for a while, but in 1950, twelve years after the Sydney Games, the fourth Empire Games were held in New Zealand. Vancouver was the site of the fifth Empire Games in 1954, and most of the times and distances set up at Auckland four years previously



Cardiff Arms Park in its normal condition. It is one of the historic Rugby Union Football grounds, and it has been transformed into an athletic stadium for this month's Empire Games.

were beaten. Twenty-four countries sent 789 athletes and team officials to Canada for the last Games, but this year the organisers in Cardiff estimate that some 1,500 competitors, representing 35 countries, will be present.

For a year and a half preparations have been under way, but in the last few months the activity has been stepped up to ensure that everything will be ready by the time the Duke of Edinburgh officially opens the Games at the Cardiff Arms Park on 18th July.

When the Rugby season closed in April an army of workmen took over the ground to transform it into an athletics stadium. They have laid a running track, with mathematical precision and much technical know-how, and have increased the accommodation so that 37,000 spectators, of whom 8,000 will be seated, will witness the track and field events.

Literally only a stone's throw away is the new Empire Swimming Pool, which has cost Cardiff Corporation an estimated £650,000. This palatial, three-storey

building is expected to be a fast pool, but apart from being the venue of the swimming events, it will be a wonderful swimming bath for Cardiff's population of 250,000, who, until now, have had to make do with a pool twenty-five yards long that was built in 1899 as a temporary measure!

The roof of the new Empire Pool is a single span of 139 feet 6 inches, which means that there are no pillars anywhere to impede one's vision. The pool itself is 165 feet long and 60 feet wide and varies in depth from three feet to sixteen. Provision has been made for non-slip tiling, easily visible lanes and a boom that will convert the course into a 50-metres one, or may be used to separate learners from more experienced swimmers, when the pool is used by the general public. For the Games there will be accommodation for 2,400 spectators, although the normal accommodation provides 1,722 permanent tip-up seats. Under-water panels, which will eventually house lights, will give those who wish an unusual view of the

swimming events.

The cycling events, except the road race, which will be run over roads in the Vale of Glamorgan, will take place at the Maindy Stadium, where there is a coloured concrete cycling track measuring three and a half circuits to the mile.

Boxing, wrestling, fencing and lawn bowls will also take place in Cardiff. The weight lifters will perform at Barry, nine miles from the Capital, and the rowing events will take place on Lake Padarn, in the shadow of Snowdon, 160 miles away.

And what of this tiny country—the smallest ever to play host to the Commonwealth for the Games—whose two and a half million inhabitants have opened their purses, their homes and their hearts to the visitors from the home countries and overseas? Most people who have never been to Wales think of it as one gigantic coal-mining valley, where gaunt pit-head gear stands out against dark clouds hanging ominously over slate-grey hills. But there is more to Wales than the Rhondda Valley and coal. (Cont. on page 354)

# Among the Model-Builders

By "Spanner"

## "Penny-in-the-Slot" Mechanism

The "penny-in-the-slot" mechanism shown in Fig. 1 is based on a design sent to me by Mr. J. G. Maltby, Epsom Downs. The outstanding features of this mechanism are its extreme simplicity and the accuracy with which the release catch operates.

The framework is built up from  $7\frac{1}{2}$ " Angle Girders and Strips and  $5\frac{1}{2}$ " Angle Girders and Strips as shown. The rails for the sliding drawer are formed by  $7\frac{1}{2}$ " Angle Girders 1 bolted to the vertical  $5\frac{1}{2}$ " Angle Girders of the framework.

The drawer itself consists of two  $3\frac{1}{2}$ "  $\times$   $2\frac{1}{2}$ " Flanged Plates bolted together, and the left-hand Plate is fitted at each side with a  $3\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Double Angle Strip. The drawer slides on the rails 1, and is guided by a 1" Reversed Angle Bracket 2 on each side. These Brackets are fixed on to a  $3\frac{1}{2}$ " Strip attached to the right-hand Flanged Plate, and their lower lugs slide underneath the Angle Girders 1. A  $\frac{1}{2}$ " Reversed Angle



Another Meccano model nears completion under the skilful hands of its builder, R. N. de Kretser, Bambalapatiya.

Bracket 3 also is bolted to one end of the  $3\frac{1}{2}$ " Strip.

The release catch is formed by a  $5\frac{1}{2}$ " Strip 4. This is bolted to a Double Bracket at the fifth hole from the left-hand end of the Strip so that normally it rests on a lug of the Reversed Angle Bracket 3 when the drawer is closed. The Double Bracket is pivoted on a Rod passed through the Angle Girders 1.

A slot to take a penny is formed by four  $3\frac{1}{2}$ " Angle Girders 5 and 6, which are bolted in pairs through their slotted holes so that the penny slides freely between them. The Angle Girders 5 are attached by  $\frac{3}{4}$ " Bolts to the front of the mechanism and the Girders 6 are fixed by a  $1$ "  $\times$   $\frac{1}{2}$ " Angle Bracket to a  $7\frac{1}{2}$ " Strip of the framework.

When a penny is dropped in the slot it falls on the release catch 4 and raises its rear end clear of the Reversed Angle Bracket 3. The catch then engages an Angle Bracket 7 fixed to a  $1$ "  $\times$   $1$ " Angle Bracket bolted to the drawer. When the drawer is opened the catch is lifted further and the penny drops.

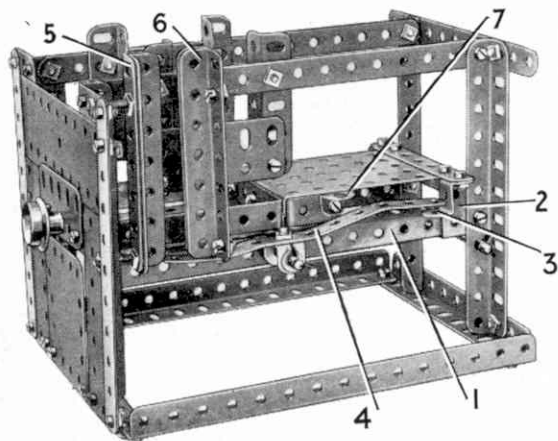


Fig. 1. A simple form of "penny-in-the-slot" mechanism adaptable to many kinds of models.



### An Easily Made Map Reader

Readers who are also cyclists will find the simple instrument shown in Fig. 2 useful for measuring distances on road maps. Of course, an approximate result may be arrived at by using a pair of dividers, but this method gives only the distance in a straight line between any two places, and does not take into consideration the

winding of the roads.

With the device shown in Fig. 2, however, it is only necessary to roll the gear wheel I along the route desired on the map to obtain a very close approximation of the real distance. The instrument was sent to me by M. Drake, Bromley.

The handle of the instrument consists of two  $3\frac{1}{2}'' \times \frac{1}{2}''$  Double Angle Strips and two 3'' Strips.

Fig. 2. An easily made map reader useful for hikers and cyclists.

