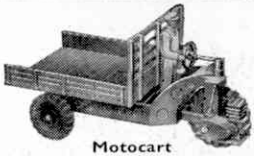
VOL. XXXV. No. 4 APRIL 1950

MECCANO MAGAZINE

THE BRIDGE

9D.

DINKY TOYS



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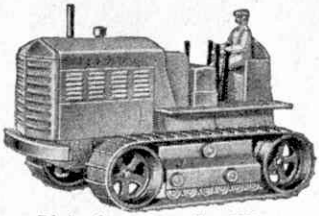

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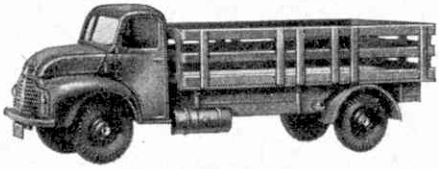

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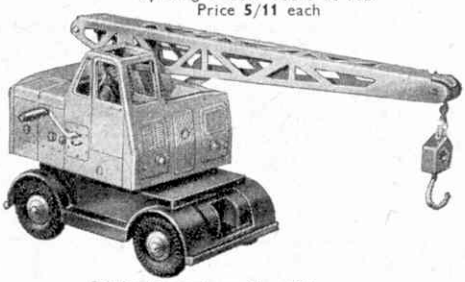

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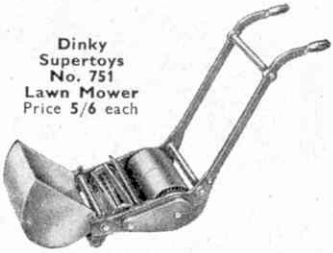

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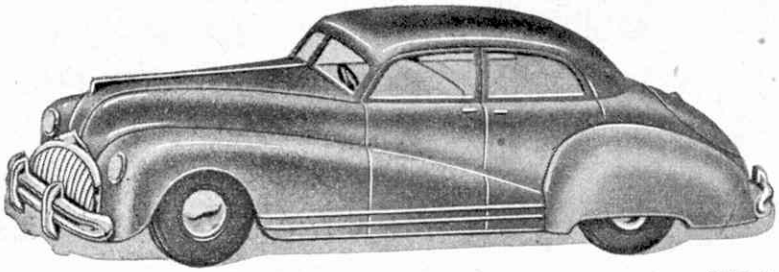

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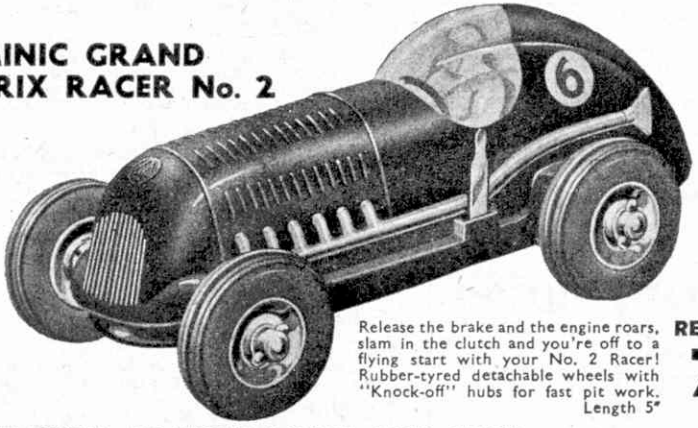

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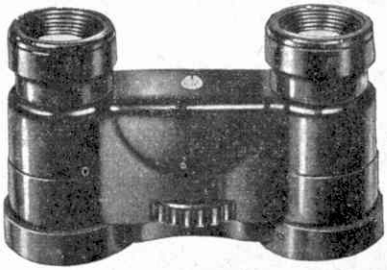

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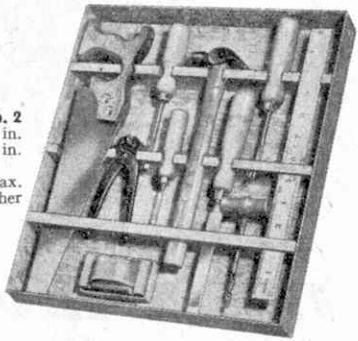

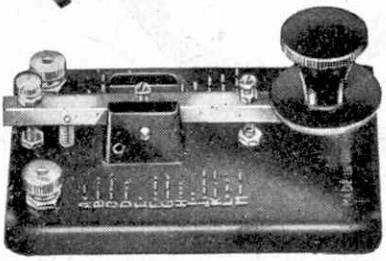

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MECCANO MAGAZINE

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With the Editor

B.E.A.'s New Air Liners

News that British European Airways will soon be operating a brand-new fleet of sixty all-British air liners has brought fresh hope to our aircraft industry. For five years this industry has been in the unenviable position of having to watch British Overseas Airways buy new fleets of American and Canadian aircraft, while our own factories have been crying out for work—the inevitable consequence of wartime policy under which Britain built only warplanes, leaving America to fulfil our transport needs.

B.E.A.'s new fleet will consist of 20 Airspeed "Ambassadors," 20–30 Vickers "Viscounts" and 14 Handley Page "Marathons." They will cost about £8 million, but should earn something like £12 million a year when they get into their stride.

Nor will their earning capacity result from a lessening of passenger comfort and conveniences. The "Ambassador," for example, will offer all the advantages of a pressurised cabin and facilities for hot meals, combined with a cruising speed of over 250 m.p.h. It should enable B.E.A. to reduce their fares substantially on short-haul routes like London to Paris.

On the Corporation's longer routes, the 40-seat propjet-powered "Viscount" will introduce completely new standards of speed and vibrationless comfort, and, cruising at 300 m.p.h., will bring Rome within four hours of Britain.

For very short routes such as their Scottish and inter-Channel Island services, B.E.A will use the 20-passenger "Marathon," the prototype of which is at present on a 35,000 mile tour to New Zealand and Australia. It is rather large for the job, but Britain has spent about £1,500,000 on its development, and B.E.A. have decided to put the national interest before their own specialised requirements, confident that the "Marathon's" four engines and high-wing arrangement will pay handsome dividends in popularity.

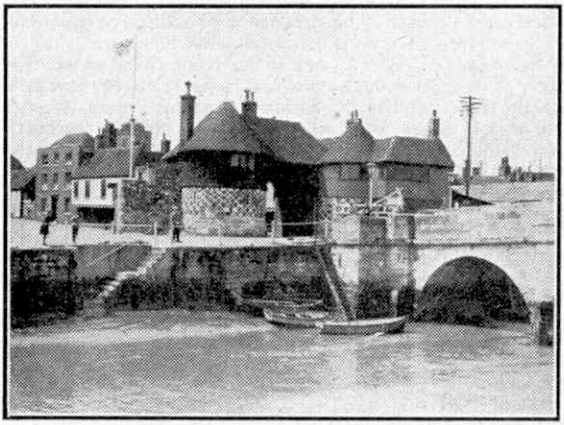
B.E.A. are to be congratulated on this demonstration of their faith in Britain's ability to produce fine air liners as well as the world's finest fighter aircraft. Remembering the achievements of the famous old British "Hannibals," "Empire" flying boats and "Rapides," they need have little fear that their new equipment will let them down.

This Month's Contents

The Cinque Ports

ANY sea-girt country suffers loss by coast erosion which can, and does, slowly but surely remove all traces of towns and ports in the vicinity, but the reverse forces of nature can equally take their toll. By the upheaval and subsidence, the denudation and encroachment of the coast-line, such as is happening on the south coast of England, ports can become only historical memories.

To every Englishman the Cinque Ports were amongst the most famous in the forming of our early history. The five great ports of their time, Dover, Sandwich, Hythe, Romney and Hastings, lying directly opposite to France, are—with one exception—no more, as ports. Like Dover, Hastings is still on the coast, but any semblance of a port is disappearing. The others now lie inland as the result of land upheavals and a receding sea.



Sandwich, now two miles inland from the sea, once took the place of Richborough.

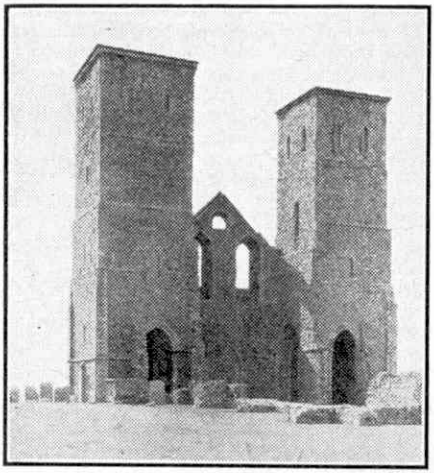
At one or other of the Cinque Ports—mostly at Sandwich—landed or embarked St. Wilfrid, St. Augustine, Hengist and Horsa, Canute, Caesar, William I, Becket, Richard I, and many other notable personages. At these ports Napoleon, and probably Hitler, cast longing eyes within the last century and a half.

The origin of the Cinque Ports may feasibly be traced back to the days of Roman rule in England. It was upon the five ports of Kent that King Alfred chiefly relied for ships in his struggle against the Danes, and while they were possibly recognised by Earl Godwin, Harold, and Edward the Confessor, primarily to repel invasions from the Continent of Europe, they may be regarded as the Anglo-Saxon successors to the Roman system of coast defence. It is said that the Goodwin Sands are the remnant of an island called Lomea which at one time comprised several thousands of acres. The island belonged to Earl Godwin and was protected by a strong wall to prevent sea encroachment. On the coming of the Normans, William placed the island in the care of the Abbey of St. Augustine at Canterbury. The Abbot failed to maintain the wall in sound condition with the result that the sea burst through, swamped the lands and eventually became the dangerous Goodwin Sands we know to-day.

There is no indication to show that they were called Cinque Ports before the sixteenth century and a good deal to verify that they were referred to as the "Five Towns" during and from the time of Henry II until that date. There is, however, evidence of considerable French influence after the Norman Conquest when French methods of organisation were introduced into the towns' laws.

In the twelfth century the Cinque Ports were given a Royal Charter. A charter of Edward I makes reference to a document granted to them by Edward the Confessor, but it was subsequent to the Battle of Hastings that the ports were formed into a jurisdiction quite separate from that of the counties of Kent and Sussex. Reculver and Deal, Winchelsea and Rye were brought in at a later date, although the present Winchelsea was never a sea-port. More than thirty other places in Sussex and Kent, and one in Essex, were added to the chief ports at different times.

Their main task in early days was to provide the Crown with such ships as were required, the Crown having possessed no permanent Navy before the reign of Henry VII. In the time of Edward I they had to provide no fewer than fifty-seven ships, fully equipped and manned, at



The old port of Regulbium now lies off shore under the sea. The Church of Reculver (its modern name) is all that remains.

their own expense. It was mainly dûe to the ships so supplied that Hubert de Burgh was able to defeat the French fleet off the South Foreland in 1217.

In consideration of these supplies, laws were made and customs duties imposed which applied to the Cinque Ports only. The Crown gave the Corporations considerable powers of self-government that make strange reading to-day. Amongst other juridicial and legislative rights were those of "sac and soc, tol and team, blodwit and fledwit, pillory and tumbril, infangentheof and outfangentheof, mundbryce, waives and strays, flotsam, jetsam, and ligan."

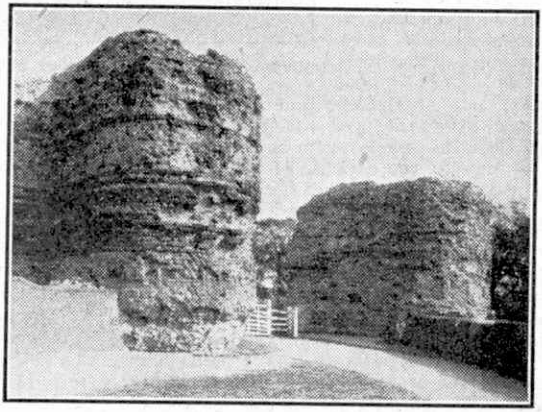
All the freemen of the Five Towns were called barons, a title then only occasionally given to London aldermen. The title gave the barons the right to carry the canopy over the king at a coronation, a function since expired. Theirs was in fact a little kingdom within a kingdom.

It is true that this nation raised itself from a small country to a mighty empire largely as a result of the determination and enterprise of the Elizabethan sailors, but England had already an inherent pride in the ability of her seamen, born largely of the men of the Cinque Ports. It was they who taught us our lesson that the first line of defence of England lies at sea. Edward III was the first king to gain control of the seas by his victory at Sluys (1340). The Cinque Ports were merged into a national defence—the Royal Navy—under the Tudor kings.

Some of them serve no longer as ports but all of them are alive to the splendid traditions of the glories of which they are the holders and trustees of to-day. Theirs was indeed the nursery of English seamanship and naval tradition. One of the strongest bonds of union that existed between the Cinque Ports was their claim to what amounted to a monopoly of the herring trade, a claim that caused considerable trouble with Yarmouth and the East Coast ports and often led to the burning of rival vessels and much bloodshed. It was in the reign of Edward III that the decline of the ports really began.

When Edward the Confessor made Sandwich, twelve miles east of Canterbury, one of the Cinque Ports, it became the most famous of all the English harbours. Under Edward IV it had ninety-five ships and fifteen hundred sailors. To-day Sandwich is no more than a decayed sea-port of Kent, standing two miles from the sea, or four if the winding of the River Stour, upon which it lies, is followed. Notwithstanding some improvements effected in 1847, the port has never recovered from the silting up of its harbour in the sixteenth century.

One-and-a-half miles further north lies Richborough, the predecessor of Sandwich, which like its successor, Sandwich, declined as the sea receded from the ancient river. It was one of the Ports of London when



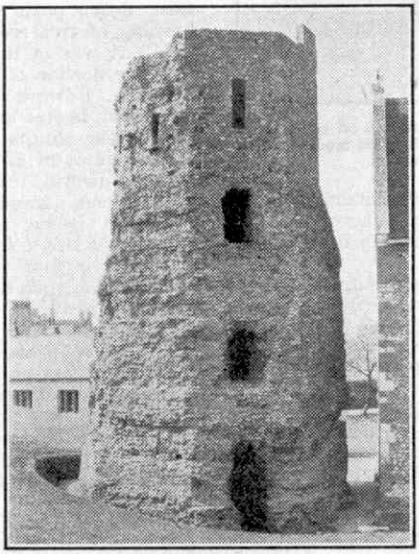
Pevensey—The landing place of William the Conqueror—now well inland.

the Wantsum was the main outlet to the sea.

It was at Richborough, called by the Romans *Rutupiae*, that in A.D. 410 they first received their instructions to evacuate Britain and return to Rome to defend their country against the Goths. It proved a sad day for the British for they had left all protection to the Romans and were ill-prepared to defend themselves against the Saxon invaders, who quickly followed. Richborough was the Romans' most important port in Britain, being the headquarters of their armies covering the East Coast and also the centre of the Roman oyster trade.

Richborough came out of its antiquity during both World Wars of 1914–18 and 1939-45. Intense military concentration converted the marshy swamps into a temporary port of considerable extent from which, later, a train-ferry service ran to France. Under peace conditions the vicissitudes of such a port have vanished and the scene to-day is a sad one of waste land with no apparent future.

Like Richborough, Deal and Sandwich have once more become famous, but for another reason. The very land upon which two of Britain's most renowned golf courses stand — Deal and Sandwich—was at one time under the sea. By siltation the land was reclaimed, but at Deal the sea is again making inroads, this time at the expense of the celebrated Royal Cinque Ports Golf Course.



Ruins of the Pharos, or lighthouse, at Dover Castle.

Reculver, nine miles west of Margate and one mile from the sea, was once the Roman port of *Regulbium* guarding the northern end of the Rutupian Channel which lay between the island of Thanet and the mainland of Kent and formed the harbour for many of the Roman galleys.

Hastings appears to have been considered the premier Cinque Port by Henry II, who granted it many privileges. Another port which came under Hastings as a Cinque Port was Pevensey, the landing place of William the Conqueror. The ancient town claims to preserve the stone on which the Conqueror stumbled on landing at Pevensey and also the stone which the Conqueror placed on Harold's grave(?). Hastings has been rebuilt three times as a result of crumbling cliffs and a silting up of the river. The old harbour-town now lies under the sea.

Romney, eight miles south-west of Hythe, ceased to be a port in the days of Edward and is now neither on the sea-shore nor on a navigable river. The old harbour of Romney was destroyed in the thirteenth century. Reclamation of the Romney Marsh, aided by the Law of Eastward Drift of the English Channel, completely altered the sea connections of Winchester and Rye. The exact position of old Winchelsea, washed away in 1287, has never been located.

The port of Hythe in early days was probably that of Lympne, the Portus Lemanis of the Romans, now some three miles inland. Hythe itself, some distance from the sea, lies on a hill. Like the harbour of Hastings it has yielded foot by foot to the Eastward Drift of shingle until water has been turned into marsh to become, later, dry land.

Rye, like Sandwich, is a decayed sea-port in Sussex, now two miles inland owing to the retirement of the sea. On a prominence overlooking the confluence of two streams is the twelfth century Ypres Tower, built in Stephen's reign by William de Ypres.

Dover, too, has its contest with nature, but the construction of a harbour capable of handling the continental service saves the port from a similar fate.

