VOL. XXXVI. No. 1 JANUARY 1951

MECCANO MAGAZINE

WINTER

9D.

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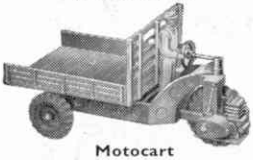

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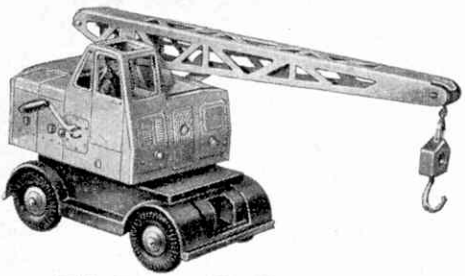

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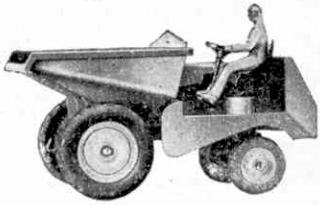

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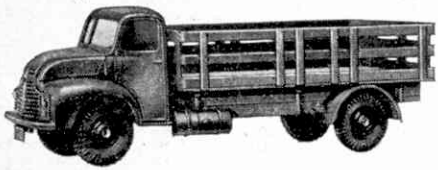

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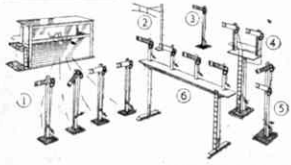

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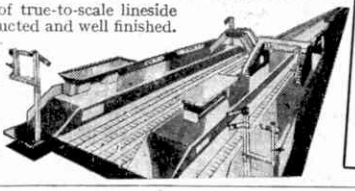

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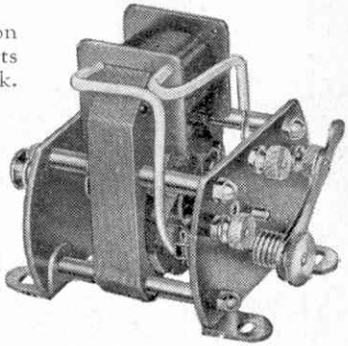

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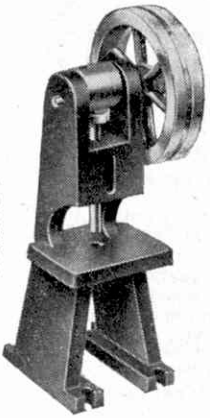

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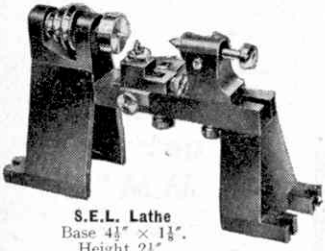

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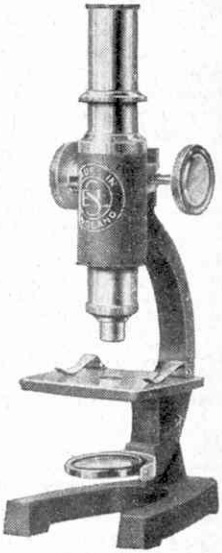

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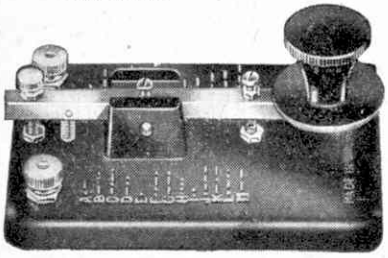

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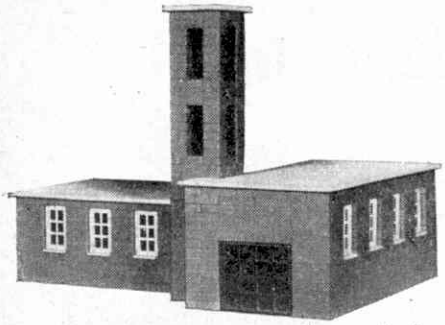

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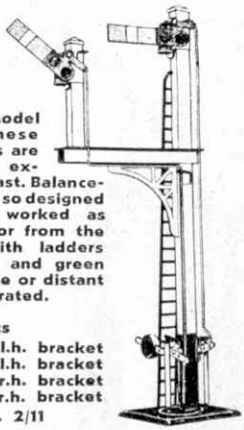

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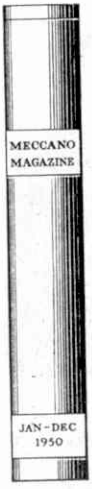

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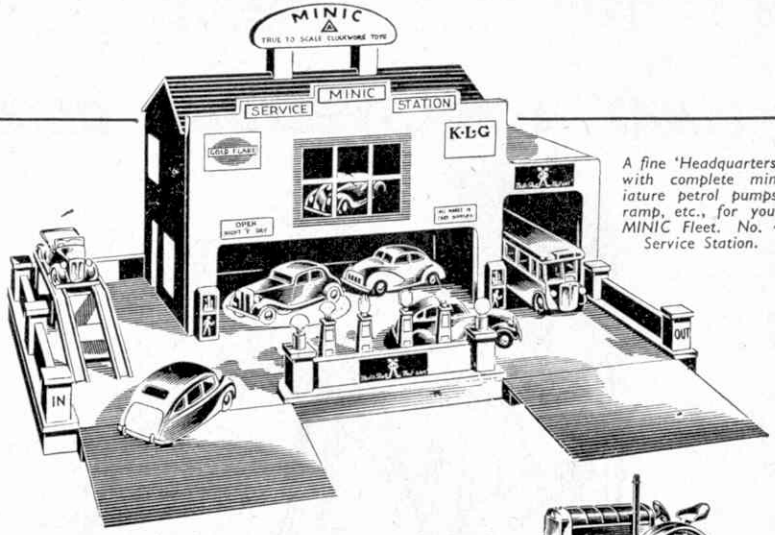

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MECCANO MAGAZINE

Editorial Office:
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Vol. XXXVI
No. 1
January 1951

With the Editor

Changes in Small Railways

During recent years there has been a rather depressing sequence of closings of small railways resulting from changes in the requirements of passenger and goods transport. These vanished lines have included some narrow gauge affairs, such as the Southwold line, the popular Lynton and Barnstaple and the Leek and Manifold. Several standard gauge lines of the light railway type have also disappeared. Among these a notable one was the Basingstoke and Alton light railway, opened in 1901, which had its track removed in 1916 for war purposes. It was out of commission until 1924 when it was restored and re-opened, but not for long. By 1932 it was again closed to passenger traffic and in 1936 to goods traffic also. Now, except for short lengths at each end of the line, the track has been removed.

Even in town or city districts changes have occurred, mostly in the withdrawal of passenger services although in many cases the lines are still in use for goods traffic. In Liverpool, for instance, the London Midland Bootle branch, which passes close by the Meccano Works, no longer conveys passenger traffic except in the form of through connections between Southport and London which do not make any stops on the branch itself.

On the other hand various local railways that might have been expected to close are still carrying on. A good example is the Kent and East Sussex line. This was formerly independent, but has become merged in the British Railways national system and is now part of the Southern Region.

A railway of a different character still in operation is the one known in its area as the "Mumbles Railway." This is really a tramway system between Swansea and Mumbles, which has been worked by electric cars for over 20 years. Prior to that steam traction was in use, and this had superseded horse power, with which the line originally began operations as long ago as 1806. The Mumbles line can claim to have been the first passenger line in the world, for passenger traffic began in 1807. I have in preparation an article describing this long-lived pioneer system.

* * * *

The new Chamber of the House of Commons was designed to resemble as far as possible the historic building destroyed by bombs in 1941, but there is one outstanding difference that is not immediately apparent. This is the use of steel on a large scale in its construction.

This Month's Contents

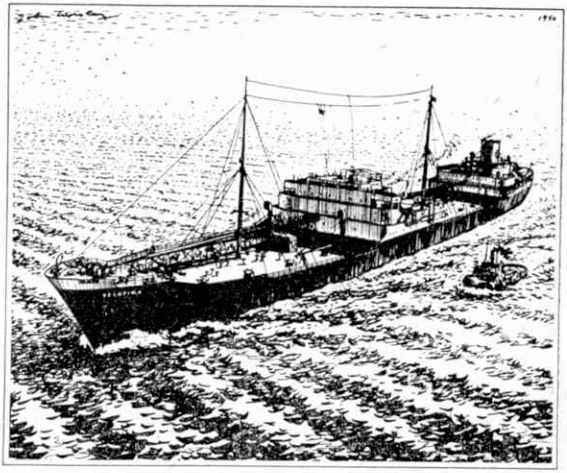
The Shell Tanker Fleet

Britain's Largest Oil Carrying Vessels

THE *"Velutina,"* a 28,000-ton tanker, was launched by Princess Margaret in April last from the Wallsend yard of Swan, Hunter and Wigham Richardson Ltd., and began her maiden voyage to the Middle East in August. She was the largest tanker built at that time in the shipyards of Great Britain, and her launch was followed on 29th June and 4th July by that of two sister vessels, one from the yard of Harland and Wolff Ltd., Belfast, and the other from that of Cammell Laird and Co. Ltd., Birkenhead. This year they will be joined by a fourth, the keel of which was laid down at Wallsend after the *"Velutina"* was launched, and this will complete a notable addition to the Shell tanker fleet.

It is 59 years since the first Shell oil tanker was launched. This was the *"Murex,"* a vessel of 5,010 tons launched from the slips of the West Hartlepool yard of William Gray and Sons. How the *"Murex"* came into existence makes an interesting story. The founder of the Shell firm was Marcus Samuel, who later became the first Viscount Bearsted. In the latter years of the 19th century Samuel was in charge of a firm founded by his father 120 years ago to carry on a general trade with the Far East. Among other activities the firm began dealing in kerosine, and it was soon realised that the transport of this fuel in barrels, the general practice in those days, was too costly. While on a visit to Russia in 1890 Samuel saw tankers used by a Swedish firm to carry oil in bulk across the Caspian Sea. One of these vessels, the *"Zoroaster,"* was indeed the first real tanker ever built. Samuel was greatly impressed. He realised at once that bulk carriage in tankers was the solution to the problem of reducing transport costs, and it was then that he commissioned the *"Murex,"* a pioneer vessel that was rapidly followed by others.

It is interesting to compare this first Shell tanker with the latest additions to the Shell tanker fleet. The *"Murex"* was only 338 ft. long, with a beam of 43 ft., and when she was built oil-carrying was considered a hazardous business. Indeed, it was only after long discussions that the Suez Canal authorities were persuaded to allow her to take the first bulk cargo of kerosine through that waterway. The *"Velutina,"* 643 ft. long and 80 ft. 6 in. in beam, has almost twice the length and nearly twice the width of her predecessor.



An impression by Mr. John Worsley, the well-known marine artist, of s.t.s. "Velutina" escorted by tugs, as seen from the air. This and the illustrations on the opposite page are reproduced by courtesy of the Shell Petroleum Co. Ltd.

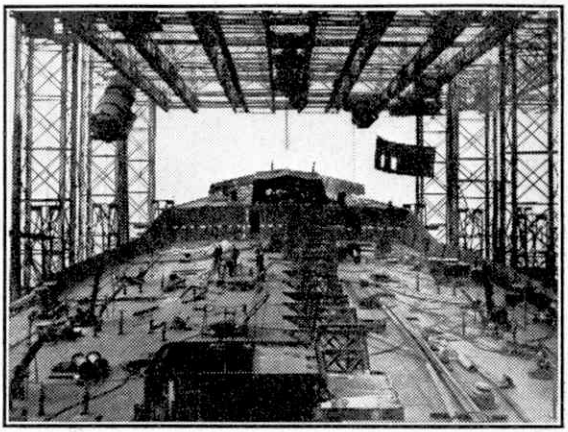
The Shell Fleet has grown in number as well as in the sizes of the individual ships in it, and oil has become the most valuable cargo in the sea-going trade of the world. On any day in 1949 about 700 ships laden with petroleum products worth £75 million could be at sea, with another 600 outward bound in ballast, about 400 in port and some 150 new ships on the stocks.

Of these oil-carrying vessels the Shell group alone operates about 300 ocean-going ships, some owned and others chartered, with a tonnage of over 4,000,000, a total that makes it the largest maritime enterprise in the world. Its tankers are seen in the East Indies and the Far East,

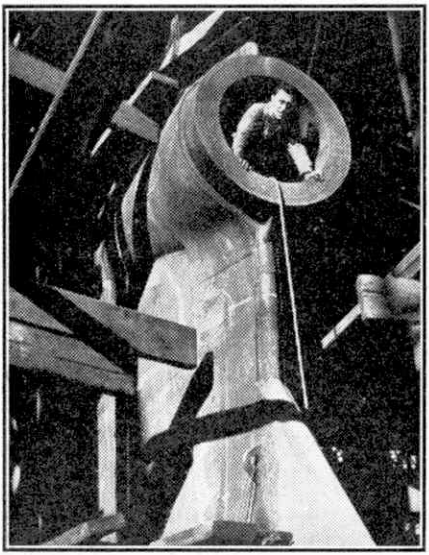
in the Middle East and in South American and West Indian waters, and there is scarcely a sea where its scarlet house flag is not displayed.

This large fleet includes both "black" and "white" ships, that is tankers carrying the heavier oils, crude oil or fuel oil, and those whose tanks are filled with petrol, kerosine and lighter fractions generally. These two kinds of ship are not readily interchangeable. A white ship can sometimes load black oil, provided she is fitted with heating coils or the cargo is one that does not require heating to make it flow through the pumps. On the other hand, a black ship cannot carry white oil until it has been thoroughly cleansed. To complicate matters still further, white oils corrode tanks more quickly than black oils, and so white ships must be changed over to black cargoes at intervals and vice versa, while in any case each vessel requires a complete overhaul every nine months.

Many of the vessels of the Shell fleet have unusual and interesting construction features. For instance, shallow draught tankers were specially designed to negotiate the shifting sand bar across the entrance to Lake Maracaibo, in Venezuela. A few ships have been specially built to carry sulphuric acid, which is used in refinery processes, or such gases as butane and propane under pressure, which liquefies them.



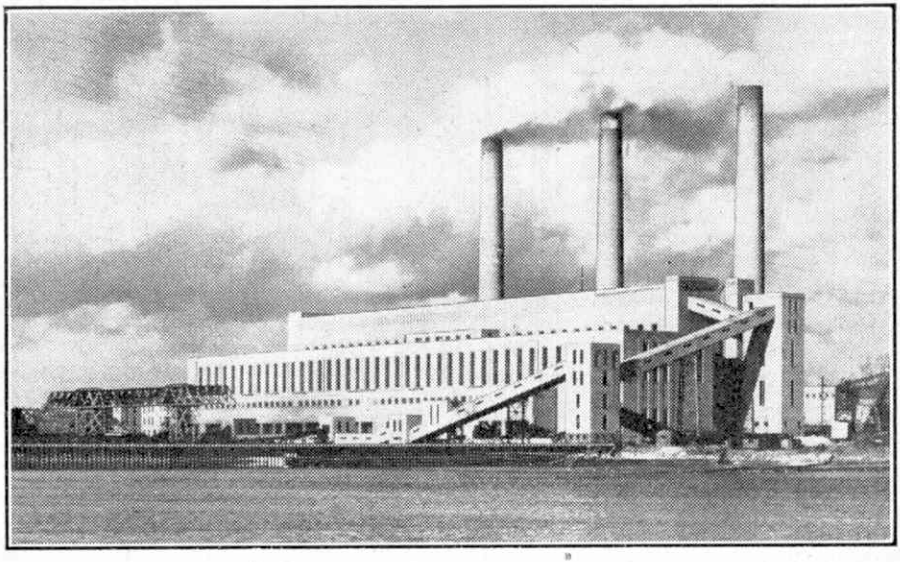
View from the bridge of the "Velutina" during construction, showing the forward pump room entrance and the forecastle deck.



The stern post of the "Velutina" during construction, showing the propeller boss, which has an internal diameter of 3 ft.

All of the vessels are remarkable for the high standard of the accommodation for the men who sail in them. Every Shell tanker coming off the slipway nowadays provides every member of the ship's company, down to the cabin boy, with a cabin to himself. There are bright, spacious mess rooms, and hot and cold water showers, and the meals are substantial and rich in variety.

The *"Velutina,"* the first of the four new vessels to be added to this great fleet, is 90 per cent. welded, and indeed is one of the most highly-welded ships ever built in Great Britain. The hull was flame cleaned before painting, the entire surface being "scrubbed" with high temperature oxy-acetylene flames, a process that removes foreign material and allows the production of a paint coat, tightly bonded with the metal, that has a high corrosion resistance. An interesting feature is that she will be powered by geared steam turbines. Most of the tankers of to-day are fitted with diesel engines, in the employment of which at sea the Shell Company was a pioneer. The installation of engines of this type in the *"Velutina"* and her sister ships (Continued on page 46)



Britain's New Power Stations

III—Cliff Quay, Ipswich

By W. H. Owens

THE Cliff Quay generating station at Ipswich, which is one of the largest to be built and put into commission in this country since the war, stands on the busy estuary of the river Orwell. Its position near the sea gives it the natural advantages of a deep-water berth for seagoing colliers and an estuary of cooling water for the station's turbine condensers.

A scheme for a new power station at Ipswich was first put forward in 1937, when it was realised that the existing station was not of sufficient capacity to cope with the rapidly increasing demands for electricity in the area. Ipswich is the second largest town of East Anglia, and also the largest seaport between the Humber and the Thames. With the establishment of many new industries, and the expansion of old ones, its population had risen to about 90,000 just before the war, and is now estimated at around 102,000. The great variety of local industries, which create a big power demand, includes the manufacture of railway equipment, electric trolley buses, electric motors, farm tractors and machinery, excavators, cranes, compressors, sluice gates and milling machinery.

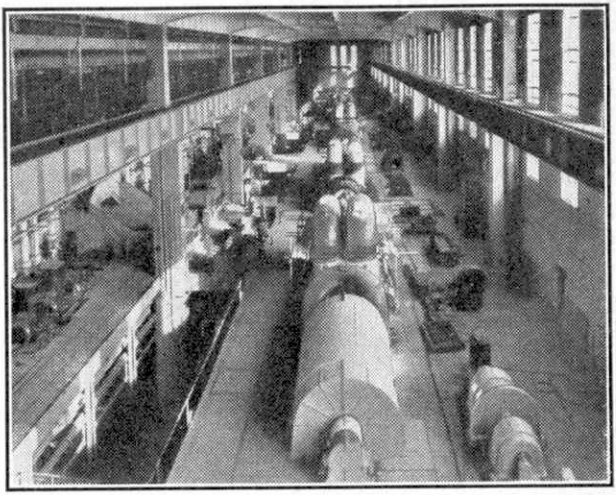
At the head of this page is a general view of the Cliff Quay power station, built on piles on a site that was once waste river marshland. Coal reaches the station by water, and the coal handling machinery and the conveyors by means of which it is carried into the station are seen in our illustration.

Under the original scheme Cliff Quay was planned to accommodate four 45,000 kW. generators, and six boilers with a rating of 307,000 lb. of steam per hour. But by 1944, when the acute shortage of electricity generating plant was beginning to be widely felt, permission was obtained from the Government to place tenders for six 45,000 kW. turbo-alternators and nine boilers, with an increased steam rating of 365,000 lb. per hour.

Cliff Quay is actually built upon some 5,500 concrete piles, and part of the estuary site which it occupies was once waste river marshland. In the course of development for building, about 17 acres of mudflats were reclaimed from the river foreshore, and this newly-won land is used as a large coal storage

area. Adjoining this is a large reinforced concrete jetty, 475 ft. long and 80 ft. wide, which is equipped with three powerful cranes with grabs for discharging coal from the colliers berthed alongside.

Fuel is brought down to Ipswich direct by sea from the collieries of north-east England, and the British Electricity Authority has two up-to-date steam colliers in regular operation to keep the new power station supplied. Each vessel has a capacity of 4,500 tons of coal and normally carries a crew of 23. Five trips each way a month are made by these ships between the Tyne and the Orwell.

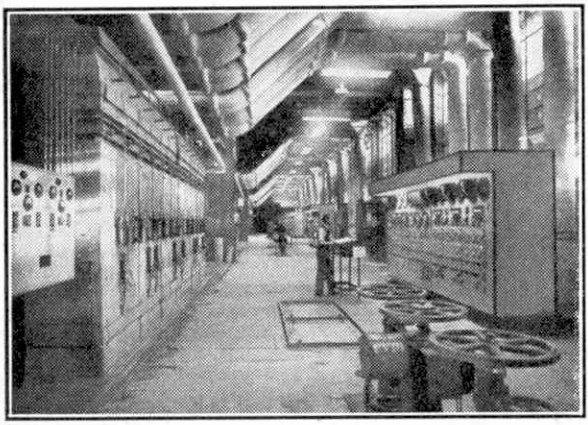


The turbine room at Cliff Quay, showing the six 45,000 kW. generators in line.

With the standard conveyor-belt system, previously described in this series, coal is discharged from the colliers to bunkers at the top of the station boiler house or to the reserve store. At Cliff Quay the journey from the unloading wharf to the bunkers is made in 12 conveyor stages. For the efficient reclamation of coal from the store there is a transporter bridge, equipped with two telfer machines and with a handling capacity of some 300 tons an hour.

When the power station attains its full generating output, the hourly rate of coal consumption will not be less than 140 tons. Boiler ashes, which amount to well over 1,000 tons a week, are pumped away to low-lying mudflats adjacent to the coal store where a further 40 acres of foreshore were reclaimed for this purpose.

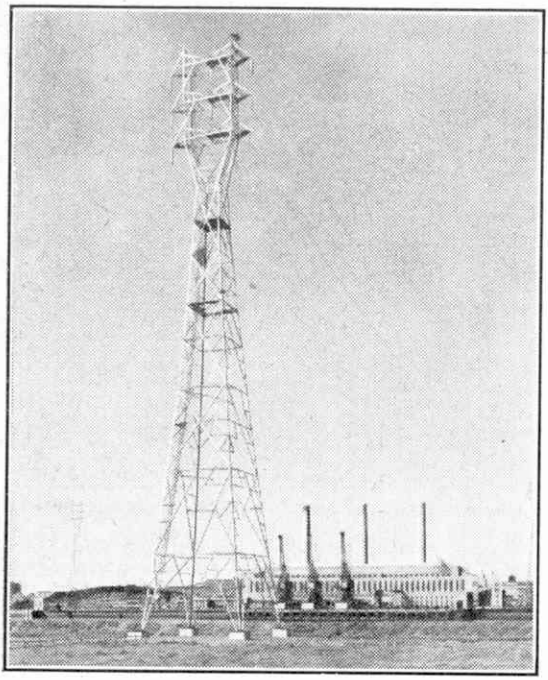
Close to the coal jetty is the condensing water pump-house. This is equipped with a set of six automatic pumps, each capable of dealing with approximately 41,000 gallons of water per minute. From this pump-house a continuous flow of water is circulated to the turbine house through three reinforced concrete channels, and after serving the condensers the water is returned to the river by two further channels.



A view in the boiler room, showing the controls.

More than 6,000 tons of structural steelwork were used in the building framework of Cliff Quay. Many large glazed windows allow the maximum amount of daylight to enter the turbine and boiler houses, and millions of special lightly coloured bricks that have a high reflective value add to the illumination of the interior of the station.