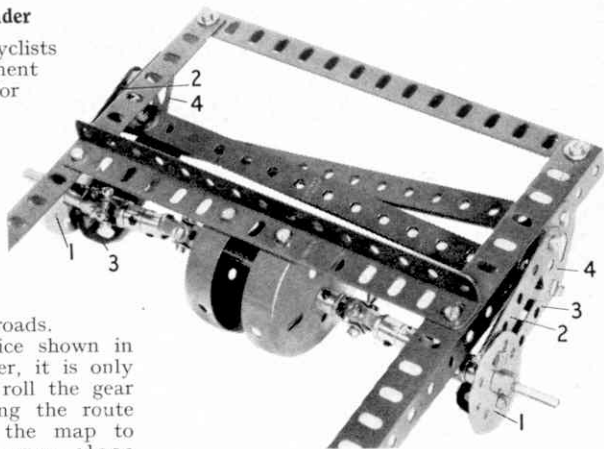
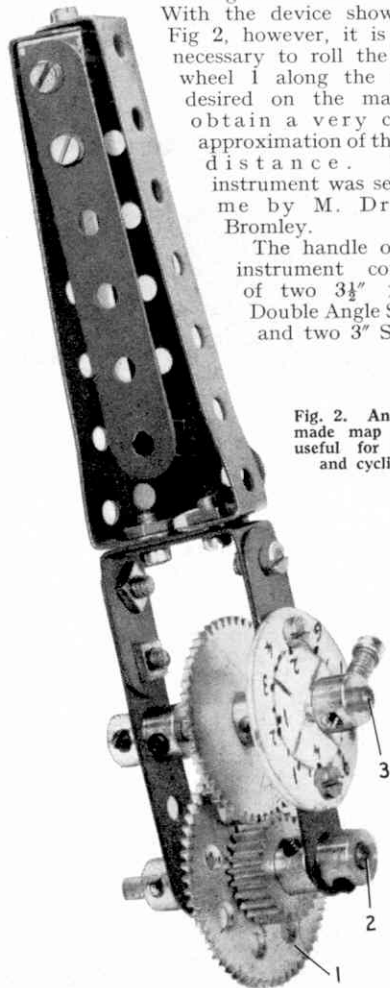


Fig. 3. An example of independent rear suspension for motor vehicles.

Two  $1'' \times 1''$  Angle Brackets are bolted to the lower lugs of the Double Angle Strips, and a  $2\frac{1}{2}''$  Strip is bolted to each Angle Bracket.

A 2'' Rod 2 is mounted in the end holes of the  $2\frac{1}{2}''$  Strips and it carries a 57-tooth Gear 1 and a  $\frac{3}{4}''$  Pinion. A second 2'' Rod 3 is arranged so that a 50-tooth Gear on it can mesh with the  $\frac{3}{4}''$  Pinion. A Wheel Disc fitted with a distance measuring scale is mounted on the 2'' Rod 3 and is bolted to one  $2\frac{1}{2}''$  Strip. The pointer is a  $\frac{1}{2}''$  Bolt fixed in a Collar and used also to lock it on the 2'' Rod 3.

The indicator dial can be calibrated so as to be suitable for use with different map scales. In our example the outer scale is 1 inch to 1 mile and the inner scale is  $2\frac{1}{2}$  inches to 1 mile.

### Independent Rear Suspension

Since the end of the war one of the most outstanding developments in motor vehicle engineering has been the almost universal adoption of independent front suspension systems for private cars. Independent rear suspension systems are less common, but many of the latest Continental cars now feature this type of suspension, and from the Meccano model-builder's point of view the mechanism can add a great deal to the interest of model vehicle construction. The main problem in design is to provide a smooth and free-running drive to the road wheels irrespective of the movement of the wheels under the action of the springs. In the mechanism shown (Cont. on page 354)

## An Attractive Model Loading Shovel

THE rear part of the chassis of the Loading Shovel shown in Fig. 1, is made up of a  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flanged Plate 1. Two  $9\frac{1}{2}''$  Strips 2 and 3 are bolted to the longer flanges of the Flanged Plate. The back wheels rotate on a  $5''$  Rod mounted in the holes of two Flat Trunnions bolted to the flanges of the Flanged Plate 1. The Rod is held in place by two Collars. The wheels consist of two  $2''$  Pulleys with Wheel Discs bolted to them as shown. Washers are used to space the Discs from the Pulleys.

The front wheels are held on a  $5''$  Rod that passes through the end holes of two  $1\frac{1}{2}''$  Strips bolted to each of the  $9\frac{1}{2}''$  Strips and is held in place by two Collars. The front wheels are two  $1\frac{1}{2}''$  Pulleys.

Two Trunnions are bolted to a  $2\frac{1}{2}'' \times \frac{1}{2}''$  Double Angle Strip 4 on each side that is bolted through its lugs to the top ends of the  $1\frac{1}{2}''$  Strips and the  $9\frac{1}{2}''$  Strips 2 and 3. Also bolted to the tops of the  $1\frac{1}{2}''$  Strips are two  $4\frac{1}{2}''$  Strips 5 and two Corner Brackets 6, the latter being used to strengthen the construction. A  $5\frac{1}{2}''$  Strip is connected to the Flanged Plate by a  $\frac{1}{2}''$  Reversed Angle Bracket 7 and is connected at its other end to the  $2\frac{1}{2}'' \times \frac{1}{2}''$  Double Angle Strip 4 by means of an Angle Bracket. On the other side a  $4\frac{1}{2}''$  Strip is connected at both ends to the  $9\frac{1}{2}''$  Strips by two  $\frac{1}{2}''$  Reversed Angle Brackets 8 and 9 as shown.

A  $1''$  Reversed Angle Bracket 10 is bolted to the foremost Trunnion and connected to a  $2\frac{1}{2}'' \times \frac{1}{2}''$  Double Angle Strip 11. The lugs of the  $2\frac{1}{2}'' \times \frac{1}{2}''$  Double Angle Strip are bolted to the ends of the  $9\frac{1}{2}''$  Strips, and two  $2''$  Strips 12 are bolted to the  $9\frac{1}{2}''$  Strips as shown. The headlamps are Threaded Bosses and they are attached to the  $2''$  Strips by means of Angle Brackets.

The  $2''$  Strips 12 are joined at their tops by a  $2\frac{1}{2}'' \times \frac{1}{2}''$  Double Angle Strip. Two  $4\frac{1}{2}''$

Strips are bolted to the lugs of the Double Angle Strip at the front; at their rear ends they are fixed to two  $2\frac{1}{2}''$  Strips 13, one on each side of the model, which are bolted to the two  $9\frac{1}{2}''$  Strips 2 and 3.

The radiator grille consists of three  $2''$  Strips joined together by two Corner Brackets at the top and by a  $1\frac{1}{2}''$  Strip at the bottom. This structure is connected to the

$1''$  Reversed Angle Bracket 10 by means of an Angle Bracket.

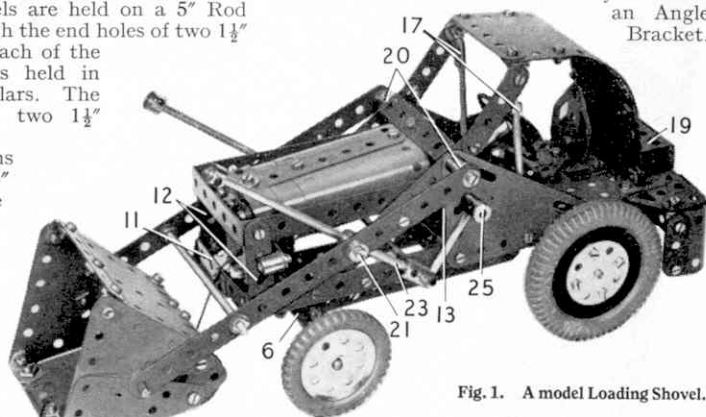


Fig. 1. A model Loading Shovel.

Make the engine cover 14 of a  $4\frac{1}{2}'' \times 2\frac{1}{2}''$  Flexible Plate and two  $2\frac{1}{2}'' \times 2\frac{1}{2}''$  Flexible Plates, shaped as shown. A  $3\frac{1}{2}''$  Strip is bolted along the centre of the engine cover and a  $2\frac{1}{2}''$  Strip is curved and bolted across the front end. This structure is connected to the radiator grille by an Angle Bracket.