The present Lord Warden of the Cinque Ports is Mr. Winston Churchill, an office he has held since 1941.

This article is reproduced from "The P.D. Review," the Journal of Powell Duffryn Ltd., Cardiff, by courtesy of the Editor.

A Mechanical Man and his Dog

By M. Lorant

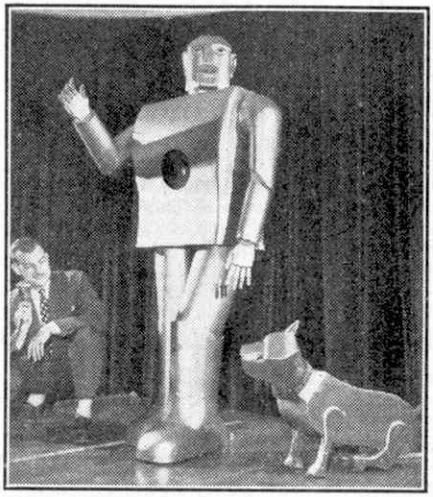
"ELECTRO," the mechanical man who first thrilled visitors to the New York World's Fair around 11 years ago, shook his aluminium head in amazement just recently at his re-found ability to smoke cigarettes, count up to ten on his fingers and even make a speech. These "human" accomplishments, demonstrated after two-weeks special schooling and tooling by the American Westinghouse engineers, won the seven-foot tall mechanical giant and his foot-high robot dog, "Sparko," their first job in 10 years.

The 260 lb. automaton, and Sparko, who begs, barks and wags his tail, have gone on the stage. They actually began their new acting careers by putting on several performances a day at the Westinghouse display at the Pittsburgh Exposition of Industrial Leadership in the U.S.A.

Electro is actually 12 years old. While he is not quite as smart as the average 12-year-old boy, he has a vocabulary of 77 words, never gets tired or hungry, and speaks only when spoken to. He is large for his age, stands 7 ft. on his aluminium feet and has an 82-in. chest expansion. His chest always is expanded because, like the rest of his body, it is made of aluminium over a steel frame. His feet are 18 in. long and 9 in. wide, and his energy comes from the nearest light socket.

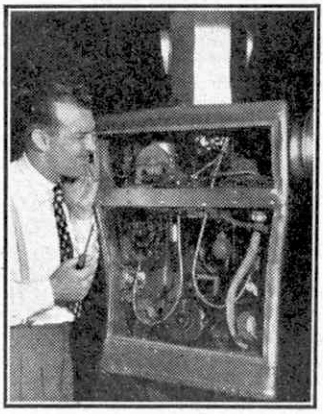
The brain of this mighty automaton consists of 82 electrical relays, which operate his nervous system of motors, levers, gears and chains to make him walk, talk, count numbers, smoke, distinguish colours and salute. His spinal column and nervous system contain hundreds of miles of wire.

No matter how capable a mechanical man may be, it still must be "bossed" by a human. Electro responds to commands spoken into a microphone,



An engineer directs the movements of Electro, the American Westinghouse mechanical man, who does 26 different tricks. Sparko, his mechanical dog, has a more limited repertoire.

each word setting up vibrations that are converted into electrical impulses. These impulses operate the relays in Electro's brain controlling his 11 motors. Talking to him is like dialling an automatic telephone, using light impulses instead of numbers to cause the relays to act. A series of words properly spaced select the movement Electro is to make. A two-word command starts each action, and a one-word commands stops it; four words return all relays to their normal positions. It makes no difference what the words are as long as the proper number of electrical impulses are produced.



"Where do I begin?" An engineer studies the imposing collection of circuits and relays that govern Electro's movements.

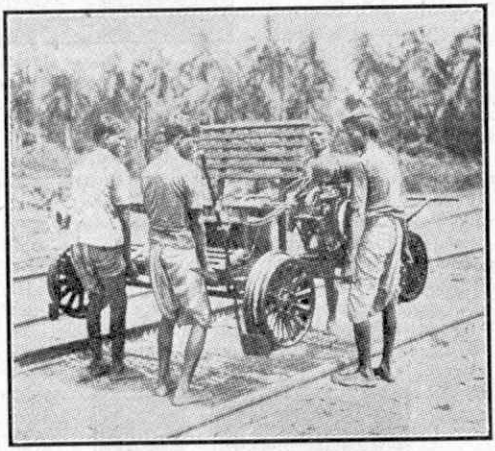
Two "electric eyes"—one with a green filter and one with a red filter—enable Electro to identify red or green lights when they are flashed before his eyes. His walking is accomplished by a motor which drives the four rubber rollers under each foot. Nine motors are required to operate the fingers, arms, head and turntables for talking; another works the bellows that enable him to smoke.

Railway Inspection Trolleys

By H. C. Towers, M.I.E.E., M.I.R.S.E., M.Inst.T.

THE railway is an organisation which has its appliances spread over thousands of miles of country. It has track, bridges, telegraph pole lines, signals, buildings and other equipment. All this has to be inspected by the maintenance staff and the transport of these workers to site is a problem.

In the United Kingdom the inspection of the permanent way is usually performed by the inspector or ganger walking along the track. Stations are fairly near each other and trains are frequent. The railway staff can get down at the nearest station to their work and walk along the line. In countries in the Commonwealth, stations are often ten to twenty miles apart and it would not be possible for staff to walk this distance. Apart from loss of time, fatigue is another consideration, particularly in tropical climates, where work has to be carried out in the blazing sun at temperatures between 90 and 115 deg. F.



Trolleymen lifting their vehicle on to an Indian railway. The trolley is motor driven.

Even in the United Kingdom, a system of gang trolleys has been devised for country districts where longer sections are experienced and trains are less frequent. These trolleys are signalled as trains, and if long occupation of a section is necessary they are removed from the line and the section is "cleared" by means of an appliance known as an occupation box, working in conjunction with the block signalling circuits.

In India inspectors concerned with permanent way, signals or bridges, are provided with light riding trolleys which can be removed from the track without undue exertion and within a short space of time. The riding platform, on which a removable seat is mounted, has open type bearings. These slip over the wheel axles. The trolley is propelled by two men who run along the track, often with bare feet. There are four men to each trolley, two pushing and two resting. A well-trained team of trolleymen can remove a trolley from the track in about 20 seconds, but an average and more leisurely time would be about 40 seconds.

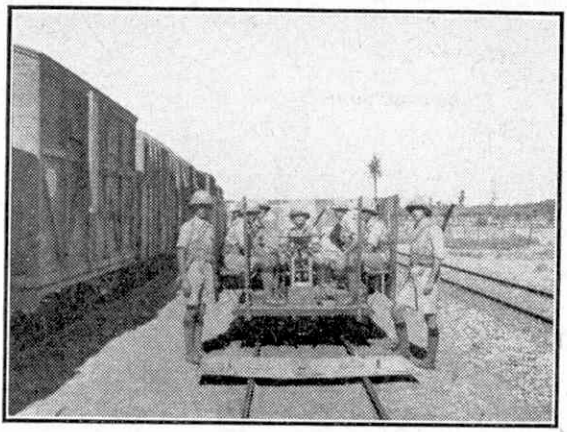
The operation of these push trolleys is covered by rules. They are not worked as trains and therefore must be capable of quick removal if a train should be sighted. On single-line sections the inspector in charge has to keep a good look-out in both directions. On the straight line he has adequate warning of train approach providing he is vigilant; but on curves and in cuttings he has to be extremely cautious. A man is sent ahead with a red flag so that he can signal the inspector if he should sight a train, and warn drivers that there is an obstruction on the line. Similar precautions are taken in the rear.

On very dangerous sections where there are heavy curves, cuttings, down grades and tunnels, the push trolleys are worked as trains. The inspector takes the tablet or token of the section in the same way as a train driver would do, and no train can enter the section until the trolley has passed through.

With the idea of increasing the efficiency of Inspectors and trolleymen in the Signal Department of the Bombay, Baroda and Central India Railway, a trolley competition has been arranged which is an event at the annual "Signal Sports" held every year.

A trolley, complete with all equipment, is placed on a short length of track laid down on the sports ground. Each Signal

Inspector has to take part, sitting on the trolley with two trolleymen while the other two stand on the track. The blowing of a whistle indicates the sighting of an approaching train and at the same time a timekeeper starts a stop-watch. Judges observe the manner in which the trolley is removed and the watch is stopped when all equipment is removed and clear. The judges award points against for bumps, evidence of confusion and so on. The Inspector of the winning team is awarded a Challenge Cup, while each trollyman receives a prize and a badge. The best timing obtained to date has been 11 seconds.



An armoured pump-handle type trolley, with the protective plating removed at one end to show how the crew are accommodated.

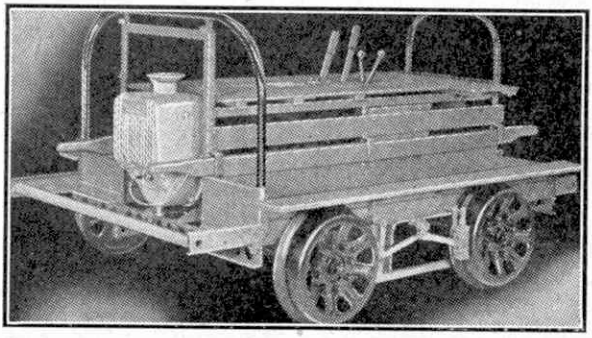
Various types of push and mechanically-propelled trolleys appeared on railways in various parts of the world towards the end of the nineteenth century. One method was to use poles in a manner similar to a punt, pushing the pole against the sleeper ends. One ingenious person even tried a sail. The track bicycle was quite a common appliance and is still in use. It is an ordinary cycle with handle bars, but it has three flanged wheels. Two wheels rest on the rail on which the cycle frame stands, and the third wheel is on the other rail. The rear wheel is rotated by pedals and chain in the usual manner.

The pump or gear trolley was another form of locomotion. This trolley had a large gear wheel meshed with a smaller one on one of the axles. The large wheel was rotated by a link motion to a pivoted bar which had a handle at each end. Two or more men could work the trolley by moving the handle up and down. This type of trolley was used on certain railways overseas during the war. These were fitted with armoured sides and were large enough to accommodate a rifle section.

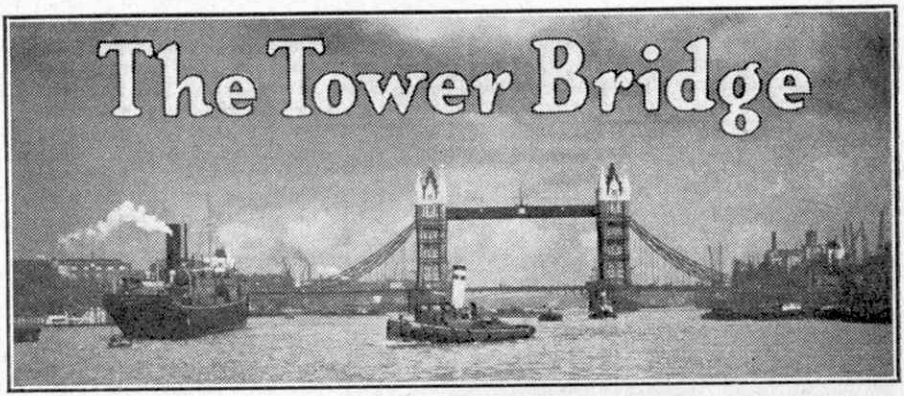
The first trolleys fitted with internal combustion engines were manufactured between 1890 and 1900. Development was more rapid in the early part of the twentieth century and larger trolleys capable of transporting gangs of men appeared.

In India, motor trolleys are worked as trains and from considerations other than speed, their weight is not of vital importance. They are equipped with electric lamps, horn, charging dynamo and so on. Their use is restricted to officers of the Engineering and Signal Departments.

In the U.S.A. motor trolleys are not worked as trains. Their operators have to be constantly on the look-out for trains and the trolleys have to be light enough to permit their being removed from the track by one man only. Signal maintainers and permanent way men use these trolleys to get about quickly. They are fitted with light screens to protect the driver from the wind, rain and snow.



A heavy-duty motor trolley of the type commonly used by maintenance crews on U.S.A. railroads.



THE bridge shown on our cover this month is one of the best known and most famous in the world. Readers can scarcely fail to recognise it as the Tower Bridge, which spans the Thames just below the Tower of London. It is an opening bridge, the two halves of its deck swinging upward to open a way when headroom is required for vessels moving up or down the river. It was in fact the first great structure of what is called the bascule type, and in many respects it is still the most remarkable. This type of bridge is a return to a practice of feudal times, for the moving deck, whether in one piece or in two, as in this example, see-saws up and down in the same way as the drawbridges built across moats to give access to the castles of Norman times.

It is now almost 56 years since the Tower Bridge was officially opened. The need for a new bridge across the Thames had been pressing for many years before this event, and various schemes had been proposed. One of these visualised a high level arch bridge to cross the river in a single span. In the end it was decided that a bridge that opened to give passage to large vessels should be constructed, and an Act was passed empowering the Corporation of London to build one. The Act laid down that there should be a central opening space with a clear width of 200 ft. and a height of 135 ft. above high water, while the level of the opening roadway was to be 29 ft. above high water. The bridge that was actually planned and constructed has a headway of 140 ft., and the closed height is 6 in. above that prescribed.

In a sense the Tower Bridge is four bridges in one. There is first the central opening span between the great stone towers. Also between the towers is a cantilever bridge at high level, with a central suspended span, providing footways that can be used by pedestrians when the bascules are raised. This is reached by stairs or lifts. Then on each side of the central span, connecting it to the banks of the river, is a suspension type of bridge. Another interesting feature that is not obvious to those who see the bridge is that it is a steel one throughout. The stonework of the handsome towers is only a shell that helps to protect the steelwork from the elements and gives a attractive and imposing appearance to the entire structure. If it vanished overnight the bridge would still continue to perform the task that it has carried out without interruption since its opening on 30th June 1894.

The cost of the bridge was about £1,000,000, a sum far less than would be required for a similar bridge to-day. Its total length, including the approaches, is half a mile. The two massive towers, measured from the level of their foundations, have a height of 293 ft., only 72 ft. less than that of St. Paul's Cathedral, and 14,000 tons of steel, 31,000,000 bricks, 70,000 cu. yds. of concrete and 235,000 cu. ft. of granite and Portland stone went into the construction of the bridge.

The piers on which the towers stand are much more complicated than those of ordinary bridges, for in addition to carrying these loads they house the machinery that raises and lowers the two leaves of the roadway. Their foundations are deep down in the London clay, which is impervious to water, and in preparing them open caissons were used. These were strong boxes of wrought iron that had neither top nor bottom, but had sharp lower edges so that they could penetrate the ground easily. Caissons to cover the

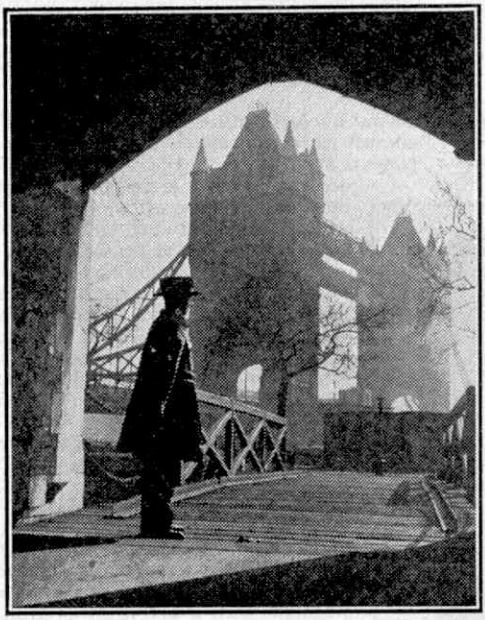
whole of each pier would have taken up too much of the waterway, and instead 12 caissons were used for each of these.

The lower portion of each caisson, described as the permanent part, was erected on timber just above low watermark, and when complete it was lifted slightly by four powerful screws attached to lowering rods. The timber supports were then removed and the caisson was lowered to the bed of the river, previously levelled by divers. Its height was raised by building up until the top of the upper section came above high-water, and divers excavated first the gravel of the river bed and then the clay beneath it. As they dug, the caisson sank, until eventually its cutting edge reached a depth of 5 ft. to 10 ft. below the bed of the river, and it was extended as required to keep its top above water. It was then safe to pump out the water within the caisson.

Digging was continued until the caisson had reached a depth of 20 ft., where its further progress downward was arrested by means of the rods from which it was hung. Excavation in the clay continued to a further depth of 7 ft., however, and was taken outward from the caisson on three of the four sides to link up with similar excavations from adjoining caissons. The whole of the space thus dug out was then filled with concrete, to provide a broad and deep foundation.

The erection of the brickwork and masonry of the piers was begun in the caisson and carried to 4 ft. above high water. The steelwork of the towers was then built up. Each consists of four octagonal columns, connected by horizontal girders and diagonal bracings. At a height of 60 ft. above the piers are the girders that carry the first landing. The second is 28 ft. higher and at the same distance above is the third, leading to the high level footways of the bridge. Each column stands on a massive granite slab, to which it is firmly fixed by means of giant bolts.