The dominant exterior feature is the trio of massive brick-built chimneys, of plain circular design, rising to a height of 310 ft. above



Tall pylons of the high voltage transmission system at Cliff Quay. Photograph by courtesy of B. I. Callender's Cables Co. Ltd.

the ground. The tapering angle is very slight, the internal diameter of each chimney being 20 ft. at the base and 19 ft. 3 in. at the top. In every case the chimney springs from a square base nearly 70 ft. above ground level.

When the order for these chmineys was placed at the beginning of 1947, it was believed at that time to be the largest contract of the kind ever placed at once in this country, the cost being approximately £75,000. The job of erecting them involved the laying of nearly four million bricks, and progress was maintained at the rate of over 10,000 bricks laid each working day. The work was carried out with the most up-to-date electrical hoists for raising the men and materials, including a special hoist allowing for the safe inspection of work at any height, and was completed in record time.

So far only six of the nine boilers of this power station are in operation, the remainder being still in course of construction. They are designed for pulverised fuel firing, and each has an economic rating of 292,000 lb. of steam per hour at a pressure of 635 lb. per sq. in. and a temperature of 850 deg. F., the maximum continuous rating being, as mentioned earlier in this article, 365,000 lb. of steam per hour under the same conditions. Gases from the combustion chamber of each boiler are drawn through the unit by induced draught fans and pass finally through an electrostatic precipitator to extract the dust before they are discharged through the station chimneys.

The turbine room is over 600 ft. long and nearly 90 ft. wide. It accommodates six generating sets which, as is the usual practice, are placed in single line lengthways through the building. Each set is 65 ft. long and has a maximum output of 45,000 kW. The operating floor is spacious, with windows along one side and galleries down both sides. Adjacent to each turbo-alternator a well opens in the floor to allow natural lighting into the basement and to give the turbine operators a clear view of the condensing plant which is installed there.

The turbines themselves are two cylinder impulse type machines. Admission of steam to each turbine is controlled through four valves operated by oil relays, controlled in turn by a horizontal spring-loaded centrifugal governor. The first two valves supply steam up to the economic rating of 36,000 kW. and the second two valves are opened when maximum rating is required.

In the administrative block of Cliff Quay is a well equipped chemical laboratory, where facilities are provided for making frequent routine tests on coal, ash, oil and water. Research work of this kind is of first rate importance to the proper working of the modern power station.

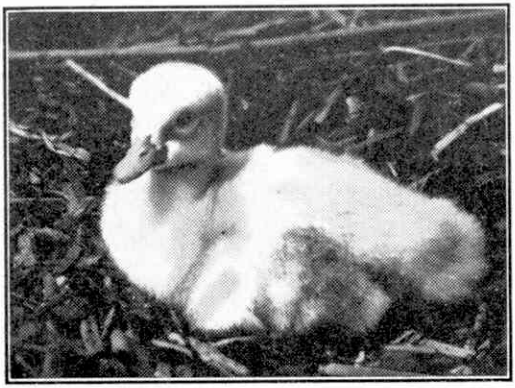
The main switching of this power station is carried out at a voltage of 132,000 in the outdoor sub-station close by. In addition to the alternator switchgear this includes circuits controlling the supply of electricity to the Grid transmission lines. Remote control of the 132,000-volt switchgear, the generator switchgear and the key auxiliary supply circuits is carried out from a series of panels in the central operating room, the nerve-centre of the station.

The Trumpeter Swan

The World's Largest Flying Bird

By M. Lorant

NORTH America's largest wild bird is the majestic-looking, pure white-plumaged trumpeter swan. This is indeed the largest living flying bird, for it weighs as much as 36 lbs. and has a wingspread of 8 ft. For years it has been threatened with extinction, but thanks to the American Government's wise and careful wildlife management, it can be said to-day that it has been saved from this fate and will probably continue to survive. It was announced recently that 451 swans had been counted on their only known United States habitat, the Northwest's Red Rock Lakes—Yellowstone Park region. This is an increase of 101 birds over the 1947 count, and the highest figure recorded since 1935, when the United States trumpeter swan population was 73 only.

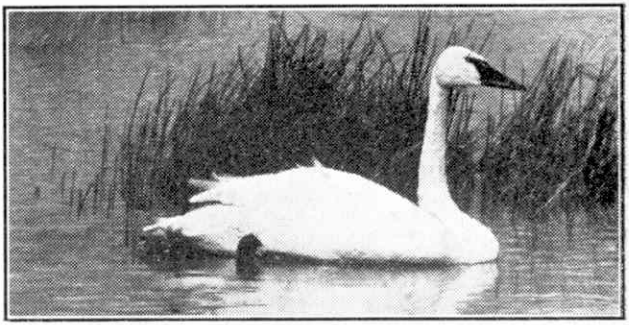


A recently hatched young trumpeter swan at Red Rock Lakes Refuge, Montana.

The chief nesting and wintering ground of the trumpeter swan in the States is the 26,600-acre Red Rock Lakes Migratory Waterfowl Refuge, in southwestern Montana, which was established in 1935 as a Federal sanctuary for the perpetuation of the almost extinct species. There biologists counted 329 trumpeter swans this summer, including 80 cygnets, or young swans. Ninety birds were counted on the nearby Yellowstone National Park in Wyoming, 28 of them cygnets. Five adult swans were found on the National Elk Refuge, and refuges in Oregon and Nevada held further 27 adult swans.

The trumpeter swans had been previously placed on these last three Federal wildlife refuges to widen the species' breeding range, after the Red Rock Lakes and Yellowstone areas had apparently reached their population limits for trumpeters. This step also met the possible threat of extinction of the rare species by epidemic or other catastrophe that might have resulted from its limited U.S. distribution.

At one time the trumpeter ranged all over the West and midwest: California and British Columbia, to Manitoba, Minnesota, Iowa and Missouri. Then it began to decline. Its life habits made it especially susceptible to the dangers that followed the growth of population. The birds were disturbed on their nests so frequently that their eggs would not hatch, and their low swooping flight, with their wing spread of 5 to 10 ft., has always made them an easy target for hunters.



A graceful swimming trumpeter swan at Red Rock Lakes Refuge, Montana, an area of over 26,000 acres that is now a sanctuary for the bird.

HOW THINGS ARE MADE:

Laminated Safety Glass

By T. R. Robinson

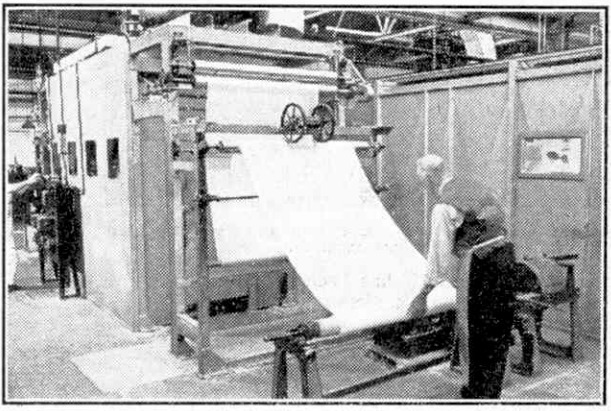
"AS brittle as glass," is a phrase often used to describe very fragile and breakable things. When most of us think of glass, particularly when it is in the form of sheets or plates, we picture a substance that is not only easily shattered, but is also exceedingly dangerous when broken; but two answers have been found to the problem of making some form of glass that could withstand blows and shocks without splintering into razor-like fragments. The application of these has led to the development of a highly specialised industry, making glass that ensures safety for all kinds of road vehicles and aircraft, and has hundreds of industrial uses as well.

The Triplex Safety Glass Company Ltd. are one of the largest makers of safety glass, and the processes carried out at this firm's works at King's Norton, near Birmingham, form the subject of this article. Both "Laminated and "Toughened" safety glass are manufactured by the company, by two different processes carried out on the most modern flow-production lines.

"Laminated" glass, the first of the two kinds to be dealt with, is best described as being of sandwich construction, consisting of two sheets of glass with an interlayer of a transparent substance that adheres closely to both glasses, uniting them tightly. This firm adhesion of the interlayer, and its great tensile strength, coupled with the fact that no two sheets of glass shatter along exactly the same lines when broken, ensure that although a sheet of laminated glass may be cracked by a heavy blow, it will not break up into dangerous fragments.

It is interesting to find that the invention of this kind of safety glass was really due to an accident. Edouard Benedictus, a French chemist, chanced to knock down a flask that had contained a collodion solution, and noticed that although the glass was cracked and starred in all directions, all the fragments had stuck so firmly to the collodion coating which had formed inside the glass as the solvent had evaporated that none had become detached. Benedictus saw the value of the discovery, and later made the first piece of laminated safety glass by putting celluloid between two sheets of glass and clamping them in a letter press after applying a suitable adhesive.

The first stage in the manufacture of either form of safety glass is the reception and inspection of the raw sheet or plate glass. This is obtained in bulk from the makers, who work to a very close specification. The glass arrives in special crates, designed to hold their contents very securely, and so prevent surface damage during transit. This is most important, for the slightest scratch may completely spoil a large piece of glass.



Vinal interlayer, a plastic material, being conditioned and reeled in readiness for use in making laminated safety glass at the works of the Triplex Safety Glass Company Ltd., to whom we are indebted for the illustrations to this article.

After unpacking, each piece of glass is placed on a conveyor, which carries it past a row of girls who are experts in detecting various defects. The conveyor holds the glass at a carefully chosen slope, and a special arrangement of lamps and mirrors is provided at each inspection

Cutting vinal interlayer to the sizes required. This is done on glass-topped benches with the aid of glass templates or guide patterns.

point. As the pieces of glass move along, the girls rapidly examine them for defects, and any piece which does not come up to the correct standard is immediately rejected.

The interlayer used to-day is "vinal," a synthetic resin that has the advantages of a toughness and shock-resisting quality far better than either celluloid or cellulose acetate, which were formerly employed. It has also the property of adhering to the glass on the application of heat and pressure alone, and there is no need to seal the edges of the finished panels.

Laminated glass may be made to the shape in which it is ultimately required, or it may be made in rectangular sizes from which the required shape is subsequently cut. The big motor manufacturers require large numbers of pieces of any one shape and size. In such cases the glass and interlayer are cut to the required pattern before they are stuck together, and in their production the first step is the cutting of the two pieces of glass. Often the shapes are quite complex, made up of a number of differing curves, but each glass must be extremely accurate and pair up exactly with the other. The craftsmen who cut them are very highly skilled, working at specially designed benches which enable the glass to be placed in just the right position and at the right angle for speedy cutting.

Next a very thorough cleansing of both sheets of glass is necessary. Every speck of grit, grease, or other impurity is removed from both sides by a special conveyor-type washing machine that also dries the sheets by passing them between cambric-covered rollers, and then removes the last traces of damp by subjecting the glass to a blast of warm, dust-free air. As the glass leaves the delivery end of the machine, it is literally spotless, and has a polish that is quite astonishing.

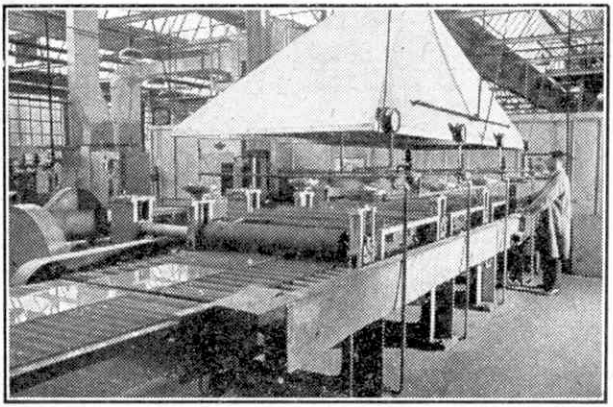
The glass then moves on to the point where it meets its interleaving material. This is as transparent as the glass itself when the laminating process is complete, but at first it is almost opaque and resembles a fine, silky and very elastic fabric. To prepare it for use it is passed through a series of washing and conditioning processes, and then reeled on rolls of a size that can be efficiently handled by the girls who cut out the requisite shape. As the reeling takes place, a clever counting attachment measures the length of vinal sheet, and so enables just the required length to be coiled on each roll.

The first stage in the interleaving process is the cutting of the vinal sheet into suitably sized pieces on benches in

Assembling the constituents of sheets of laminated safety glass and trimming the edges of the vinal interlayer.

a special cutting room. Each bench has a glass top, and glass templates, or guide patterns, are used to give the exact sizes and shapes required. The vinal is carefully unrolled, and laid out flat on the bench. The template is laid on it, and after making sure that the placing is correct, the operator runs a special knife along the edges. The result is a cleanly cut piece of material, which now leaves the cutting room and passes along a conveyor. During its passage it too is washed and dried, since cleanliness is of paramount importance.

The assembly of two pieces of glass and their interlayer into a sandwich is carried out in the assembly room, a place of very special construction. Entrance is by double doors, and the walls are designed to exclude dust and damp and to provide heat insulation. The interior of the shop is kept at exactly the right degrees of temperature and humidity by complex air conditioning apparatus, and such points as the lighting and the colour of the walls have been given special attention. Only the actual staff of the shop are normally allowed to enter it, and they are provided with special overalls. All this is necessary, for a grain of dust that happened to get between the glasses and the interlayer material would entirely spoil the panel concerned.



Laminated glass assemblies are given their first pressing between rollers that impose a carefully adjusted pressure on them.

Both sheets of glass themselves have entered the assembly room by means of a conveyor which passes through slots in the wall. While the glass in cut pairs is still travelling along, the interlayer is placed in position on one sheet and the other sheet is lifted and placed on top of it. Care is taken to get the correct fitting or "register" of the three parts of the sandwich, and any slight projecting edges of vinal are trimmed away.

The loosely assembled panels then move onward along the conveyor, out through a slot in the opposite wall of the assembly room, and into a machine which carries out the first of the pressing operations that will bind the three components of the sandwich into the finished piece of safety glass. This "preliminary pressing" machine, as it is called, consists of a series of pairs of rollers, mounted in bearings that permit a carefully adjusted pressure to be imposed on the glass and vinal sandwich. This pressure, which is accompanied by closely controlled electric heating, squeezes out the air trapped between the glass components and the interlayer during assembly, and begins the work of making the glass and interlayer adhere closely.

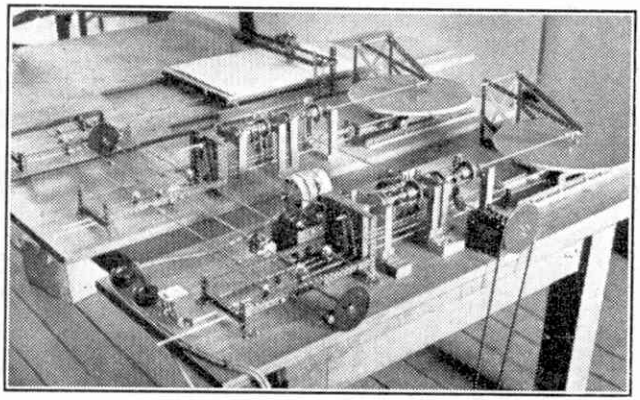
When the assembly is completed the mat finish of the vinal sheet and the air that clings to it give to the panels an opaque appearance, rather resembling that of ground glass, but as each panel passes through the pressure rollers it becomes more and more transparent. During its journey through the preliminary pressing machine, each panel is subjected to the pressure of four sets of rollers, each pair of which is individually adjusted for pressure and temperature; and when it emerges from the final pair, the interlayer and glass have already bonded fairly closely and the panel is almost transparent.

As the partially finished panels come off the pressing machine, they are transferred to crates, in which they are built up in stacks consisting of alternate panels and spacers. These stacks are then moved over to the next process, which is rather like the heat-and-pressure "cook" used in the production of moulded plastic articles. The stacks of panels are placed in autoclaves, large vessels that look something like giant copies of the pressure cookers used in kitchens. (Continued on page 40)

A Meccano Calculating Machine

Solving Complex Mathematical Equations

A WONDERFUL Meccano model constructed by Professor D. R. Hartree, then of Manchester University, was described and illustrated in the *"M.M."* for June 1934. The purpose of this was to solve complicated mathematical equations, a task that it performed accurately and far more quickly than was possible by ordinary calculations. Its original, to which the name differential analyser was given, had been designed and constructed by Professor V. Bush at the Massachusetts Institute of Technology, in the United States. After seeing photographs of this machine Professor Hartree had the impression that someone had been enjoying himself with a large Meccano Set. This suggested building a differential analyser of Meccano Parts, and the demonstration model that he constructed actually proved of use in his own research work. Other successful Meccano reproductions of the machine followed, and on this page we illustrate one that has been constructed at the new University of Malaya, Singapore, by Professor J. C. Cooke.



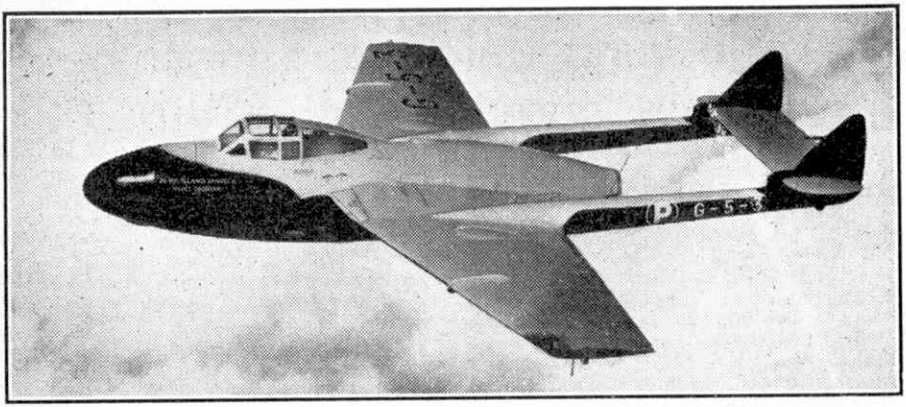
The differential analyser built of Meccano parts by Professor J. C. Cooke University of Malaya, Singapore.

This remarkable machine can add, subtract and multiply, and in addition it carries out a more complicated process known as integration. It works with a series of shafts turning at various speeds. These shafts, built up of Meccano Axle Rods, can be seen on the left of the photograph of Professor Cooke's model. For adding two terms in an equation shafts are made to rotate at speeds corresponding to them and by means of differential gearing these turn a third shaft at a rate corresponding to the sum. Multiplication is effected by simple gearing in a similar manner.

For integration, which is the central purpose of the machine, the round tables seen on the right are used. These are made of bakelite. The mechanism of each table is connected by cross shafts to the appropriate shafts on the left, the drives being given by bevel or helical gearing. One of the cross shafts rotates the table, and a second acting through a Screwed Rod moves it towards or away from the rest of the machine. Resting on the table is a Bush Wheel and the shaft of this is connected to a third shaft on the left. As the table rotates it turns the Bush Wheel, at a low speed when this is near the centre of the table and at a higher speed when it is nearer the circumference. This variation in speed enables the device to accomplish the type of summation that mathematicians call integration, and the result is transmitted to one of the shafts on the left.

The results of all these operations are represented by the rates at which the final shafts in the model turn. In some cases the turning of these shafts is made to draw a curve that represents the "answer." In others revolution counters are turned to give direct numerical result.

Professor Cooke's model is not just a toy, or even a demonstration model. It is a mathematical calculating machine capable of serious work, and its success emphasises the judgment of Professor Hartree, that such machines are a striking tribute to the practical value of the Meccano system.



D.H. "Venom" Mk. 2 Night Fighter, which is in production for the Royal Navy.

Air News

By John W. R. Taylor

Korean Air Lift

Although it has received little publicity, the air lift operated from the United States to Japan at the height of the Korean War far surpassed the Berlin Air Lift in size. In September, 1950, for instance, aircraft engaged on this operation flew a total of some 250,000 miles a day, against an average of 239,000 at the peak of the Berlin Air Lift.

In three months the aircraft carried into action about 34,000 troops and thousands of tons of cargo, including a 650 ft. long aluminium bridge weighing 256 tons, which was split up in sections and carried by 70 aircraft. Specialist engineers to erect it travelled to Kimpo airfield in the same machines as the bridge sections, with the result that United Nations troops were able to use the bridge to cross the Han River, on their way to the "38th Parallel," within three days of the components leaving America.

Aircraft engaged on the Korean Air Lift were roughly half U.S. military transports and half civil air liners. Nearly half of the air liners were provided by air charter companies, which thus have played a leading role in three major post-war aerial emergency operations, th others being the Berlin Air Lift and the evacuation of India during the troubled times following the grant of independence to India and Pakistan.

"Venom" Night Fighter

One of the highlights of the last S.B.A.C. Display was John Derry's superb flight demonstration of the new de Havilland "Venom" Mk.2 night fighter, illustrated above. His extremely fast low-level passes over the airfield, followed by rocket-like climbs and precise hesitation rolls showed that the provision of radar equipment in a lengthened, bulbous nose, plus a second seat for the radar-observer, has had no adverse effect on performance.

As in the case of the "Vampire" night fighter, the nose of the "Venom" 2 is interchangeable with that of the day fighter version, which is in production for R.A.F. Fighter Command.

Rocket Brakes

In an effort to shorten the landing run of light aircraft and gliders and so permit them to use very small airfields, the U.S.A.F. is experimenting with a rocket-driven harpoon "brake." This consists of a steel tube, 28 in. long and packed with rocket-propellant, which is housed in the tail of the aircraft and connected by 200 ft. of steel ribbon to a hydraulic winch in the fuselage. The idea is that just before touch-down the pilot will fire the rocket, which will drive the tube 18 in. into the ground at an angle of 40 deg. It will act in much the same way as arrester gear on an aircraft carrier by pulling the aircraft to an abrupt stop, the shock of sudden deceleration being absorbed by the hydraulic winch.

Last of the B.O.A.C. "Yorks"

On completion of its flight from Santiago, Chile, to Nassau, Bahamas, on 7th October, 1950, the last of B.O.A.C.'s fleet of Avro "Yorks" was retired from passenger-carrying operations. The Corporation's South American west coast service has been taken over by "Constellations," which now operate over the entire route from London to Santiago.

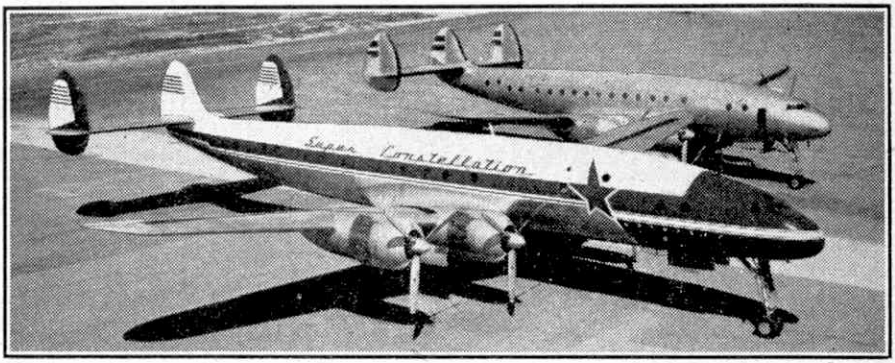
Since early 1944, when "Yorks" were first flown by the Corporation, they have played an important and highly successful part in maintaining Britain's long-distance overseas routes until more modern air liners became available. In all they covered over 13,000,000 miles on the routes of B.O.A.C. and British South American Airways.