The sides of the cab consist of  $3\frac{1}{2}'' \times 2\frac{1}{2}''$  Triangular Flexible Plates bolted to the  $9\frac{1}{2}''$  Strips 2 and 3, and to the vertical  $2\frac{1}{2}''$  Strips 13 at their front edges. Two  $2''$  Strips forming the sides of the windshield are bolted to the  $4\frac{1}{2}''$  Strips 5. At their upper ends the  $2''$  Strips are bolted to Rod and Strip Connectors 17, each of which supports a  $3''$  Rod 15 connected to one of the side flanges of the Flanged Plate 1 by means of a further Rod and Strip Connector.

The roof and back of the cab consists of a  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flexible Plate strengthened

Fig. 2. An underneath view of the Loading Shovel.

at the lower end by a  $2\frac{1}{2}$ " Strip and at the top front by a  $2\frac{1}{2}$ " Strip 16. At the front, the roof is connected by Angle Brackets to the two Rod and Strip Connectors 17 on the 3" Rods.

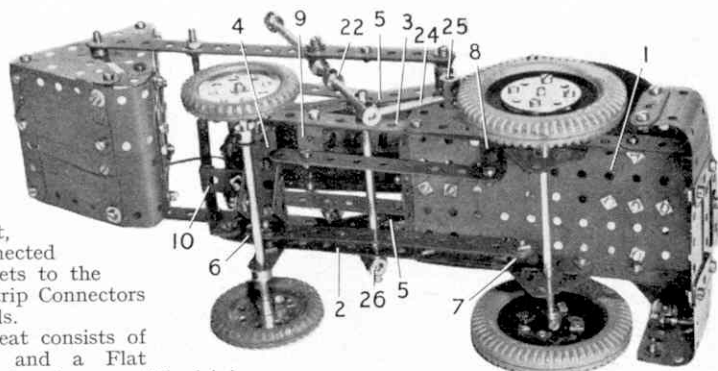
The driving seat consists of two Trunnions and a Flat Trunnion arranged as shown, and the driving wheel is held on a 3" Rod that passes through a  $1" \times 1"$  Angle Bracket and an Obtuse Angle Bracket bolted to the Flanged Plate 1. The Angle Bracket is bent slightly to give the correct slope to the steering column.

The rear bumper is made up of three  $2\frac{1}{2}$ "  $\times$   $1\frac{1}{2}$ " Flexible Plates and four  $1\frac{1}{2}$ " Strips arranged as shown, and at each side is connected by an Angle Bracket to a Trunnion 18 bolted to the Flanged Plate 1. Two Corner Brackets also are bolted to the Trunnions as shown. The tool box 19 at the back consists of two  $1" \times 1"$  Angle Brackets and a Channel Bearing arranged as shown.

The excavator bucket consists of six  $2\frac{1}{2}$ "  $\times$   $1\frac{1}{2}$ " Flexible Plates bolted together in two sets of three and connected at their ends to 3" Strips. One of the Strips is seen in Figs. 1 and 2. Each end consists of two  $2\frac{1}{2}$ "  $\times$   $1\frac{1}{2}$ " Triangular Flexible Plates, a  $2\frac{1}{2}$ "  $\times$  2" Triangular Flexible Plate and a Corner Bracket. The ends are fastened to the sides

by Angle Brackets.

Each of the two arms that carry the



bucket consists of a  $7\frac{1}{2}$ " Strip. To its inner end a 3" Strip is bolted for strengthening purposes. Each arm pivots on a  $\frac{1}{2}$ " Bolt that is locked by a nut in a Threaded Boss 20 fixed to the side of the cab in the position shown.

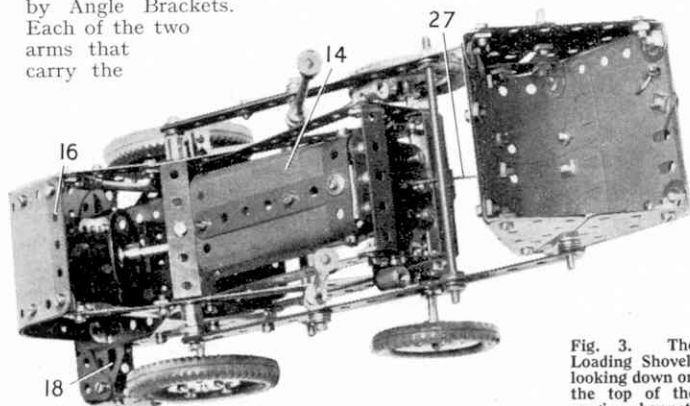
A bolt 21 in the sixth hole from the rear end of the arm is fitted with a nut tightened against the arm, and the shank of the bolt is then screwed into a Collar 22 that must be free to slide on the 5" Rod 23. Washers must be used on the bolt to space it so that it cannot be screwed too far into the Collar 22 and cause it to grip the Rod 23. This construction is the same on each side of the model.

One of the Rods 23 is fixed in a Coupling mounted by its centre transverse hole on a Rod journalled in the  $9\frac{1}{2}$ " Strips of the chassis. A short Rod 24 is fixed in the Coupling as shown and is fitted with a Short Coupling 25. The other Rod 23 is fixed in a Short Coupling 26. Collars are fixed on the upper ends of these Rods.

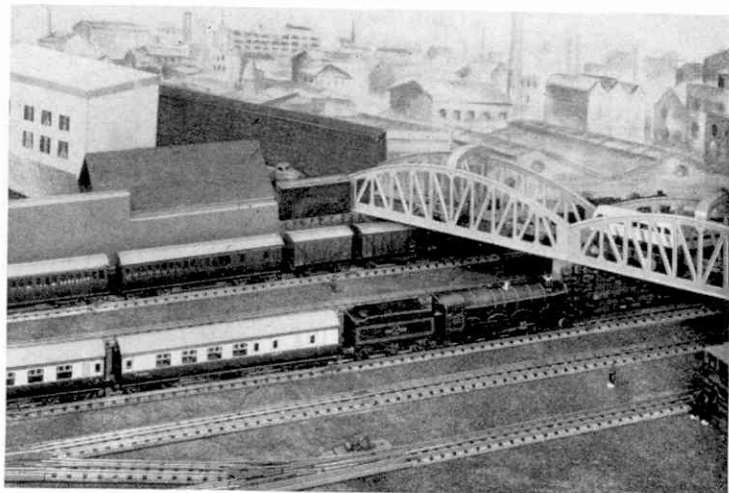
By pressing on the Short Coupling 25 the Rods 23 rise towards the rear of the vehicle and this movement raises the arms carrying the bucket.

The bucket can be tipped by pulling on a Cord 27. This is attached to the

Fig. 3. The Loading Shovel, looking down on the top of the engine bonnet.



(Cont. on page 329)



The long journey is nearly over as "Bristol Castle" approaches the City. Holiday traffic is a two-way business, for those who go away must come back.

## HORNBY RAILWAY COMPANY

by The Secretary

# More Good News and Holiday Trains

There is another addition to the range of goods vehicles with fully-detailed moulded bodies in the shape of the SD6 6-ton Refrigerator Van (W.R.), I may as well deal with this vehicle at the same time as the SD6 Standard 13-ton Open Wagon first mentioned last month. Both incorporate the standard Hornby-Dublo die-cast base and they run on the moulded spoked wheels now becoming familiar in the Hornby-Dublo system. These of course provide the easiest of running.

The 13-ton Open Wagon has a finely moulded body, fully detailed to show the planking, strappings, door details and corner plates. As in the other vehicles that I have spoken about previously, special care has been taken to reproduce the sections of the door fittings and other items exactly to scale.