The most interesting feature of the Tower Bridge of course is the opening span. The movements up and down of the two leaves, or bascules, are fascinating in the extreme. Each is 162 ft. 3 in. in length and 50 ft. in width, and has a weight of 1,200 tons. They turn on horizontal steel pivots 21 in. in diameter, and are balanced by the fitting on the shorter or landward arm of counterpoises consisting of 290 tons of lead and 60 tons of iron, enclosed in ballast boxes. The raising gear therefore has only to overcome the inertia of the leaves and wind pressure on their surfaces.



An impressive view of The Tower Bridge from the Tower of London. The steelwork of the bridge was faced with masonry so that it would harmonise with the Tower.

The mechanism that raises and lowers the leaves is simple. To each is fixed a quadrant with teeth on its outer rim, and these mesh with teeth on two fixed pinions. Turning the pinions therefore rotates the quadrant and with it the leaf. Each leaf carries two quadrants, fitted to the ends of its outside girders, and there are two pinions to each quadrant, four in all, each of which alone is capable of operating and controlling the entire lift. Hydraulic machinery provides the power. Pumping engines on the Surrey side of the river supply water at a pressure of about 850 lb. per sq. in., but this pressure is not applied directly. Instead it reaches the turning machinery by way of a hydraulic accumulator.

A tall ship passing up or down the river hangs out a black ball not less than 2 ft. in diameter during daylight, and displays two red lights 6 ft. apart at a minimum height of 20 ft. above the hull (*Continued on page 190*)

New Method of Aircraft Construction

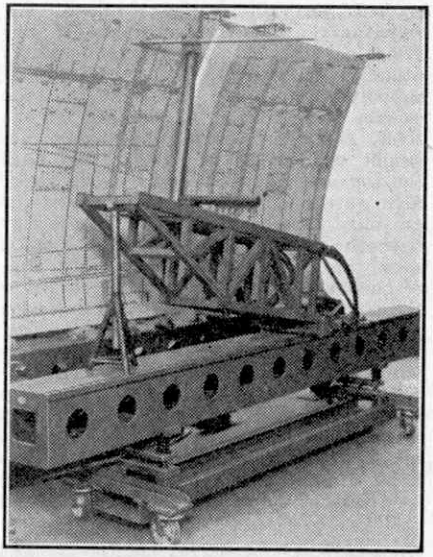
By John W. R. Taylor

A REVOLUTIONARY new method of aircraft construction invented by The Fairey Aviation Company promises to abolish the hand-made prototype aircraft as we know it to-day. Instead, future Fairey prototypes will be in effect first production machines, built on mass-production jigs and completely accurate in every detail.

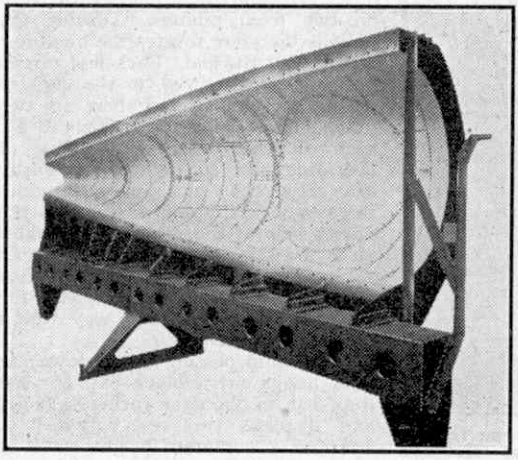
The need for a more efficient method of construction has been apparent for a long time. The first all-metal aircraft, such as the "Battle," "Blenheim" and "Spitfire," were designed and put into production when the aircraft industry was expanding rapidly to meet the growing threat of war with Germany. Aircraft were required urgently in large numbers and nobody had time to work out new ways of building them.

As in the days of the "Camels" and S.E.5s of the First World War, a prototype was first designed and built by expert workers in the company's experimental shop. Later, when an order for the type was received, another group of designers had the unhappy task of trying to devise jigs and tools on which production machines could be built fairly quickly, by less-skilled workers.

It was often a hopeless task, and sometimes faults in the jigs were discovered only when aircraft were already being built on them. As a result, it was by no means uncommon for the first 10 or 20 aircraft to be all different in detail. Components such as cowling panels and access doors were seldom interchangeable between one aircraft and another, which presented Service ground-crews with a lot of headaches.



Machine for lofting on curved surface, showing the tower at low angle with jack and scriber in position. The illustrations to this article are reproduced by courtesy of The Fairey Aviation Co. Ltd.



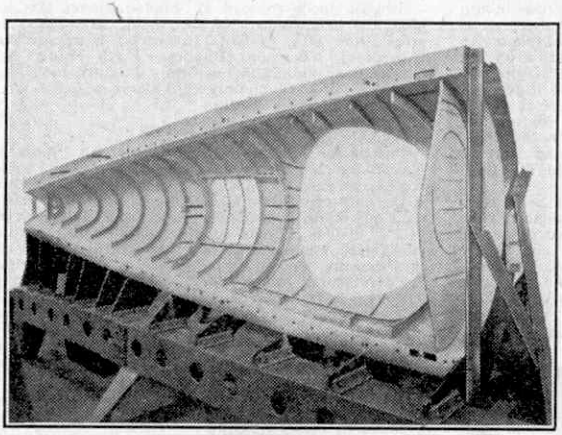
A complete jig for building an aircraft fuselage panel.

Furthermore, hand-made prototype aircraft, built without proper jigs, were often not accurate in shape. For example, a certain prototype fighter was discovered on completion to have a slight twist in one of its wing spars, so that it could not be flown at its full designed speed until a new wing had been built for it. That sort of thing can waste an awful lot of development time and money.

In an effort to remedy this state of affairs, Faireys set to work after the war to perfect a process that would combine accuracy of construction with a saving in development time. It was tried out on a limited scale for production of their "Spearfish" torpedo-bomber, but

the first aircraft built completely by the process is the new Fairey "17" anti-submarine aircraft illustrated on page 166.

The principle of the scheme is that the outside skin of the aeroplane is accurately shaped in "envelope" jigs before any of the inside structure is fitted. This is the exact reverse of usual practice, where the skin is attached after the inside structure of ribs, spars, formers and stringers has been built.



Completed fuselage panel in the jig.

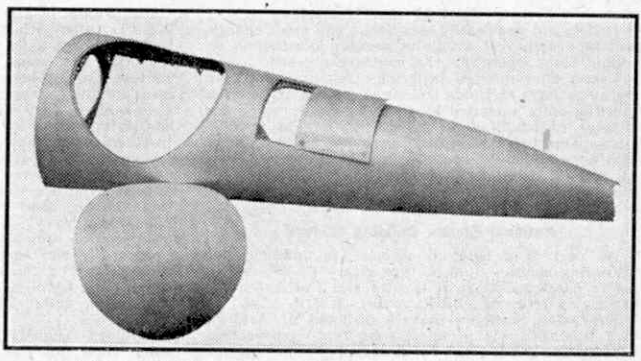
The way in which the Fairey method saves development time is obvious. The first thing to be settled for any new type of aircraft is the outside shape, and it is at this stage that Faireys can start making their jigs. Furthermore, the outside shape of an aircraft is seldom altered very much when it has passed its prototype trials and is put into production, although its internal structure and equipment may be extensively changed. Consequently prototype jigs will be quite suitable for building production aircraft, so eliminating the usual time lag.

As can be seen in the illustrations on these pages, the new-type Fairey jigs are simple, neat structures, very different from many of the old-type structural pick-up jigs. They are all built on standardised square-section bases, on which are first erected formers, shaped to represent a contour which is a pre-determined distance outside the skin of the aircraft. As they are marked out at the same time as the "lines" of the aircraft itself are drawn, they can be made extremely accurate.

On these formers is fixed a skin, the inside face of which is the outside shape of the aircraft. This skin is sprayed with light-coloured paint, so that the particular part of the aircraft being built can be marked out on it full-size, by means of a special "marking out table" which is lined up in front of the jig. All rivet holes are accurately positioned, checked, and then opened up to holes of suitable size for drilling and countersinking, riveting and milling.

When a component is built by the new process, its outside skin is first of all attached to the jig, ensuring a perfectly accurate contour, and the ribs and frames are assembled as they become available. They cannot be riveted in the wrong place, as all rivet holes are located in the jig skin. This results in an extremely smooth skin, with no trace of "quilting"—a factor of major importance for high-speed aircraft.

Faireys have already announced that they will use this method of jigging for all their future aircraft types. Other companies will almost certainly follow their example, for although these new jigs offer unprecedented standards of accuracy and efficiency, they are no more costly to build than older types.



The completed fuselage panel after removal from the jig.

Railway Notes

By R. A. H. Weight

National News

Further adjustments to the boundaries of the British Railway Regions come into force this month in order to bring all lines within a particular area as far as possible under one control. Most notable of the latest changes perhaps is the administration by the London Midland, instead if the Eastern Region, of the former Great Central main line from Rickmansworth, or Ashendon Junction, Bucks., to Heath in North Derbyshire. The Western Region controls the lines from Marylebone to Northolt Junction, also those (Metropolitan Joint) between Neasden and Harrow, thus linking with a section under London Transport administration.

The former Midland main lines from Selly Oak, Birmingham, to Bath and Bristol, including the famous Lickey Incline, pass to the control of the Western Region. Part of the Somerset and Dorset line will also now be administered by the Western Region, together with all former S.R. lines west of Exeter. The S.R. takes over various former G.W.R. routes in Dorset, Wiltshire and Hampshire.

It does not necessarily mean that any great change will be evident yet awhile as regards locomotives or rolling stock operating the routes concerned.

Latest developments in quicker relaying of tracks by mechanical methods include successful trials with hoisting units, operated by compressed air, which are capable of handling 60 ft. sections of old or new track. Diesel-electric cranes for similar purposes have also been employed successfully. A large proportion of renewal work is now done with pre-fabricated sections made ready before conveyance to the site where relaying operations are in hand.

National Engine Building Scheme

As part of a national scheme for building and allocating engines, L.M.R. type class "4" 2-6-0s are under construction at Doncaster and Darlington for service on former L.N.E.R. routes. L.M.R. class "4" 2-6-4Ts for Southern use are in hand at Ashford and Eastleigh. It is understood that construction of new standard type 4-6-0 Mixed Traffic engines and 2-6-2 tanks will be put in hand at Swindon Works later.

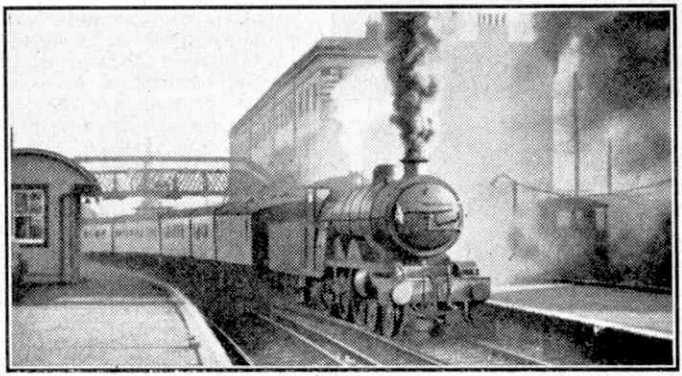
Scottish Locomotive Notes

In the Scottish Region, the last of the "A1" 4-6-2 built at Doncaster, Nos. 60159-62, are allocated to Haymarket Shed, 64 B. Several Peppercorn "A2s" have lately been moved from the Great Northern Section to this depot, as has "A2/1" No. 60507 "*Highland Chieftain*". All the "A2/2" "*Cock o' the North*" rebuilds, with longer wheelbase, have been transferred to York or Peterborough.

Scottish sheds are now all numbered from 60A to 68D, the headquarters of each being as follows, in order from 60A to 68A: Inverness, Kittybrewster (Aberdeen), Thornton (Dundee), Perth South, St. Margarets (Edinburgh), Eastfield (Glasgow), Polmadie (Glasgow), Caledonian, Corkerhill (Glasgow, G.&.S.W.), Kingmoor (Carlisle North).

Southern Tidings

One of the illustrations to last month's "*Railway Notes*" depicted a rebuilt L.B.S.C. 0-6-2 radial tank engine carrying two domes. So far as is known this is the only engine of "E5x" class to have been fitted with one of the spare boilers intended mainly for the "C2X" 0-6-0s. Some of the latter tender engine class were equipped at one time with a top-feed arrangement for water, which was housed within the extra dome. Its use was discontinued some years ago, but it is easier to leave the unusual external appendage in position than to provide additional boiler plates which would otherwise be necessary.



Up boat train leaving Newhaven Harbour in charge of S.R. No. 2426 "St. Albans Head," one of the Brighton "Atlantics" long associated with these duties. Photograph by D. A. West.

No. 11001, the first diesel-mechanical shunting engine, has been completed at Ashford, where some parts have been made for Nos. 10200-1, diesel-electric main line locomotives.

The last Stirling "F1" 4-4-0, No. 1231, withdrawn over a year ago, was still intact quite recently. The "Leader" class double-ended 0-6-6-0s, intended to be numbered 36002-4, had at the time of writing been stored in a partially completed state, pending further trials or decision in the case of the initial one, No. 36001.

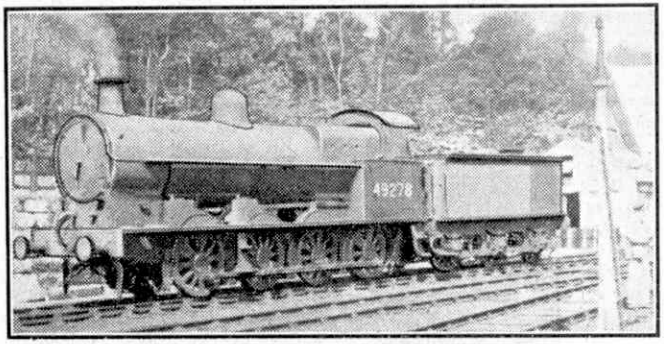
No. 31599 is the first of the Wainwright "J" 0-6-4Ts to be withdrawn; parts of this engine, which had become partially worn out, are being used to keep the other four going, as they are not standard with another class. These engines, with a wheel arrangement unique on the Southern, and never much used, were built in 1913 with Belpaire firebox, superheater and piston valves, for London outer suburban services, In recent years thay have been stationed at Ashford.

Construction continues of the last batch of "West Countries" numbered 34101 upwards. Nos. 34036-41 of that type are stationed at Brighton, the first of these having been converted back into coal firing. "Merchant Navy" 4-6-2s stationed at Dover have been seen on ordinary trains to Victoria and Charing Cross. A reader reports a very fast run by one of these "Pacifics" shedded at Nine Elms, when the 79¼ miles from Southampton to Waterloo were covered in about 78 min. with the "*Bournemouth Belle*."

Bo-Peep Tunnel, St. Leonards-on-Sea, which is about three quarters of a mile in length and nearly 100 years old, has had to be closed since the end of November last, probably for six months or so, while

extensive repair work is carried out. This includes the fitting of a steel and concrete lining in the sections where the brickwork has deteriorated most. Concrete inverts have been placed beneath the tracks to check subsidence and prevent a recurrence of flooding.

All steam and electric trains between Hastings and the London or Brighton directions normally pass through the tunnel on two tracks. At present they



L.M.R. No. 49278, one of the numerous and well known "Super D" 0-8-0 engines of the former L.N.W.R. Photograph by D. W. Backhouse.

are all diverted or terminated short of the obstruction. Special bus services provide the necessary link-up for passengers and luggage. It is expected that full services and normal running will be in operation again before the summer holiday season.

"King Arthur" 4–6–0, No. 30788 "*Sir Urre of the Mount*", lately painted dark green, is fitted with large chimney of the spark-arrester type as on No. 30784 "*Sir Nerovens.*"

Eastern and North Eastern Regions

There are intended to be 400 "B1" 4–6–0s, in addition to the original 10 "Antelopes" of Thompson design completed during the recent war, so that the numbers will ultimately run from 61000 to 61409. Any "B16" North Eastern 3-cyl. 4–6–0 mixed traffic engines numbered between 61400–9, that are still in service when the new ones appear, will be renumbered at the end of the "B16" batch, after No. 61469.

New "J72" 0–6–0Ts have been completed at Darlington carrying numbers 69001–20, being stationed in the N.E. region except Nos. 69012–15, at Doncaster. We understand that they have the numbers painted on the tank sides below the British Railways emblem. Further "K1" 2–6–0s lately completed by the North British Locomotive Co. were Nos. 62057–65, allocated to Darlington, followed by Nos. 62066–7 to March.

New "L.1" 2–6–4Ts at Neasden include Nos. 67767–76. Some of the Neasden "A5" G.C. 4–6–2Ts have moved to the Nottingham area, some "Sandringhams" to Woodford Halse, more "K3" 2–6–0s to Gorton, "N7" 0–6–2Ts to Hatfield and Boston, and "B12/3" G.E. 4–6–0s to Grantham. A good many former N.E.R. 0–6–0s and "Q5" 0–8–0s have recently been withdrawn, as have more "D9" G.C. 4–4–0s, together with two G.N. "Atlantics," Nos. 2839 and 62885. Only three of the latter are now in use.

"B17" No. 61663 "*Everton*" worked the Royal Train without stop from King's Lynn to King's Cross on the occasion of Their Majesties' return from Sandringham in February last. No. 61671 "*Royal Sovereign*," the usual engine for such jobs had then been in shops for some time.