Flood Relief by Air

Speedy relief for areas of Northern New South Wales and Southern Queensland devastated by last year's serious floods was provided by freight-carrying aircraft of several Australian airlines. Australian National Airways flew 26,000 miles to drop 250,000 lb. of food, medical supplies and cattle fodder. Aircraft of the State-owned Trans-Australia Airlines covered a total of 10,000 miles and dropped some 100,000 lb. of relief supplies. They were ably supported by Butler Air Transport, which normally operates regular services to the flooded areas, with the result that stocks of parachutes were quickly exhausted and people who had bought Government surplus parachutes at disposal prices were asked to return them for use in the relief operations.

U.S. Now Accepts British Certificate of Airworthiness

The announcement that the U.S. Civil Aeronautics Administration will in future accept a British Certificate of Airworthiness as being at least equivalent to its own is excellent news for the British aircraft industry. Refusal to accept the British C. of A. has, in the past, been a major handicap to firms trying to sell their aircraft in the United States, especially in the case of jet air liners. American operators will now be free to buy British aircraft without any worries on airworthiness grounds.



The new Lockheed "Super-Constellation," with a standard "Constellation" alongside it. Photograph by courtesy of Lockheed Aircraft Corporation, U.S.A.

New "Super-Connie"

Orders totalling £18,000,000 have already been received by the Lockheed Aircraft Corporation for their new Model L-1049 "Super-Constellation," illustrated above. It is designed to maintain the "Connie's" leadership on international air routes until jet air liners are available, and is 18 ft. longer than the 200 early model "Constellations" now in service, has 30 per cent. more power, 41 per cent. greater passenger accommodation and 68 per cent. more cargo space.

The "Super-Constellation," fully loaded, has a take-off weight of 130,000 lb., nearly twice the weight of the original "Constellation" built 10 years ago. It is powered by four of the new 3,500 h.p. Wright 3350 compound engines, which utilise exhaust gases to drive turbo-superchargers and so combine greater power with fuel economy. As a result, the "Super Constellation" will be able to fly non-stop between New York and London, cutting five hours off the present schedule for the route. Normally accommodation will be for 76 standard-fare passengers, but up to 110 "skycoach" seats can be fitted.

Helicopters in the Arctic

Two Bell HTL-3 helicopters played an important part in a recently-completed U.S.-Canadian naval mission, which re-supplied the weather stations at Alert and Eureka on Ellesmere Island and Resolute Bay on Cornwallis Island in the Canadian Arctic. The helicopters were taken to their destination aboard the ice-breaker *"Edisto,"* after which they were used extensively for short range ice reconnaissance; for geologic, wildlife and other field studies; and to carry Canadian Government surveyors and technicians to survey locations.

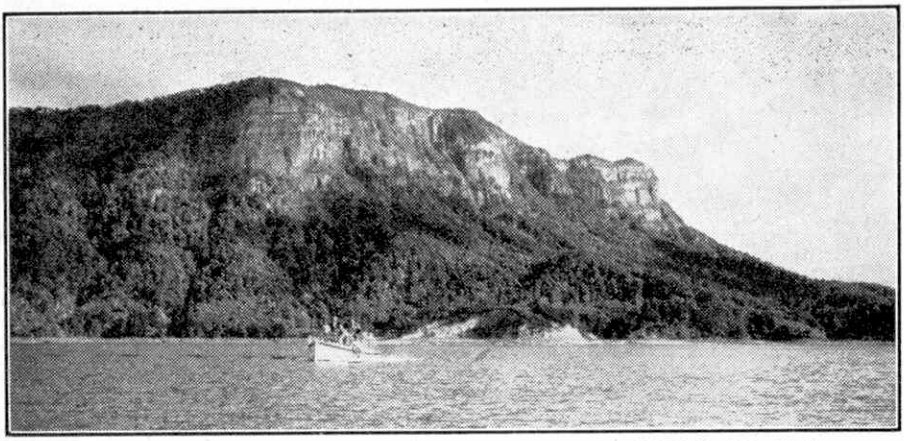
Feathered Spotters

Seagulls living near a certain Australian flying boat base have developed a unique standard of proficiency in aircraft recognition. As soon as they spot a "Sandringham" approaching the base, even though it is several miles distant, they fly out to meet it. On the other hand, "Hythes" approaching the same base are completely ignored. The reason is that the maintenance men throw scraps of food overboard when a "Sandringham" is in for servicing, whereas the "Hythes" do not carry food.

Fire-Watching in New Zealand

A detachment of two pilots, a ground crew of three, and two "Auster" aircraft of No. 42 Squadron, R.N.Z.A.F., are spending six months as flying fire-watchers over the valuable State forests in the Roturua-Kaiangaro region of New Zealand. Their job is to keep constant watch over an area of nearly 750,000 acres of forest, as a safeguard against a recurrence of fires similar to those which destroyed many thousands of pounds' worth of timber a few years ago. The aircraft are in radio communication with the State Forest headquarters, hill-top observers and fire-fighters, and can thus report outbreaks of fire and guide ground parties quickly to the spot.

"Auster" Mk. 5D, a new version of the popular Mark 5, which has a "Gipsy Major" engine instead of the usual Lycoming, to overcome the difficulty of obtaining spares for the American engine. Photo. courtesy Auster Aircraft Ltd.



Panekiri Bluffs, Lake Waikaremoana.

Lake Waikaremoana

New Zealand Hydro-Electric Power

By V. May Cottrell

HIGH up in the mountains, forty miles inland from Hawke Bay on the east coast of the North Island of New Zealand, Lake Waikaremoana—"Sea of Rippling Waters"—provides power for hydro-electric stations and a beautiful resort for tourists and holiday makers.

I took my place on board the launch for one of those delightful cruises round the numerous bays and inlets with the melodious Maori names. We were taken first to the Outlet, where we were interested to see a diver, in full regalia, seated in his chair on a platform preparatory to being lowered into the water. The divers, under the direction of State Hydro and Works Department engineers, are engaged in a unique undertaking. They are endeavouring to seal up leakages from the lake bed in order to conserve water required for generating electricity at the three power stations. These stations are situated at varying levels in the valley below.

Geologists believe that countless thousands of years ago the sides of a great ravine collapsed, during a subterranean upheaval, thus forming a massive barrier of earth and rock. They surmise that rivers banked up behind this natural dam, filling gorges and valleys to great depths and thus forming Waikaremoana. The lake is 12 miles long and six miles wide, with a coastline of 90 miles, the whole area being about 21 square miles—3½ times that of Windermere. It is as much as 846 ft. deep in many places. The lake bottom near the Outlet presents a strange spectacle to the divers for it is composed of huge rocks, some of which are as large as small houses. The great cavities between them were filled originally with mud and clay, thus preventing water seepage. With the passing of time these natural sealing substances have been washed from between the rocks, leaving an extensive honeycomb of passages under the lake bed, through which a large volume of precious water is escaping. Now, in terms of the generation of electricity, this seepage means a continual loss of valuable power.

In order to check this waste, the engineers devised a method of blocking up the fissures in the lake bed. Divers investigate and plug cavities through which the water is escaping. Sometimes whole tree trunks have to be raised and part of the rock base blasted away before filling operations can commence.

The divers use pneumatic drills on rocks on the lake bottom when drilling holes into which water-proof charges of dynamite are laid. These are fired with a fuse from the land. The point on the lake above each cavity to be filled is marked with a coloured buoy. Then a specially-

constructed barge, with opening doors in its bottom, deposits first rock, then sand, and finally clay in the fissures. Tons of spoil of this nature are dumped into the cavities in this sealing-off process which, it is believed, will reduce the leakage to 45 per cent.

This unusual undertaking has been filmed and its screening aroused great interest. The under-water photography was done at depths ranging from 15 ft. to 60 ft. It was accomplished by means of a movie camera fitted ingeniously inside a specially-constructed diver's helmet. The operator was obliged to move along the lake bed with the utmost caution because of the great weight on his head—some 50 lb.—and the imminent danger of falling into one of the deep fissures between the rocks.

From this point our launch party was taken to where twin tunnels draw the water off for the three power stations operating at different levels in the valley below, and generating 124,000 kilowatts all told. The water from Waikaremoana is used again and again, and is conveyed to the three power stations by means of huge intake pipes, tunnels and canals.

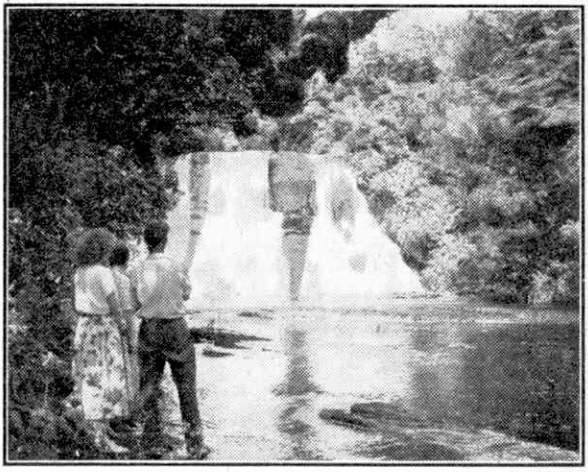
A giant whirlpool swirled and boiled menacingly quite close to the launch, denoting the entrance to the intake tunnels. We shuddered to think what the fate of a luckless swimmer would be if sucked down into its sinister depths.

The first power station is at Kaitawa, generating 32,000 kilowatts; the next, Tuai the largest of the three, generating 52,000 kilowatts, and the lowest and newest station is Piripaua, generating 40,000 kilowatts.

Later, when returning to Napier by road, we were shown over the Tuai station, and were interested to see the bewildering maze of coloured lights on the switchboards which, to the trained eyes of the engineers and electricians, convey at a glance information concerning the operation of the complicated electrical system. I was told that the two smaller power stations are practically self-controlled. In the event of a defect occurring, or a breakdown of any sort, they switch off automatically. This is shown immediately by means of special indicators on the switchboard at Tuai, the controlling centre of the Waikaremoana hydro-electric system.

The great intake pipes convey the water to huge turbines at each of the power stations, which in turn feed the giant generators. Waikaremoana's triple scheme is linked with hydro-electric power stations already in operation in other parts of the North Island of New Zealand. Thus Waikaremoana forms an integral part of a very comprehensive system for the generation of electric power from the rivers and lakes with which New Zealand is so lavishly endowed. The South Island also has a similar system.

There is one unique feature about Waikaremoana that was discovered quite by accident, and is not generally known. On one occasion an outboard motor was lost in deep water and a diver went down to try to recover it. He was unable to do so, however, for he found to his amazement that he was descending into a buried forest. It was unsafe for him to continue his descent because of the danger of fouling his lines on great forest trees, from 40 ft. to 60 ft. tall, still standing in a state of perfect preservation in the white sand of the lake bed, where they have stood for centuries.



The Rainbow Falls.

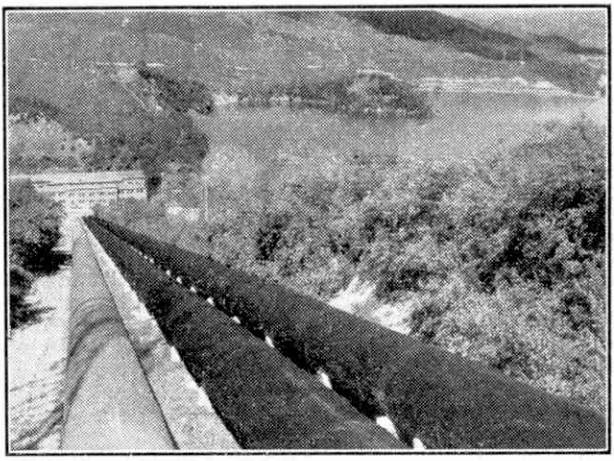
After a pleasant cruise along the indented coastline of the Wairau-Moana Arm, we landed and had a picnic lunch. The sun shone brilliantly until we started out in the launch on the return journey.

Then, in an incredibly short time, the whole aspect of the lake and the surrounding country changed completely. The calm, sparkling water was whipped into a fury by fierce gusts of wind that roared out of the south; the contours of the hills and promontories disappeared completely behind a thick curtain of rain that reduced our range of vision to a few yards. We appeared to be lost in a waste of wildly heaving, tumbling water as waves over 6 ft. high tossed the launch about like a cork. We rather enjoyed the experience as being something in the nature of an adventure. We were glad, however, to hear the steady rhythmic beat of the engine, and wondered what would happen if it stopped under such stormy conditions. There would, we knew, be no possible chance of anchoring in that depth of water, and we wondered also how the steersman could keep to his course in the absence of all landmarks. But he has been about the lake for over twenty years, and seemed quite unperturbed by the storm, which he said was one of the worst he had experienced on the lake.

The trip that thrilled me most of all was the day's jaunt to lovely Waikare-iti, a quiet, secluded gem of a lake which lies about 1,000 ft. above Waikaremoana. A large party of us left Lake House for the short launch trip across the Whanganui-a-paua Inlet and up the Aniwaniwa Stream as far as it is navigable, just below the first waterfall.

Leaving the launch, we walked up a path which skirts the stream for a short distance, past deep, still pools where the shy trout lurk, and the varying tones of the native bush are mirrored in the clear water. Having gazed our fill at the delightful picture presented by the first cascade, we pressed on to the higher fall which is even more captivating and inspiring. There is a certain fascination in watching this large sheet of water rushing endlessly to the edge of a precipice and hurling itself recklessly into space. The Maoris called this waterfall Te Aniwaniwa—"The Rainbow."

After walking steadily for about 1½ hours, and rising 1,000 ft., beautiful Waikare-iti lay spread out before us. This placid, isolated sheet of water is so far removed from the ordinary haunts of men that it remains unchanged in a rapidly changing world. It looks now just as it must have looked when the first human being gazed upon its silent mysterious waters in the dim, forgotten past. Unlike Waikaremoana, its shores have never been used by either white man or Maori for settlement.



Tuai hydro-electric station.

We were surprised and delighted to find that we were to have the privilege of cruising round Waikare-iti in a boat fitted with an outboard motor. The mystery of the boat's presence on the scene was explained by our guide, who said that the weighty craft had been hauled all the 4½ miles up the narrow bush track by means of a block and tackle. As they could only hoist it a few yards a day, it took over four months to reach Waikare-iti. They were all heartily sick of the job long before its completion.

But visitors to this scenic gem have reason to be thankful that the boat finally reached its destination. An hour's cruise round the lake, winding in and out among its seven fascinating islets, is a really delightful experience. We even had the pleasure of landing on one of them. After climbing a primitive ladder, at the water's edge, and scrambling up a steep path, we came upon a tiny jewel of a lakelet, some 2½ acres (*Continued on page 46*)

S.T.S. "Velutina," the first of four new 28,000-ton vessels of the Shell tanker fleet.

Shipping Notes

S.T.S. "Velutina's" Maiden Voyage

The illustration at the head of this page shows S.T.S. *"Velutina,"* the 28,000-ton tanker launched in April last from the Wallsend Yard of Swan, Hunter and Wigham Richardson Ltd. As explained in the article on page 2 of this issue, this vessel is one of four being added to the Shell Tanker Fleet, each of which is estimated to have cost about £1,000,000. They are intended for transporting crude oil from the Middle East, and the *"Velutina"* left the Tyne on 23rd August on her maiden voyage to the Persian Gulf, where she was to pick up her first crude oil cargo of 26,000 tons. Our illustration is an aerial view of the tanker as she began her voyage.

"Lucy Ashton's" New Role

A photograph and description of *"Lucy Ashton,"* the oldest British Railways steamer, was included in the March 1950 *"M.M."* As explained in the article, the hull of the veteran Clyde paddler was purchased by the British Shipbuilding Research Association for use in experiments on hull resistance.

In preparing the vessel for these trials the hull was carefully cleaned and painted. It could not be driven through water by means of a propeller, as this would have interfered with the flow of the water, so four jet engines were mounted in pairs, two on each side, on specially designed outriggers. The engines used were Rolls-Royce Derwent 5s. They were placed about midway along the hull, so that the high velocity gases flowing from them would be discharged clear of the hull.

In the trials a wide range of speeds was used, with the hull at two different draughts. A photo-finish form of apparatus was used to measure the speed with a high degree of accuracy, and careful measurement was made of the thrust on the hull in order to discover the resistance to its passage at various speeds.

Launch Driven by a Gas Turbine

The gas turbine engine developed by the Rover Co. Ltd. has now been applied to a sea-going launch. This is the *"Torquil,"* a 60 ft. vessel that was formerly a sea-rescue craft of the R.A.F. In it two Rover gas turbine engines have been installed. At present these have a continuous rating of 100 h.p., with a maximum of 150 h.p., figures that will be greatly improved as the engine is developed. With these engines, driving the propeller through reduction gearing, the *"Torquil"* started well and answered excellently to the controls in a demonstration, and there was an absence of vibration and noise.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With certain exceptions which will be indicated, these should be ordered through a bookseller.

"STAND AND STARE"

By Walter J. C. Murray and L. Hugh Newman, F.R.E.S. (Stales Press. 7/6)

A delightful book by two experts, who not only know the plants and living creatures about which they write and how to photograph them, but also can tell their stories in a really attractive and interesting way. Their title comes from a poem by W. H. Davies, quoted at the beginning of the book, which gives the key to their purpose, and there is no doubt that they will be successful in helping readers to appreciate the wonders of nature with which they deal.

In the book itself we pass through the year, beginning with tracks written in the snow and the creatures who make them. The coming of Spring brings us to consider the flowers of trees and that underground specialist the mole. With Summer we reach the time of butterflies and here we have really fascinating accounts of British orchids, insect music makers of nature, moths, snails and spinning spiders, all of them revealed as creatures with their own wonders. The country pond and the fungus family are next dealt with and finally we see how living creatures prepare for the dark cold days of the Winter.

The stories told are beautifully illustrated by an excellent selection of photographs, 38 in number and many of them full page. The volume is excellently produced and can be strongly recommended to all lovers of nature.

"THE L.N.W.R. EIGHT-COUPLED GOODS ENGINES"

By J. R. Gregory (R.C.T.S. 2/6)

This publication by the Railway Correspondence and Travel Society is a re-print in book form of a series of articles that appeared a little while ago in the Society's Journal, "*The Railway Observer*."

The eight-coupled engines of L.N.W.R. design are probably the only tender engines belonging to that company with which present-day enthusiasts are really familiar. There are still many of them in service, the total at the end of 1949 being 381. The engine from which the design developed appeared in 1892, and the type has progressed through three- and four-cylinder compound variations to large-boilered rebuilds, and finally to the superheater version well-known to-day as the "Super-D."

This intricate story is traced in a fascinating manner, and the text is well supported by illustrations of the different varieties, including the 2-8-0 version into which some of the compounds were converted.

Copies of the book are obtainable from Mr. D. H. Wakely, 18, Holland Avenue, Cheam, Surrey, price 2/8 including postage.

"THE JOHNSON 'WELLCOME' PHOTOGRAPHIC YEAR BOOK"

This popular Annual is in handy pocket size, so that photographers can conveniently carry it for quick reference when they are out and about getting pictures. The 1951 edition contains the usual diary, a greater number of pages for recording exposure details, the monthly light tables and the exposure calculator, the instructions for using which have been clarified. Film and plate speeds, and time and temperature tables for those who do their own developing also are provided. Other matters dealt with include the photography of moving objects, calculating depth of focus, determining exposures for interior subjects, photography by artificial light, supplementary lenses and light filters.

The Year Book can be obtained from photographic dealers, price 5/- including purchase tax.

"SPEED"

Edited by J. C. Reynolds (Temple Press. 7/6 net)

We are all thrilled by speed exploits, whether on land, on water or in the air, and welcome authentic stories of them. For this reason alone "*Speed*" will prove attractive, but readers will find in it more than mere reports of record making efforts of recent years. To begin with it is complete, dealing in turn with motor car and motor cycle achievements, speeds on the water, railway records and speed in the air. Further, the stories are told by men whose names are household words in this record-breaking era, including John Cobb, Raymond Mays and other famous motorists, the motor cycle champion Freddy Frith, Reg. Harris, the famous cyclist, and Group Captain E. M. Donaldson, who tells how he created his record speed of 616 m.p.h. in a "Meteor." Every story indeed is written by a real expert, who writes graphically and gives his readers the genuine thrills of racing and record making, while technical details and figures throughout are correct. We are taken well behind the scenes, for in addition to the actual creation of records and the winning of races we see something of the organisation that lies behind every successful effort.

The book is of large size, and is splendidly illustrated, the pictures including seven full page productions in colour.

"STRANGE DEVICES"

By I. O. Evans (Warne. 6/-)

For his story Mr. Evans has turned to Syracuse, the great Sicilian city of more than two thousand years ago that was founded by Greek colonists. At the time it was besieged by the Romans, and in its defence wonderful machines invented by the famous scientist Archimedes were used. These included devices for hurling stones to great distances, and stories have come down to us of immense burning glasses he devised that concentrated so much heat on the ships of the Romans that these went up in flames. Into these thrilling surroundings came a young apprentice engineer, who helped to make and use the strange new weapons, and he had many adventures and narrow escapes before the city fell and Archimedes was murdered by a Roman soldier.

In this book the author accomplishes two things. In the first place he tells a story of adventure that will interest his readers; in the second he introduces them to some of the wonders of the ancient Greek civilisation and of the accomplishments of Archimedes, to many of us an old friend of school days.

There is a coloured frontispiece, with drawings in the text illustrating many of the devices that Archimedes is said to have invented.

"CAPTAIN OF TWO SCHOOLS"

By Hylton Cleaver (Warne. 5/-)

A well-written school story is always attractive, and Mr. Cleaver's yarn is full of interest from start to finish. It concerns the rivalry between two schools, one old established and the other a famous public school that had been bombed out of its own home and had come to occupy a country house in the same district. To complicate matters the head boy of the old established school was nominated head of the incoming institution, to which he was transferred. The result was problems for the new head boy, difficulties for his successor at his former school, and rivalry between the two schools that at one time threatened to become really heated. These conditions gave rise to many acute situations, and how everything was finally worked out is well told.

The book has a coloured frontispiece.

"THE GLASGOW AND SOUTH WESTERN RAILWAY"

(The Stephenson Locomotive Society. 7/6)

The Stephenson Locomotive Society have produced an excellent record of this interesting railway throughout the whole of its independent existence. It was formed in 1850 by the amalgamation of several companies, and in its own rather special way it served efficiently the territory indicated by its title. It was merged in the former L.M.S. in 1923.

The career of the line is well covered by an account of early developments and a very complete year-by-year chronology. The G. and S.W. engines, of which none now remains in British Railways service, occupy a large section of the book, and locomotive enthusiasts will welcome this authoritative account of the products of such giants in the locomotive world as the two Stirlings, P. Drummond and Manson among others. The line did much to develop the Clyde coast traffic, at many points in deadly rivalry with its traditional enemy, the former Caledonian Railways, and here its steamships, docks and harbours are adequately covered. Notes on various train services, fastest schedules and other data complete the book.

There are many illustrations, including one of a striking coat of arms that was proposed but never actually used. A coloured frontispiece of one of the once-familiar Manson 4–6–0s adds to the attractiveness of this entertaining "*Sou'West*" chronicle.

Copies can be obtained through booksellers or direct from Mr. T. P. Hally Brown, C.A., 29, Waterloo Street, Glasgow C.2., price 7/6 each including postage. It should be noted that postal orders should be made payable to the Stephenson Locomotive Society members of which have compiled the booklet.