The new SD6 6-ton Refrigerator Van is another super-detail job that captures precisely the appearance of the real thing. All Western enthusiasts will recognise it as following the lines and details of a Swindon-built *Mica B.*, to quote the code name long used to distinguish this vehicle. Apart from its general character this Van is all the more striking because of its white finish. Detail on the sides is all there, hinges, locking bars, handles and even

the doorstops, and the more closely you examine this the more you will like it.

The ends are particularly fascinating, for they include the steps and the rather "curly" handrails that give access to the roof, as well as the characteristic wedge-shaped ventilating hoods. You may wonder why it is necessary for anyone to go up on to the roof, apart of course for repair purposes. Well, as the real van is a refrigerated one it carries ice bunkers and these are filled or inspected through hatch covers near to each corner of the roof. The latter, by the way, on the miniature van is of correct Western profile for this type of vehicle, and is finished in the usual B.R. roof grey.

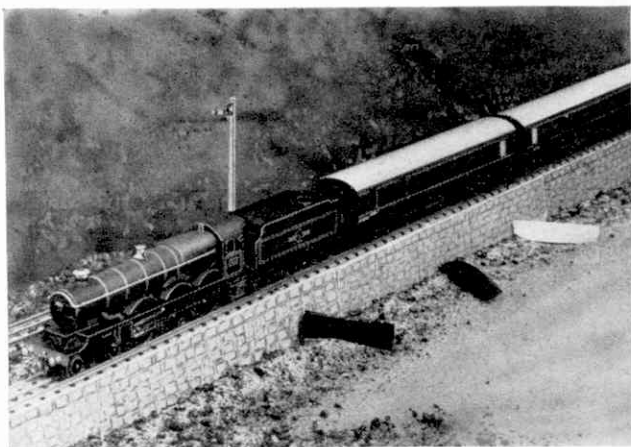
It has taken us rather a long time, but time well spent, as I am sure you will agree, to get round to the subject of our pictures this month. The general theme of these is train operation for holiday times and the views will no doubt interest all those who make a special feature of holiday traffic in miniature, particularly the owners of "Bristol Castle" Locomotives and W.R. rolling stock. Of course not all trains that run in the Western Region are made up of brown and cream Corridor Stock. So you will be quite in order in running a train of D22 Coaches in maroon livery

With a through express from another Region, "Bristol Castle" runs alongside a miniature sea wall, above the beach with its paper boats.

behind your Castle, as is being done in the upper picture on this page. Here we have in miniature a sea-wall scene of the kind familiar to railway enthusiasts and we have on one or two previous occasions in the *M.M.* given useful hints for the arrangement of such a scene. The "boats" on the beach, by the way, are made of paper, but no doubt most of you will have some suitable small craft that would fit in with a scheme of this kind.

The holiday period is a busy time for the railways and with careful management you can arrange a fine programme of long-distance expresses. Don't forget that your train marshalling arrangements must be very complete and that there will be a strong demand for the services of your Restaurant Car, or Cars. You need not worry if you find it necessary to include one in red and cream livery in a train of maroon or even Western brown and cream Corridor Coaches. This can easily happen especially at busy holiday periods.

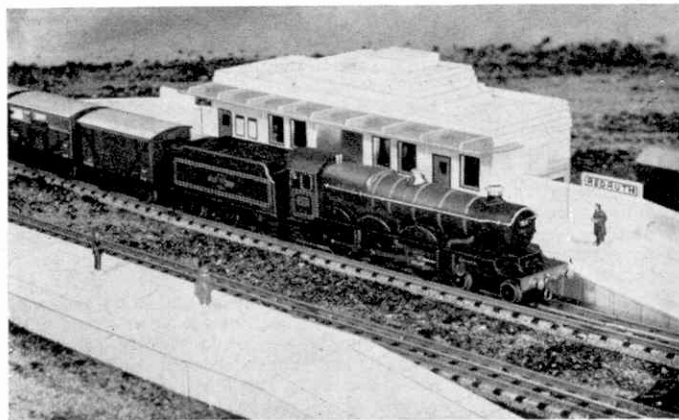
Don't be misled by the station nameboard in the last picture. This does not mean that a new series of Hornby-Dublo station names



is ready! You can make up your own labels to attach to station nameboards and the title shown—*Redruth*—has been chosen in order to give a Cornish holiday "flavour" to operations.

Of course to obtain the greatest possible fun from your train working at any time you will make quite sure that the track is in good order and well cleaned, and that the general preparation of the engines and rolling stock has been well carried out. You will remember particularly the hints that I gave earlier in the year regarding *Bristol Castle*. So make sure that your Castle is in the pink of condition for running your holiday service!

Holiday traffic works both ways of course, as the picture on the previous page suggests. If you do find that there is no immediate return working for an engine, or perhaps a "special" crops up unexpectedly, then you may well have something like the situation in our lower picture, where a Castle is hauling an urgent produce train.



West Country produce is hustled to town in Hornby-Dublo Vans behind a Castle 4-6-0.



An end-on view of the Hornby-Dublo layout of Robert Newcombe, Pontypool, showing the interesting centre section and the main lines that pass through the scenic section at the far end. Photograph by L. H. Morgan.

## Do It Yourself!

### Scenic Layouts by "M.M." Readers

*Do It Yourself* is a familiar phrase nowadays, but the idea is not a new one for many miniature railway enthusiasts, who have long been accustomed to doing things themselves. For instance, the baseboard to hold the railway is usually a home-construction affair. Then after the erection of the railway, which is necessarily a job for the enthusiast himself, there comes the entertaining business of dressing it up to look more like the real thing by providing suitable surroundings, or at least improving the bare nature of the board on which just the railway essentials have been provided.

There is plenty of scope for ingenuity in this direction, and the pictures on these two pages show particularly good examples of the work of Hornby-Dublo enthusiasts who have followed the *Do It Yourself* idea. Each in its own way provides ideas that will no doubt be found useful by others.

On this page we have the layout of Robert Newcombe, of Pontypool, who has built up a good little railway on a 6 ft. by

4 ft. baseboard. The end-on view here shows that the busy part of the system is in the centre, where a miniature township is served by the railway station and associated tracks. The railway passes out of town and then into the countryside, which our reader has been careful to build up in an attractive manner.

There are two main lines, one at normal baseboard level and the other taken to a higher level at the far end of the system. There both tracks pierce quite a formidable mountain, with a cleft between the two "humps" through which tunnels have been driven.

This mountain is really a built-up affair consisting of chicken wire, to give the basic shape and foundation, with sheets of newspaper laid over it and then covered with plaster. The surface is moulded and generally treated while wet in order to produce the broken natural contours that are apparent in the illustration. Here the surface of the mountain is used as a battle

training ground. for miniature figures of various Army personnel and it will be noted that aircraft also take part in the exercises.

Down below in the village things are normal. The station is busy, the local Hunt is meeting outside the miniature hostelry and there are some soldiers paraded with their field guns before being transported to their mountain Headquarters. The railway traffic is managed comfortably by a Hornby-Dublo A4 Pacific of the older *Sir Nigel Gresley* type, and one of the familiar 0-6-2 Tanks in B.R. finish.

We have already seen in last month's *M.M.* something of the layout of C. C. French, of Wolverton, whom you see busy here with his system. In the right hand corner of the illustration the railway passes beneath a section that has been built up over a framework erected on the baseboard, and then covered over and painted, ready to receive the miniature buildings that make an attractive part of the layout.