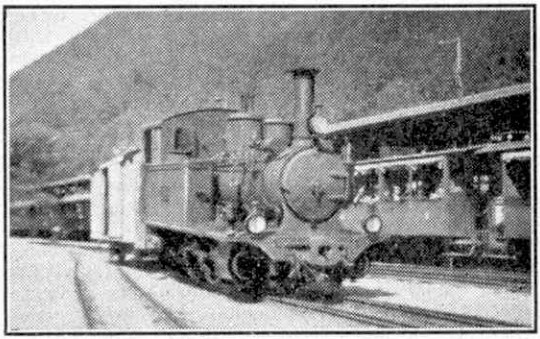
W.R. Locomotive News

Engines built at Swindon during January last included 4–6–0 mixed traffic No. 7907 "*Hart Hall*," No. 7908 "*Henshall Hall*," No. 7909 "*Heveningham Hall*," No. 7910, "*Hown Hall*," and 0–6–0 pannier tanks Nos. 7440–1. In addition, Nos. 8408–14 and 8455 were built by contract. These are of the large 94xx class, of which 200 are on order. The first 10, Nos. 9400–9, are superheated, but this will not apply to the remainder. It is understood that the "Halls" on order go up to No. 7929, and that 30 more light 0–6–0Ts will follow after completion of No. 1619. The latter have cylinders 16½ in. diameter with 24 in. stroke as on other light tank engine classes. The boiler pressure is 165 lb. per sq. in. Nickel steel plates have been included in the boiler construction in order to save weight.

No. 3588 was the last of the 35xx series of 2–4–0–Ts when withdrawn in December last. Lots of them were familiar for many years in the London district, including a number fitted with condensing apparatus for working freight trains over the London Transport (Metropolitan) lines. They also ran well with suburban passenger trains. In their early days they had little in the way of cab shelter for the enginemen. The 2–4–0T is now extinct on the W.R. Only nine "Bulldog" 4–4–0s, with the outside frames once so characteristic of G.W.R. practice, appeared to be left on the active list in February last.

The Bernese Oberland Railway

The Bernese Oberland Railway is a narrow gauge line that traverses some of the grandest mountain scenery of Central Switzerland and serves famous resorts such as Lucerne and Interlaken. Electric traction is now employed, but steam tank engines were familiar thereon for many years, passenger trains being worked by those of the 2–6–0 type to a considerable extent. For shunting, however, veteran tanks of the 0–6–0 wheel arrangement were still in use at any rate until quite recently. The one we illustrate this month was built in 1890 and photographed when shunting at Interlaken.



A veteran Swiss engine of 1890 shunting at Interlaken on the Bernese Oberland Railway. This is a narrow gauge system. Photograph by Peter Salisbury.

Newts and Lizards

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

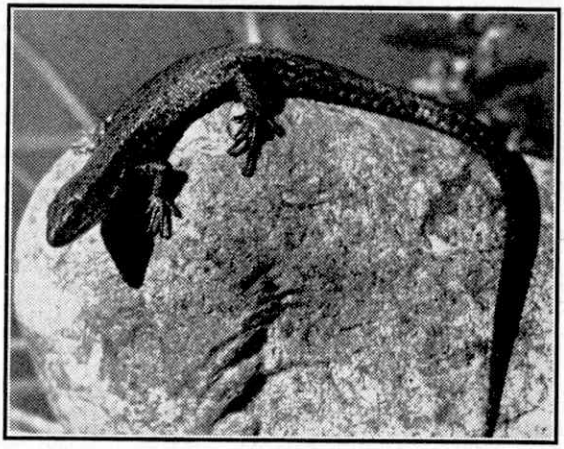
THERE is little doubt that lizards are descended from scaly amphibians, but there is no real relationship between the lizards of modern times and the newts, in spite of their superficial resemblance. Lizards are able to swim, and newts can live quite happily without water. Though one might regard the newt as a type of water lizard if one judged only by appearance, its life history shows quite plainly that it is an amphibian and not a reptile. Whereas the newly born lizard grows without any startling changes into an adult, the young newts begin life as tadpole-like creatures, breathing with external gills that gradually disappear as the lungs develop.

The crested newt is the largest and most beautiful of the British species. Fully grown it is nearly six inches long, with a skin covered with small raised lumps. During the mating season the male develops a high serrated crest that starts between the eyes and stretches to the tip of the tail. Often this crest is as wide as the body, so that a male newt in courting dress is a far larger creature than at other times of the year. The normal colouring changes too. A blue and white band with a shimmer of mother-of-pearl appears on each side of the tail, the top of the head becomes marbled in black and white, and the orange-coloured belly is much more vivid than usual.

The female does not develop a crest, but instead a yellowish band often appears along her back, and her yellow underside becomes conspicuously brighter. Both sexes have at this time black rings on their yellow toes. When breeding is over, the crest gradually disappears, the blue streak vanishes and the orange colour fades to yellow.

The skin of the common newt is quite smooth. The male always has a slight crest, which develops strongly during the mating season, but although it becomes wavy in outline it is not serrated. The toes of its hind feet become fringed, and both sexes change the usual brownish colour of their upper sides for a more olive shade, a vivid orange streak appears on their bellies and the black or dark brown spots become bolder than usual. These spots sometimes form a continuous band along the sides of head, body and tail.

The palmated newt is only three inches long, and never has any spots on its throat. The tip of the tail is blunt, with a curious thin thread-like attachment of varying length. The male has webbed hind feet during the breeding season and a ridge appears along its back which only on the tail reaches proportions big enough to be termed a crest.



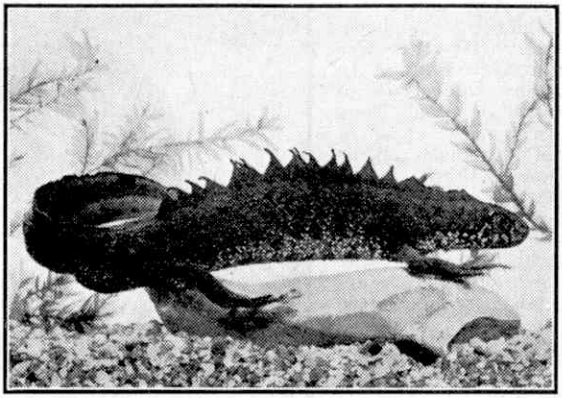
The common lizard. One distinction between lizards and newts is that the former can replace their tails only once; newts can do this many times. Photograph by W. J. C. Murray.

Although newts spend many months on dry land, it is obvious from their behaviour that they feel more at home in the water. Whereas they are clumsy, slow and awkward on land, they become graceful, quick and agile when at the approach of spring they return to their own element. They will breed in all kinds of ponds or pools, both clean and dirty, and old sandpits that have filled with water are favourite places.

The courtship of the newt is an interesting example of elaborate display. The males follow the female of their choice everywhere, circling round her and showing off their crests and colours. Frequently a pair will stop with noses almost touching,

and then the male bends his tail right round and touches the side of the female with its tip.

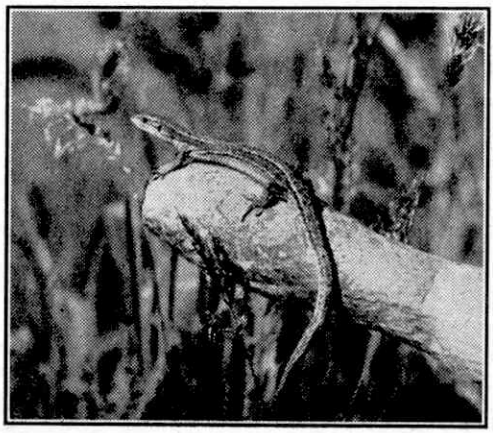
The eggs are enclosed in sticky envelopes, and as they are laid the female attaches each one to the leaf of a submerged plant, folding the leaf skilfully with her feet so that the egg is hidden and protected. This usually hatches in about a fortnight and in three months the metamorphosis from tadpole to newt is complete. The adult newts begin to leave the water soon after the breeding season, but the young newts stay in their native pond until autumn, when they too retire into hibernation. As lung-breathing creatures they must perforce find winter quarters in some spot where they are not threatened with drowning when the cold weather numbs their limbs and makes them inactive. For this reason they usually crawl away quite a distance from the water and hide under stones or roots high up on the banks.



A male crested newt. Photograph by L. Day, A.R.P.S.

Newts possess in a very high degree the ability to regenerate lost or mutilated parts of the body. New legs will grow with bones and joints complete, not once only, but any number of times. The tail will be replaced by a new one quite as good as the old, and even an injured or lost eye will completely recover, although the new eye is usually rather smaller than the original one. In this respect newts, being of a lower order than lizards, have the advantage, for although a lizard too can replace a lost tail once, the new one is inferior to the old one, and if it is lost again the creature will remain tailless for the rest of its days. The popular belief that a lizard can drop its tail at will is untrue, although very little force is necessary. Holding a lizard by the tail while it struggles to escape is enough to cause a break.

The bones of the tail are specially adapted for easy breaking. Each has a breaking point right in the centre of the bone so that the tail does not snap off at the joint between two bones, but across the bone itself, and the new tail grows from the remaining half of the last vertebra. If the tail is merely fractured and not actually lost, a new one will nevertheless start to grow from the point of the fracture, and it is not so very unusual to find a lizard with as many as three tails. The new appendage has no bones inside it and the surface scaling is different from the original one. This scaling corresponds to that of the earliest ancestors of each type of lizard; it is in fact a reversion to the primitive type, and regenerated tails have often been of assistance in cases of difficult classification.



The common lizard is found generally all over England and Scotland. Photograph by W. J. C. Murray.

The common lizard is found generally all over England and Scotland and is the only reptile that occurs also in Ireland. It is a quick and lively little creature, about six inches long, light brown in colour with darker spots on the sides and a

dark line down the middle of the back. Baby lizards are blackish-brown in colour with rows of yellowish spots. There are usually eight or ten in a family and the female lizard leaves them at once to fend for themselves. They soon start to forage and grow remarkably quickly. Plant lice are a favourite food in the early days.

The sand lizard has a curiously local distribution in this country. It is found on the hills round the Frensham ponds in Surrey, on the sandy heaths of Dorset and Hampshire and on the dunes near Southport in Lancashire, but not elsewhere. It is not as agile as the common lizard, which it exceeds in size. The female is brown, with eye-spots on the back and sides, and the male has a greenish tinge, particularly in the spring. The mating season is usually in late April or May, and not until about a month later does the female lay her eggs.

This important event nearly always takes place at night, and the five to eight eggs are buried in the sand or between small pebbles, or sometimes in the nest of the black ant in a warm and sunny spot. They take five weeks or more to hatch, but some time before the young lizards appear, the old ones have already retired into a kind of semi-hibernation under stones or in crevices in a wall.

A female smooth or common newt among the water weeds. Photograph by L. Day, A.R.P.S.

Both these lizards are insect eaters, and will catch anything that comes in their way, from a butterfly to an aphis. They have no objection to spiders either, and will eat worms and slugs and even their own offspring. They have keen sight, but appear to be rather deaf. Their level of intelligence is high and they are capable of learning by experience. Hence the behaviour of the adults is far more wary than that of the young lizards. On the whole they are rather indifferent to man, and unless frightened will come quite close. The common lizard often appears in gardens and likes to sit and bask in the sunshine on terraces and warm stone walls. A more charming and useful creature it would be hard to find, and the wise gardener will give it every encouragement.

Why Do Stars Twinkle?

UNTIL recently twinkling was thought to be due to the passage of light from the stars through the uneasy upper atmosphere, changes in the density and optical properties of which cause it to vary in its absorbing power and so bring about rapid changes in the intensity of the light reaching ground level. This explanation did not satisfy Professor H. Hartridge, an authority on vision, who thought he would make some experiments for himself. He began by making an artificial star on earth in the form of an electric lamp placed at a distance of several miles. The light from this earthly star did not pass through the upper atmosphere, and yet as he looked at it he found its light twinkling. Then he turned a telescope on to it, with the result that the light became quite steady. This agrees with observations on stars. The very brightest of these do not twinkle, and the twinkling of many others stops when they are looked at through a telescope.

This, with other experiments in his laboratory, led Professor Hartridge to a new idea, that the twinkling is due to our eyes. These are never still; we cannot look with perfect steadiness at an object for any length of time. The eyes rest on any one point for only about a tenth of a second and then move slightly to some other point near by. The result is that light from an object looked at falls on different rod-shaped cells, the elements at the back of the eye that enable us to see. Some of the rod cells are more sensitive than others, so that the source of light appears to vary in intensity. Here then is the explanation of the twinkling of the light from a distant object, whether it is the electric lamp in the experiments already referred to or the stars in trials that we can all make.

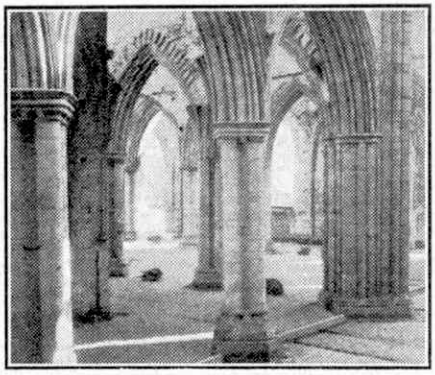
Those who think the twinkling is due to the upper atmosphere have not given up the idea, however. It has been pointed out that on some days, when seeing is what is described as "bad," the twinkling of stars is more pronounced than on nights when conditions are good. Probably both causes play a part in causing twinkling.

Photography

Camera Work in April

By John J. Curtis, A.R.P.S.

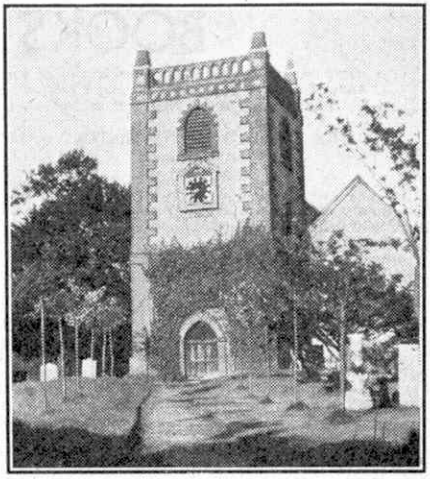
THE subject selected for this month is Architecture. Maybe that will strike some as being a very "specialised" subject, but although a knowledge of building construction may be an advantage yet one does not have to be an architect to



Harmony in Arches, Tintern Abbey. Photograph by John J. Curtis, A.R.P.S.

appreciate the beauty that is so evident in our glorious cathedrals, abbeys and ancient ruins.

This branch of the hobby is not difficult; it certainly demands a little more thought and time but it is worth while. Those who are living near to a cathedral should get permission from the Dean and then contact one of the Vergers, who can give you good advice as to the best time of day for taking any particular section or objects. Remember that lighting is the most important factor. April light is "soft" and hard contrasts are avoided; that beautiful aisle is enhanced if some of the work is picked out by light streaming through one of the side windows, so also is that piece of statuary on an ancient tomb. Spend some time going round the building and noting any special section or object and make a note when the lighting is best.



Shoreham (Kent) Parish Church. Photograph by F. G. Reynolds, Sidcup.

You should have a rigid tripod, for many effects can only be successfully obtained by time exposures. Fairly early in the morning there are fewer people about, but be patient, make quite certain that every detail is in sharp focus. It is not possible to give advice on exposure as conditions vary so much. Use an exposure meter or calculator and so make sure of good results.

Do not be satisfied with interiors only, walk round the building and pick out the best viewpoint for an outside photograph.

The fine interior of Winchmore Church, in the Cotswolds. Photograph by John J. Curtis, A.R.P.S.

BOOKS TO READ

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

"THE SEA AND ITS MYSTERIES"

By JOHN S. COLMAN
(Bell. 12/6 net)

The sea has many more mysteries than is usually imagined, and anyone who once dips into this splendid book will read on, surprised and fascinated by the author's story.

After a brief account of the stages in man's exploration of the sea, the author deals with its shape, telling his readers about its extent and its greatest depths. He then explains its three divisions, the continental Shelf, the Slope that leads down to a depth of between 1,500 and 2,000 fathoms, where the floor becomes more level again across the Abyss, as the third and deepest part of the ocean is called. The saltiness of sea water and its temperature are next considered, and many readers will be astonished to learn of the five main types of water in it, the lowest consisting of cold water from Antarctic snows, and of the currents in its depths. Remarkable stories too are told of giant waves and tides, with explanations of their origin and movement.

Then we come to fascinating sections dealing with the life of the sea, beginning with the plant and animal plankton, the tiny organisms that abound in it. On these the life of the seas ultimately depends, for they provide food for larger sea creatures, some of which of course are themselves the prey of larger and more voracious living things. The author's account of the fantastic fish living in the depths of the sea provides more surprises for us, and coral reefs next claim attention. Then we pass on through the story of the living creatures that flourish between tidemarks to a general account of fish and whales and their migrations. Here we read on the one hand of the amazing life history of the eel, which travels thousands of miles to its breeding ground off the Bermudas, and on the other of the marked thornback ray that was caught several times in two years in exactly the same spot off Plymouth. Finally we learn something of the way in which the naturalist at sea works, and are taken for an imaginary voyage from Liverpool to Cape Town, to meet with yet more marvels.