"THE MONSTER TRAINS BOOK"

(Ian Allan Ltd. 9/–)

Here is an attractive train book designed for younger railway enthusiasts. It begins with the story of trains with names, and then we read about the work of such familiar railwaymen as the driver, the guard, the signalman and the station-master. In between these stories there are descriptions of engines, famous stations, coaches and the engineering wonders of our railways, with railway yarns, picture puzzles and so on, the whole providing a varied and interesting survey of railway life.

There are plenty of illustrations, severa of them in colour, and an article on painting pictures of trains is included. The book can be obtained through booksellers, or direct from ABC Books Mail Order Dept., 33, Knollys Road, Streatham, London S.W.16, price 9/3 post free.

"A.B.C. OF SOUTHERN ELECTRIC TRAINS"

(Ian Allan Ltd. 2/–)

Southern Electric enthusiasts will welcome this recent "ABC," which devotes itself specially to the rolling stock, routes and head codes of the Southern Electric system. It begins with an account of the development of electrification on the Southern. Head code indications of the various sections follow, after which there are classified lists in numerical order of the various Southern Electric motor units.

The booklet is well illustrated. Copies can be obtained from booksellers or direct from ABC Books Mail Order Dept., 33, Knollys Road, Streatham, London S.W.16, price 2/3 post free.

"TRAINS DIARY, 1951"

(Ian Allan Ltd. 3/–)

This compact and well-bound diary can be recommended to railway enthusiasts. The usual diary pages contain a calendar and useful general information. In addition there are details of special interest to railway enthusiasts, including figures of longest tunnels, notable bridges, largest stations and so on. The British standard headlamp code, standard signals, the signal box bell code and lineside signs are tabulated and illustrated, and a map shows the regional boundaries of British Railways.

"MODERN RAILWAYS"

By BRIAN REED (Temple Press. 8/6)

"*Modern Railways*" is issued as part of the "Boys' Power and Speed Library" of the publishers. In it the author deals in an informative and interesting manner with railways as they are to-day. He begins with the development of the early tram roads into the railway as we understand it now, and the work involved in the planning and building of a system is described. Having got his railway, the reader can then examine the permanent way over which the trains are to run.

The organisation of a system, and its motive power and rolling stock are next considered, and the interesting topic of traffic operation is well treated, with special reference to the influence of timetables and tracks on passenger and freight movements. The supervision of traffic by Control offices and the working of the signalling system bring the book to a close.

Photographs and diagrams are fairly plentiful, and some of the latter are of particular interest. There is a coloured frontispiece depicting a London Midland "5X" 4–6–0, surprisingly shown in the blue B.R. livery, which is reserved for the heavy-duty passenger classes.

"HOME CARPENTRY" "WOOD FINISHING"

By W. A. G. BRADMAN (W. and G. Foyle Ltd. 2/6 each)

Mr. Bradman has written two concise and practical booklets that will be of real worth to beginners in the hobbies with which he is concerned. In the first he explains stage by stage how to make various types of joints and describes how these are used in actual woodworking. Veneering also is dealt with and finally full instructions are given, with illustrative and dimensioned drawings, for making a work bench, a garden gate and four other articles.

The second of these books supplements the first by giving details of the preparation of wood for finishing and for French polishing. Varnishing, wax polishing and various fancy finishes also are described and the booklet ends with painting, and enamelling by brush and spray. There is a useful glossary.

"SHIPS OF THE SOLENT"

By RIGBY WASON, JNR. (Ian Allan Ltd. 2/6)

All who have spent a holiday in the Isle of Wight, at Bournemouth or at any other resort within easy reach of Southampton will know something of the many and varied vessels that cross the Solent or carry visitors on cruises in the surrounding waters. Here in handy form are details of these ships of the Solent, grouped in sections. The first describes the vessels of the excursion fleet, beginning with the oldest, the "*Empress*" and "*Victoria*," both based on Weymouth. Next come the vessels of the Portsmouth fleet. The Southampton fleet follows and finally we have accounts of the three ships that provide the service between Leamington and Yarmouth.

This interesting story is well illustrated by photographs of the vessels concerned, and a table of sizes and speeds completes an excellent booklet.

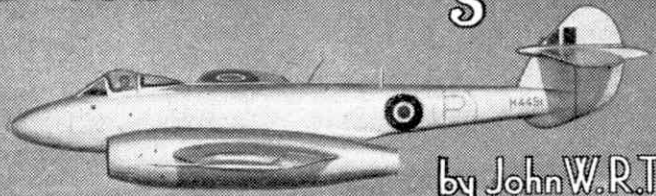
"THE BRYDONS LOOK FOR TROUBLE"

By KATHLEEN FIDLER (Lutterworth Press. 6/–)

In two delightful stories Miss Fidler, well known to radio listeners, tells us what happened to the Brydons in adventures in the Ribble Valley. In the first of these one member of the family has a loose tooth, and his reluctance to face the dentist leads to heaps of trouble, beginning with a stamp robbery and continuing with capture by smugglers. In the second the Brydons, lost in a fog, have an encounter with turkey thieves. Commonsense and a little luck bring both matters to a satisfactory conclusion.

The tales owe much of their attraction to the Brydons themselves, now well known characters, and to Marsdie, the absent-minded but resourceful lady with whom they live. There is a coloured frontispiece with many line drawings in the text.

Meteoric Progress



by John W. R. Taylor

SINCE the day in December 1921 when the little Gloster "Bamel" biplane proved itself the fastest thing in the world by flying at 212 m.p.h., the Gloster Aircraft Company have built many record-breaking aircraft and fast, efficient fighters. But none contributed so much to aviation progress as the tiny Gloster-Whittle E28/39 that, 20 years after the "Bamel," heralded the start of a new era of powered flight and made every fighter 'plane in the world as out-of-date as last year's calendar.

Developed in strict secrecy to a 1939 Air Ministry specification for a high-altitude interceptor, it was like no other aeroplane ever seen in British skies, for in place of the usual propeller it simply had a hole in its nose, leading back to a revolutionary new type of aero engine designed by Air Commodore (now Sir) Frank Whittle, and which seemed to be nothing more than an overgrown blow-lamp.

It is hardly surprising, therefore, that the E28/39 was greeted with much scepticism, for nobody had ever before built a really practical jet 'plane. Nevertheless, the Air Ministry had such faith in Glosters, and the Whittle engine, that they gave the company a contract for 12 twin-engined jet fighter prototypes, to specification F9/40, three months before the E28/39 flew on 15th May, 1941. Their confidence was justified when the E28/39 proved that jets were not only practical, but likely to revolutionise air fighting.

Unfortunately there was good reason to believe that the Germans too were aware of this, so the Air Ministry decided not to wait for the 12 prototype F9/40s, and placed a further order immediately for 20 production machines of the same type. So was born the "Meteor," for the F9/40's original name of "Thunderbolt" was dropped when the American Republic Company produced their P-47 "Thunderbolt" fighter.

Even with two 1,000 lb. thrust Rover-built Whittle W.2B jet units, the first F9/40 was so underpowered that it was suitable only for taxying trials, and thus the earliest prototype to become airborne was the one with two Halford H.1 engines—forerunners of the de Havilland "Goblin." It was flown for the first time by Gloster test pilot Michael Daunt on 5th March, 1943 at Cranwell, a happy choice of airfield as it was while serving there as an R.A.F. Cadet that Sir Frank Whittle had first conceived the possibility of using jet engines as aircraft power plants. The various Power Jets, Rover, Halford, and Rolls-Royce engines fitted to later F9/40 prototypes were all developed from his original Power Jets W.1. centrifugal unit, as used in the E28/39, the only exception being the independently-produced axial-flow Metrovick F2/1.

The picture above shows the experimental "Avon"-engined Gloster "Meteor," which has two of the new 6,000 lb. Rolls-Royce "Avon" jet engines. Photograph by courtesy of Rolls-Royce Ltd.

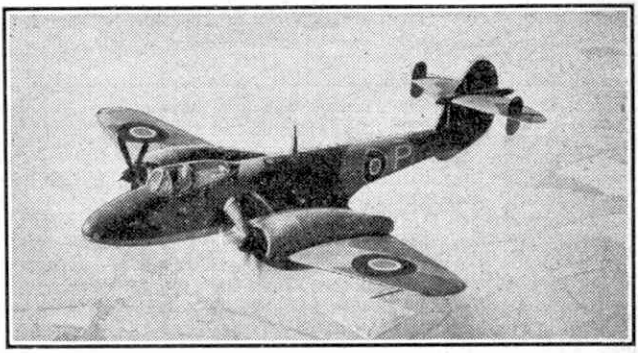
While these unarmed F9/40s were completing their flight trials, work continued on the first batch of "Meteor" 1 fighters for the Royal Air Force, each powered by two 1,700 lb. thrust Rolls-Royce W2B/23 "Welland" engines and armed with four 20 mm. cannon. It had been intended to build also the "Meteor" 2 with two Halford "Goblin" engines, but this version was abandoned, as all the "Goblins" were needed for the up and coming "Vampire" fighter.

Because of the Air Ministry's foresight

in ordering the "Meteor" 1 "off the drawing board," the first two were delivered to No. 616 Squadron on 21st July, 1944, only 16 months after the first flight of the F9/40 prototype. Within a few days No. 616 was in action against German V.1 flying bombs, and the "Meteor" thus gained the distinction of being the first and only Allied jet 'plane used in World War II. First blood went to Flying Officer Dean, who deflected a flying bomb into the ground with his wing-tip on 4th August, and, in all, 29 of Hitler's much-vaunted reprisal weapons fell to "Meteors."

It was obvious, however, that the "Meteor's" top speed of 410 m.p.h. would have to be improved if it were to hold its own against new German jets reported in service. In the absence of more powerful engines than the "Welland," experiments were made with after-burners, but these proved costly in fuel—a serious drawback, as the "Wellands" already burned fuel at such an alarming rate that greater endurance was needed as urgently as more power.

Then, at just the right moment, Rolls-Royce perfected the 2,000 lb. "Derwent" 1, which promised partly to solve both problems, as it combined higher power with better fuel consumption. Glosters at once adapted the "Meteor" to take two "Derwents," at the same time making provision for an additional 180-gall. fuel tank to be carried under the fuselage.

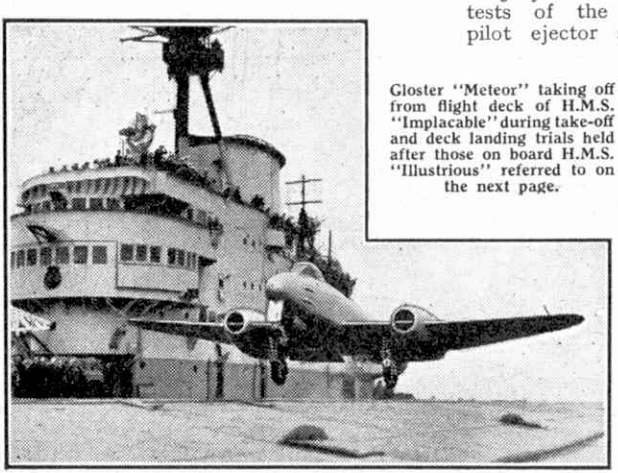


A Gloster "Meteor" fitted experimentally with two Rolls-Royce "Trent" engines, the first aircraft to fly with propjets. Photograph by courtesy of Rolls-Royce Ltd.

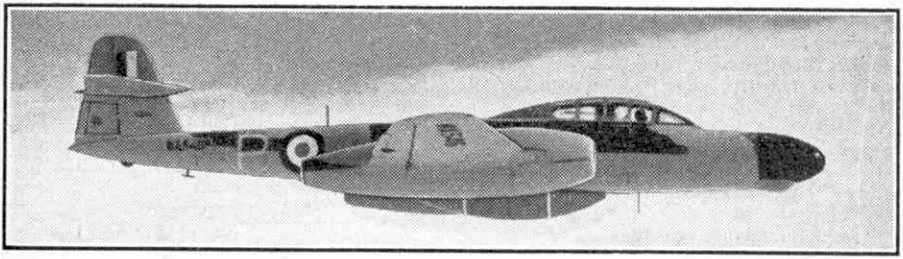
The resulting "Meteor" 3, which had a speed of 475 m.p.h., was put into immediate production and entered service in time to support the final Allied advance into Germany in 1945.

Inevitably, other "Meteors" were allocated as "guinea pigs" to Dominion air forces and private firms engaged on jet research. Thus, in September 1945, a "Meteor" 1, fitted experimentally with two Rolls-Royce "Trent" engines, became the first aircraft ever to fly with propjets. In July of the next year, the first "live" tests of the Martin-Baker emergency pilot ejector seat were made from a specially-modified two-seat "Meteor." Other tests helped to improve the efficiency of the "Meteor" itself and its "Derwent" engines to such good effect that by mid-1945 the "Derwent" 5 was giving 3,500 lb. thrust.

It was obvious that in the "Meteor-Derwent 5" combination Britain had a world-beating team, and this was confirmed on 7th November, 1945, when Group Capt. Wilson set up a World Speed Record of



Gloster "Meteor" taking off from flight deck of H.M.S. "Implacable" during take-off and deck landing trials held after those on board H.M.S. "Illustrious" referred to on the next page.



This striking view of the new Armstrong Whitworth "Meteor" NF-11 night fighter, developed from the Mark 8 machine, shows the lengthened nose, two-seat pressurised cockpit and the large fuel tank beneath the fuselage.

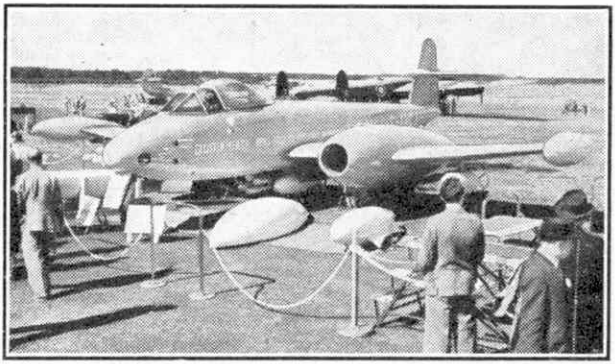
606 m.p.h. in a "Meteor" 4 with "Derwent" 5 engines, beating the old record by as much as 125 m.p.h. Ten months later another "Meteor" 4, piloted by Group Capt. Donaldson, raised the record by another 10 m.p.h. Nor were these speeds achieved by "freak" aircraft, for the "Meteor" 4 which superseded the Mk.3 in production for the Royal Air Force was virtually identical with the record breaking machines except for its square-cut "clipped" wings, which were adopted to improve manœuvrability.

The Mk.4 is still standard equipment in the air forces of the Argentine, Belgium, Denmark, Egypt and the Netherlands, as well as in R.A.F. Fighter Command. But Glosters always realised that it by no means represented the ultimate capabilities of the basic "Meteor" design and, to improve performance still further, they designed the swept-wing Mk.6. This was not built, but in June 1949 the first "Meteor" 8 appeared, its clean, square-cut tail unit, new hood and lengthened fuselage giving promise of improved handling qualities at high speeds and increased fuel tankage. No performance figures may yet be given for this version, which is being built in very large numbers by Glosters and the Dutch Fokker Company.

In parallel production is the well-known Mk.7 two-seat trainer, which paved the way for the new "Meteor" N.F.11—perhaps the fastest and deadliest of all this famous family. Developed by Armstrong Whitworth from the Mk. 8, it is the perfect answer to our urgent need for a two-seat night fighter, carrying extensive radar equipment in its lengthened nose and four cannon in its long-span wings.

Nor is that the limit of the "Meteor's" versatility, for, although the projected Mk. 5 photo-reconnaissance aircraft was abandoned, its role has been taken up by two brand-new "Meteors"—the Mks. 9 and 10. Both carry cameras in a glass-panelled nose; but whereas the Mk. 9 is basically a Mk. 8 fighter, the high-flying Mk. 10 has a Mk 4 tail, long-span wings and extra cameras in its rear fuselage, but no guns.

Side-by-side with these Service types, large numbers of "guinea-pigs" have continued to appear. In September 1948 a special "Meteor" 3, fitted with "Derwent" 5 engines, long-span wings and an arrester hook, made the first carrier landings and take-offs by a twin-jet aeroplane, on H.M.S. "*Illustrious*." Four months later a "Meteor" 4 powered by two Metrovick "Beryls," climbed 7½ miles in 7½ minutes. In August 1949 a Mk. 3 demonstrated one answer to the problem of high fuel consumption (*Continued on page 46*)



The new "P.V." "Meteor" ground attack fighter, with its alternative loads of bombs, rockets, extra guns, etc., at the S.B.A.C. Display last year. Photograph by courtesy of Gloster Aircraft Co. Ltd.

Photography

January Snow

By E. E. Steele

JANUARY usually brings bleak weather, with considerable falls of snow in many parts of the country. Every now and then we get a really old-fashioned Winter with heavy and prolonged snowfall as happened in 1947, which, despite discomfort, brings exceptional opportunities for making real Winter photographs.

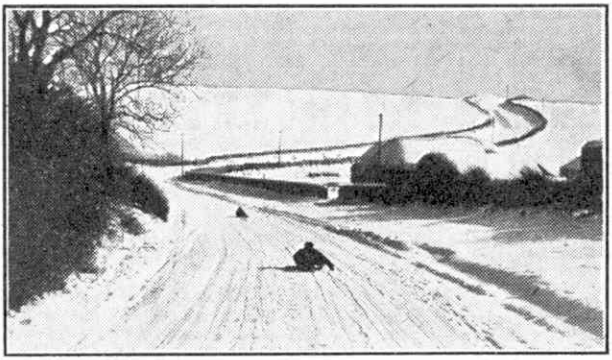
Avoid making snapshots of snow scenes in dull light, or the results will be very flat and lifeless, with snow looking like grey blotting paper. It is almost essential to have sunshine in making snow pictures. This gives a sparkling effect, and every small depression throws a little shadow, giving substance and tone which is usually referred to as "texture." It is this which makes all the difference between a good picture and a bad one.

Quite often, after a night of heavy snowfall and low temperature, the morning comes with a clear sky and little wind, and a "top coat" warmer, as the old country folk say, revealing a dazzling landscape of gleaming white, and a thousand and one things to photograph. This is the time to get busy with the camera but resist the temptation to include all the white landscape on one negative. It is much better to plan a picture where, say, the dark trunks of trees can be made to form a kind of framework for the more delicate tones of the white fields beyond. Excellent results can be obtained by ignoring the old advice of having the sun behind the camera, and deliberately pointing it towards the light, but this must only be done if the lens is shaded to prevent direct sunlight from entering and causing unwanted reflections and fogging. The usual commercial lens-hood is efficient, or a temporary one can be made from a card tube, blackened inside.

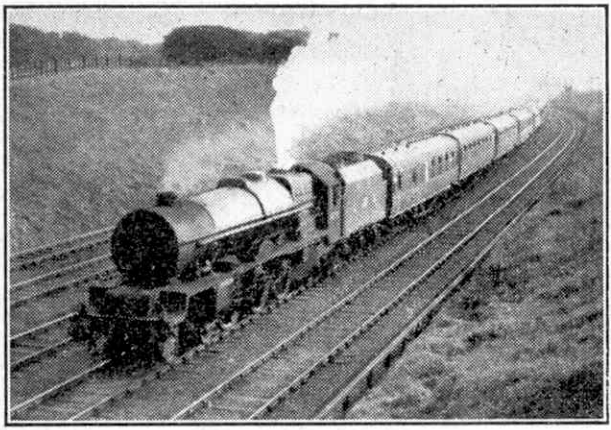
Tracks of hare in the snow. The photographs on this page and that on which our cover is based are by the author.

Animal tracks make good pictures, and are especially interesting to those with a knowledge of woodcraft, enabling them to identify the tracks and make a guess at what the animal has been doing during the night, probably coming from the woods to raid the carrots left in the garden! I still recall the thrill we boys enjoyed when we trod the crisp snow, following the criss-crossing tracks in the hope that we might, at least, track a rabbit to its hide under grass tussock or bramble bush.

Sledging, of course, needs no comment. Where there is a hill covered with snow there will be boys with sleds and opportunities for pictures. Side lighting is best. Avoid snapping a sled passing at right angles.



Winter thrills. A fine toboggan run.



London Midland 4-6-2 No. 46201 "Princess Elizabeth" with a Birmingham-Scottish express near Weaver Junction. Photograph by R. Whitfield.

Railway Notes

By R. A. H. Weight

Britannia Tubular Bridge Centenary

The Britannia Tubular Bridge across the Menai Strait is regarded as one of the greatest engineering features of all time. It was built by Robert Stephenson and an article in the March 1950 "*M.M.*" commemorated the centenary of its completion. Its complete opening to traffic was commemorated on 3rd November last by the unveiling of a plaque on the Bridge by Col. E. F. C. Trench, Chief Engineer of the L.N.W.R. from 1906 to 1923 and of the L.M.S. from 1923 to 1927.

In connection with the unveiling of this centenary plaque a special train conveyed guests to the Caernarvonshire end of the Bridge and back again after the ceremony. This was of two coaches, hauled by 2-6-2T No. 40143 from Bangor Shed, 7B.

London Midland Region

The following new engines were recently placed in service, stationed as indicated. Class "2" 2-6-2T built at Crewe: No. 41266, 20E, Manningham; No. 41267, 20A, Leeds; No. 41268, 15C, Leicester; Nos. 41269-72, 15D, Bedford; Nos. 41273-4, 20C, Royston; No. 41275, 4A, Bletchley; and No. 41276, 7D, Rhyl. Class "4" 2-6-4T built at Derby: Nos 42052, 42146, 20E; No. 42050, 21B, Bournville; No. 42051, 14B, Kentish Town; and No. 42053, 21A, Saltley. Diesel electric 0-6-0 350 h.p. shunters: Nos. 12071-3, 18A, Toton; and Nos. 12074-6, 21A, Saltley. Class "5" 4-6-0 mixed traffic type, built at Horwich: Nos. 44688-9, 27A, Bank Hall. The last two engines are fitted with roller bearings on driving axles only.

"Royal Scot" 4-6-0 No. 46141 "*The North Staffordshire Regiment*" has been fitted with new tapered boiler in accordance with the latest standard.

The withdrawal from traffic of No. 20155 for breaking up marks the end of a class of former Midland Railway 2-4-0 single frame passenger tender locomotives built originally to the design of Mr. S. W. Johnson in 1876. They were his first express passenger type and the last survivor remained substantially the same in appearance throughout its long existence, except for the provision in recent years of a Belpaire fire-box. This engine began work as No. 96 being renumbered 155 in 1907 and 20155 in 1937. A new British Railways number, 58020, had been allotted, but this change had not been effected when the decision was taken to withdraw the old engine, which has run nearly 1½ million miles. There are now no L.M.R. 2-4-0 tender locomotives in service.

The following locomotives have lately been reported on joint workings with the Western Region on fast or slow trains in the Shrewsbury area; 4-6-0s No. 46101 "*Royal Scots Grey*," No. 45502 "*Royal Naval Division*," No. 45504 "*Royal Signals*," and No. 45510 of the "Patriot" class, as well as "Jubilees" No. 45632 "*Tonga*," No. 45688 "*Polyphemus*" and No. 45700, "*Britannia*."

"Patriots," including one or two rebuilt as "6P," have been noted on Midland Division expresses south of Nottingham or Leicester, as well as on Bletchley-Bedford locals. "Jubilees" stationed at Longsight, Manchester, 9A, are often on Manchester-St. Pancras fast trains, with mixed traffic 4-6-0s working on corresponding runs sometimes from the London end, stationed at Kentish Town.