Apart from the tunnel a further home-made structure is the road overbridge leading from the raised section down to baseboard level. This is a simple cardboard affair, quite convincing in its effect and typical of the sort of lineside addition that almost any Hornby-Dublo owner can easily make. Some nice stiff card, or thin wood, a pencil, steel rule and a modelling knife will produce the parts. Stick these together



C. C. French, Wolverton, turns his "Bristol Castle" Locomotive in the course of operations.

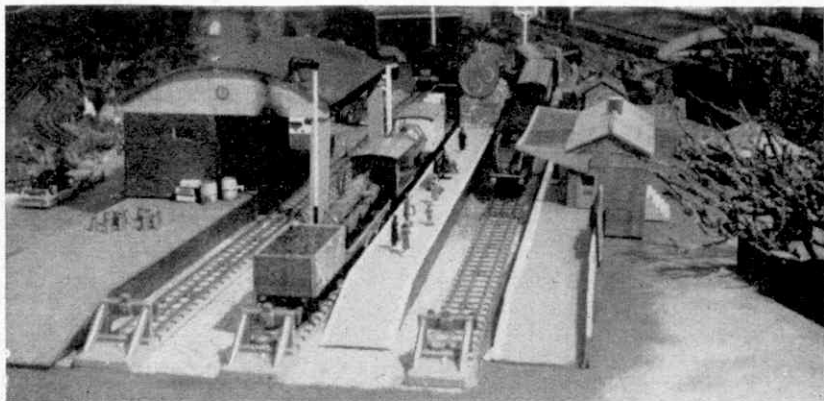
with tube glue and finish off with paint, and there you are.

Finally we have the neat and simple system shown in the third illustration, this being the layout of H.R.C. member No. 281253, C. Dyson, of Pudsey. The system is nicely arranged with various lineside buildings that add considerably to the general effect.

You will notice that there is what we may call some surface material inside the main oval and between the tracks to represent the ground. Canvas suitably painted does well for this, but for those who like something ready coloured, green baize will do quite well. A little extra work with the paintbrush will produce excellent roadways on a canvas surface.



A simple baseboard layout belonging to C. Dyson, Pudsey, which includes various home-assembled lineside features.



## This Looks Like a Railway!

By Layout Man

LAYOUTS always seems to me to reveal something about those who plan them. Once we get away from the standard oval with which we begin, every addition gives some indication not only of the wishes of the builder, but also of the direction in which his mind is working, and this I often find very interesting.

Take for instance the layout illustrated on this page. It is compact, with a good deal of railway on a board only 8 ft. x 5 ft., and it is sound from the model railway point of view, both in construction and in the opportunities it gives for running a variety of trains in good style. But there is something else that attracted me as soon as I saw the photographs on which our illustrations are based, and I hope you too will be interested.

It is clear that to Mr. R. J. Fryman, Birmingham, who is the owner of

this layout, it is not sufficient to go on just adding tracks and accessories. When looking at a railway, whether in town or countryside, there is much more in the way of surroundings than of railway to be seen, and I think you will agree that it is so in the case of Mr. Fryman's railway. On it the lines really fit into the scene.

There is, of course, much more in Mr. Fryman's layout than this successful effort to be completely realistic. An example is the raised section, which is carried above the rest of the layout by means of retaining walls.



The illustrations here show fine views on the layout of Mr. R. J. Fryman, Birmingham, that is described on this page.





# Club and Branch News



## WITH THE SECRETARY

### PRAISE FROM THE MAYOR

The Launceston M.C., Cornwall, is one of the younger flourishing Meccano Clubs, and in a few years has built up an excellent local reputation by its constructive activities. Hence the Mayor of Launceston's ready acceptance of the invitation to open the Club's fourth Annual Exhibition, on 1st May last. In his remarks at the opening ceremony the Mayor emphasised the value of the Club's work, and in his subsequent tour of their display he found much to praise—and took the opportunity of operating one of the locomotives on the Hornby-Dublo layout! Later he presented the prizes to the members who had built the best models, and presented the Club's cup for the "Member of the Year" to K. Keast. Congratulations to all who had a part in this very successful occasion.

### PROPOSED MECCANO CLUB

CALCUTTA (INDIA)—Mr. Diptish Gangopadhyay, 20 Gokul Mitra Lane, P.O. Hatkhola, Calcutta 5, India.

### CLUB NOTES

CONSETT AND DISTRICT Y.M.C.A. M.C.—The summer programme includes rambles, cycle runs and swimming. Visits to interesting industrial concerns are being planned, among them the Consett steel works, and to railway depots at Darlington, York and Carlisle. Secretary: D. Whitfield, Berry Edge Farm, Number One, Co. Durham.

MILE END (PORTSMOUTH).—Meccano models completed recently have included a "dogger" car built by Mr. Gifford, R.N., of H.M.S. *Vanguard*, who is one of four new members enrolled after a recent Open Day meeting. *Ernie*, the Meccano robot, has been dismantled, and a motor car illustrating differential gears, etc., is being constructed. A Photographic Section has been formed. Secretary: Mr. A. J. Nicholson, 312 Sultan Road, Buckland, Portsmouth.

### NEW ZEALAND

CHRISTCHURCH M.C.—Model-building activities have

centred round a series of competitions for home-built models, with a different subject each time. On one occasion the subject set was *Something found in a Workshop*, and this produced some excellent models of drilling machines, hand, clockwork and electric planers, and other tooling plant. Secretary: R. Boundy, 25 McBratneys Road, Sallington, Christchurch, New Zealand.

### SOUTH AFRICA

CAPE TOWN M.C.—The Club was invited to stage a models display at the King David Sports Club for the members and their children, who also exhibited their own hobbies. At one meeting, Mr. Spence gave a very interesting lecture on *The Early History of the Steam Engine*. Secretary: C. Cohen, 23 Upper Rhine Road, Sea Point, Cape Town, South Africa.

### BRANCH NEWS

FEATHERSTONE CASTLE (HALTWHISTLE)—An additional line has been added to the Branch layout and it is now possible to have independent running of two trains at the same time. During school holidays some of the members have been exploring old railway tracks in this part of the county. Secretary: F. N. Clark-Lowes, Featherstone Castle, Hillbrow School, Haltwhistle, Northumberland.

POTTERS BAR.—Members have been engaged in transferring the Branch track to its summer home in a garage. The layout is based on a scene in an old *M.M.*, and gives very satisfactory working. The Branch Magazine continues to flourish. Secretary: R. Woods, 120 The Walk, Potters Bar, Middlesex.

MILE END (PORTSMOUTH).—Several new members have been enrolled. A recent Open Day was such a great success that it has been decided to hold a large two-day Exhibition in August, and the extensive preparations for this are already in hand. A mock trial has been held and a recent Social evening was well attended. Secretary: A. H. Firman, 171 Fratton Road, Portsmouth.

Her Royal Highness, the Princess Royal, inspecting the model industrial plant in the fine Consett Y.M.C.A. Meccano Club display at the opening of the new Y.M.C.A. premises, Consett, last March. Seen in the picture are (left to right): J. Bramley, H.R.H. the Princess Royal, Mr. J. L. Stevens and, hidden by the model, Mr. Goodrum. Illustration by courtesy of the "Northern Echo" Darlington.



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# Stamp Collectors' Corner

By F. E. Metcalfe

## YOUR "VARIETY"

It is getting on for 120 years since the first postage stamps were used, and almost from their very beginning collecting them has been a hobby. Yet during the whole of that long period stamps have never been so much in the public eye in Great Britain as they were a few months ago, and that was due largely to the discovery at Dartford of a single sheet of imperforate stamps, which is not in itself by any means unique. The newspapers got hold of the event, to make an almost front page news item of it, owing to the fact that the sheet of stamps was valued at several thousand pounds; and they have continued to report when other imperforate stamps have turned up, as they do occasionally in booklets.

Collectors recognise other classes of varieties, and a new one for the public was brought to their attention recently when two stamp booklets were found with what is known as a tete-beche variety. That is a French term, roughly meaning head to feet, which is used by philatelists to describe a pair with one stamp upside down as compared with the stamp alongside.