The author has been able to draw from his own experience in many sections of his story, and much of this has not hitherto been recorded in books. Many diagrams help to illustrate his descriptions, and in addition there is a coloured frontispiece, showing living coral on the great barrier reef of Australia, with 16 other full page plates and a chart.

"MORE OF MY BEST RAILWAY PHOTOGRAPHS"

No. 15. By M. W. EARLEY
(Ian Allan 2/–)

This is the second booklet in the Ian Allan series reproducing a selection of railway photographs by M. W. Earley, who has long been well known for his photographs of G.W.R. subjects, some of which have appeared in the "*M.M.*" Variety is the keynote of the present selection, for the author presents what he calls a medley of pictures covering several railways during the period from about 1922 to 1949. These form a fascinating pictorial record that is much more satisfying to the enthusiast than a mere jumble of train shots.

Each subject is adequately described and photographic experts will take keen interest in the details given regarding the camera employed, the exposures used and the lighting conditions under which the pictures were obtained.

Copies can be obtained from bookstalls or bookshops, or from the publishers at 33, Knollys Road, Streatham, London S.W.16, price 2/2½ post free.

"DEVON BELLE"

By ALAN ANDERSON
(Brockhampton Press. 3/6)

"*Devon Belle*" is listed as "Famous Train Journeys No. 2," the first number of the series, "*Flying Scotsman*" by the same author, being dealt with in the "*M.M.*" for August, 1949. The present book gives an excellent impression of the journey from Waterloo to the West Country on the all-Pullman "*Devon Belle*," in the course of which the train and its engines, the permanent way, tunnels, signalling and timetables are all discussed.

The book is an ideal companion for the traveller who makes the journey on the actual train, the running of which can be followed on a route map in sections, with a mileage scale alongside, inside the covers. For illustrations there are pleasing sketches by the author, with a front cover in colour showing the train itself.

"THE OBSERVER'S BOOK OF BRITISH GEOLOGY"

By I. O. EVANS, F.R.G.S.
(Warne. 5/– net)

This survey of British geology in pocket form is intended for the general reader who would like to know something about the science, particularly as far as it applies to his own country. At first glance rocks and fossils may not appear very exciting, but they have their own stories, and they take on a new aspect when we begin to understand what they can tell us. Mr. Evans has set out to help his readers to discover this by showing them how to recognise the rocks that build up the country, to learn something of their composition and to understand the often remarkable formations they have taken up. In doing this he covers in tabloid form a very wide range, and those who travel about the countryside, among our mountains or along the seashore with his book at hand will gradually learn to realise the importance and interest of knowing something of the part of the earth on which we live.

To help the reader there are 170 reproductions of photographs and line drawings, with a geological map of Great Britain and 12 coloured plates of rock scenes and specimens.

"THE LIGHT RAILWAYS OF EIRE"

By R. W. KIDNER
(The Oakwood Press. 2/–)

This interesting little book forms No. 6 of the series of Light Railway Handbooks by the same author. In addition to details of the numerous quaint light railways of Eire, space has been found for particulars of the Isle of Man Railway system and the now defunct railways of the Channel Islands.

In each case the routes covered, dates of opening and subsequent events are briefly noted, while particulars are given of the locomotives and rolling stock working on the various systems. Thumbnail sketches illustrate many of the engines, and in addition there are some interesting half-tone reproductions.

"BRITISH ELECTRIC TRAINS"

By H. W. A. LINECAR
(Ian Allan. 5/–)

The first edition of this book was reviewed in some detail in the June 1949 "*M.M.*" In the present edition details have been amplified somewhat and brought up to date, so that there is much to interest the electric railway enthusiast as well as the reader to whom the book appeals for reference purposes.

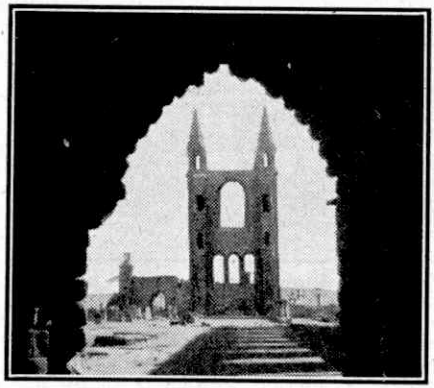
The illustrations include route maps and half-tone reproductions that in most instances give good impressions of the trains and vehicles described.

From Our Readers

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

A FAMOUS CATHEDRAL

The accompanying photograph shows the nave of what was once one of Britain's finest buildings, the Cathedral of St. Andrews. At one time it was the second largest Cathedral in Europe, and in this respect its magnificence was only outclassed by that of St. Peter's at Rome. Though now almost a total ruin, those parts which still stand serve to illustrate how large the building must have been.



The ruins of St. Andrew's Cathedral, at one time the second largest in Europe. Photograph by T. Hunter, Edinburgh.

The Cathedral was founded in the 12th century, but was not completed until 1318. In 1559 it was stripped of its images and ornaments by the reformers, and later it fell into ruins. Its Archbishop was the head of the Scottish Church until 1688. Like many old buildings, it has its ghost stories. The most famous of these concerns the "Beautiful White Lady of the Haunted Tower." In the illustration the tower haunted by the White Lady can just be seen through the third lower right window.

T. Hunter (Edinburgh).

THE GORGE OF THE AAR

The River Aar, in Switzerland, has an adventurous career for the first few miles of its course. It flows from the Grimsel Lake, 6,400 ft. up near the top of the famous Grimsel Pass leading into the Rhone Valley. The lake has been enlarged by means of two great dams, one of which is the largest in Europe and is 370 ft. high. Its waters supply two big power stations, one at Handegg and the other at Innertkirchen, which generate 120,000 and 130,000 h.p. respectively.

Only a few miles below the great dams, the river flows over the Handegg waterfall, which is 150 ft. high and is famous for the rainbow that can be seen around midday in its spray. Soon afterwards the Aar comes to the strange place shown in the accompanying illustration. There it flows through a gorge that in the course of centuries it has cut through the Kirchet hill. With towering cliffs on each side, its waters milky white with tiny particles of stone worn from the rocks by the glaciers high up in the mountains where they rose, the river pours through the gorge for a mile and a quarter. Nowadays one can walk right through by means of a wooden gallery which clings to the face of the cliffs just above the torrent. In places the gorge is so narrow that it is only just possible to squeeze through, and the cliffs almost shut out the light.

The upper end of the gorge is near the village of Innertkirchen, and from the other end a tram runs to the town of Meiringen.

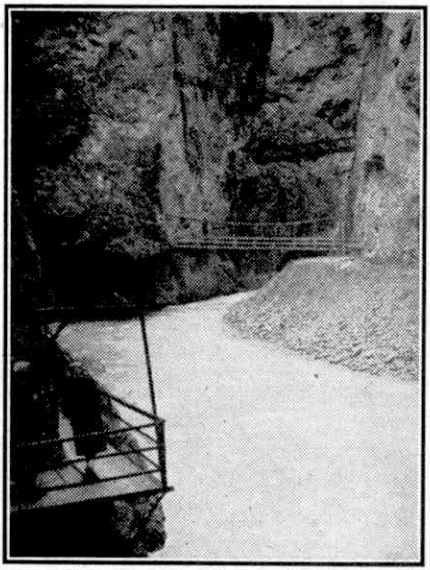
E. C. Ive (Caversham, Reading).

SEEING A MERMAN

The story in the December 1949 "*M.M.*" of the oiling of ships at Aden reminds me of an incident that occurred when my ship called there for fuel many years ago. With others of the ship's company I was looking over the side when one cried suddenly "What on earth's that funny looking thing? It's got a real head." Sure enough there was a dugong, a strange creature that has been described as a "merman" because of its appearance. It was about 3 ft. long, brownish in colour, with long hair and skinny hand-like flappers.

We had a perfect view of the dugong's head as it released its hold of the bow plating and pushed itself away, turning over in the process and looking upward with a dead, "all is lost" expression in its big dark eyes. Its queer nostrils and mouth were plainly visible as it drifted slowly away under water.

R. L. Mauger (Sutton).



Looking down the gorge of the Aar, Switzerland, showing the footwalk on the face of the cliffs. Photograph by E. C. Ive, Caversham, Reading.

The Giant's Causeway Tramway

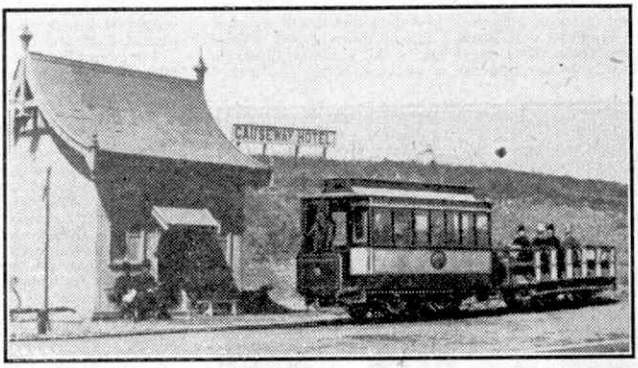
By C. L. Fry

THE closing last year of the Giant's Causeway Tramway removed from the active list the first electric system in the British Isles and the first hydro-electric rail system in the world. This is situated in Co. Antrim, connecting Portrush with Bushmills and the Giant's Causeway. The gauge is 3 ft. and the length some eight miles.

The line to Bushmills began working traffic in January 1883, but apparently there were a lot of electrical troubles and steam tramway type locomotives often ran the entire journey. The system was opened officially on the 28th of September 1883 by Lord Spencer, the then Lord Lieutenant of Ireland.

The hydro-electric station was at Walkmills within a mile of Bushmills, the waterfall on the River Bush driving the source of power. There was an auxiliary steam power station of 25 h.p. installed at Portrush. The extension to the Causeway, two miles long, was opened in 1887, and passed over a three-span bridge known as the Victoria Jubilee Bridge, as it was built in the Golden Jubilee year.

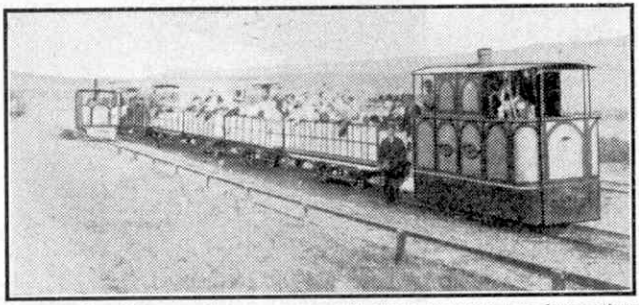
The line runs on reserved track, that is on a separate location alongside the road, with the exception of about a half-mile in Portrush where it is in the street. The track for the last two miles to the Causeway is on a separate right of way of its own. The summit of the line is 193 ft. above sea level at Colooney Head, shortly after passing Dunluce Castle, where there is magnificent scenery. Some gradients are as steep as 1 in 30 and curves are sharp.



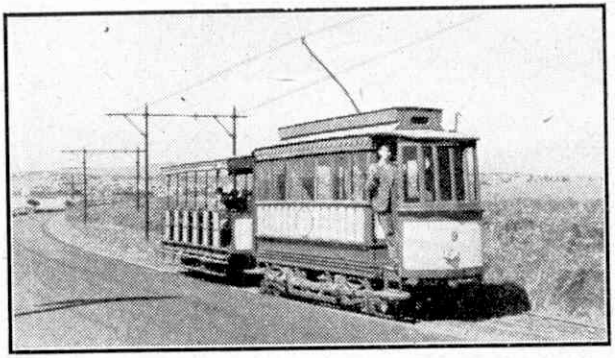
Causeway Hotel terminus, showing an original motor car, No. 9. On the left is one end of the side conductor rail.

Current was first taken from a side conductor rail carried at a height of 17 in. from the ground and 22 in. from the inside running rail. This is shown in the two photographs on this page. As the side conductor rail could not be used in the street section the steam tramway locomotives were used for this. In fact steam locomotives, of which there were eventually four, worked all the heavy traffic up to 1915. The system was converted to overhead wire in 1899, and it then became possible for the electric cars to run through the streets of Portrush. At the same time current supply was changed from 250 to 550 volts.

There was at one time a branch from Portrush to the Harbour, the line following



Heavy traffic at the opening ceremony, with steam tramway type locomotives in use. What looks like a fence in the foreground is the side conductor rail for electric cars.



Car No. 9 as converted for the overhead wire system, and still in working order. The photographs on this page are by E. M. Patterson.

the route of the former Belfast and Northern Counties Railway to the Harbour, in the form of a mixed gauge line. This, however, was taken up in 1893.

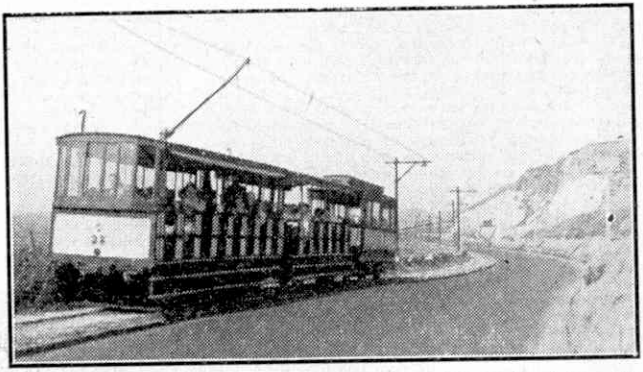
The steam tram locomotives had vertical boilers. Nos. 1 and 2 were obtained in 1883. The underframe of the former was converted to a ballast wagon in 1910, but the latter had been scrapped in 1899. Nos. 3 and 4 were large engines, painted green and lined, and they survived until about 1930. In the early days the locomotives had been painted similarly to the trailers, in cream and brick red.

There were, latterly, six electric motor vehicles. One only, No. 9, is an original car and this is shown in the first illustration in its early state. Four of them are "toast-racks" with roofs and blinds that could be pulled down at the sides. They could seat 27 passengers. All but one had glazed ends. The last motor car, No. 24, was purchased from Dunfermline in August 1937. Its gauge was altered from 3 ft. 6 in. to 3 ft. for the Causeway line and the car was also changed from double deck to single deck. This car had vestibuled ends and longitudinal seats for 24 passengers.

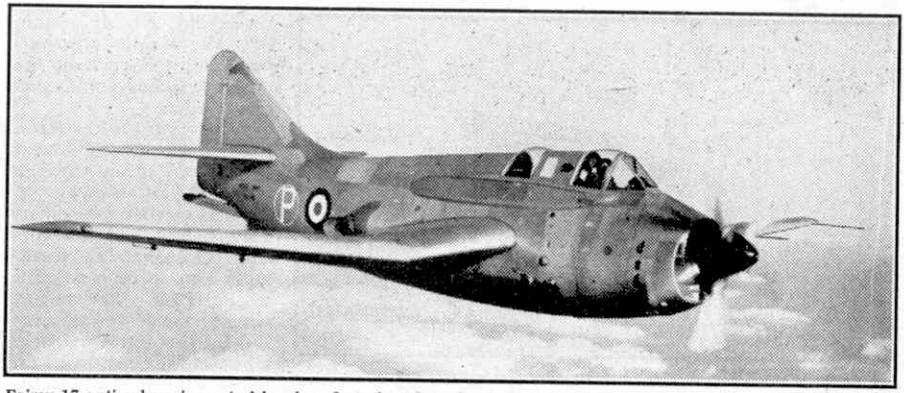
Of the twelve trailers, eight were "toast-racks" with roofs and pull-down blinds on the sides, and three were enclosed cars with open platforms, seating 20 inside and 2 or 4 outside. There is one original trailer car, No. 4, seating 24. All vehicles are four-wheelers, and each of the motor coaches could pull two trailers.

With regard to the fares, there was a curiosity that to book a journey through from the Causeway to Portrush cost considerably more than booking from Causeway to Bushmills and from Bushmills to Portrush. The recent actual single fare was 1/6 for the entire journey, whereas Portrush to Bushmills was 9d. and Bushmills to the Causeway was 4d. It will therefore be seen that one saved 5d. by booking twice. The colour of the cars was brick red and cream.

It is to be regretted that this pioneer line is scheduled for the scrap heap. It is to be hoped at least that one of the original cars will be preserved. At the time of the promotion of the line it was regarded as a bold scheme to use electricity for traction purposes, the more so because its generation was to depend on a waterfall on the River Bush. The persistence of the prime mover of the scheme, William Traill, who was chiefly responsible for its construction and equipment, and who afterwards was Engineer and Managing Director until his death in 1933, caused the venture to be referred to at the time as *"Traill's Folly."* But he carried the scheme through, aided by the interest of Dr., afterwards Sir William, Siemens, who became a director of the company.



Car No. 23 hauling one "toast rack" trailer and one of the enclosed type with end platforms.



Fairey 17 anti-submarine patrol-bomber, first aircraft to fly powered by a coupled "propjet" engine. Photograph by courtesy of The Fairey Aviation Co. Ltd.

Air News

By John W. R. Taylor

New British Anti-Submarine Aircraft

German U-boats very nearly brought Britain to her knees in both world wars, and even in this age of atom bombs the submarine remains one of the most potentially dangerous weapons in the world. Britain's two new anti-submarine aircraft, the Fairey "17" and the Blackburn YA.5, recently taken off the secret list, promise therefore to be among the most important components of our future air power. Few details of them may yet be given, but they are known to incorporate every possible device for hunting and "killing" the submarine from the air.