Construction work on new medium 4-6-2 standard locomotives has begun at Crewe.

Scottish News

The "B1" 4-6-0 locomotive No. 61353 stationed at Keith, 61C, on the former Great North of Scotland Section, which was constructed at Darlington with provision for use of ordinary, double, or multiple jet blastpipe, with chimneys to suit, has gone to the Testing Plant at Rugby for trial under various conditions of steaming, etc. This will follow extensive tests there with class "5" engines of similar mixed traffic type.

Ex-L.N.E.R. "A4" 4-6-2. No 60012 "*Commonwealth of Australia*" was recently reported at Crewe, having apparently worked over the West Coast main line from Glasgow. On several occasions "A1" No. 60161 was seen working between Glasgow and Carlisle. It was understood at the time of writing that an exchange of "A1" and "Duchess" 4-6-2s was being arranged between the Scottish, London Midland and Eastern Regions. "7P" 4-6-2s from Crewe shed work to Perth at night, thence during the day on occasion from Perth to Aberdeen and back, including the haulage of the fast-timed postal train on the return run from Aberdeen, on which service high speeds are often recorded.

Accelerated timings now in force include a run over Beattock summit from Carstairs to Carlisle at an average of 58.8 m.p.h., only 75 min. being allowed for 73¼ miles. The "*Queen of Scots Pullman*" covers the 124¼ miles without stop between Edinburgh and Newcastle in 135-136 minutes, while the "*North Briton*" is allowed 140 min. from Newcastle to Waverley, these East Coast schedules being quicker than those for the same expresses in 1939, though there was then a 130-min. timing by one evening train.

Several of the "Ben" class 4-4-0s are still working in the far north of Scotland, including No. 14399 "*Ben Wyvis*" and No. 14398 "*Ben Alder*" observed on the Wick or Thurso lines.

Visit of H.R.H. Princess Elizabeth to Swindon

During the Princess's visit to the famous Locomotive, Carriage and Wagon Works at Swindon as part of her tour of the town on the occasion of the Jubilee of the Borough, on 15th November last, a 700-ton veneering press used in the preparation

of coach woodwork was working in the Carriage Finishing Shop. A greeting in molten metal was cast in the Iron Foundry, and 100-ton overhead cranes were in use in the Locomotive Erecting Shops, where a replica of the first broad gauge engine "*North Star*" was on show.

During the tour H.R.H. named No. 7037, the latest "Castle" class engine, "*Swindon.*" Finally she took the controls of No. 4057 "*Princess Elizabeth*" which she drove under the supervision of the enginemen from the works to the station.

Their Majesties King George V and Queen Mary made a similar journey in 1924 on "*Windsor Castle.*"

Western Locomotive Notes

New "Hall" class 4–6–0s lately completed at Swindon were Nos. 7925–8, named respectively "*Westol Hall,*" "*Willey Hall,*" "*Willington Hall,*" and "*Wolf Hall.*" One more was under construction. The previous five, numbered 7920–4, carry names as follows: "*Coney Hall,*" "*Edstone Hall,*" "*Salford Hall,*" *Speke Hall*" and "*Thornycroft Hall.*" Nos. 7921–2 are stationed at Chester, 84K, No. 7923 at Swindon, 82C and No. 7924 at Westbury, 82D. New "Castles" were recently allocated as follows: No. 7034, Bristol, Bath Road 82A; No. 7035, Shrewsbury, 84G.

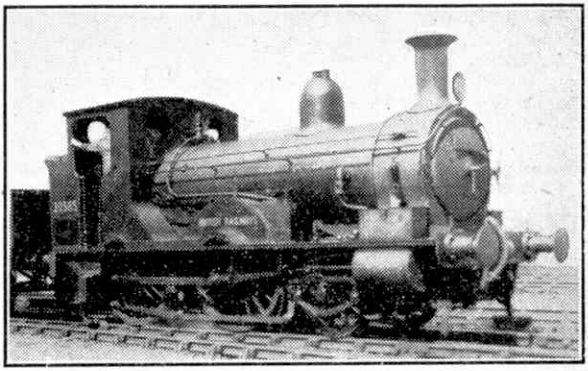
Latest 0–6–0Ts placed in service include Nos. 9425–30, 8422–3, 8463–4, 6770–1.

Two 2-cyl. 4–6–0 "Saints," Nos. 2920, "*Saint David*" and 2937, "*Clevedon Court*" from Hereford, hauled a heavy main line express excursion to Bournville, travelling up the Lickey incline on the former Midland Bristol-Derby line, where they were assisted in rear by 0–10–0 No. 58100. No. 18000, the Gas Turbine locomotive, has been making regular runs with the 3.30 p.m. Paddington-Plymouth express, returning at the head of the 7.15 a.m. from Plymouth next morning. These journeys usually alternated with trips to Bristol and back on Friday or Saturday.

Passenger trains on hilly routes in South Wales are sometimes worked by 2–8–2T engines. London Midland type "8F" 2–8–0s are also seen so employed along the former and L.N.W. Central Wales line from time to time, which now come under direction of the Western Region. No. 7035 "*Ogmore Castle*" was recently seen assisted by 2–6–0 No. 7308, which was nearest the train, from Hereford over Llanvihangel Summit.

The "Beattie Tanks"

In the town of Wadebridge, in North Cornwall, there are three of the Southern Region's oldest locomotives, which were designed by W. G. Beattie and built in 1874–5. They were re-built by Adams during 1884–92, by Urie in 1921–22 and by Maunsell during 1931–35. The last re-building entailed new cylinders, a new section of framing on the front end and a new steel buffer beam in place of the original timber one.



This "Beattie" survivor in British Railways service, No. 30585, is one of the three similar locomotives specially maintained for Southern duties requiring light locomotives.

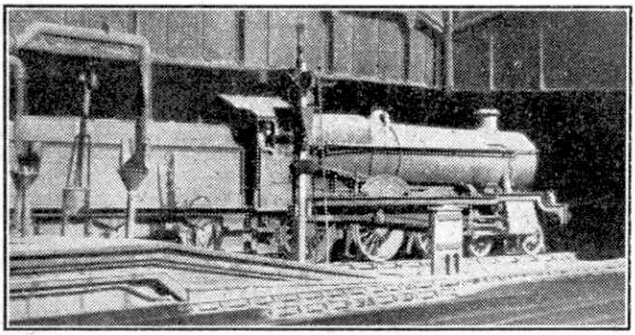
These engines form the only class of well tanks still existing on the Southern. They now carry B.R. numbers 30585–7, the former Southern railway numbers being respectively 3314, 3327 and 3298. Two of the engines are used for shunting in the marshalling yard, while the third is used on the lightly-laid mineral line to Wenford for the china clay traffic. It is owing to these conditions that these veteran engines have been maintained in service for so long. One of them is shown in the upper photograph on this page.

The driving wheels of these small 2–4–0 tanks have a diameter of 5 ft. 7 in. and the weight of each engine in working order is 37 tons 16 cwts. The boiler pressure is 160 lb. per sq. in.

B. L. HENDERSON.

An Enterprising "Lakes Express" Run

The southbound "*Lakes Express*" from Windermere to Euston during the last week of its summer season running in September 1950 consisted of seven coaches, including a 43-ton restaurant car, as far as the main line at Oxenholme, where four more carriages, from Keswick and Penrith, were attached. On one run a class "5" 4–6–0, No. 45416, worked it as far as Preston, being succeeded there by No. 46100 "*Royal Scot*" for the run on to London. With load increased to 15 corridors, nearly 500 tons in all behind the tender, time was gained to Warrington, stops being made there and at Wigan. A dead stand for 14 min. occurred below Stafford owing to a mishap ahead. Further smart work made the Euston arrival only 7 mins. late.



A Western "Grange" at New Street, Birmingham. Note the miscellaneous array of equipment at the platform end. The two photographs on this page are by J. D. Mills.

A Glimpse of Venice

By E. Emrys Jones

VENICE is literally something out of this world. During my stay there I made a point of exploring every hole and corner of the city and it took me six months just to get a glimpse. Six years would be ideal for a real good holiday there, and I am looking forward to going again.

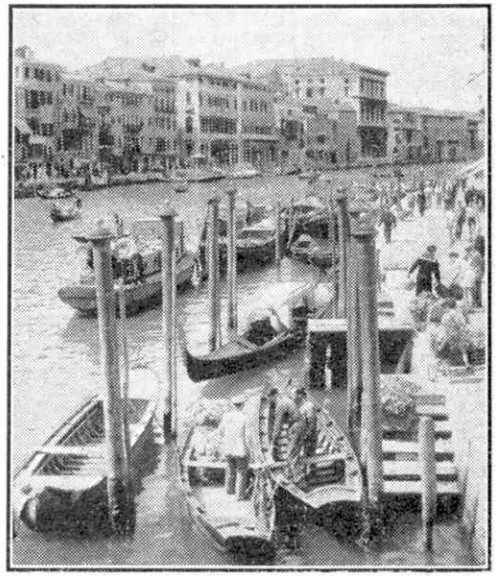
What is there about this place that fascinates one so much? The question is a difficult one to answer. Perhaps it is the thousands of gondolas, the 400-odd bridges, or the 150 or so canals. One thing that will surprise the visitor is that there is no vehicular traffic at all in Venice, so that you need not worry about the possibility of being knocked down by some Italian road hog.

The houses are built on islands, 117 of them in all. The fine marble palaces rest on wooden piles which are hundreds of years old, and there are fine shops, cinemas, restaurants, cafes, etc., built in exactly the same way.

The mainland is Mestre, which is joined to Venice by a long road bridge and a railway bridge. Once you leave the station or the car park you come right away to a canal where dozens of gondolas await your orders. You just say the word, and in a flash you are wafted along by a cheerful gondolier in a most fascinating gondola. The first gondola ride is something really thrilling and exciting, like opening one's Christmas presents or tackling the first of the season's strawberries and cream. You pay your fare at the end of the trip, plus a tip. You can also walk to wherever you want to, making your way along streets, through shopping centres and open air markets and over one bridge after another. On foot, incidentally, is the ideal way to see Venice. I know that the gondola is unbeatable for seeing the overall sights and famous buildings, but you can't get right into the heart and very arteries of the city's life until you put on a good pair of shoes and walk.

The main street is the Grand Canal, threading its way "S"-like through the city. It is two miles long, its average width is 77 yards, and its depth 17 ft. There are handsome palaces and houses on each side of the Canal, houses which were built by the ancient aristocracy of Venice To-day there are shops and restaurants as well. There are over 400 bridges in Venice, 177 smaller canals acting as arteries to the Grand Canal, and 2,327 alleys, or "calli" as they are called in the town.

The smaller canals do smell during the summer months! Houses line the banks of these canals, and if the refuse is in the way one is always tempted to throw it out of the window into the canal.



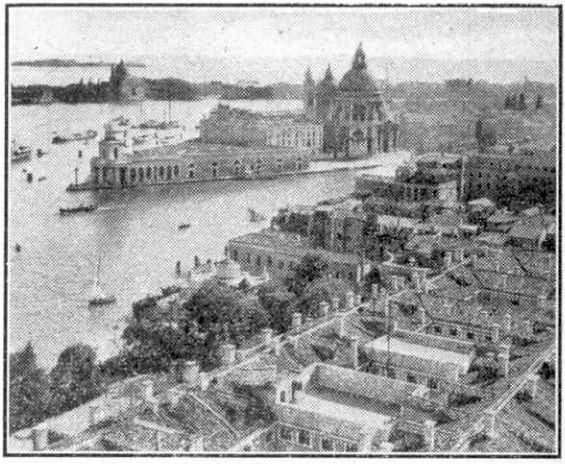
A busy scene on the Grand Canal, Venice, which is lined with palaces and shops.

The fire service is based on the canal. It is a sight to see these fine fast launches and speed boats answering a call. On hearing the unmistakable sound of their sirens all craft make for the banks, leaving the canals clear for the fire engines, which appear to be set on beating some record or other. The ambulance service is likewise speedy and efficient. Funeral barges are not in the same category. Usually the coffin, nearest relatives and priest are in one large gondola or barge, the mourners following in another craft. Foodstuffs

and vegetables are delivered by gondola or boat. If you live on the top floor of a building, you throw down your rope, to which is attached a pail or basket.

As you go along the Grand Canal you will pass 200 fine palaces and shops, and obviously you cannot explore more than a fraction of these. You should not miss the gems, however. There is the Ca d'Oro, the most beautiful Gothic building in Venice, built in the early 15th century. St. Mark's and the Doge's Palace are truly amazing; you would do well to make use of guides to take you round these two buildings. By the way, you will find plenty of so-called guides near St. Mark's and the Doge's, but make sure that the one you choose speaks good English. Have a chat with him first and assure yourself that he can explain things, and that he is not one of the clever ones who have a small stock only of well pronounced phrases. Many Venetians have spent years in America, thereby speaking good American at least!

My first guide was a gondolier who insisted upon taking me to his beloved St. Mark's. He came from Hull, went to sea, met a beautiful Venetian, married, and settled down in his dream city. "Left Hull 22 years ago, and never to return I'm afraid," he said with a nostalgic sigh for the Yorkshire port.



A general view of Venice, looking over part of its extensive system of canals and lagoons.

There is something definitely oriental about St. Mark's, especially the domes. The pigeons in St. Mark's Square are as famous as their London cousins in Trafalgar Square.

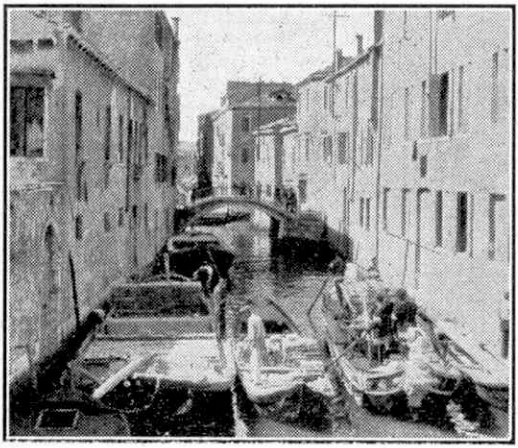
The Doge's Palace is unique. It was first built in the 9th century, and has been rebuilt time and time again as a result of fires. The ceilings and wall paintings are among the largest and richest in colour in the world, especially those of Veronese and Tintoretto.

Near by is Piazzetta, the "little square" facing the canal, a good place to start or finish a gondola ride. It is certainly a headquarters for gondoliers and gondolas.

One of the most interesting walks in Venice is that from the Piazza, or Square of St. Marks, to the Rialto Bridge. You will pass along the finest shopping centre and end up in the fruit and vegetable market of Venice by the Rialto. But you must pause on the bridge and stay awhile to admire the Grand Canal. There you will find all types of river craft, but the gondola reigns supreme. Steam boats provide a good service to the islands of Murano and the Lido.

Let us look more closely at the gondola, with its steel bow, or ferro, and study the gondolier and his technique. The rower does not, as with us, sit with his back to the way he is going and use two oars. Instead, he stands and

On the Piazzetta.



A typical scene on a side canal. On the right is a funeral barge.

faces forward, pressing with all his body on a single oar. The rowlock is a free arm-bend of walnut, and the oar is of beech. The vessel has "a delicate gumboil leftward twist or malformation towards the prow to balance the weight of the gondolier on the right of the poop."

The gondolier has three cries, the warning hoot, the Premi and the Stali. These cries are quite easy to understand if we remember that a gondola is propelled by a double stroke—the main stroke and the return stroke. The former pushes the boat onward, but since it is on the right-hand side, the head moves to the left. This twist is corrected by the return stroke. Imagine yourself in a gondola, one of many in a narrow canal. All canals are not dead straight, and you have no idea what or who may be around the corner. As the gondolier approaches a corner he gives a warning call which sounds like an "a'-oel." Then he shouts "Premi," which means "Go left yourself, because I am going left," or he may shout "Stali," the meaning of which is "Go right, because I am going right."

Collisions are rare, but "near collisions" are frequent. This results in a duet of choice Venetian words and a verbal barrage of no small ferocity! It is unwise to ask the gondolier what the other fellow said! Although I can speak Italian fairly fluently I could never quite catch these fiery words. I have a sneaking suspicion that they cannot be found in any self-respecting English-Italian dictionary.

But all this, plus the smell of the canals, is one of the standard experiences of Venice. Likewise you cannot escape the pigeons of St. Mark's, and the Grand Canal and its traffic will always fascinate you. The Doge's Palace and the facade of St. Mark's will always take your attention; you feel that you are looking at treasures of another world—and so you are.

If you are on a 14-day tour of Italy, you should allow yourself three clear days at least for exploring Venice. Remember that you should also go about on foot as well as by gondola. Avoid the hot afternoon excursions of August, devoting mornings and evenings to sight seeing. Bathe in the Lido, or lounge in a shady spot from 1 p.m. until 4 p.m. On the Canal during the mid-day heat of a sweltering August day can be a grilling experience.

This is particularly so if one sits on an open gondola with no overhead cover. Fast motor launches have recently gained in popularity with visitors; no doubt their extra speed creates a welcome breeze during the hot summer months and the Venetians find that they can travel quicker to business by motor boat. But the gondola will always reign supreme.

Venice is a wonderful place, always full of life and sunshine, and certainly one of the most interesting holiday places in Europe.

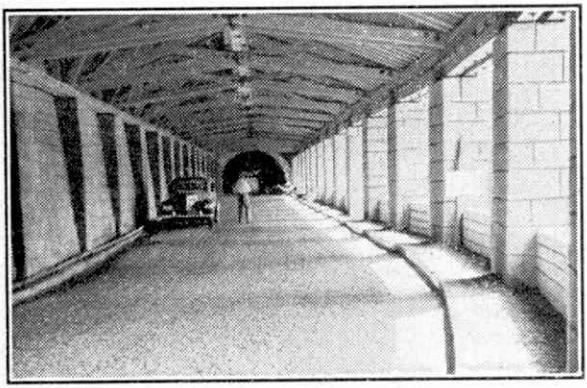
Ponte Rialto, the busiest of the bridges of Venice.

From Our Readers

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

AN ALPINE ROAD

The Flexenstrasse is a remarkable motor road running through the Austrian Alps. Its construction is not yet complete, although traffic is allowed to use



A shelter protecting the Flexenstrasse, a road in the Austrian Alps, from snow and rock falls. Photograph by E. C. Ive, Reading.

it; and it is particularly interesting on account of the number of avalanche shelters, rock tunnels, and bridges that have had to be built to allow traffic to pass over it without obstruction.

The new road is much used by long-distance motor coaches, and there is also a post bus service over it from the main line railway station at Langen to Reutte in Tyrol. Langen is at the western end of the great Arlberg tunnel, over six miles long, and is nearly 4,000 ft. above sea level. From it starts the road over the Arlberg Pass.

The Flexenstrasse turns off this Pass beyond the village of Stuben, at a height of 4,650 ft. It climbs along the steep sides of a valley containing a stream called the Stubenbach. Most of the time the road is under cover, to protect it from falls of rock or snow, and there are spectacular views back towards Stuben and the Arlberg Pass. Towards the summit the stream can be seen falling in a series of cascades to the valley below. The top of the Flexen Pass, or Flexensattel as it is called, is at an altitude of 5,775 ft., but the road is so well graded that the climb offers no serious difficulty to motor traffic.

Beyond the summit the road becomes much less exciting as it descends first to Zurs and then to the charming mountain village of Lech, which is becoming an important centre for winter sports as well as for climbing and mountain walking in the summer. Lech lies in the valley of the little river Lech, which the bus route follows to Reutte.

E. C. Ive (Reading).

BIRDS TRAINED TO CATCH FISH

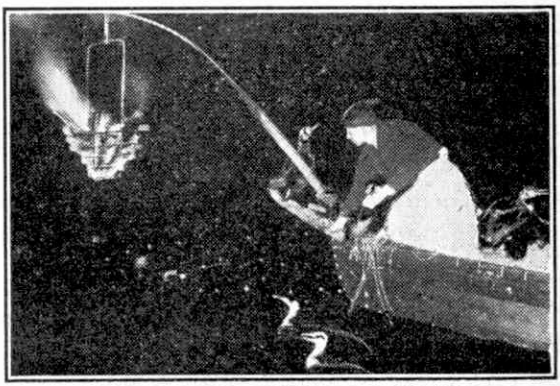
In far-off Gifu, in Japan, there are birds that actually earn their own living. These are cormorants trained and used by the fishermen to catch the succulent fresh trout in the river Nagara.

This unusual kind of fishing dates back to the 10th century. The fishing boats are rather like large rowing boats and are steered from the helm by a pole, while weird pitch-pine torches in hanging baskets flare from the bows, as seen in the accompanying photograph, attracting the fish and casting an eerie glow on the dark waters. The birds line up on either side of the prow, each in his appointed place, and at the word of command they dive off and the underwater chase is begun.

It is a wonderful sight to watch the master fishermen, each deftly manipulating 12 cormorants attached to as many strings, which miraculously do not become entangled as the birds dart here and there searching for fish, which they hunt with marvellous dexterity. Round the base of each bird's neck a ring is fastened to prevent the trout, which are swallowed whole, from going any further; and the master fisherman, keeping an eye on each bird, draws them in one by one, when their crops are full, and gently squeezes their necks to release the fish. Again and again the cormorants are sent off, and soon the bottom of the boat is completely covered with trout.

After each expedition the cormorants are, of course, given a good feed and rightly take their share of the "spoils." These birds are apparently devoted to their masters, and any morning they can be seen, unfettered, around their boats.

V. Hallam (Twickenham).



A Japanese cormorant fisherman and his birds.

Among the Model-Builders

By "Spanner"

A Small Roller Bearing

(M. Rose and B. Freedman, London N.14).

Two Meccano enthusiasts in London have designed a small roller bearing that they think may be of interest to other model-builders, especially those owning Outfits of medium size, as it is suitable for use in small model excavators and cranes and other models in which a sturdy bearing is required to support a swivelling superstructure.

The bearing, which is seen in Fig. 2, consists of a spider carrying four ½" Pulleys. Two 1½" Rods, one of which is seen at 1, are held in opposite ends of a Coupling 2, and a 3½" Rod 3 is held in the centre transverse hole of the Coupling by the long Bolts 4, which are spaced from the bosses of the two 3" Pulleys by Washers. The ½" Pulleys revolve on the rims of the 3" Pulleys and retain their places without any need to use retaining Clips or Collars. A belt drive can be taken to either of the 3" Pulleys as desired.

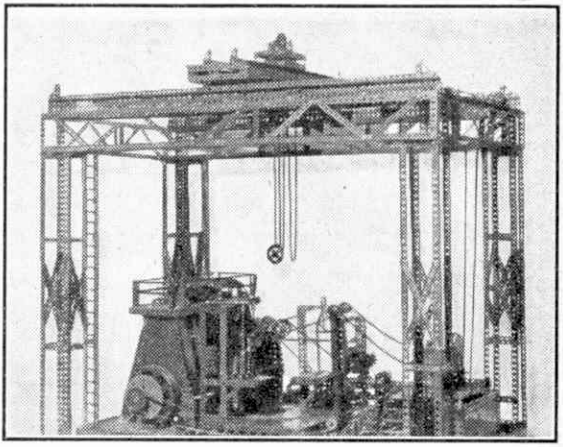


Fig. 1. This group of working models represents a portion of a factory. The models were designed and built by Raymond Hassan, Alexandria.