In each of the booklets there was one stamp tete-beche, and the two brought the not inconsiderable sum of £140 in auction. Some people, not interested in stamps, will wonder just how silly collectors can be. Others may wonder how such a formation could come about, and a short explanation may not be out of place.

Stamps are specially printed in Britain for using in booklets. If one of the latter is examined it will be noticed that the stamp panes always have the selvedge to the left. The stitches pass through that selvedge to make up the booklet. Now if we could see the stamps before they are cut up into panes, it would be noticed that the left half of the sheet has the stamps the right way up, while those on the other half are the other way round. This is done so that when the stamps are cut up all the resulting panes have that left-hand selvedge. It also accounts for half the stamps in booklets having their watermarks inverted.

Now it will become clear how a stamp upside down is discovered in a booklet. In the two booklets that sold for such a handsome sum, there was a pane of seven stamps—the normal six, plus an extra stamp that was doubled back, and which had belonged to the right half of the sheet. Don't ask me how it had happened. But I am pretty sure that if it had not been for the publicity given to the imperforate sheet of stamps, the purchasers of the booklets would each have been very considerably poorer today, for they would probably never have thought that their oddities had any particular value.

In one of the illustrations on this page two New Zealand stamps have been placed tete-beche to show what this interesting variety is like.

And that brings me to the real reason for writing this month on varieties. Ever since the newspapers printed the publicity to which I have referred, letters have been arriving from readers who have noted what they considered peculiarities in stamps that have come their way, and want information on the value of what they had found. Alas, the most unpleasant part of all this is that one has to reply that nothing worth while has been discovered, for it must be remembered that varieties are valuable only because there are so very few of them. It is to save those disappointments that I



propose to refer in some detail to a selection of the letters I have received.

Most enquiries refer to stamps found in booklets, where one or perhaps two sides are without the teeth left by perforation. In explanation of this quite common condition, so common that it is unusual to come across a booklet that has not got at least one stamp with a straight edge, it should be explained that when the panes of six stamps are made they are cut with a guillotine and the descending knife does not always fall exactly midway between each two stamps. In fact it rarely seems to do so, and when it runs a bit to one side, it naturally cuts away the teeth of some of the stamps.

I think this should clear that point up. In any event, before a stamp can really be considered imperforate, it must be joined to another one to show for certain that the teeth have not been cut away, as could have been the case where only one stamp is concerned.

On two occasions this year I have received Canadian stamps that had quite large margins all round, and in appearance were quite imperforate. One reader was quite sure that the margins were too broad for the stamps to have had the teeth cut away. Well, I was sorry to have to explain to the lady who sent that specimen that what she had got was a stamp from booklets that have strips of three stamps perforated only vertically. This results in the end

right-hand stamp having no perforations on three sides to start with, and all that had happened in this case was that the teeth on the left-hand side had been cut away. The accompanying illustration of a strip will show what I mean. Such examples, of course, are quite common.

Although these booklet "Imperfs" form the majority of the varieties I am asked to pass judgment upon, it is not unusual to receive a

British stamp with a tiny mark. As some stamps with outstanding flaws have been listed in the Commonwealth Catalogue, senders of these stamps wonder if they have come across a new variety that should be recognised.

Our stamps are printed by the photogravure process,  
(Continued on page 354)



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# Stamp Gossip

## FIRST DAY COVERS

Sometimes I am favoured by a "First Day" cover, and such thoughtfulness on the part of my correspondents is always very much appreciated. One that I received recently from the U.S.A. must be given a special place in my cover collection, for apart from the attractiveness of the stamps, the thought behind the sending was such a nice one.



This issue was made to commemorate the 100th Birthday of L. H. Bailey, the American horticulturist, who is portrayed on the official first day cover. And of all the nice gestures, inside the envelope was a packet of snapdragon seeds, one of five thousand that had been donated by that great United States seed firm, the W. Atlee Burpee Co.

## GOLD ON THEM THAR HILLS

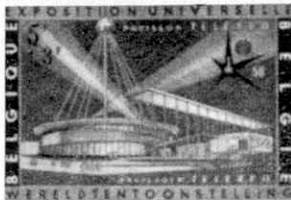
Still in North America, it is a fine stamp of Canada that is the next one to study. This time it is an issue made to commemorate the British Columbia Centennial.

The stamp as usual was line engraved and the designer was Mr. Jack Harman, Vancouver. Another point that will interest collectors is that once more the sheets will show the plate number. Until recently, all Canadian stamps issued for many years had plate numbers on the selvage, and so popular were these plate blocks, as they were called, that collectors occasionally made a bit of a nuisance of themselves by asking for them at the post office.

Australia had the same trouble when their stamps had marginal markings, so they cut them out. Canada did the same, as far as the sheets sent for sale to the various post offices were concerned. But to oblige collectors, sheets on sale at the Philatelic Bureau, Ottawa, retained the marginal markings, so that if you wanted the plate blocks you could get them, without causing disturbance to ordinary post office customers.

## TELEXP

Many readers may have the luck to visit the Brussels Exhibition, but most of us have had to put up with the next best thing—the stamps issued to commemorate the event. The U.S.A. issued one and France another.



The stamp illustrated is one of a set of six issued in Belgium on 15th April, for the benefit of the Commissariat of the Exhibition and the T e l e x p o Association. The 5f. + 5f. stamp depicts

the pavilion of the Telecommunications and Postal Service group, and that building must have been of great interest to all visiting stamp collectors.

## OIL

The fourth stamp to be illustrated this month is one that interests me very much, and I hope readers will like it. It was issued by Argentina to commemorate the 50th anniversary of its oil industry.

Why does it particularly interest me? Well, it is over forty years since I was living and working very near to that part of Argentina which was making that country's oil history. As a matter of fact, my superior went off to the town where the first oil wells were sunk and if the first world war had not broken out then I would have followed suit.

Things have changed down there as far as transport is concerned, at any rate. At that time, just north of the oil wells where I was then living, a boat arrived every two or three weeks with the mail. The boat used to take around five to seven days to come down. Now, I understand, a plane does the trip several times a week, and it only takes a few hours.

## TIP OF THE MONTH

There must be many readers who collect Canadian stamps, and if they are spending a bit more on them than they wish to throw away on a hobby, I would like to assure them that I think there are no stamps being issued today with better prospects. All the time the population of Canada is increasing, and the percentage of collectors over there is also on the rise. This means a bigger demand for its stamps, not only for the older issues, but even for the modern ones, providing the condition is superb. By that I mean well centred copies, with light postmarks, in the case of used, and the mint without a blemish.

There is no need to go to a lot of expense by going in for the earlier. Take the trouble to get fine copies of all the modern special issues. For instance, take the U.P.U. set issued as recently as last year. The 5c. value used is common enough, but it is soon going to be quite hard to pick up fine used copies of the 15c.

As a matter of fact, it is not easy even now. Recently I had the task of trying to get some together to send to America, and I had to give it up. The copies I could find were too poor to suit the purpose. Yes, I can recommend even the modern Canadian stamps. The country's issues merit all I have written about them.



**Quiet Please!**—(Continued from page 310)

with noise from other sources. On almost every street corner there is a public address system. These blast out advertising commercials continuously, interspersed with strident music. Large loudspeaker trucks rumble through the streets, stopping every so often and adding to the volume of noise.

To get away from the perpetual cacophony of Tokyo we must go to Memphis, Tennessee, which is claimed to be the quietest and most peaceful city in the world. Though it is a modern city of 450,000 inhabitants, there is none of the nerve-shattering noises that most city dwellers have to endure. You rarely hear a motor horn or a train whistle. There are no roaring exhausts, shrieking sirens or blaring loudspeakers. It is indeed a haven of peace, and anyone who violates this peace with loud, disturbing and unnecessary noises gets more than a black look. He gets a summons! Fines for breaking the city's anti-noise laws range from three to eleven dollars.