The Fairey "17," illustrated above, has an Armstrong-Siddeley "Double Mamba" propjet engine, which consists basically of two "Mambas" mounted side-by-side and each driving one unit of a contra-prop. One half of the engine can be shut off in flight to improve endurance, and the "17" thus combines the aerodynamic advantages of a single-engine installation with the performance of a "twin." Another obvious virtue is the pilot's superb field of view over the short sloping nose.

The prototype Blackburn YA.5, which was designed to the same specification as the Fairey "17," is fitted with a Rolls-Royce "Griffon" piston-engine at present, but has been planned to take a "Double Mamba" eventually. Photographs show a large radar scanner mounted under its deep fuselage aft of the bomb-bay.

"Freighter" Cross-Channel Car Ferry

The Ministry of Civil Aviation have granted permission for Silver City Airways to operate the Lympne-Le Touquet cross-Channel car ferry service for a further two years, and the company expect to carry at least 6,000 vehicles to and from France in their Bristol "Freighters" this year, compared with 2,700 in 1949.

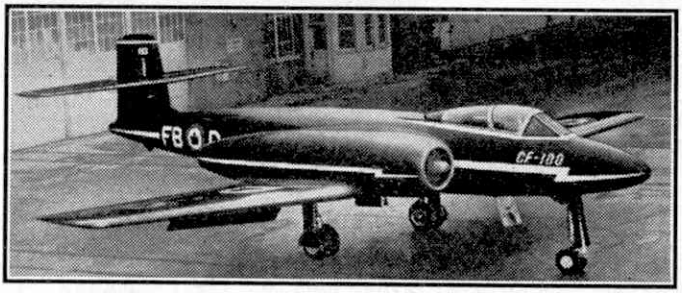
The car ferry service began experimentally in 1948 with a single "Freighter," and has proved one of the outstanding successes of post-war civil aviation. During the peak period of 1949 the "Freighter" fleet was increased to four, and services, which began at three daily, rapidly increased to 12, and then to 18. This year, bookings have already been received for many months ahead, and as many as 24 services a day will be operated during peak periods.

One interesting recent operation carried out by car-ferry "Freighter" was the transport across the Channel of a Rolls-Royce car taking part in the Monte Carlo Rally. It was the first occasion on which a Rally competitor had made this part of the journey by air.

World's Most Powerful Jet Fighter

The new Avro Canada CF-100, illustrated below, is the first jet fighter designed and built in Canada; it is also the most powerful fighter in the world. The prototype is fitted with two Rolls-Royce "Avon" engines mounted in nacelles above its wings, but future CF-100s will have two of Avro Canada's own tremendously powerful "Orenda" jets.

The CF-100 is a two-seat, long-range, all-weather fighter, and thus fills a vital gap in Commonwealth air defence plans. It flew for the first time on 19th January last at Malton, Ontario, piloted by Squadron Leader W. A. Waterton, Chief Test Pilot of the British Gloster Aircraft Company, who was loaned to Avro Canada for the job. No details of performance or armament may yet be given, but its wing span of 52 ft. makes it about the same size as a "Mosquito," and it is reputed to weigh 16 tons.



The Avro Canada CF-100, the most powerful jet fighter in the world. Photograph by courtesy of A. V. Roe Canada Ltd.

"Super Ace" Foils Bandits

From the dark interior of Lower Perak comes news of how a British-built Chrislea "Super Ace" light 'plane is helping a plantation owner to outwit hostile Malayan Communists.

Mr. Rolf Grut of Ulu Bernam Estate bought the "Super Ace" originally to save travelling time between his home and the business centres of Malaya. The Estate is 40 miles up river from the nearest main road, and before a traveller can reach his car he has to spend from three to four hours on the Bernam River. If his destination is Kuala Lumpur there is a further journey of 140 miles by road. In his four-seat "Super-Ace," Mr. Grut can fly the 57 miles from his air strip to Kuala Lumpur landing ground in 33 min.

Once a month the Estate's cash requirements of up to $200,000 are collected from Kuala Lumpur. This is done by "Super Ace" because, says Mr. Grut, "if this cash should be drawn from Teluk Anson and transported by river to our Estate, the Malayan Communists, who are unfortunately still active, might find it worthwhile to ambush us en route. As the terrorists have not yet taken to the air, we find that our present method of flying the cash in the 'Super Ace' is by far the safest."

"Hermes" IV air liners on the assembly line at Handley Page's Radlett aerodrome. These machines are for B.O.A.C. service. Photograph by courtesy of Handley Page Ltd.

Isotopes by Air

A new and more economical technique has been developed for transporting radio-active isotopes by air from Britain to South Africa. The isotopes are enclosed in small metal containers and carried in the wing tips of "Skymaster" aircraft, eliminating the need for the heavy lead casings previously necessary to protect crews and freight against radiation.

Radio-cobalt was first placed in a wing-tip container on a "Skymaster" for 24 hrs., and 20 X-ray plates were distributed in the pilot's cabin, passenger cabin and freight holds. Exhaustive tests showed that gamma-rays from the cobalt would not affect human beings or freight carried anywhere in the fuselage.

"Able Mabels" for Reservists

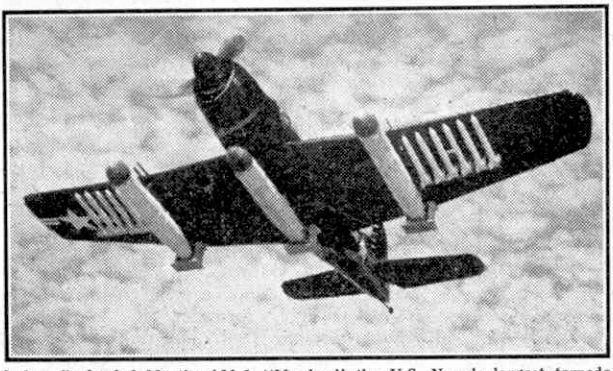
A total of 82 Martin "Maulers," the U.S. Navy's largest torpedo-dive bombers, are being turned over to units of the Naval Air Reserve to give reservists experience in flying the most modern and powerful military aircraft.

In service with the U.S. Fleet, the "Maulers" gained the nickname of "*Able Mabel*" because of their load-carrying ability. One took off with a load of three 2,200 lb. torpedoes and twelve 250 lb. bombs, as well as its normal guns and large fuel load—a record for any single-engined aeroplane. Its all-up weight was greater than that of the average twin-engined air liner.

Record Load Flown by "Freighter"

The heaviest single "lift" ever made by an aircraft in Australia has been achieved by a Bristol "Freighter" of Australian National Airways. The cargo consisted of a Greyhound Road Grader weighing 9,264 lb. and measuring 21 ft. in length, 7 ft. 3 in. in width and 6 ft. in height. The grader was freighted in one piece, despite the fact that it was two inches wider than the normal floor width of the "Freighter's" hold. A special top flooring 13 in. high was built, so that advantage could be taken of the maximum breadth of the hold.

Using special ramps, the grader was driven into the hold under its own power at Melbourne, and was unloaded at Flinders Island on to a 5-ton semi-trailer. Within 24 hrs. of leaving the Melbourne factory it was in use on Flinders Island, nearly 200 miles away.



A heavily-loaded Martin AM-1 "Mauler," the U.S. Navy's largest torpedo dive bomber. Photograph by courtesy of The Glenn L. Martin Co. Ltd.

Standard Cockpit Control Knobs

To simplify the work of the pilot all new aircraft types designed for the Royal Air Force will have cockpit knobs of standardised shapes and sizes.

For example, all flap control knobs will be spheres with small cylindrical projections each side. The supercharger control will be a $\frac{3}{4}$ in. cube; the mixture control a disc with small pyramids on the rim. Emergency controls will have diagonal yellow and black stripes for quick identification.

The effect of this decision will not be seen for some years, when aircraft now in the development stage reach the squadrons, but it will then enable pilots to transfer from one type of 'plane to another with fewer worries. It should also improve safety, as the pilot will know instinctively which knob is which.

Workers of Sydney Harbour Bridge

By Angus Brammall

(Illustrations from photographs by Jack Band)

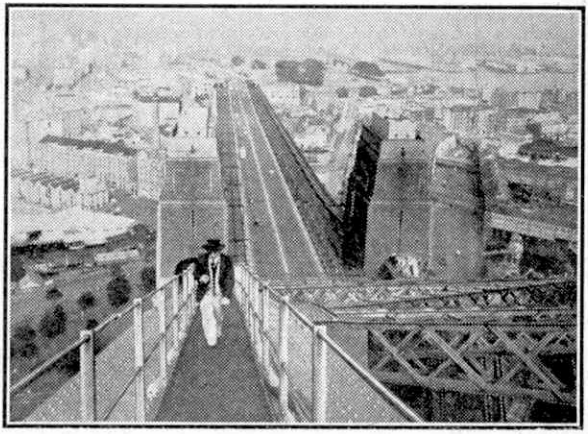
THE maintenance workers on the £A9,000,000 arch bridge spanning Sydney Harbour, Australia, describe themselves as "bridge-biassed." They say they will stay with it until they are too old to work any more. All Australians are proud of the bridge, which carries a far greater load than any other arch span in the world, and has become almost as symbolic as the kangaroo. None are prouder than the bridge workers, and quite a number of these were born in Britain.

They tell you that although the 1,650-ft. arch is 25 in. shorter than the world's longest arch span, New York's Kill van Kull bridge, it carries a 12,000 lb. per ft. live load compared with Kill van Kull's 7,000 lb. They remind you that the Sydney bridge has two more traffic lines, two more rail tracks and one more footway than Kill van Kull.

They quote figures, explain that the bridge is a heavy one because it does a heavy job. From its opening to traffic in March 1932 to 30th June 1949 it carried 178,846,000 road passengers, 314,028,000 rail passengers, 227,344,000 tram passengers and 67,886,000 bus passengers. Nearly 100,500,000 road vehicles and 2,000,000 electric crossed the bridge in that period.

The supervising engineer, Mr. Frank R. Litchfield, says that it is 11 bridges in one. As well as the great arch span there are five smaller truss bridges at each end, closing the gap between concrete abutments and pylons and completing the magnificent sweep of the approaches. With a gradient of one foot in 40, the truss bridges are 167 to 238 ft. long and rest on their own individual bearings.

The millions who travel to work over the bridge, and visitors who gaze up at the sweep of the immense parabolic arch, seldom give a thought to the men working hundreds of feet above their heads or on the gantries slung under the bridge's humming traffic highways. The bridge gives a living to 100 men, whose work ensures its continued life. Steel's deadly enemies, rust and corrosion, must be fought the year round with perpetual vigilance. At least 30 painters are endlessly wielding their brushes over and under the great arch. It takes five years and one month to paint the bridge, and when they have finished they start all over again. In each painting cycle the bridge swallows 1,716 gallons of red lead and 7,541 gallons of warship grey.



C. J. Phelps, Sydney Harbour Bridge foreman, climbs the 1,800 ft. catwalk of the top chord of the bridge on an inspection tour.

The 51,300 tons of steel in the bridge is not a dead mass. The workers say that with its expandable joints it is a moving, almost a living thing; and the huge bearings supporting the bridge at each pylon allow for expansion, which may lengthen the span by 14 in. and raise the height by 7 in.

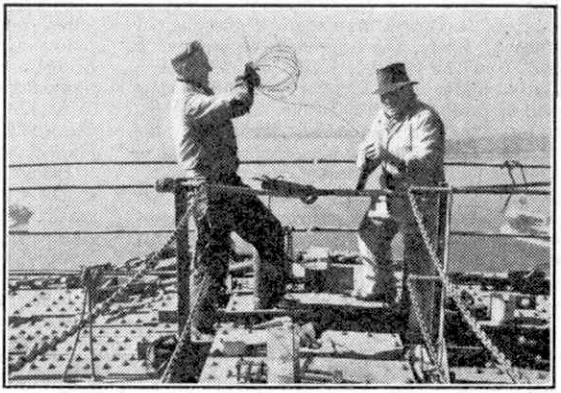
Many bridge employees are returned soldiers of one or both world wars. Others did essential wartime jobs in dockyards or engineering shops. All serve the bridge as faithfully as they served their country.

The bridge foreman is 48-year-old Joseph Phelps. Joe is one of the five sons of a London master butcher. All but Joe were choristers in St. Paul's Cathedral. Joe could not sing, and he did not like

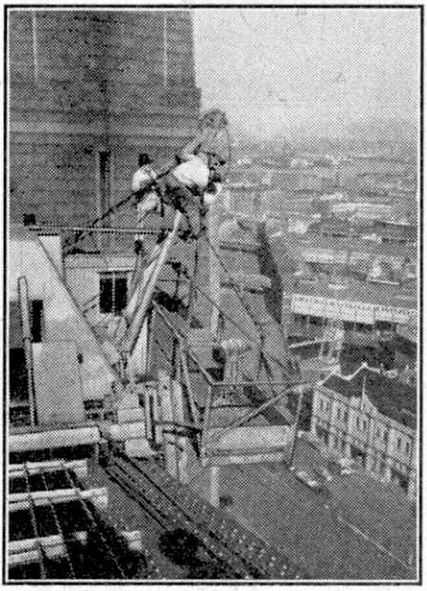
meat, so he joined the staff of a Hertfordshire firm of bridge engineers, spending his evenings on an engineering course at the London Polytechnic. In 1922 he read about the great arch bridge which the English firm of Dorman Long was to build at Sydney. Within a month he was on a ship for Australia. His qualifications were so good that he was appointed fabrication inspector, later foreman.

Joe "lives" in an eyrie 251 ft. above mean sea level in the bridge's southwest pylon tower. This room is the nerve centre of the spreading web of steel which enmeshes the bridge workers from 7.30 a.m. to 4 p.m. five days of the week. Every member in the bridge is numbered, and a wall chart shows the daily working position of every man. Progress of scraper, painter or rigger is plotted with flags. Painting headway is coloured in on another diagram, with which is a graph indicating the exact cost a square yard.

For safety, the men are generally sent to work in pairs. Storms and high winds may rise quickly in Sydney's climate, and weather reports are received frequently throughout the day. When rain or gale threatens, stages are brought in and men diverted to workroom jobs inside the pylons.



Heavy work on the bridge is done by four travelling cranes, and here Sidney Black and Ernest Tomrup are seen servicing the safety wire of the south east crane at the top of the great arch, 440 ft. above water level.



Sidney Black and Ernest Tomrup are quite at ease overhauling the hoisting wires of a painting stage 250 ft. above sea level.

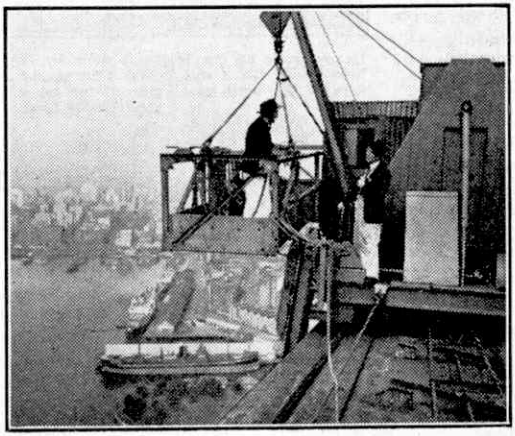
The bridge has 61 telephone points, and each gang has a portable telephone which can be quickly plugged in for urgent messages to administrative office or first-aid room. Code signals are used, one long ring bringing the foreman to his receiver, two shorts the ambulance bearer.

As an additional safeguard, the men work to a "token" system devised by the Main Roads Board, controlling authority of the bridge. At the checking post in the south-west pylon there is a numbered board hung with round brass tokens, each representing a worker. When he signs on at 7.30 a.m. he removes the disc corresponding to his number and replaces it at night. Should he injure himself returning from work to the checking post and be unable to reach it, the blank space on the board is immediately noticed and a search is started. Despite such precautions the bridge cost more than mere money. Sixteen men were killed during construction, and one maintenance worker has been killed.

The first-aid officer, 62-year-old Charles Scowcroft, has attended 15,800 accidents since construction began. Besides the telephone network, an elaborate electric alarm system warns him of accidents, and Scowcroft is quickly on the scene with black bag and stretcher bearers. His

"case book" is packed with dramatic stories. In it you may read of 40-year-old Vincent Kelly, the only man to survive a fall from the bridge. Kelly was riveting a girder under deck level, 170 ft. above the water, when his drill broke, upsetting his balance. Clutching the compressed air hose he hurtled down through space, watched by his horror-stricken mate, Reg Coomber. But throughout the fall Kelly did not lose consciousness nor presence of mind. Realising he would hit the water, he covered ears and eyes with his hands and managed to fall feet first.

Sydney Harbour is about 100 ft. deep where Kelly fell, but he came up swimming, to be picked by a passing launch. He broke three ribs in the fall and was severely shocked, but was back at work within a few weeks. The accident left him with a slight stammer.



It takes five years to paint Sydney Harbour Bridge, and 1,716 gallons of red lead and 7,541 gallons of warship grey are used. Here the bridge foreman inspects the painting of a travelling crane.