Rear Axle and Differential

Some of the older readers of the "*M.M.*" may remember a description of a very compact differential unit for model cars that appeared in the July 1939 issue. This month I am describing an even smaller unit, which is completely enclosed in a casing formed by Wheel Discs and 1½"×½" Double Angle Strips. The unit is shown in Figs. 3 and 4, and its most unusual feature is that ordinary gearing is used only for the crown wheel and pinion of the unit. The sun and planet gears are assembled from the "spiders" taken from Universal Couplings or Swivel Bearings, and each has only four "teeth," which are represented by Bolts. The differential operates very smoothly, considering the unorthodox plan on which it is designed, and I think that model-builders specialising in motor vehicle construction will find it very useful in small and compact models.

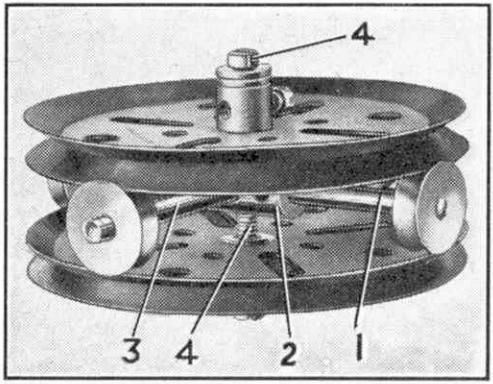


Fig. 2. A small built-up roller bearing suggested by M. Rose and B. Freedman, London N.14.

This differential is incorporated in the fine model motor chassis that forms the subject of the New Model on pages 32, 33 and 34 of this issue. The axle casing is in two sections, each of which consists of a Bush Wheel and a Wheel Disc 1 joined by two 1½"×½" Double Angle Strips. The sections are connected by three 1½"×½" Double Angle Strips bolted to the Wheel Discs. A 1½"

Strip 2 is fixed to each Wheel Disc, and the outer ends of these Strips are connected by a further Double Angle Strip 3 and a Double Bent Strip. The half shafts are mounted in the Bush Wheels and Wheel Discs, and one of them carries loosely a 1½" Contrate 4. A "spider," fitted with four of the special Bolts from Universal Couplings, is then fixed on the inner end of each half shaft. The "spider" 5 is then spaced from the Contrate 4 by two Washers, and "spider" 6 is separated from the casing by one Washer.

Two ½" Bolts are fixed by nuts in diametrically opposite holes of the Contrate 4, and a Collar 7 is screwed on the end of each Bolt. A 1" Rod is held in the Collars 7, and a further Collar is fixed at the centre of the Rod in line with the ends of the half shafts. Two "spiders," fitted with special Bolts in the same way as the "spiders" 5 and 6, are now mounted so that they can rotate freely on ⅜" Bolts 8 screwed into the centre Collar on the 1" Rod.

The differential is completed by fixing a ½" Pinion on a 1½" Rod mounted in Double Angle Strip 3 and the Double Bent Strip. The Pinion is spaced from the Double Angle Strip by three Washers. The differential is enclosed by a 5½" × 1½" Flexible Plate curved to shape and clamped in position by two ¾" Bolts 9.

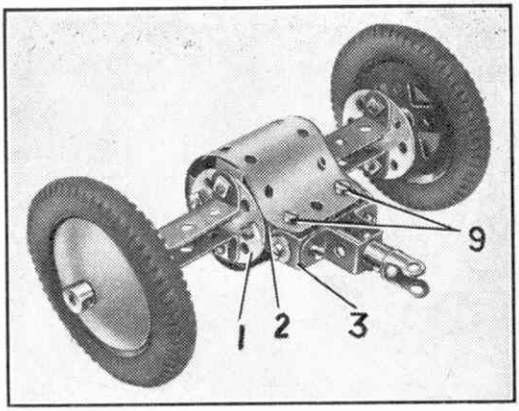


Fig. 3. Gear teeth formed by bolts, are an interesting feature of this small and compact differential.

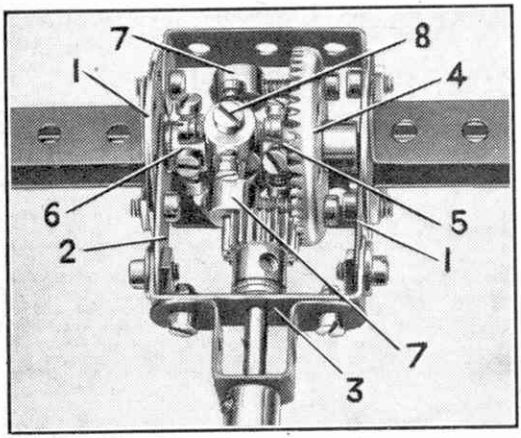


Fig. 4. The novel differential mechanism of Fig. 3, shown here without its casing.

A Built-up Eccentric

(P. Knight, Bristol).

P. Knight, Bristol, sends details of a built-up eccentric that he designed for use in a model horizontal steam engine.

The sheave of the eccentric is made by fixing a 1" Rod 1 through the bosses of two 1¼" Flanged Wheels placed face to face. A Rod 2 is then passed through a hole in each Flanged Wheel and is held in place by Collars. The Flanged Wheels turn with the Rod due to the Grub Screws in the Collars.

The strap consists of two 5½" Strips 3 and 4 bolted together at one end and connected at the other by a 2½" Curved Strip. A 2" Slotted Strip 5 bolted to the 5½" Strips is used to locate the strap in position.

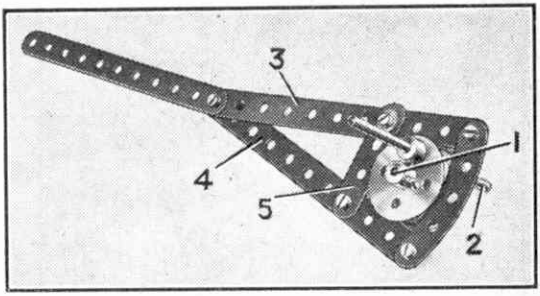


Fig. 5. A built-up eccentric designed by P. Knight, Bristol.

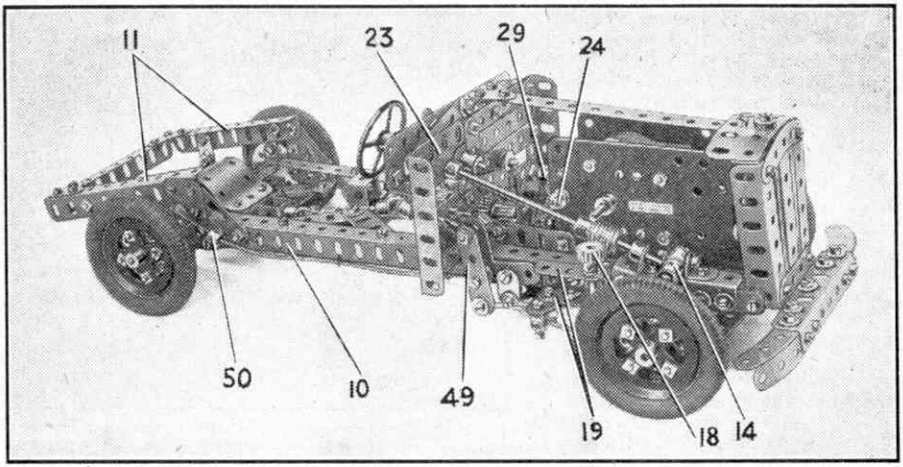


Fig. 1. This fine motor chassis is driven by an E20R Electric Motor through a two-speed and reverse gear-box controlled by a lever close to the steering column.

New Meccano Model

Motor Chassis

A MOTOR chassis equipped with steering column gear change control, independent front wheel suspension and cable-operated brakes, forms the subject of the new model shown complete in Fig. 1.

Each side of the chassis consists of a 12½" Angle Girder 10 and a 4½" Angle Girder 11 joined by a 1½" and a 1" Corner Bracket to form the arch over the rear axle. The main girders are joined at the rear by a 4½" Angle Girder, and at the front by a 2½" × ½" Double Angle Strip placed immediately above the front spring.

Each rear spring consists of a 4½", two 3½", a 2½" and a 1½" Strip, held together and attached to the rear axle casing by a ⅜" Bolt. An Angle Bracket is bolted to each end of the 4½" Strip, and one of them is lock-nutted direct to the chassis. A Fishplate is lock-nutted to the second Angle Bracket and also to the chassis.

The rear axle is exactly the same as that described in the "*Among the Model-Builders*" pages of this issue, except that brakes are fitted. Each brake shoe consists of a Bell Crank lock-nutted at 12 to the Wheel Disc at the end of the axle casing. The shoe is held clear of the drum by a 2½" Driving Band looped over a ⅜" Bolt 13 and fixed to the Wheel Disc.

The front spring is formed by a 4½", two 3½", a 2½" and five 1½" Strips curved to shape and attached by a ½" Bolt to the centre of the Double Angle Strip across the chassis. The spring forms the lower link of the suspension system, and the upper link is a Swivel Bearing 14. This is attached by a ⅜" Bolt to a Collar that pivots on Bolts 15 passed through Angle Brackets 16 fixed to the chassis. A 1½" Rod is fixed in the Swivel Bearing, passed through the end hole of the front spring, and is held in place by a Collar. A Coupling 17 is free to turn on the 1½" Rod between the Swivel Bearing and the spring.

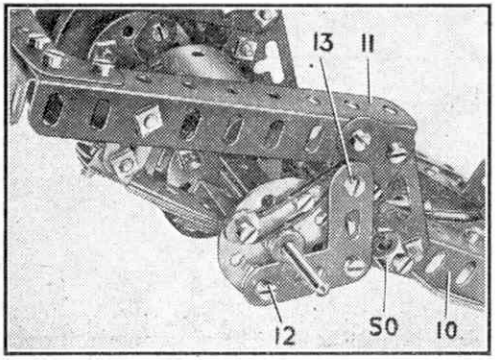


Fig. 2. A close-up of the rear springs and brake assembly.

The track rod is built up of a 3½" Strip and a 2" Slotted Strip bolted together, and is connected by bolts to Collars fixed on the ends of ⅜" Bolts screwed into the Couplings 17. The Bolts are not screwed into the Couplings far enough to grip the 1½" Rods, however, and they are locked by nuts tightened against the Couplings. The stub axles are 1" Screwed Rods screwed partly into the Couplings and held in place by nuts. A Wheel Disc is gripped between two nuts on each Screwed Rod, and the front hub is passed over the Rod and held in place by lock-nuts. The hub is a Wheel Flange attached to a Bush Wheel by ⅜" Bolts, which are used also as stud bolts to fix the front wheel to the hub.

The steering column is a 6½" Rod fitted with a Worm that meshes with a ½" Pinion 18. This Pinion is fixed on a 1½" Rod mounted in two 1½" Angle Girders 19 bolted to the chassis, and it carries at its lower end a Crank 20. A compound 4" Strip links the Crank to a Collar

fixed on a ½" Bolt screwed partly into one of the Couplings 17 and locked by a nut.

The lower bearing for the steering column is a Corner Angle Bracket 21 bolted to the chassis, and the upper end is mounted in a bulkhead assembled on a 1½" Angle Girder 22 on each side of the chassis. A vertical 3" Angle Girder is attached to each of the Girders 22, and the 3" Angle Girders are connected at their upper ends by two 3½" Strips overlapped four holes. A 2" Flat Girder 23 is bolted to one side of the bulkhead, and the steering column passes through this Flat Girder. The column is held in place by Collars.

A ½" Pinion on the E20R Motor shaft meshes with a 57-tooth Gear on a 2½" Rod 24. This Rod is fitted with a ¾" Contrate 25.

The gear-box and clutch are built as a unit, and they are housed in a framework formed by two 3½" Flat Girders 26 and two 1½" Flat Girders 27. These parts are connected together by Angle Brackets, and a 1½"×½" Double Angle Strip 28 is bolted across the centre of the gear-box. A 1½" Strip is bolted across the slotted holes of the rear Flat Girder 27 at the extreme limit of the slots so that a ¾" and a ½" Pinion mounted on Rods in holes in the Flat Girder mesh accurately. A Flat Trunnion, with its apex upward, is used in place of a 1½" Strip at the front of the gear-box, however, and a ¾" Bolt is fixed by a nut in the apex hole of the Flat Trunnion. A ½"×½" Pinion 29 is free to turn on this Bolt and meshes with the Contrate 25.

The gear-box input shaft is a 2½" Rod mounted in one of the Flat Girders 27 and in Double Angle Strip 28. It carries a ½" Pinion 30 and a ¾" Pinion 31, and about ½" of the Rod projects beyond the Double Angle Strip and into the bore of ¾" Pinion 32. Pinion 32 is on the output shaft, which is a 1½" Rod carrying also a ¾" Pinion 34. The layshaft is a 3½" Rod fitted with a ½" Pinion 35, a ½" Pinion 36 and a Collar 37.

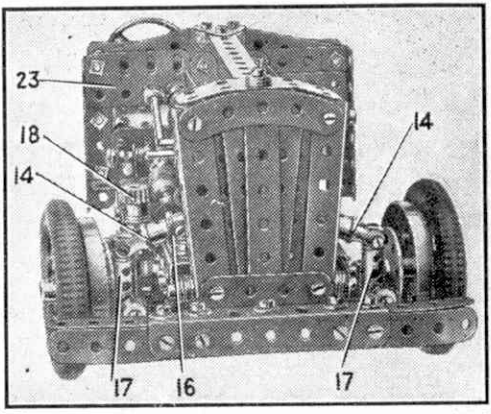


Fig. 3. This view shows the arrangement of the upper links of the independent front suspension.

Movement of the layshaft is controlled by a ⅜" Bolt 38 engaging between Collar 37 and Pinion 36. The Bolt is held by a nut in a Fishplate fitted also with a ¾" Bolt. A 1½" Strip 39 is passed over the ¾" Bolt but is separated from the Fishplate by three Washers. This assembly is then held tightly by a nut, and the shank of the ¾" Bolt is passed through a 1" Triangular Plate bolted to the side of the gear-box. Two Washers are used to space the 1½" Strip from the Triangular Plate and the ¾" Bolt is held in place by lock-nuts. The reverse ½" Pinion is free on a ¾"

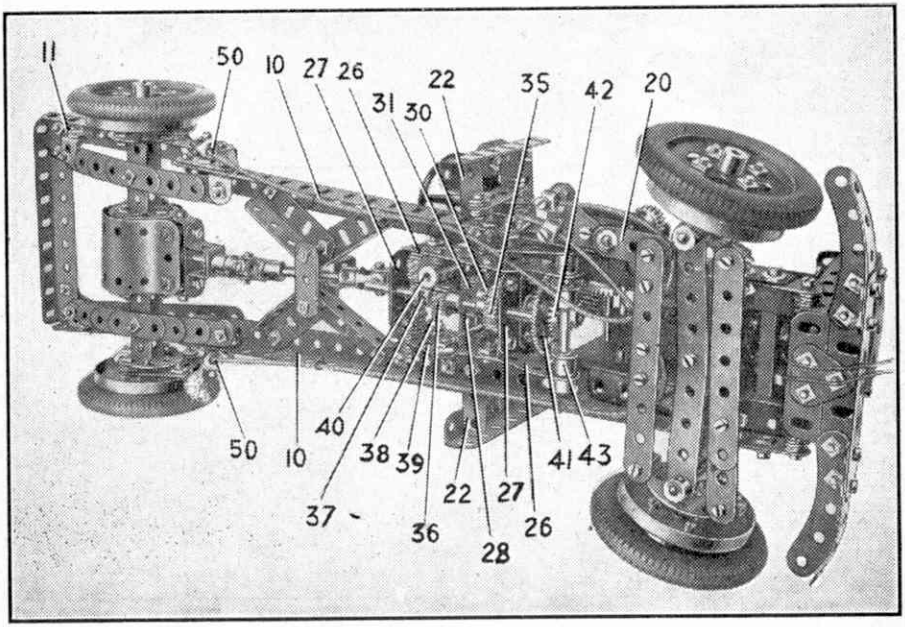


Fig. 4. An underneath view of the chassis showing the steering linkage and details of the clutch and gear-box.

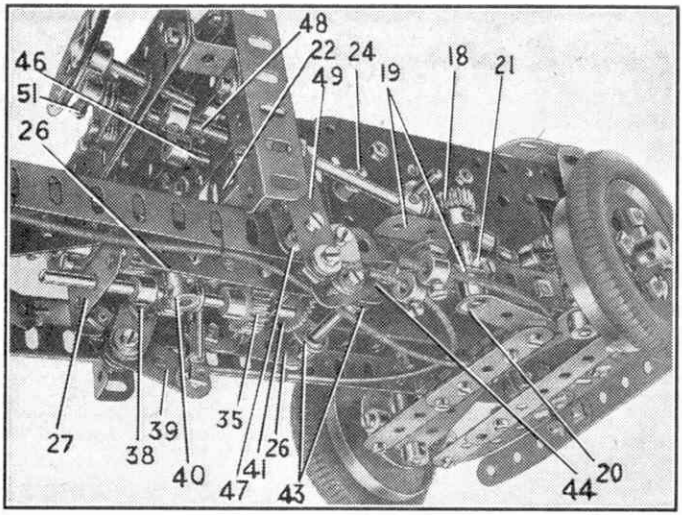


Fig. 5. This view of the model displays the compact clutch and brake pedal assembly and the gear selector levers.

Bolt screwed into the tapped hole of a Coupling 40, and the Bolt is prevented from turning by the grub screw. The Coupling is held by a $\frac{3}{8}$" Bolt passed through the side of the gear-box and screwed into the centre tapped hole of the Coupling. The Coupling 40 is spaced from the side of the gear-box by Washers.

The clutch driving member is a 57-tooth Gear 41 meshing with Pinion 29. The Gear is free on the shaft, and the fixed member is a $\frac{3}{4}$" Bevel Gear 42. A thin piece of rubber should be glued to the Gear 41 to provide the friction surface. A Compression Spring placed between Gear 41 and the front of the gear-box forces the Gear against the Bevel 42, but it can be withdrawn by Pawls 43. The Pawls are fixed on a $2\frac{1}{2}$" Rod mounted in the lower end holes of the Flat Girders 26, and they are operated through a Crank 44 fixed on the same Rod. The gear-box and clutch unit is bolted to the Motor by the end slotted holes of Flat Girders 26, but the Girders are spaced from the Motor side-plates by two Washers on each bolt.

The Motor is attached to the chassis by the same bolts that hold Angle Brackets 16 in place, and the rear of the gear-box is supported by an Angle Bracket 45 clamped between the chassis and a $1\frac{1}{2}$" Strip.

The clutch is operated through a 1" Rod 46 fixed in a Rod and Strip Connector lock-nutted to a Bell Crank with boss 47. The brake is operated by a 1" Rod 48 fixed in a Rod and Strip Connector lock-nutted to a 2" Strip 49. A $\frac{3}{8}$" Bolt is passed through the 2" Strip and the boss of the Bell Crank and is lock-nutted to the chassis. A Fishplate is lock-nutted to the Bell Crank, and a $\frac{3}{8}$" Bolt fixed by a nut in the Fishplate engages the slotted hole of Crank 44.

The brakes are operated through cables consisting of thin wire passed through an outer sheath formed by Spring Cord. One end of the Spring Cord is clamped in a Collar 50 screwed on to a bolt fixed in the chassis, and the other end is clamped in a Collar screwed to a bolt fixed in a 1" Corner Bracket bolted to the lower of the Girders 19. The wire is fixed to the end hole of the Strip 49 and to the Bolt 13 on the brake shoe.

The brake drums are Wheel Flanges fixed to Bush Wheels by $\frac{3}{8}$" Bolts. These serve also as stud bolts for the rear wheels.

Gear selection is controlled by a $\frac{1}{4}$" Bolt 51 screwed into a Collar fixed on a 2" Rod, which is mounted in the facia panel and the bulkhead.

The inner end of the 2" Rod carries a Crank, and a Rod and Strip Connector lock-nutted to it is fitted with a 2" Rod. This Rod passes through the gear-box, and carries at its lower end a second Rod and Strip Connector that is lock-nutted to the gear selector lever 39.

The radiator is assembled from two 3" Angle Girders joined at the top by a $2\frac{1}{2}$" Angle Girder and a $2\frac{1}{2}$" Curved Strip, and at the bottom by a 2" Angle Girder. It is filled in by five 3" Strips clamped between the $2\frac{1}{2}$" Angle Girder and the Curved Strip, and the 2" Angle Girder and a 2" Strip. It is attached to $1\frac{1}{2}$" Strips bolted to the chassis and is located centrally by Washers on the Bolts fastening it in position. The radiator is braced to the bulkhead by a $5\frac{1}{2}$" Strip extended by a 1" Triangular Plate.

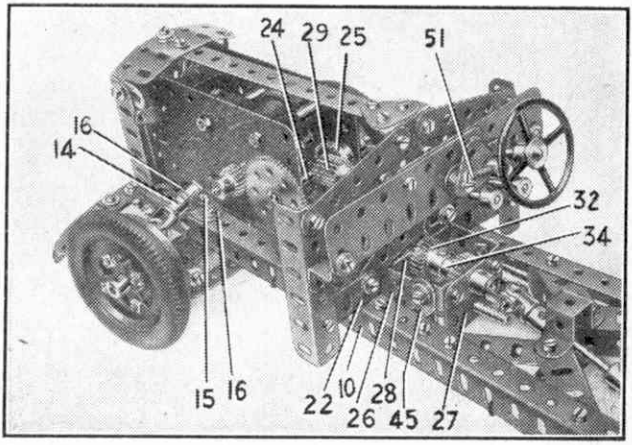


Fig. 6. The arrangement of the reduction gearing between the E20R Electric Motor and the gear-box is seen clearly in this view.

More Prizes for Meccano Model-Builders

A "New Year" Competition

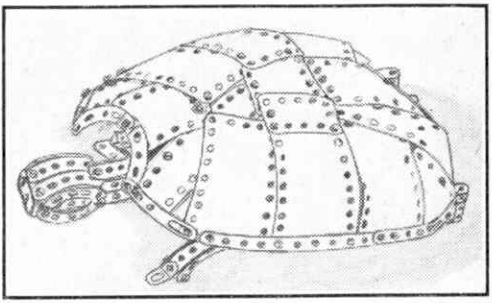
In this contest we offer many splendid prizes for the best Meccano models received from readers. Models may represent any desired subject and may be constructed from any size of Outfit or number of parts, but even small and simple models will stand an excellent chance of winning a prize provided that they are well built and show originality in design.

Entries will be divided into two Sections; Section A, for readers living in the British Isles, and Section B, for readers living Overseas. The age of each competitor will be taken into consideration when making the awards.

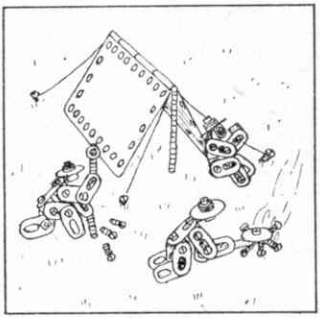
The following complete set of prizes will be awarded in each Section of the Contest. First: Cheque for £3/3/-. Second: Cheque for £2/2/-. Third: Cheque for £1/1/-. Ten Prizes each of 10/6 and Ten Prizes each of 5/-.