Under the section of the law that deals with "animals, birds or fowls given to frequent or long continued noise," a man in Memphis was recently fined for having a pet bullfrog that disturbed the neighbours' sleep with its constant croaking.

**Road and Track**—(Continued from page 315)

mile at 95.668 m.p.h. The 200 b.h.p. gas turbine engine that made these speeds possible is mounted on a normal Rover car chassis, fitted with Dunlop disc brakes.

**Scotchlite**

In recent months I have noticed an increasing use of Scotchlite on the rear bumpers of vehicles, and there is no doubt that this form of warning device is helping to reduce road accidents, two thirds of which occur during the hours of darkness.

The reflective sheeting "glows" in the headlights of overtaking vehicles and is especially valuable in fog or mist because it will reflect light from a point at least 50 per cent. beyond the driver's normal range of vision. Under conditions of rear light failure Scotchlite becomes absolutely invaluable.

The secret of Scotchlite is that it contains millions of microscopic glass spheres, permanently bonded into a durable light reflecting film. This undoubted aid to road safety can be used on road signs, car bumpers, the hubs of car wheels and the frames of motor cycles and cycles, and as items of clothing for road users. For instance, hand signals become reflective and clearly visible if the giver is wearing Scotchlite gloves.

**The Fairey Rotodyne**—(Continued from page 313)

This, then, is the aircraft that may one day revolutionize air travel on routes up to 400 miles long. At the moment, there is just one prototype, which flew for the first time on 6th November, 1957, with a second, slightly larger prototype on the way.

So far, test flying has gone well, and a major hurdle was crossed on 10th April when Fairey's Chief Helicopter Test Pilot Sq. Ldr. Ron Gellatly, converted successfully from helicopter to autogyro for the first time. Much remains to be done before conversions can be considered easy and safe enough for everyday passenger services, and the process will be automatic in due course. But if B.E.A., or one of our enterprising independent airlines, had sufficient faith in this wonderful British achievement to order some Rotodynes in the next year or so, that dream trip to Paris could be reality by 1961-62.

**My Canal Journey**—(Continued from page 337)

This was *Kingfisher*, the official launch of Sir Reginald Kerr, General Manager of the Waterways Division of the British Transport Commission, who was himself at the wheel. She slid gently into the tank of the lock, and then the guillotine gate was lowered to seal it off from the part of the waterway along which it had come.

The gate is counter-weighted, so that there was no difficulty in turning the large copper key known as a windlass provided for this special occasion to raise and lower the guillotine gate. With the lowering of the gate the tank was sealed off from the northern part of the canal, so that the upper sluices could be opened, to allow water to enter from the southern, higher stretch of the canal. In a very short time *Kingfisher* had risen to the upper level, after which the guillotine gate at the southern end was opened and the launch travelled on southward.

The operation took only a few minutes and was carried out easily and efficiently, a testimony to the design of this remarkable lock, which I believe has no parallel anywhere in the world.

**The 1958 Empire Games**—(Continued from page 339)

There are castles as well as coal mines, heather-covered hillsides as well as black slag heaps, sparkling salmon streams as well as steel works. Even in the south, which is generally regarded as an industrial region, there are many places of real beauty. No Welshman will deny the existence of the narrow, grimy coal-mining valleys. In fact he is proud of them, for without coal Wales could not be so economically prosperous as it is today, and Welsh coal is claimed to be the finest in the world.

With their own language, literature, customs and music—true Welshmen will burst into song at the drop of a hat!—the people of Wales, a sporting people, a hospitable people, a friendly people, say to their visitors, "Croeso—Welcome".

**Among the Model-Builders**—(Continued from page 341)

in Fig. 3 on page 341 the drive to each wheel is transmitted by two Universal Couplings. The springing action is provided by laminated torsion bars.

The bearing for each axle shaft is a Bush Wheel 1 fitted with a 2½" Strip and a 2½" Angle Girder 3. The Strip and the Angle Girder are lock-nutted to the Bush Wheel and to a Fiat Trunnion 4 bolted to the chassis. Each torsion bar consists of two or more 7½" Strips, the exact number depending on the weight of the model and the strength of the spring required. One end of the torsion bar is bolted to the rear of the Girder 3, the other end is fixed to an Angle Bracket bolted tightly to the opposite side of the chassis.

The Boiler Ends forming the differential housing are bolted to a 7½" Angle Girder fixed across the chassis. The shafts extending from the differential are fitted with Universal Couplings, and these are connected to further Universal Couplings by 1" Rods. The outer Universal Couplings carry the 1½" Rods that form axles for the Road Wheels. These Rods are mounted in the bosses of the Bush Wheels 1.

**Stamp Collectors' Corner**—(Continued from page 351)

and this method results in numerous flaws. A good pair of eyes can spot several on almost every sheet of stamps examined. But before such flaws are worth consideration, they must be plainly visible to the naked eye, and they must be constant. That is to say the flaws must be the result of an imperfection on the cylinder itself and not just due to some extraneous matter lodged on the cylinder during printing. And of course, even if some of these flaws are worth a place in the catalogue, as there are so many their value is relatively small.

There are other varieties of philatelic interest, such as retouches, where to restore the design work is done on the plate or cylinder, or re-entries where the design on the plate is not satisfactory and a second application of the transfer roller is necessary to rectify things. A stamp with a retouch, shows up with a slight deviation in part of the design, and in the case of the re-entry, there is a doubling of some of the lines of the design. But as these varieties are not easily spotted, only the well grounded philatelist notices them as a rule, so we can leave them for some other time.

# Fireside Fun

Waiter: "Did you enjoy your steak, sir?"  
Diner: "Yes, give my compliments to the stable-lad!"

Explorer (just back from an expedition): "I brought back six tigers, two leopards and a potter."  
Friend: "What's a potter?"  
Explorer: "To cook the meat in."



Summerfield

"Cheeky Monkey! Ever since he found out my name is Belle he's called me BELLE TENT!"

"I haven't seen you at church lately, William," said the vicar. "What is the matter?"  
"My daughter's learning to play the harp," replied the man.  
"But what has that got to do with it?"  
"Well, I'm not so keen now on going to Heaven!"

"Did you make sure that the seat you booked for me is near the stage?"  
"If it was any nearer, you'd be in the programme."

Teacher: "What is your name?"  
Small Boy: "Jule, Sir."  
Teacher: "You shouldn't use a nickname. Your name is properly Julius. Next, what's your name?"  
Second Small Boy: "Bilious, Sir."

Judge: "You have heard the charge. Do you plead guilty or not guilty?"  
Prisoner: "It's no good asking me. I'm prejudiced."

"My youngest boy has trouble with eczema."  
"Gracious, how did he get it?"  
"He hasn't got it. He just can't spell it!"

"Grandpa, why don't you get a hearing aid?"  
"Don't need it, son. I hear more now than I can understand."

Professor: "If molecules can be split into atoms, and atoms broken up into electrons, can electrons be split up any further?"  
Student: "Well, professor, you might try mailing them to someone in a package marked 'Fragile!'"

Tom: "What man is the slowest writer?"  
Tim: "I give up."  
Tom: "The convict. He sometimes spends 15 years on one sentence!"

A pious but cranky old lady was put out because her neighbours had not invited her to the picnic. On the morning of the event, one of them called to ask her to go along.  
"It's too late," she snapped, "I've already prayed for rain."

## BRAIN TEASERS

### JUMBLED NAMES

Below are ten words of jumbled letters. Each of these represents the name of some man well-known to boys. The names include statesmen, sportsmen, scientists, etc. What are their names?