Scowcroft works in close liaison with safety officer Alfred Charles Culver, who keeps a constant check on working cables, gantries and other maintenance equipment. An English-born hero of World War 1, Culver spent his youth in sailing ships, joining the P. and O. company as a bo'sun in 1908. Now, from his patrol area along the 11,250 ft. of bridge "catwalk," Culver sees liners, tramps and sailing ships pass by hundreds of feet below. At Garden Island, a mile or two away, grey Australian warships ride peacefully at their moorings, but Culver hardly notices them. His thoughts are all for the Bridge, his watchful glances only for it and the men for whose safety he is responsible.

There is the public to consider, too. Belt, spanner or paintbrush dropped from 150 ft. might brain a man, or crash through a car top or train roof. For this reason, tools are fitted with spring clips and straps by which they are fastened to a worker's wrist.

One of Culver's worst moments was when one of the 285 ft. high granite pylons was struck by lightning when the bridge was crowded with traffic. The lightning flash dislodged a half-ton block of stone from the parapet, hurling it to the roadway below. The mass missed a loaded car by inches.

Bridge workers say that when a thunderstorm threatens, crackling blue sparks of static electricity may be drawn from the steelwork by a touch of the hand.

Wind is always a risk. In a gale which swept Sydney some years ago, one of the stages used by painters snapped its guy ropes, crashed back on the crane roof. There was imminent danger of its falling to the decking below, and riggers had to climb up and lash the platform down.

Only one thing worries leading hand painter George Giddings, who has worked on the bridge for 16 years. Now 60, Giddings has climbed more than 100 miles along its steelwork. Lately, he has left climbing to younger men while he works along the lower levels. But 310 electric trains and 1,004 trams rumble across the bridge every day. Like a continuous thunderstorm, the noise gets just a little bit on Giddings' nerves, particularly when he is working under track level. The pitch of his slow, Welsh voice rises and falls as he talks against the tempo of the trains. But it is all in the day's work, and Giddings would not leave the bridge, not even for "another fiver a week."

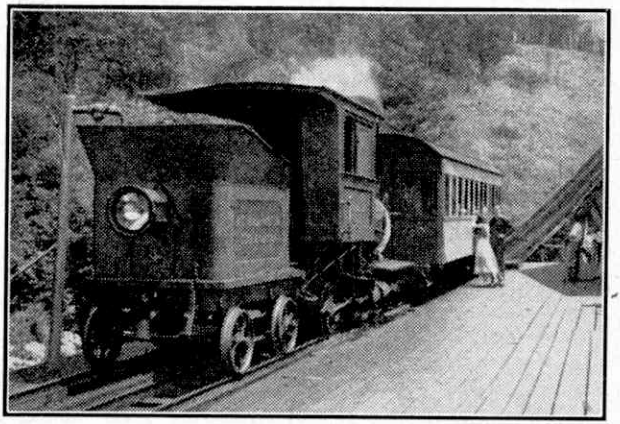
After three and a half years in a Japanese prisoner-of-war camp, 43-year-old ironworker Reg Coomber is happy on the vast, airy reaches of the bridge. Starved and beaten by brutal guards, Coomber gnawed his heart away behind barbed wire in Java and says he can never work in an enclosed space again. Except during his war

(*Continued on page 190*)

The Mount Washington Cog Railway

By H. E. Meats

THE Mount Washington Cog Railway is one of the only two surviving rack railways in the U.S.A., the other being the well-known Pike's Peak R.R., in Colorado, described in the *"M.M."* in January 1949.



A view on the Mount Washington Cog Railway, U.S.A. Photographs are by C. E. Keevil, Chicago.

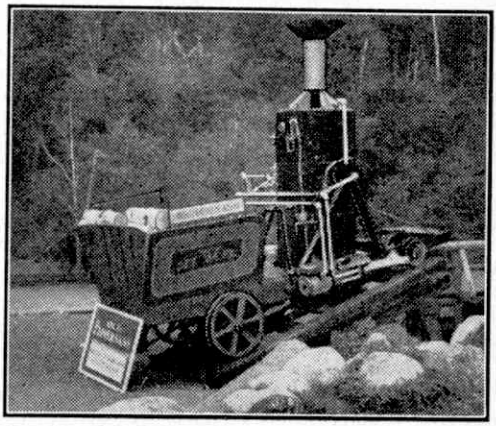
The Mount Washington line was opened for traffic in 1869 and claims to be the oldest rack railway in the world. The gauge is 4 ft. 7 in. The total length is 3.17 miles and the eventual height reached in this short distance is 6,284 ft. The average gradient is 25 per cent. and the steepest part of the line, named "Jacob's Ladder," has a gradient of 37 per cent. The general speed is three miles per hour.

Trains consist of a single coach seating 50 passengers, which is pushed on the up journey by the engine. When descending, the locomotive runs first; the coach merely rests against the front of the engine and is not coupled to it. This is similar to the method used on the Snowdon Mountain Railway. The line has a 100 per cent. safety record to date, no passenger having been killed or injured.

The original engines were queer-looking affairs, small four-wheelers with vertical boilers and no cabs. They had two cylinders with a bore and stroke of only 8 in. by 12 in. in the first engines, and 10 in. by 16 in. in later types. After a few years' service they were rebuilt with horizontal boilers and four cylinders, each cylinder 8 in. by 12 in. driving one of the uncoupled wheels which were geared to the cog driving wheel. Present-day engines have horizontal boilers that are tilted forward in order to maintain as far as possible the water level on the gradients, and to make firing easier.

The first engine on the line was nicknamed *"Old Peppersass,"* and in 1928 a full-size working replica, shown in the lower picture, was built not only for publicity but for actual use. After a derailment, however, it was withdrawn from use and placed on permanent exhibition at the lower terminus of the railway.

The line operates in summer only and seems assured of a long life. No highways as yet ascend the mountain to provide the motor competition that has forced the closing of so many small unconnected lines.



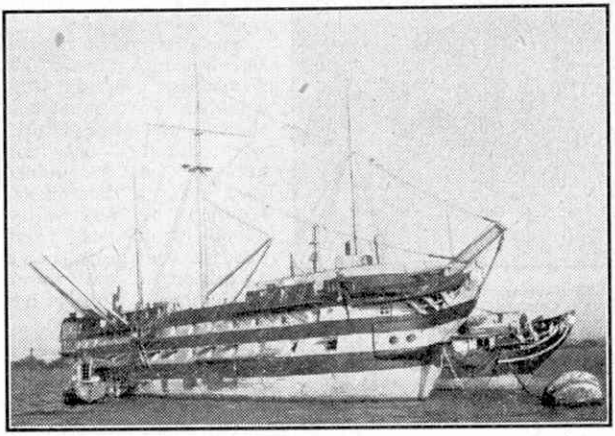
A replica of "Old Peppersass," engine No. 1 of the Mount Washington Cog Railway.

The Story of H.M.S. "Implacable"

By David Gunston

NOT many ships are destined to have such colourful and outstanding careers as the old wooden wall H.M.S. *"Implacable,"* which after nearly 150 years of floating existence was ceremonially sunk in the English Channel in December 1949.

This fine old vessel, which many interests tried hard to save for posterity was originally a French ship, the *"Duguay-Trouin,"* After being laid down in the great shipyards at Rochefort, in N.W. France, in 1797, eight years after the French Revolution, she was launched in 1800. She was one of the finest ships of her time, beautifully designed and expertly built. She had three decks and carried 74 guns, the largest of which were 36-pounders. After the style of the day she had three masts, a massive bowsprit, high stern galleries exquisitely carved in the Greek column design, and an enormous spread of canvas when in full sail.



H.M.S. "Implacable" at Portsmouth. Alongside is the "Foudroyant." Photograph by courtesy of "The Times."

She carried a crew of some 640 men, yet was only 181 ft. long with a burthen of 1,882 tons. Often the men on board would not set foot on dry land for three years at a time, living below decks in cramped quarters, eating and sleeping close to their muzzle-loading cannon. Just how well she was built, with her massive oak and teak beams and planks fastened together with immensely long bolts of pure copper, is proved by her long life and the difficulty that was experienced when she was scuttled in deep water.

The *"Duguay-Trouin"* took part in many exciting skirmishes in various parts of the world as a leading ship of the line in the French Fleet, during which time she tried to run the British blockade returning from the West Indies and narrowly escaped capture. She was then brought into the limelight as one of the principal ships in the French Fleet under their great Admiral Dumanoir at the Battle of Trafalgar. She was in the Van Squadron. As she was still a comparatively new ship—Nelson's famous flagship *"Victory,"* by way of contrast, was then nearly 40 years old—the French were anxious not to lose her, and although she fought well, actually exchanging shots with Nelson's ship and receiving great damage aloft, she withdrew under cover of other men-o'-war and seemed to have made good an escape after the outcome of the battle was obvious.

But the *"Duguay-Trouin"* and her companion ships had not bargained for the cleverness of Captain Baker of the British frigate *"Phoenix,"* which spotted the runaways making for France and directed a rearguard squadron of British ships under Sir Richard Strachan to them. In the ensuing battle *"Duguay-Trouin's"* commander and all her lieutenants save one were killed on deck. The fighting was hard and furious, and at last orders were given for the Tricolour to be struck in formal surrender, to save further loss of life. But just as the signalman reached the taffrail all three of her masts fell with a crash into the water. Sir Richard Strachan's squadron took her prisoner, fitted jury masts and sailed her as a prize back to Plymouth.

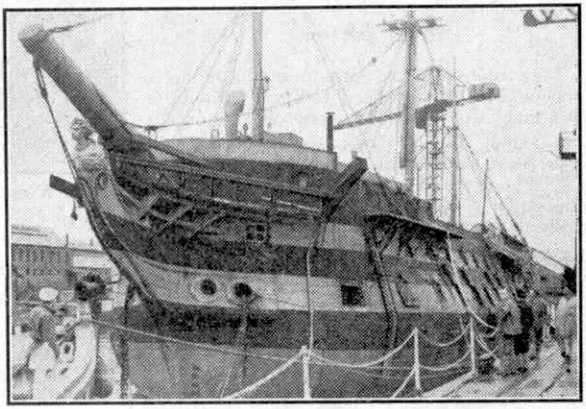
In time all her substantial damage was repaired, and as she was a particularly fine specimen of a 74-gun 18th century ship she was re-named *"Implacable"* and

brought into service with the Royal Navy. Thus began some 50 years of fine and useful activity under the White Ensign, during which time she fought Russian ships in the Baltic Sea. In 1842 she returned to Devonport at the completion of her commission, wearing a gilt cockerel at her main masthead to signify that she had been the smartest ship in the Mediterranean exercises.

But her life was now running on, and soon the old sailing ships were to give place to steam-driven warships. And so from 1855 to 1908 she was used as a training ship for naval cadets at Plymouth, and many thousands of sailors must have received their training in her. All these long and eventful years in salt water had not improved her condition, of course, and it so happened in 1908 that the Admiralty felt she was no longer any use to the country, and decided to put her up for sale. Thanks to the timely intervention of a number of people, headed by King Edward VII himself, interested in preserving such a fine old wooden wall she was reprieved, handed over to a private owner and ultimately to the Society for Nautical Research, who were glad to have her for new work they had in mind.

In 1925 the cost of her upkeep and preservation grew too high for private purses to bear. Her decks had to be regularly caulked to keep out rain, her rotted timbers replaced, and the ravages of time, death-watch beetles, wood rot and salt water had constantly to be countered. So £25,000 was raised by public subscription to carry out a great task of repair at Plymouth.

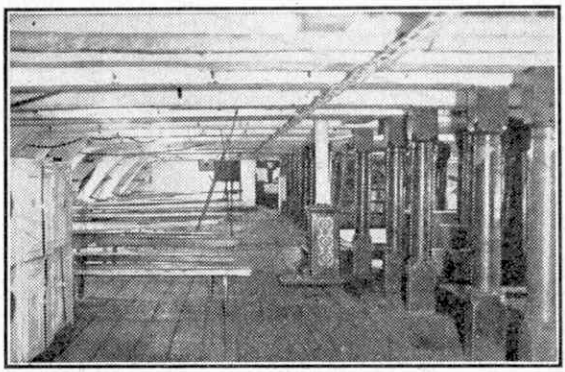
And so, at last, she was towed to Portsmouth Harbour and set up at anchor under the shadow of historic Portchester Castle as a Holiday Training Ship for boys and girls. From 1932 until the outbreak of war, hundreds of lucky children spent their summer holidays aboard her and her companion vessel, a small fast frigate of 46 guns called "*Foudroyant*," which had been built in Bombay as the "*Trincomalee*."



Bow view of the "Implacable." Photograph by courtesy of the "Evening News and Hampshire Telegraph."

Both ships were beautifully fitted out for this work, kept spotlessly clean and shipshape, and were equipped with 20 boats between them. Under the watchful eye of Lt.-Col. Harold Wyllie, an expert on all aspects of these old ships, and his cheery Irish second-in-command, Lieut. Michael O'Loughlin, Sea Scouts and members of other youth organisations as well as up to 200 girls were taught seamanship, boat handling and a love of the sea for one or two weeks at a time. This was grand work, over 10,000 young people having had the benefit of living afloat on a historic vessel.

Then came the war. The Navy wanted (*Cont. on p. 190*)



A view in the ward room.

Model-Building Competition Results

By "Spanner"

October General Contest (Home Section)

The principal prize-winners in the Home Section of the October "General" Model-Building Competition were as follows:

First Prize, Cheque for £3/3/–: H. H. Taylor, Huddersfield; Second Prize, Cheque for £2/2/–: J. A. Heywood, Macclesfield; Third Prize, Cheque for £1/1/–: G. R. C. Taylor, Halewood, Nr. Liverpool. Five Prizes each of 10/6: K. Saunders, Lyndhurst, Hants.; H. Tothill, Hove, Sussex; S. Reid, Aberdeen; L. Finner, Cork, Eire; R. Reynolds, Higher Tranmere, Birkenhead. Six Prizes each of 5/–; G. Tyrrell, Sevenoaks, Kent; W. S. Roberts, Bradford, Yorks.; G. P. Clark, Tavistock, Devon; B. Gowing, Yoxford, Suffolk: B. Hoyle, Deepcar, nr. Sheffield; D. Smith, Ilford, Essex.

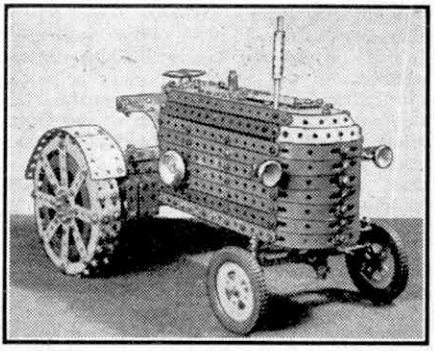


Fig. 1. A neat diesel tractor by G. R. C. Taylor, winner of Third Prize.

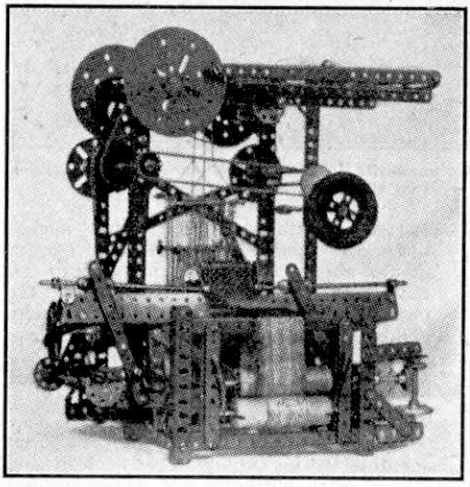


Fig. 2. A practical model loom built by H. H. Taylor, Newsome, Huddersfield, for which he was awarded First Prize.

First Prize was awarded to Harold H. Taylor, for the fine loom shown in Fig. 2. This model is capable of all kinds of weaving by varying the drafting of the healds, and adjustment of the "lag cylinder," and the illustrations submitted were accompanied by several fine examples of cloth produced with it and a highly technical description of its operation. I hope it will be possible to obtain a more simple description of its construction and if this is forthcoming I will give further details of this interesting model in a future *"M.M."*

Second Prize went to J. A. Heywood, for an excellent model of the Diesel Electric locomotive 'No. 10000.' The model was built from a photograph reproduced in the February 1948 issue of the *"M.M."* and its overall length is 37 in. with a width of 4 in., the gauge of the track is 2½ in. Heywood submitted a very neat and careful drawing of the model, and I am reproducing it as Fig. 3 on this page. I think Heywood deserves congratulating not only for the fine work done in the model itself, but for his drawing.

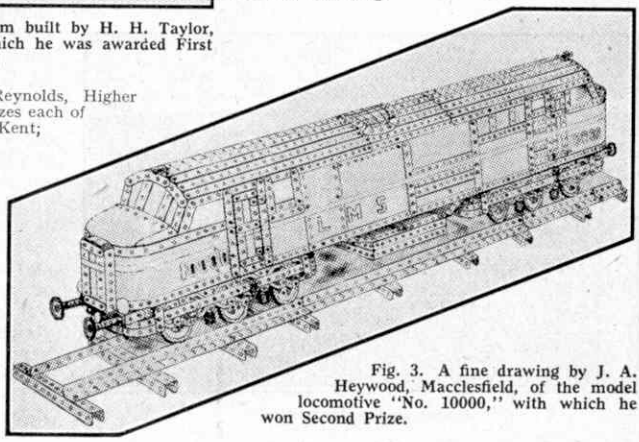


Fig. 3. A fine drawing by J. A. Heywood, Macclesfield, of the model locomotive "No. 10000," with which he won Second Prize.