Readers should send in clear photographs or good drawings of their models, together with any written explanations that may be necessary. The competitor's age, name and address must appear on the back of each illustration. Envelopes should be addressed *"New Year Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13."*

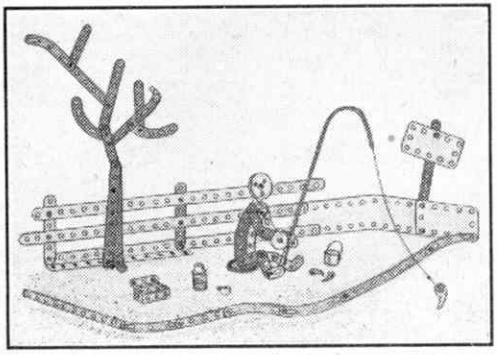
The closing dates are: Home Section, 28th February; Overseas Section, 31st May.



This Tortoise won First Prize in the "Birds and Beasts" Competition for Geoffrey M. Stock, London S.W.19. It is animated by a very ingenious mechanism.



The First Prize entry in the Summer "Simplicity" Contest. It is the work of R. Martin, Ewhurst.



K. R. Pargeter, Wollaston, Stourbridge, won Second Prize for this amusing Simplicity model of an angler and his catch.

Model-Building Competition Results

"BIRDS AND BEASTS" CONTEST (Home Section)

First Prize, Cheque for £3/3/-: G. M. Stock, London S.W.19. Second Prize, Cheque for £2/2/-: B. R. Harris, London S.E.18. Third Prize, Cheque for £1/1/-: C. N. Ellacott, London N.2.

Five prizes, each of 10/6: B. Robinson, Cottingley, Yorks.; P. French, St. Leonards, Sussex; G. Suckling, Gravesend, Kent; J. Wilson, Falkirk; D. K. Thomas, Plymouth.

Five Prizes each of 5/-: A. F. Smith, Saltford; P. J. Shipp, Harrow; N. S. Hooper, Dundee; D. Hardy, Blackwell, Derby; O. Riches, Surbiton.

SUMMER "SIMPLICITY" COMPETITION (Home Section)

First Prize, Cheque for £3/3/-: R. Martin, Ewhurst, Surrey. Second Prize, Cheque for £2/2/-: K. R. Pargeter Stourbridge, Worcs. Third Prize, Cheque for £1/1/-: B. Woolford, Petworth, Surrey.

Five Prizes, each of 10/6: W. E. Roberts, Pwllheli, N. Wales; R. Dongray, Wadebridge, N. Cornwall; D. Yardy, New Malden, Surrey; G. White, Burntisland, Fife; F. G. Downing, Folkestone, Kent.

Five Prizes, each of 5/-: D. Franklin, Colney Heath, Herts.; W. F. Messenger, Aspatria, Cumberland; R. Bruce, Ashtead, Surrey; J. Griffiths, Boroughbridge, Yorks.; P. Newman, Lincoln.

Club and Branch News

WITH THE SECRETARY

SPEEDING UP PROGRESS

Once again we enter upon another year, and to begin with I send best wishes for 1951 to all connected with the Guild and the H.R.C.

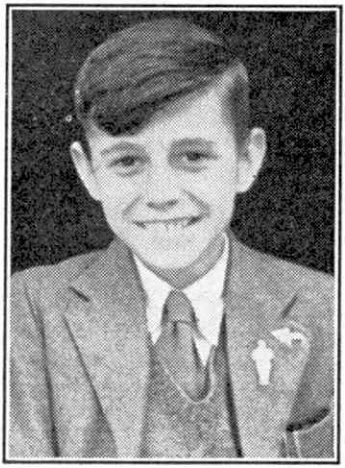
A year ago I urged members to make 1950 a record. They responded splendidly. There was a remarkable increase in both Guild and H.R.C. membership during the last 12 months, new Guild members numbering over 12,000 and those of the H.R.C. 35,000. The number of Clubs and Branches also increased, and there is every indication that this excellent progress will continue during 1951.

All these advances mean that more and more boys are enjoying more and more fun from the two hobbies. The aim of the Guild and of the H.R.C. is not only to make life happier and brighter for its members, but also to develop in them initiative and enterprise. Opportunities for this are best obtained through Clubs and Branches, and every member of the Guild or of the H.R.C. who is not already connected with one of these organisations should immediately join the nearest. If there is no suitable Club or Branch he should set to work to form one himself. I will give full details to any member who writes to me.

A PLAN FOR THE NEXT SESSION

At the moment we are in the midst of the Christmas and New Year social events, but in a week or two we shall settle down to the regular programme of the second Winter Session. This is usually a period of the greatest interest in model-building on the part of new members, and also of old ones, most of whom now have increased stocks of Meccano Parts. It is therefore important to arrange a good series of Model-building Competitions, in which members vie with each other in efforts to build the best lorries, bridges, cranes and so on, and also to encourage the construction of larger models by small groups of members. The latter is an absorbingly interesting plan. If, say, four enthusiasts design a large working model with attractive movements, and then set to work to build it from their combined resources, they enjoy one of the greatest thrills possible in Club life when their production springs to life, especially if several groups are in competition with each other.

Other Club activities, such as Indoor Games, Talks, Film Displays and Visits, should continue throughout the coming Session, but I should like the Leaders of all Clubs to make a special feature of Meccano model-building on the lines I have suggested. Discuss the idea with members, and after securing their agreement put it into practice with enthusiasm and efficiency.



G. A. Viney has been Secretary of the Morden M.C. and Branch No. 508 of the H.R.C. since August 1949. This organisation was affiliated with the Guild in May 1948, under the Leadership of Mr. H. B. Moyer, and shortly afterwards was incorporated with the Hornby Railway Company. Its members are active Meccano model-builders, and also operate an interesting Hornby-Dublo layout. A special feature is made of excursions, most of which take members to places of railway interest.

CLUB NOTES

THE CRYPT GRAMMAR SCHOOL (GLOUCESTER) M.C.—A presentation was made to Mr. R. Horton, Leader, when he left to take up a position elsewhere. Mr. G. W. Simpson succeeded him as President and Leader. A special meeting was arranged to welcome new members. Model-building Competitions have been arranged, a Table Tennis Tournament has been held and a Football Team has been formed. Club roll: 40. *Secretary:* Mr. D. H. Gettings, 17, Riversley Road, Gloucester.

THE MICHAELIAN M.C.—This Club, formed in St. Michael's College, Hitchin, is making good progress. Two gangs have been formed, the "Platelayers" and the "Porters," each in charge of a Foreman. This Club owns a large Meccano Outfit for common use and many original models are produced. Club roll: 10. *Secretary:* Mr. J. Sayer, St. Michael's College, Hitchin, Herts.

GREAVES METHODIST CHURCH M.C.—Members enjoyed several successful outings. On one of these the Levland Motor Works were visited, and on another occasion members were the guests of the Mersey Docks and Harbour Board, touring several Liverpool docks and visiting the Radar Station of the Port. It is hoped to form a Junior Section, and the Senior Section is being enlarged. Typical efforts of a recent month were two Model-building Evenings, a Lecture Night and a Film Display, the subject of which was "Petroleum." Club roll: 13. *Secretary:* Mr. T. Starr, "Derwent," Scotforth Road, Lancaster.

SOUTH AFRICA

MALVERN (JOHANNESBURG) M.C.—Steady progress is being made. Construction meetings are held regularly, and excellent Model-building is carried out on these occasions. Other efforts have included a Mock Trial, a Quiz and Bicycle Runs, one of which took place in moonlight. A Christmas Tree was prepared for the Epworth Homes, and by various efforts money was raised to provide a party and toys for the children in them. Club roll: 20. *Secretary:* Miss Jean Weaver, P.O. Box 8, Cleveland, Johannesburg.

BRANCH NEWS

HIGH CRAIGIE (PERTH)—A permanent Hornby-Dublo layout is being planned, and more locomotives, rolling stock and accessories have been acquired. The Hornby-Dublo train layout also continues in good working order, and excellent use is made of Dinky Supertoys in connection with this. A Stock Club has been formed for the purchase of material. Plans are being made for a Concert. *Secretary:* Mr. J. Duncan, "Dunrae," 41, Evelyn Terrance, Craigie, Perth.

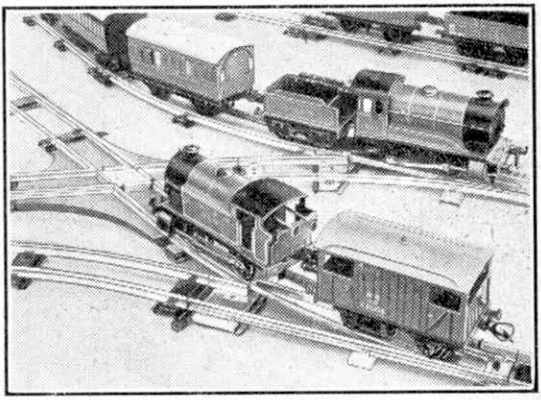
The Care of Hornby Track

IT is a curious fact that of all the component parts of a miniature railway system, the rails usually receive the least attention. Probably one reason is that most Hornby Railway owners are so keen to get to work with their trains that the rails are put down as quickly as possible. Similarly, when running is over and the railway has to be put away the track, which comes up last, is usually given somewhat hasty treatment.

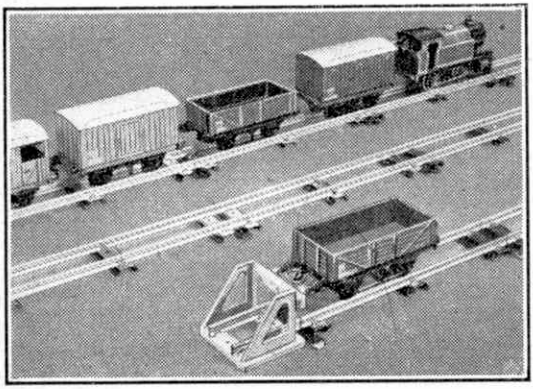
Care of the track begins with putting the rails together. This must be done carefully and joints must be secured by means of Connecting Plates or, in the case of MO rails, Connecting Clips. But even before the track is laid its position requires attention. If it has to be on the floor, sudden changes of level must be avoided, and it is particularly important that the rails should not be trodden on.

If a new layout is being worked out, any forcing of the rails to complete a particular formation should be avoided. This is specially necessary when Points and Crossings are involved. It must be noted too that Curves, Points and Crossings of the two standard radii, 2-ft. radius and 1-ft. radius, cannot be used together with success in the same layout; nor can the standard Hornby Rails be joined up correctly to rails of the kind included in the MO Train Sets.

It is a good idea to test the truth to gauge of the rails from time to time. This is readily done with the aid of the locomotive winding key. Any tight places then discovered should be remedied by easing outward the running rail concerned. Points also call for attention, and if they are constantly in use it is well to examine the switch rails occasionally to make sure that they occupy their correct positions in accord with the settings of the operating levers.



Hornby 2-ft. radius Points and an Acute Angle Crossing are shown in this picture. Here two main tracks divide into two pairs of diverging lines.



A typical section of a layout of Hornby track showing the main lines and in the foreground a siding terminated by Buffer Stops.

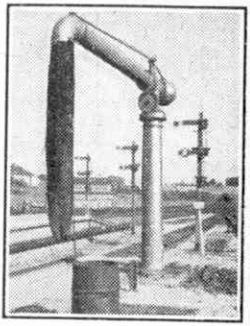
When the railway has to be picked up and put away, the parting of the joints should not be carried out roughly. After the Connecting Clips or Plates have been removed the rails should be pulled firmly apart without any sideways motion. "Worrying" the rail joints from side to side damages the hollow rail ends, and may prevent the rails from fitting firmly together again. Finally the rails should be stored neatly in their boxes so that they are ready for use when next required. If one big box is used for them, rails of each different kind should not be mixed up in a confused mass; each type should be kept together in lots.

The Hornby-Dublo Water Crane

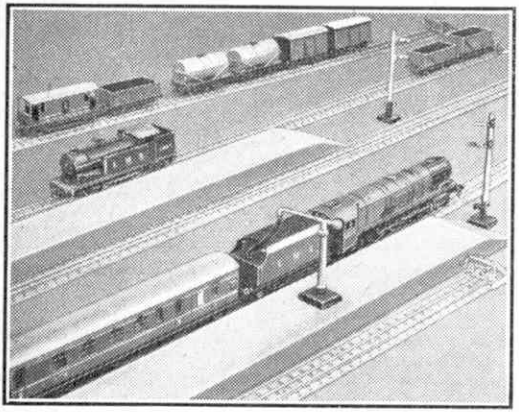
OF the various successories of the Hornby-Dublo System, the Water Crane is one of the most popular. It is in fact a necessity on any miniature railway where steam-type engines are used, and this means every Hornby-Dublo layout. In actual practice the filling up of an engine's tender or tank is an operation that has a special fascination for the onlooker. With the Hornby-Dublo Water Crane the interest of the job can be reproduced in miniature.

The Hornby-Dublo Water Crane is a die-cast accessory consisting of a vertical column, at the top of which is mounted a swivelling horizontal arm with one end down-turned. From the latter there hangs a flexible pipe representing the familiar leather "bag" of real practice. At the other end is the usual ball-shaped counterweight. The base includes a short column and a dummy handwheel as usually provided for controlling the flow of water.

There are many places on a layout where the Hornby-Dublo Water Crane can be used. Stations, goods yards, engine sidings and shed premises all provide likely positions. Sometimes it can be mounted on the Station platform, just about the place where the engines stop, and this is the situation shown in one of our illustrations. Normally the moving part of the Crane lies parallel to the track, being only swung round approximately at right angles to it when an engine requires to "take water." To prevent the swivelling arm moving when not required, two small notches are cast on the underside of the swivelling joint and these register with two ridges in the corresponding top face of the main column.

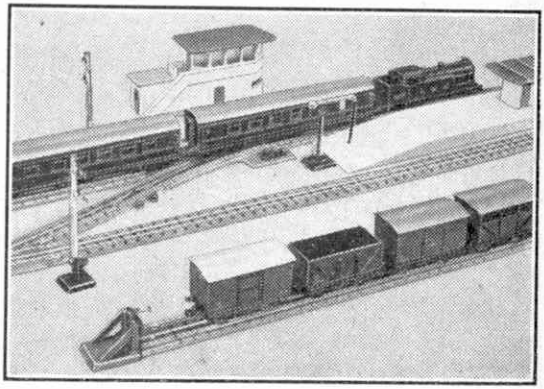


A real water crane of the type represented by the Hornby-Dublo one. Photograph by A. N. Davenport, Epsom.



The Hornby-Dublo Water Crane mounted on an island platform. The swinging arm and pipe can serve engines standing on either line.

Another likely place for the Water Crane at a station is at the foot of the sloping platform end or ramp. This means that engines requiring to use the Crane will come to rest beyond the platform. This arrangement therefore allows longer trains to be dealt with at the platform than would otherwise be the case. Whichever plan is followed, careful engine driving is called for when the train is being brought into the station, so that the engine comes to rest opposite the Water Crane.



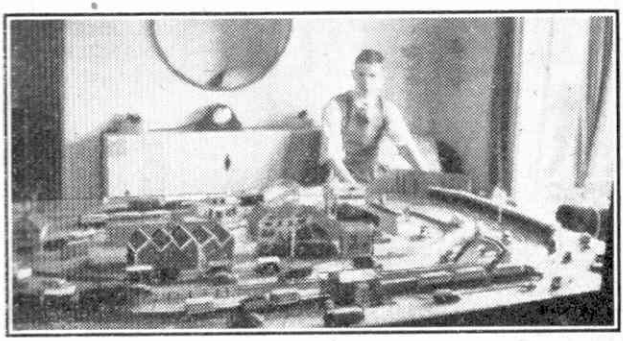
A favourite position for the Water Crane is at the end of the platform slope or ramp.

"Milchester" to "Hilton" by Hornby-Dublo

THE Hornby-Dublo layout shown on this page, the owner of which is G. Mower, Hull, started with a *"Sir Nigel Gresley"* Passenger Train Set and an L.N.E.R. Tank Locomotive with half a dozen wagons running on a plain oval. Owing to the war it was some time before points could be obtained to make a siding for rolling stock not in use. When they did become available the track was gradually extended and with the addition of a new Passenger Train Set and a Tank Engine it became fairly well equipped. Originally it was put on the floor, but is now accommodated on an extensive table tennis table.

There are two main oval tracks connected by Dublo crossover points, and a third oval track connected by points to the inner main line. This inner oval track throws off a wagon siding and two engine roads, the latter so placed that any engine coming off duty can run straight into them. The outer main line, with a siding, is controlled independently of the other track by its own Controller, while the inner main line and the third oval track together are operated by a second Controller. The layout is provided with various Isolating Rail sections that make it possible for any of the four engines in turn to be moved to any part of the track.

In our lower illustration the three tracks can be seen plainly, with *"Sir Nigel Gresley"* on a train bound for *"Milchester."*

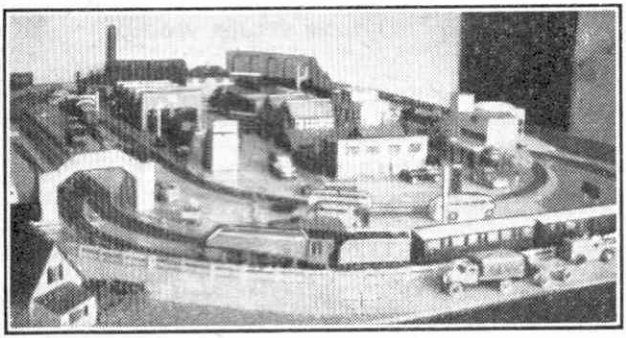


"M.M." reader G. Mower, of Hull, with his Hornby-Dublo layout. Lineside buildings and Dinky Toys are prominent at the lineside.

This is one of the two stations on the layout and is the three sections. One of these includes a platform with a back wall and another the centre station building with a clock tower. The third section is an island platform serving both main line and siding.

The second station is *"Hilton,"* which has three platform faces. In it an island platform serves the outer and inner main lines and another platform, on which the station building is placed, serves the third oval. Buildings such as a cinema, shops and houses give a realistic effect to the layout, and this is enhanced by the use of Dinky Toys miniature road vehicles.

Regular express passenger trains run between the two stations, and a local passenger train uses the inner main line. Goods trains generally take the innermost tracks, but a run is made on the outer circuit to *"Milchester"* at certain time of the day to convey perishable traffic. Timetable running has been successfully carried out for short periods.



"Sir Nigel Gresley" rounding the curve into "Milchester," one of the stations on G. Mower's Hornby-Dublo layout, described on this page.

For other Stamp Advertisements see also pages 42 and xv.

Stamp Collecting

An Attractive West Indies Issue

By F. Riley, B.Sc.

TORTOISES and turtles may be slow, but they have been quick enough to find their way into stamp designs. They form a distinct order of reptiles, the turtles being entirely marine in habit. The largest are the giant tortoises of the Galapagos Islands. These are land creatures and a stamp illustrating one of them was included in a set issued in 1936 by Ecuador, the country to which the Islands belong, to celebrate the centenary of a famous visit made to the Galapagos by Charles Darwin, the great naturalist. Giant land tortoises are found also in the islands of the Western Indian Ocean, and one of these is illustrated on stamps of the Seychelles, five values of the 1938 issue. The tortoise that is familiar to boys in this country is imported in large numbers from the Mediterranean, and so far as I can recall has not yet crept on to a stamp!

These stamp exploits of the tortoise family are recalled by the appearance of the Cayman Islands pictorial set issued on 2nd October, for two of the 13 stamps of this issue are concerned with turtles. The Cayman Islands are in the West Indies, about 200 miles from Jamaica. The Spanish name of Las Tortugas was given to them by Columbus when he discovered them in 1503 because of the abundance of turtles in the waters around the Islands. There do not appear to be so many turtles nowadays, probably because they have been so thoroughly hunted for food. Turtle soup has long been a traditional dish at banquets.

The turtle of the Cayman Islands is known as the green turtle, and it is found in the Indian and Pacific Oceans as well as in Atlantic waters. The fishing fleet of the Cayman Islands now catch turtles on the Mosquito Bank, which is off the coast of Nicaragua, 300 miles away. The creature grows to a very large size; large specimens may have a shell 4 ft. long and a weight of about 3 cwt. One of them is seen on the 1d. value of the new Cayman Islands set, and on the 1/– value is a "crawl," a stockaded portion of beach and sea, in which the turtles are kept for fattening purposes.

The issue that includes these stamps is quite attractive. Each stamp is in two colours, and the only complaint that can be made against them is that in general they are a little on the pale side. The designs too are interesting, covering different aspects of life in the Islands. A map is included, on the 2½d. stamp. This shows the three main Islands, Grand Cayman, Little Cayman and Cayman Brac. Grand Cayman is the largest, but is only 17 miles long and 7 miles in width, and the entire group has in it only about 7,000 people.

The stamps help to show how picturesque these tropical islands are. The scenes shown on them include a bluff on Cayman Brac, on the 6d. value, and a coconut grove on the same island on the ½d. stamp. Another product of the Caymans is a form of rope. The 1½d. value shows the palm from which the material for this is derived, and the rope borders of several of the stamps of the issues are also reminders of the existence of the industry.

The sea plays a great part in the life of small islands, and the Caymans are no exception to this rule. Of the 13 stamps of the issue nine are connected with the sea, including the one showing the bluff on Cayman Brac to which I have already made reference. The 5/– value shows boat building in operation, and the next lowest value, 2/–, shows a Cayman schooner, a handsome type of vessel built from local woods.

On the lowest value, ½d., is a representation of the cat boat of the Islands, a little vessel sharply pointed both fore and aft. It is said that these boats are painted blue because when of this colour they are not quickly noticed by the turtles when they pass over these creatures on their feeding grounds.

The 2d. value shows Cayman seamen on the bridge of a vessel and the 9d. value illustrates Georgetown Harbour. Georgetown is on Grand Cayman and is the capital of the group, and the picture on the stamp is notable for the presence of a flying boat, presumably one of those used for maintaining the regular service between the Islands and Jamaica. The Government Offices of the Islands are shown on the highest value, 10/–, of the set.

Finally there is the 3d. value, which shows a scene off the Islands. In this is a large representation of the parrot fish, which is one form of the sea life around their coasts. This fish can grow to a length of 3 ft. and is remarkable for its sharp beak, formed by the joining of its teeth, which it uses to bite off bits of coral in which are the sea plants on which it feeds. It is this beak that gives the fish its descriptive name.

This is not the first pictorial set that has come from the Cayman Islands, for an excellent set, with each stamp in one colour, appeared in 1938. There were five designs.

For other Stamp Advertisements see also pages 40 and xv.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

THE opinion used to be held that for a country to become popular among collectors it must keep itself in the limelight by issuing plenty of attractive stamps. That of course was when there were relatively so few different kinds that even cut-outs from postal stationery were added to collections. But things have quite changed nowadays, and countries like Belgium have completely lost their following owing to their multiplicity of issues. On the other hand Canada, through keeping to the middle path, is more popular than ever, and the latest stamp from that country, which is to form part of a new set depicting peace time activities, has been given a warm welcome. Let it be said that it is one of the most beautiful stamps that Canada ever issued. The 10c. is referred to; don't be misled by the illustration, for the stamp itself, in a lovely shade of deep brown, is really handsome. It is already known as the "Wigwam" stamp, though the motif has to do with the fur industry.