IHCLRLUHC  
WSHETMTA  
NTOKELACSH  
ESUOHFOIL  
REWHOSENEI  
NNYEPE  
COINRAM  
NGMOREY MOT  
AMNADRB  
YTWAACAH

## FIVE MINUTE CROSSWORD

### Clues

#### Across

1. A means of obtaining uniformity.
4. Scene in a Shakespearean play.
5. The ballet lake is not complete without these.

#### Down

1. Dribs and —
2. Part of the name of a famous gem.
3. You can cross these and draw them.

1	D	R	0	L	5
	R		N		I
4	A	R	O	E	N
	R		I		E
5	S	W	A	N	S

## ANSWERS TO LAST MONTH'S PUZZLES

### Hidden Animals

- (1) Chamois. (2) Buffalo. (3) Heifer. (4) Beaver.

### What am I?

The answer is a Match.



**DON'T LET ACCIDENTS KEEP YOU OUT OF THE GAME**

Danger signs mean  
what they say  
Keep to the safe part  
when you play.



A cut from glass can  
spoil your fun  
Don't break your bottles  
when you've done.

When you're swimming  
do make sure  
You don't swim out too  
far from shore.




—AND HERE'S ANOTHER GOOD TIP! Remind Mother that chewing delicious Wrigley's Spearmint Chewing Gum is naturally good for your teeth and won't fill you up between meals. Ask her to buy some today.



£207/8







*Take  
your  
life in  
both  
hands!*

You can't afford a hand for your tennis racket when you're cycling on today's busy roads. You need *both* of them where they belong—on the handlebars! That's why you need a Terry clip on your front fork to hold your racket safely for you. Terry clips are lined with felt to protect the handle of your racket; and they work just as well for hockey sticks.

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Tennis Racket Clips  
black 3/6 silvered 4/-

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The Household Outfit at 5/6

provides more Rawlplugs and screws and a useful Rawlplug and Screw Gauge. The Handyman Outfit at 11/9 provides the choice of No. 8 or 14 Rawlplugs with appropriate screws and a No. 14 Tool-holder with No. 8 and 14 "jumpers" to fit. Also the Rawlplug and Screw gauge and instruction book.

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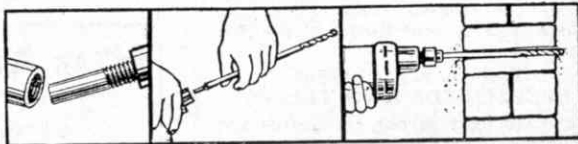
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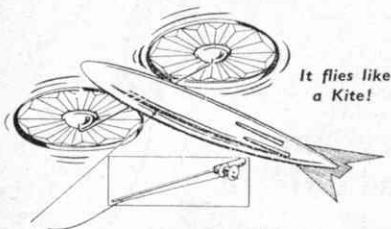
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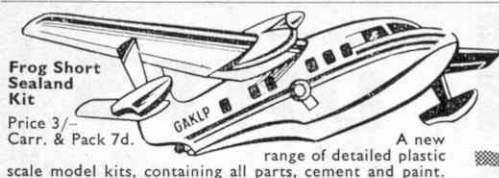
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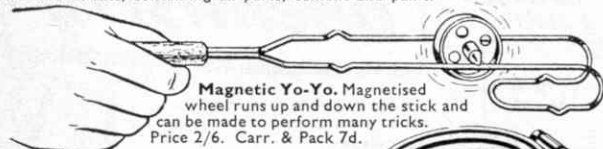


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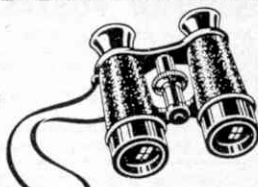
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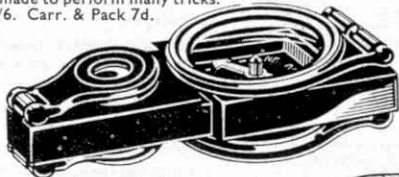


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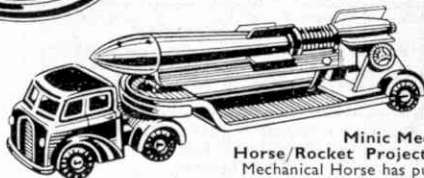
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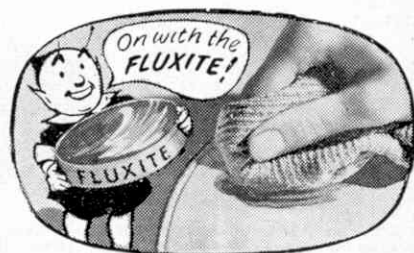
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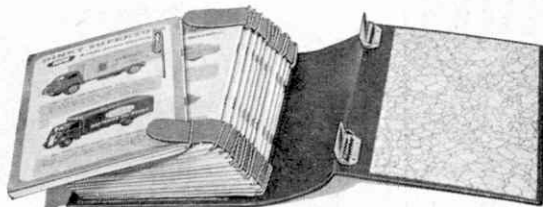
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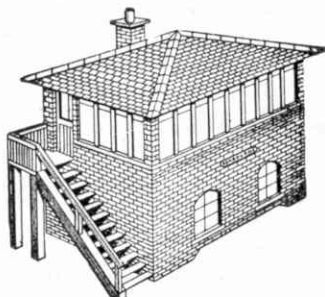
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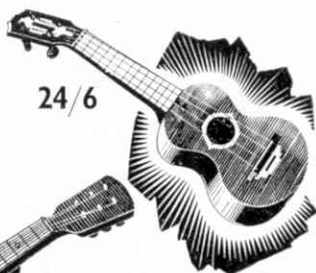
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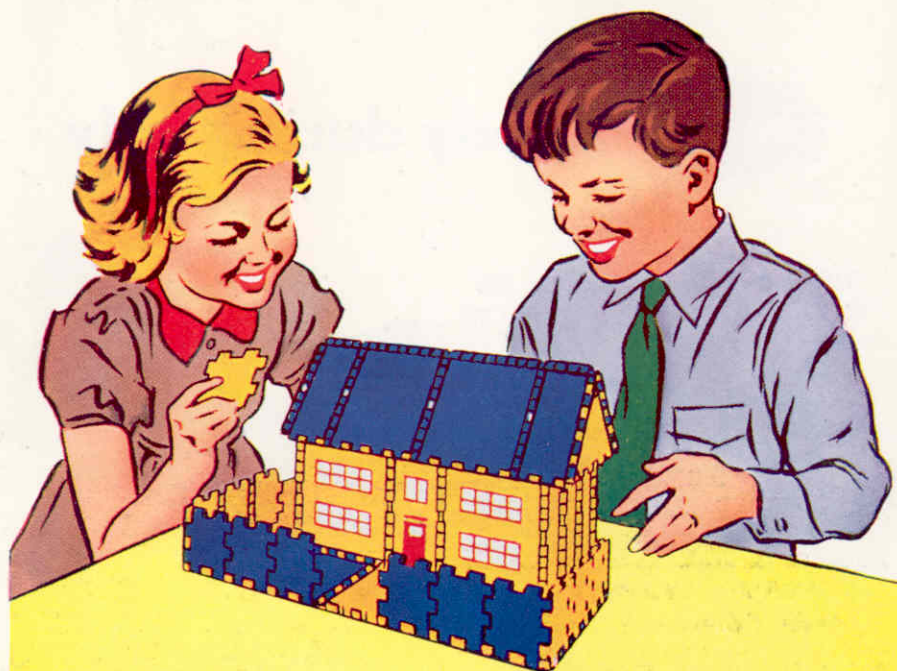
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