By the way, Canada is making another change in its stamps. Fairly recently a number were overprinted "O.H.M.S."—hitherto these letters had been punched—but apparently the French speaking portion of Canada did not understand what these letters meant. At least that's the story, so now the overprint has been changed to "G" and no doubt all will be well. But this is the point; already some of the "O.H.M.S." stamps are obsolete, and they will prove very scarce in time, though official stamps generally speaking are nothing near as popular as ordinary issues. Nevertheless, if you can get a set do so, providing it comes within the scope of your collection.

If we move down a country we come to the U.S.A. and our second illustration shows a stamp that has been issued to commemorate the centenary of California as a State. There has been quite a fuss about this stamp, for of course this golden territory must have a golden stamp in its honour. It would have been quite possible to produce one which looked like gold, for collectors will bring to mind the 1½d. stamp emitted by South Africa in 1936 depicting a gold mine. An ink looking like gold was used for part of the design with entire success, but apparently the U.S.A. authorities were not prepared to go as far as that and California has had to be satisfied with a dull looking stamp, printed in a dull orange. Nobody is very pleased about it.

Our third illustration is of one of the commemorative stamps issued by far off Tonga, to mark the 50th birthday of their Queen Salote. A rather interesting point here is the watermark, which is the ordinary "Script C A," as used by most of the other colonies. Prior to the war the stamps of Tonga—some of the values are still current—had a watermark of tortoises, for which this island is famous. Some philatelic scribes have called these watermarks turtles, but they are quite wrong in doing so.

Tonga tortoises are said to live to a tremendous age. A story was published recently that one of these tortoises, which had just died, had been alive and seen by Captain Cook during his visit to the islands towards the end of the eighteenth century.

Tonga has some attractive stamps. While little publicity has been given to them, philatelists will find many varieties among latter printings, which is not to be wondered at, for some of the plates still in use have done service for many years. Collectors of K.G.VI stamps got a shock last year, when they found in a new edition of Gibbons' catalogue that stamps which were issued as long ago as 1897 had been included, by virtue of the fact that they are still on sale in the post office. This is surely a record in these days, when some governments bring out a new set every month, and it is a reply also to those critics who claim that British Commonwealth Governments are exploiting collectors.

Mention is made in the preceding paragraph of Gibbon's catalogue. Now there is news that another K.G.VI catalogue is to be published shortly. There is plenty of room for it, for the collection of stamps which it will deal with is still increasing. It has been mentioned before that the Crown Agents have opened a branch for the sale of our Commonwealth stamps in Washington, U.S.A. There is also news that this agency is meeting with great success, which must be pleasing to all concerned, for while it is true that there were nothing like as many collectors of our Commonwealth stamps out West as at home, there is scope in the U.S.A. to swamp us in point of view of numbers if the group of stamps catch on, as they may actually be doing.

Some collectors have been surprised to notice on letters they have received stamps overprinted with the letters M.E.F., or E.A.F., or Tangier. More than one have asked the question how these came to pass the postal authorities, without surcharge. The answer is that some time ago official notice was given that even though British postage stamps were overprinted for use in overseas territory, they are valid at home also, providing they are not surcharged as well. Dealers with substantial stocks of these stamps, which were heavily bought when there was plenty of money about during the war, and few foreign stamps to buy, are taking the opportunity of using up some of their stock, as these stamps have not been selling very well lately. Probably it was always permissible for these stamps to be used, but nobody knew. Anyhow, it's good for everybody. Dealers are clearing unwanted stock and collectors will get stamps of great interest.

A collector who recently bought some stamp mounts was told that being foreign they were better than those made at home. Good mounts are important, but British are again the finest in the world.

Competitions! Open To All Readers

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

Which 1950 Cover Did You Like Best?

It is customary in the January issue of the "*M.M.*" to give readers the opportunity of comparing the covers of the past year. Now, therefore, we give them the opportunity of letting us know what they think of the covers of 1950.

As a guide to entrants in this contest we reproduce in miniature on this page the 12 covers that form its subjects. These reproductions are in black and white, and so of course give no idea of the brilliancy and colour of the originals.

Readers are asked to state, on a post-card: A, which of the 1950 covers they liked best; and B, in what order they think the covers will be placed by the combined votes of the competitors. The covers must be referred to by the names of the months in which they appeared, and it is not necessary for an entrant to place his own choice at the head of list B.

There will be the usual sections in this contest, for Home and Overseas readers respectively, and in each prizes of 21/–, 15/– and 10/6 will be awarded for the best entries in order of merit, with consolation prizes for other good efforts. Entries should be addressed "*1950 Cover Voting Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 28th February; Overseas Section, 31st May.

Railway Painting Competition

It is a very long time indeed since we gave "*M.M.*" readers an opportunity of showing what they could do in colour. This month, therefore, we have arranged a painting contest. This has a railway interest, as a locomotive is the subject.

In this competition there is no restriction in regard to the choice of a locomotive. No doubt most competitors will select a modern British Railways engine, but any reader who wishes may send a painting of a locomotive in the colours of any of the four groups that were merged into the national system in 1948.

In each of the two sections of the competition, for Home and Overseas readers respectively, there will be prizes of 21/–, 15/– and 10/6 for the best efforts in order of merit. Entries should be addressed "*Locomotive Painting Contest, Meccano Magazine, Binns Road, Liverpool 13.*" Closing dates: Home Section, 28th February; Overseas Section, 31st May.

January Photographic Contest

This month we begin our 1951 series of photographic competitions. The January contest is a general one, in which we invite readers to send in prints of any subject. There are only two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. There will be two sections, A for readers aged 16 and over, and B, for those under 16. Each competitor must state in which section his photograph is entered. There will be separate Overseas Sections, and in each section prizes of 21/–, 15/– and 10/6 will be awarded.

Address entries to "*January Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" The closing dates in this competition are 31st January in the Home Section, and 30th April in the Overseas Section.

Competition Results

HOME

AUGUST 1950 CROSSWORD PUZZLE

1st Prize: A. B. Partridge, Edinburgh. 2nd Prize: R. G. Collett, Wealdstone. 3rd Prize: D. J. Sims, London W.13. Consolation Prizes: J. A. Gamble, Breaston; P. W. Jones, Patrick, I.O.M.; D. N. Dixon, Rotherham.

AUGUST 1950 LOCOMOTIVE CONTEST

1st Prize: J. H. Ephithite, Chislehurst. 2nd Prize: P. J. Lucas, Southport. 3rd Prize: J. Bourne, Reading. Consolation Prizes: G. Coaker, Walton-on-Thames; R. W. Cambridge, Southend-on-Sea; E. Allick, Billingham.

SEPTEMBER 1950 PHOTOGRAPHIC CONTEST

1st Prize, Section A: W. R. Ogden, Swinton; Section B: A. Fearnley, Middlesbrough. 2nd Prize, Section A: J. B. Taylor, Cottingham; Section B: J. F. W. Paige, Chelsfield. 3rd Prize: Section A: J. L. Langton, Bradford; Section B: C. W. Alexander, Chichester. Special Editorial Prizes; Section A: J. R. Wooldridge, Stanmore, and G. S. Finlayson, Sheffield 8; Section B: D. G. Fifer, Peterborough, and D. Mere, Hindhead. Consolation Prizes, Section A: A. R. Casebrook, Wolverton; G. J. Heighton, Sutton-in-Ashfield; J. G. Crawford, Darlington; D. A. Stace, Birmingham 26; G. Shenen, London N.W.7; P. J. Street, Southampton; Section B: B. Lewis, Richmond; C. Smith, Pinner; T. G. Booth, Bolton; P. G. Chatham, Kendal; P. Motion, Warminster; L. Feasley, Leeds 11.

SEPTEMBER 1950 HIDDEN PROVERBS CONTEST

1st Prize: E. J. Sinton, Aberdeen. 2nd Prize: R. Norman, Wolverton. 3rd Prize: P. Merrill, Ashover. Consolation Prizes: G. H. Gray, Kearsley; J. A. Venables, Manchester 20; A. Phillips-Smith, Birmingham 27; M. H. Hope, Baldock.

SEPTEMBER 1950 RAILWAY CONTEST

1st Prize: C. E. Wrayford, Bovey Tracey. 2nd Prize: B. E. Timmins, Birmingham 24. 3rd Prize: B. J. Holden, Burgess Hill. Consolation Prize: F. Mills, Kearsley.

OVERSEAS

MARCH 1950 DOUBLETS CONTEST

1st Prize: C. Groenewald, Elliot, S. Africa. 2nd Prize: R. Field, E. London, S. Africa. 3rd Prize: C. Fraser, Grenada, B.W.I. Consolation Prizes: H. Dodd, Springs, S. Africa; G. K. Churches, Walkerville, S. Africa; C. O'Sullivan, Dublin, Eire.

MARCH 1950 PHOTOGRAPHIC CONTEST

1st Prize, Section A: R. S. Grewal, Jinja, B.E.Africa; Section B: E. March, Windhoek, S.W. Africa. 2nd Prize, Section A: H. Tapken, Constance, Switzerland; Section B: G. B. Simpson, Dunedin, N.Z. 3rd Prize, Section A: T. P. Mansergh, Auckland, N.Z.; Section B: R. C. Wilson, Auckland, N.Z. Consolation Prizes: B. Biswas, Calcutta, India; N. V. Murray, Auckland, N.Z.; H. J. Sullivan, Dublin, Eire; G. Ditchfield, Dunedin, N.Z.; H. Arnold, Dublin, Eire; Miss A. Neilson, Pleasant Point, N.Z.; I. C. Dyer, Bombay, India; C. Beavan, Southampton, Bermuda; N. J. Beattie, Mercer, N.Z.

APRIL 1950 THRILLS CONTEST

1st Prize: J. Erdos, Wellington, N.Z. 2nd Prize: A. P. Griffin, Montserrat, B.W.I. 3rd Prize: K. V. Narayanan, Johore, Malaya. Consolation Prizes: C. O'Sullivan, Dublin, Eire; T. Searson, Salisbury, S. Rhodesia.

APRIL 1950 ENGINE PARTS CONTEST

1st Prize: S. O'Neill, Dublin, Eire. 2nd Prize: L. G. Poole, Melbourne, Australia. 3rd Prize: D. Searson, Salisbury, S. Rhodesia. Consolation Prizes: G. Banks, Rome, Italy; J. McNiven, Valletta, Malta, G.C.

APRIL 1950 PHOTOGRAPHIC CONTEST

1st Prize, Section A: R. H. Aitken, Bombay, India; Section B: L. Williams, Nelson, N.Z. 2nd Prize, Section A: S. J. Birch, Vienna, Austria; Section B: R. S. Rowlands, Montreal, Canada. 3rd Prize, Section A: T. D. Wallace, Brussels, Belgium; Section B: S. D. Field, Rotterdam, Holland. Consolation Prizes: S. D. Grover, Dehradun, India; H. Watson, Shankill, Eire; B. J. Holmes, Berne, Switzerland.

MAY 1950 PHOTOGRAPHIC CONTEST

1st Prize, Section A: S. E. Airey, Krugersdorp, S. Africa; Section B: R. Rutherford, New Plymouth, N.Z. 2nd Prize, Section A: Miss N. P. Milne, Hastings, N.Z.; Section B: A. Watkins, Palmerston North, N.Z. 3rd Prize, Section A: I. C. Dyer, Bombay, India; Section B: A. Flett, Richmond, S. Africa. Consolation Prizes: D. Schoffner, Heidelberg, S. Africa; J. C. Carter, Stellenbosch, S. Africa; L. W. Humm, Geraldine, N.Z.; J. Xuereb, Valletta, Malta, G.C.; M. Bedlington, Milford, N.Z.; A. R. Imlay, Invercargill, N.Z.; J. Palmer, Wellington, N.Z.; B. Fletcher, Mullinger, Eire; T. L. Humphreys, Santa Fe, Argentina.

MAY 1950 KNIGHT'S TOUR PUZZLE

1st Prize: M. Bashir, Soroti, B.E.A. 2nd Prize: D. H. Hodgson, Sydney, Australia. 3rd Prize: S. T. Allen, Papatoetoe, N.Z. Consolation Prizes: G. Fisher, Auckland, N.Z.; P. Wright, Auckland, N.Z.; C. Beriakuma, Abonnema, Nigeria.

MAY 1950 ADVERTISEMENT CONTEST

1st Prize: G. Fielder, Barbados, B.W.I. 2nd Prize: D. G. Montieth, Hamilton, N.Z. 3rd Prize: H. W. Kensley, Goodwood, S. Africa. Consolation Prizes: P. Moss, Wellington, N.Z.; E. E. Galea, Toronto, Canada.

JUNE 1950 PHOTOGRAPHIC CONTEST

1st Prize, Section A: G. C. Leach, Durban, S. Africa; Section B: L. Myers, Wicklow, Eire. 2nd Prize, Section A: B. K. Jenks, Calgary, Canada; Section B: J. B. Johnstone, Genoa, Italy. 3rd Prize, Section A: D. Barker, Calcutta, India; Section B: M. Quinn, Sydney, Australia. Consolation Prizes: T. Melia, Bombay, India; V. Moss, Auckland, N.Z.; F. K. Riley, Rotterdam, Holland; L. B. Sinclair, Zurich, Switzerland.

JUNE 1950 LOCOMOTIVE CONTEST

1st Prize: S. H. Walters, Livingstone, N. Rhodesia. 2nd Prize: P. G. Mills, Inglewood, W. Australia. 3rd Prize: W. E. H. Brockie, Dunedin, N.Z. Consolation Prize: F. McLellan, Pinelands, S. Africa.

JULY 1950 PHOTOGRAPHIC CONTEST

1st Prize, Section A: J. Bousfield, Stutterheim; S.A.; Section B: R. E. King, Nicosia, Cyprus. 2nd Prize, Section A: P. H. Brett, Christchurch, N.Z.; Section B: A. E. Maclachlan, Johannesburg, S.A. 3rd Prize, Section A: C. J. R. Smith, Hamilton, N.Z.; Section B: N. M. Banachi, Alexandria, Egypt. Consolation Prizes: R. D. Boyle, Takapau, N.Z.; J. M. Hamilton, Gisborne, N.Z.; D. C. Matheson, Southampton Island, Canada; B. Hamilton, Gisborne, N.Z.; R. Stafford, Dublin, Eire; P. Keely, Dublin, Eire; W. R. Kilroy, Oldcastle, Eire; W. H. Brown, Baily, Eire; G. Davern, Takapuna, N.Z.; R. Lee-Emery, Ellerslie, S.E.6., N.Z.; J. Murphy, Dublin, Eire.

The Shell Tanker Fleet—(*Continued from page 3*)

would mean that their fuel consumption would be smaller. Engines of adequate power would occupy too much space, however. Moreover, in some circumstances, steam must be provided in tankers for heating the cargo to a temperature at which it can readily be pumped. No separate steam generator is required in a steam-driven vessel, and the oil fuel steam boiler has therefore been adopted as the most suitable source of power for these large tankers.

Steam is used at a working pressure of 500 lb. per sq. in. and a temperature of 750 deg. F. The turbines are designed to develop in service a total of 11,000 s.h.p. when the single propeller employed is turning at 100 r.p.m., giving a speed of 16 knots. The maximum shaft horse power is 13,000, and the astern power is 70 per cent. of this. All the turbines are of the impulse type except the medium and low power ahead, which are of the reaction type.

The principal task of the "*Velutina*," and of her sister ships, is to carry crude oil from the Middle East to the new Shell refineries at Shell Haven in the Thames estuary, and Stanlow on the bank of the Manchester Ship Canal, near Ellesmere Port, Cheshire. Her cargo capacity is 26,000 tons, and as she is capable of eight round trips a year from the Persian Gulf she will be able to bring over 200,000 tons of oil a year to Great Britain.

Laminated Safety Glass—(*Continued from page 10*)

When the vessels are full they are sealed, and their contents are subjected to a pressure of 100 lb. per sq. in. and a temperature of 120 deg. C. The temperature and pressure are maintained for a carefully controlled length of time, and are then gradually reduced to a normal level. Unloading of the vessels then begins, and when the panels are taken out they are completely transparent, and have all their component parts firmly bonded into a perfect piece of laminated safety glass.

Careful inspection searches out any defects, and after this the panels have their edges ground or polished. Finally the panels are washed, re-inspected and trade-marked.

For smaller quantities the required shape is cut out of stock rectangles of laminated glass. Cutting this is a very different matter from cutting an ordinary piece of sheet or plate, for even the simplest kind of laminated glass consists of two pieces of glass and an interlayer, and all three must be cut before the surplus can be removed; but the cutters know the work so well that the panels are dealt with very rapidly.

Each panel is placed in position on the bench, clamped to guard against accidental movement, and then cut by a tool whose movements are guided by a jig. In most cases a large number of exactly interchangeable panels are required for such uses as the windscreens or side windows of popular makes of cars, and special jigs are used to control the accuracy of cutting, and ensure that all panels will be the same.

When the panels are cut to shape, they still have rough edges, and despite the accuracy of the cutting jigs there are also slight inequalities in the sizes of the two sheets. To give a smooth finish and make the glasses uniform, the panels are next edge-ground. The process is carried out by grindstones of many special shapes and sizes, mounted on grinding machines constructed for the work. Not only must the stones be of exactly the right kind and shape, but the speed at which they run is also important. In addition, as the grindstone grit is sharply abrasive, care has to be taken that it does not scratch the flat surfaces of the panel.

The grindstones are lubricated by a constant flow of water on the grinding surface, and the glass panels are usually held in clamps or jigs which enable the grinder to control their movements and the amount of grinding given to them. For many of the smaller panels, however, the clever fingers and accurate eye of the workman are better than any jig, and panels are fed against the stones by hand.

The form of laminated glass described, consisting of two sheets only of glass and one interlayer, is that most normally used for motor car and similar windows, but the firm also produce multi-layer laminated safety glass for many purposes, including even bullet-proof glass for aircraft and similar uses. The general principle of manufacture is the same in all cases, but as it is not possible to cut thick panels to shape after completion, each glass component of the sandwich is cut as closely as possible to the finished size before assembly, and the final shaping is by grinding only. This makes the grinding a far slower and more expensive process, but the resulting safety glass, which can take tremendous blows and shocks, is essential for some purposes, and there is a considerable demand for it.

Lake Waikaremoana—(*Continued from page 16*)

in extent, nestling in a crater on its summit. The deep water is so perfectly still and clear that it makes a perfect mirror, faithfully reflecting the dome of the sky, passing clouds, and the bush which grows right down to the water's edge.

All the islands in Waikare-iti are completely clothed with forest, and the water is so clear that you can see objects quite distinctly over 50 ft. below the surface. Nor is the water of this lake ever discoloured, even during rainy weather, for no streams flow into it. It is fed only by seepage from the forest-clad islands and the low, wooded hills by which it is surrounded.

When we were once more aboard the launch and speeding back across Waikaremoana, the Star Lake as it is sometimes called because of its shape, we all agreed that we had had a most delightful day's outing.

Meteoric Progress—(*Continued from page 22*)

by remaining airborne for 12 hrs. 3 min., using a new method of flight refuelling. Next month, at the S.B.A.C. Display, the public saw a "Meteor" 4 fitted with the latest type of after-burners, and another powered by two of the new 6,000 lb. Rolls-Royce "Avons." In May 1950 a standard "Meteor" 8, flown by Squadron Leader "Jim" Cooksey, set up a new World Speed Record of 510.9 m.p.h. over a 1,000 km. Closed Circuit.

That record still stands, and so, ten years after it was designed, the "Meteor" remains one of the fastest, most formidable fighters in the world. Just how fast and formidable was shown at the last S.B.A.C. Display, when a "Meteor" 8 performed faultless high-speed aerobatics carrying two 1,000 lb. bombs, and other "Meteors" fitted with "Avon" and Armstrong-Siddeley "Sapphire" engines—the most powerful in the world—climbed almost vertically from the runway and disappeared into the clouds, their ability to reach 40,000 ft. in three minutes equalling Air Ministry climb requirements for future fighters still on the drawing board!

Only the "Meteor" could flight test such engines, and only the new Private Venture "Meteor," shown for the first time at Farnborough, could carry two tons of bombs, twenty-four 95 lb. rockets or 580 gall. of extra fuel to meet the modern need for a specialised ground attack jet fighter. By doing so, the "Meteor" has made doubly sure of its claim to a place among the greatest aeroplanes ever built.

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A few copies of the following issues are available, price 8d. each, including postage, etc., October, November and December 1939; March 1940; January 1946; July, August and November 1947; June, September, October and November 1949. The May, June, July, August, September and November 1950 issues are also available, price 11d. each.

Readers wishing to obtain copies of these issues should write immediately to the Editor, "*Meccano Magazine*," Binns Road, Liverpool 13, enclosing a Postal Order for the necessary amount.

Fireside Fun

"Just think of it. Ice cream and chocolate. Any amount—and nothing to pay."
"Where? Quick."
"Nowhere, but just think of it. Lovely!"

* * * *

Motorist: "I'm sorry I have run over your hen, but I'll replace it."
Farmer (gloomily): "What good would you be? You couldn't even cackle."

* * * *

"And the worst of it is, doctor, that I find I am losing my memory."
"Oh, don't bother about that. Just forget it."

* * * *

"Can you tell me where the railway station is?"
"Of course. Are you lost?"
"Certainly not. I'm here. It's the station that's lost."

* * * *

"Anything fresh this morning, Jimmy?"
"Oh, yes. The paint on that fence."

* * * *

"Why do they blow those old sirens here for a fire?"
"They don't blow them for a fire; they blow for the firemen. They've got the fire."

* * * *

"Yes, poor Bill was always jumping to conclusions, and he did it once too often."
"How was that?"
"He jumped out of his aeroplane, but forgot to take his parachute with him."

* * * *

BRAIN TEASERS

NOW DOWN UNDER

Six four-letter words are wanted to make up the six columns of the accompanying diagram. The clues to these, from left to right, are: 1, tramp; 2, employed; 3, sea change; 4, duty; 5, above; and 6, ointment.

1	2	3	4	5	6

If the clues have been followed correctly the first and third horizontal lines will spell the names of two famous cricketers now with the M.C.C. in Australia.

* * * *

STILL RUNNING

The last puzzle leads naturally to a cricket problem. Tingle, the star batsmen of the Muddleton Sloggers, came in at a critical stage of the innings. When he had scored seven runs his partner, who had gone in earlier, had scored twice as many. Twenty runs later, in which there were two byes, Tingle's total was still half that of the other batsman. What were their scores at that stage? B.C.

* * * *

"You're not going to eat that big pie all alone, are you?"
"No, mum. I'll have one or two of those tarts with it."

* * * *

JUST WORK IT OUT

From 6 take 9, from 9 take 10, and from 40 take 50 leaving altogether just half a dozen.

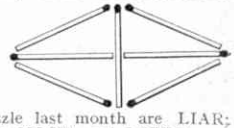
* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The motor cars of our first puzzle of last month were DAIMLER; BENTLEY; AUSTIN; FORD; PACKARD; HILLMAN; and LANCHESTER.

The words in our second puzzle were STAND; CHERISH; RUNIC; TEE; and MISS. Putting these letters in the places indicated by the numbers we find that in order they make MANCHESTER UNITED.

The accompanying illustration shows how to make eight triangles with seven matches.



The six reversible words in our final puzzle last month are LIAR; LEVER; DRAW; ROOD; MOOD; and LEPER.

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(See also pages 40 and 42)

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