Using the Meccano Gears Outfit "A"

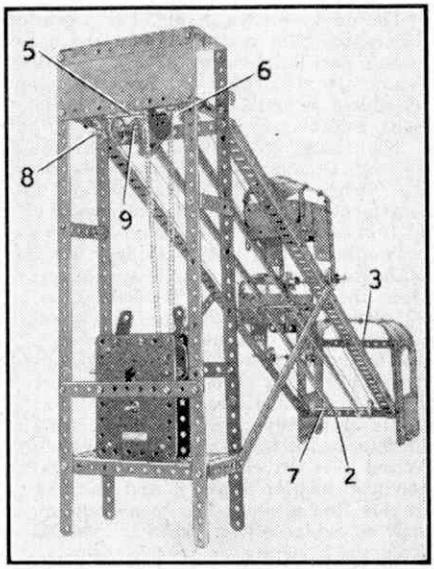
A Funicular Railway for Outfit No. 5

A FUNICULAR is a type of inclined railway used in some parts of the world, principally Switzerland and Japan, for ascending the slopes of mountains. In Fig. 1 we illustrate a model railway of this kind that forms a good subject for the owner of Outfit No. 5 and a Meccano Gears Outfit "A."

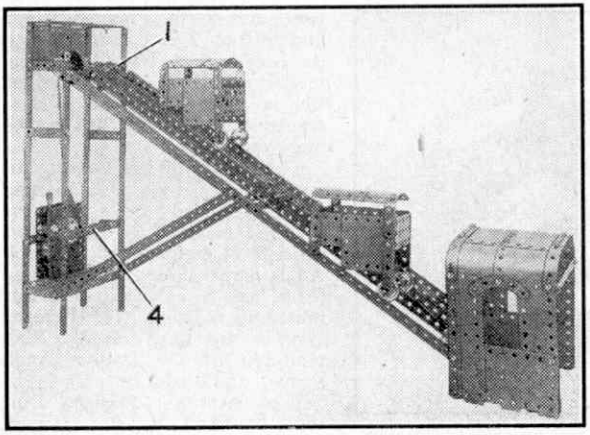
Construction of the model is begun by building the tower. The four supports of the tower are compound strips made by overlapping 12½" and 5½" Strips three holes. They are braced by Strips and Plates. The outer running rails are 12½" Angle Girders overlapped two holes, and 12½" Strips connected in the same way are used for the centre pair. They are supported by 5½" Strips, and at the tower end are bolted near its top. The inner rails are attached to the 5½" Strips by a 1½"×½" Double Angle Strip 1 at the upper end and two Reversed Angle Brackets 2 at the lower.

The sides of the lower station are constructed from two 5½"×1½" Flexible Plates and half a Hinged Flat Plate. Two 5½"×2½" and two 2½"×2½" Plates are used for its roof, which is edged with Formed Slotted Strips and Strips. It is strengthened by a 5½" Strip bolted across at 3. The sides of the cars are identical in construction, each being made with a 2½"×2½" and a 2½"×1½" Flexible Plate. A Semi-Circular Plate bolted to a Double Angle Strip fills the backs of the cars while the front of one of them is a 2½"×1½" Flanged Plate. Two Flat Trunnions bolted to a Double Angle Strip form the front of the other car. Two 1 11/16" radius Curved Plates and two 2½"×2½" Flexible Plates form the roof and are attached to the Strips on the sides of the car by Obtuse Angle Brackets. The 1" Pulleys forming the wheels are held on the Rods by Spring Clips.

A ½" Pinion on the Motor engages with a 1½" Contrate Wheel on a 4" Rod, bearings for which are provided by two 1"×1" Angle Brackets bolted to Strip 4. A ¾" Sprocket Wheel on the Rod is connected by chain to a 2" Sprocket on a 5" Rod 5. This Rod carries a 1" Pulley 6, and a length of Cord is passed round this Pulley and a second 1" Pulley held loosely on a 4" Rod 7. The Cord is then tied to each end of the car. The reversing movement, which allows one car to be lowered and the other raised, is produced by a ¾" Pinion on Rod 5 meshing with a similar part on 2" Rod 8. Bearings for Rod 8 are two Fishplates, one of which is seen at 9. The other is attached to a Trunnion bolted to the 5½" Strip. A 1" Pulley on Rod 8 drives the second car and the Cord is passed round a ½" loose Pulley on Rod 7 and tied in the same way as the first. The model is reversed manually and care should be taken when adjusting the Cords to see that both cars reach the end of their run simultaneously.



A rear view of the funicular showing how the Clockwork Motor is fitted in the tower.



A funicular railway that can be built from Outfit No. 5 and a Gears Outfit "A."

Parts required to build model Funicular Railway: 10 of No. 1; 14 of No. 2; 2 of No. 3; 10 of No. 5; 2 of No. 6a; 4 of No. 8; 3 of No. 10; 2 of No. 11; 12 of No. 12; 2 of No. 12a; 4 of No. 12c; 1 of No. 15; 1 of No. 15a; 1 of No. 15b; 2 of No.16; 1 of No. 17; 5 of No. 22; 2 of No. 22a; 1 of No. 23; 11 of No. 35; 100 of No. 37; 7 of No. 37a; 11 of No. 38; 1 of No. 40; 1 of No. 48; 8 of No. 48a; 1 of No. 51; 1 of No. 52; 2 of No. 90a: 2 of No. 111a; 6 of No. 111c; 1 of No. 126; 2 of No. 126a; 4 of No. 188; 4 of No. 189; 4 of No. 190; 2 of No. 191; 4 of No. 192; 1 of No. 198; 2 of No. 199; 2 of No. 200; 2 of No. 214; 4 of No. 215; 1 No. 1 Clockwork Motor; 1 Gears Outfit "A."

Among the Model-Builders

By "Spanner"

Simple Friction Differential Gear

The device shown in Fig. 1 is a gearless differential that is designed for the use of young car builders who do not possess Gears. It is entirely friction driven and of course is only suitable for use in light vehicles.

The frame is constructed with two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips and two $2\frac{1}{2}''$ Strips. A $1\frac{1}{2}''$ Contrate Wheel 1 is attached to an end of the frame by $\frac{3}{8}''$ Bolts as shown. A $3\frac{1}{2}''$ Rod 2 carries a Coupling 3 and two 1" Pulleys fitted with Rubber Rings, which are spaced from the frame by six Washers. Two $3\frac{1}{2}''$ Rods 5 and 6 forming the wheel axles are each journalled in the ends of the frame and in Coupling 3, and carry 1" Pulley Wheels and Rubber Rings that take the place of Bevel Gears generally used in an actual mechanism of this kind. The Contrate Wheel 1 is driven by a $\frac{1}{2}''$ Pinion on the transmission shaft 4, and the end of this Rod is journalled in a Coupling that is held loosely on Rod 6 and spaced from the Contrate by four Washers.

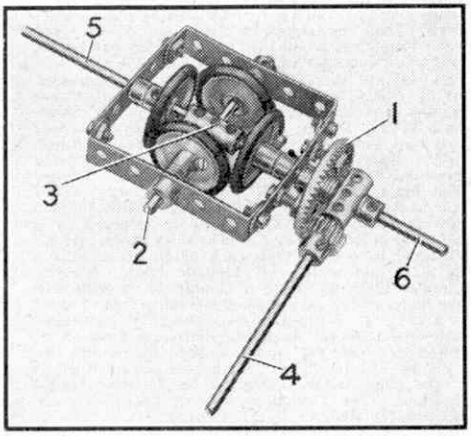


Fig. 1. A friction type differential suitable for light and simple model cars.

Roller Bearing for Large Cranes

A necessity in constructing large model cranes and excavators is that of providing a suitable roller bearing for carrying the swivelling superstructure. The standard Flanged Rings, part No. 167b, are ideal for the purpose, and a bearing built up with them is capable of carrying heavy loads and is very steady in operation.

The lower part of the bearing is made from two Flanged Rings connected together by eight $\frac{3}{4}''$ Bolts. Each Bolt is fastened by a nut in one of the Flanged Rings, and the second Ring is clamped in place between two nuts. A Face Plate 1 is bolted centrally to $9\frac{1}{2}''$ Strips fixed across the Flanged Rings, and a Rod 2 is passed through its boss. In a travelling crane model this Rod should be left free so that it can be used to transmit the drive to the travelling wheels.

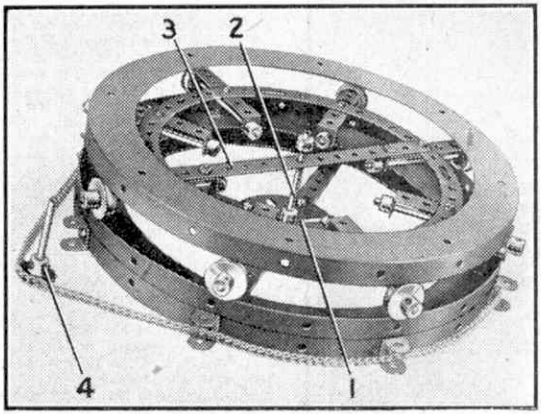


Fig. 2. An arrangement for a large built up roller type bearing. A device of this kind is suitable for use in large hammerhead and blocksetting cranes.

The rollers of the bearing are represented by $\frac{3}{4}''$ Flanged Wheels carried on a "spider" pivoting on Rod 2. The spider consists of eight $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips bolted to a Circular Strip, and a $7\frac{1}{2}''$ Strip 3 is also bolted in position. The Flanged Wheels are fixed on $3\frac{1}{2}''$ Rods mounted in the Double Angle Strips and held in place by Collars. Another Flanged Ring that is fixed to the model's superstructure rests on the Flanged Wheels, and the

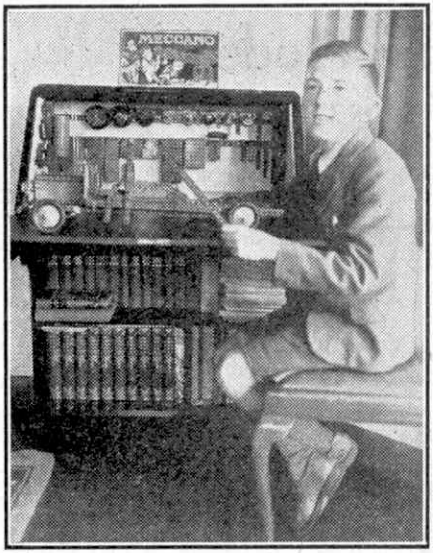


Fig. 3. Ian T. Watts, Hove, photographed with his specially designed Meccano storage and building cabinet, a description of which appears on this page.

superstructure is held in position by a Collar fixed on Rod 2.

In actual practice the lower fixed part of the roller bearing is usually toothed, so that a Pinion fixed on a shaft in the superstructure meshes with the fixed unit and can be used for slewing. In the model this mechanism can be represented by an endless length of Sprocket Chain passed between the lugs of Double Brackets bolted to the lower Flanged Ring. A Sprocket Wheel 4 mounted in the superstructure engages the Sprocket Chain.

A Novel Meccano Cabinet

An ingenious solution to the problem of storing conveniently a large collection of Meccano parts has been found by Mr. Watts, Hove, who designed for his son Ian, the cabinet shown in one of the accompanying illustrations. The cabinet is made from an old bagatelle table, and is 3 ft. 9 in. high, 2 ft. 8 in. wide and 1 ft. 3 in. deep from back to front. It is provided with a drop flap supported when open by sliding brackets, and this also forms a work bench on which Ian is able to build his models.

Underneath the cabinet are two bookshelves. The Meccano parts are stored on racks fitted to a false interior of the cabinet. The back racks are made from $\frac{1}{2}'' \times \frac{1}{8}''$ strip steel into which short rods are screwed one inch apart, while the side racks consists of ordinary cup hooks. Small parts such as nuts, bolts and spring clips are kept in small trays fitted with compartments, and Rods are stored vertically in a circular aluminium block drilled $\frac{5}{8}''$ deep with $\frac{11}{64}''$ holes.

Heavy Duty Quick Return Movement

This mechanism is particularly suited for incorporating in large model planing machines and for use in similar cases where a robust and positive quick idle stroke movement is required.

The table of the machine is represented in the illustration by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip in order to show the mechanism as clearly as possible. A vertical driving shaft 1 carries a Bush Wheel 2, and a $\frac{3}{8}''$ Bolt passing through one of the holes in the Bush Wheel is secured in the boss of a Slide Piece 3. A $3\frac{1}{2}''$ Strip 4 passed through the Slide Piece pivots about an upright fixed Rod 5 and is pivoted on a lock-nutted bolt at its outer end to a connecting lever 6. The latter, in turn, is pivotally connected to the underside of the table, which slides on the Girders 7.

The Bush Wheel 2 rotates in an anti-clockwise direction, rocking the lever 4 to and fro, and the Slide Piece 3 slides on the lever as it follows the movement of the Bush Wheel. Consequently, the guide 3 is at a greater distance from the fulcrum of the lever during the forward stroke than it is on the return.

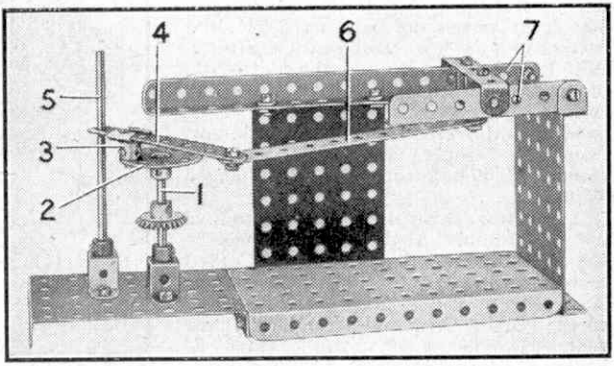


Fig. 4. A quick-return mechanism that has uses in model machine tools.

New Meccano Models

Electric Truck and Swing Bridge

THE attractive electric truck shown in Figs. 1 and 2 is based on the small vehicles used for transporting goods and parcels in factories, warehouses, railway stations, etc. The model is fitted with a simple steering mechanism, and with a pedal-operated brake acting on a drum fitted to the rear axle.

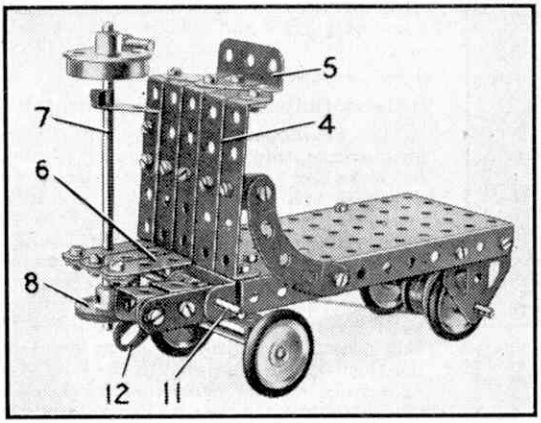


Fig. 1. A neat electric truck that makes a good subject for a small Outfit.

A $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate is used for the chassis and load platform of the model, and the rear wheels are fixed on a $3\frac{1}{2}''$ Rod mounted in Flat Trunnions bolted to the Flanged Plate. The Rod carries between the Flat Trunnions a drum 1 formed by two $\frac{3}{4}''$ Flanged Wheels. The front wheels are fixed on a $2\frac{1}{2}''$ Rod carried in a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 2. A $\frac{1}{2}''$ Bolt is passed through the centre hole of the Double Angle Strip, and is fixed by two nuts in a Double Bent Strip 3. A $\frac{1}{2}''$ loose Pulley is used to space the axle unit from the Double Bent Strip, and the assembly is bolted to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate.

A dividing panel 4 is made from five $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips bolted to the Flanged Plate. A small radius Curved Strip is used to connect the outer Double Angle Strips, and a Trunnion 5 is bolted to the Curved Strip and to the lug of the centre Double Angle Strip. Three 2" Strips 6 form a platform for the driver.

Steering is controlled by a $4\frac{1}{2}''$ Rod 7, mounted in one of the Strips 6 and in a $1'' \times 1''$ Angle Bracket fixed to the panel 4. The Rod is held in position by a Spring Clip and a Collar, and it carries at its lower end a 1" Pulley 8. A length of Cord is tied to the Double Angle Strip 2 at 9, passed round the Pulley 8, and through a Stepped Bent Strip 10. The Cord is then tied again to the Double Angle Strip 2 at point 9.

The brake pedal is made from a Crank fitted with two Double Brackets. The Crank is fixed on a $3\frac{1}{2}''$ Rod 11, which is carried in a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip bolted to the front of the Flanged Plate. Rod 11 is fitted with a second Crank 12, and one end of a length of Cord 13 is tied to the Crank. The Cord is passed through an Angle Bracket 14, led twice round the drum 1 and finally is tied to the Double Bent Strip 3.

Parts required to build model Electric Truck:

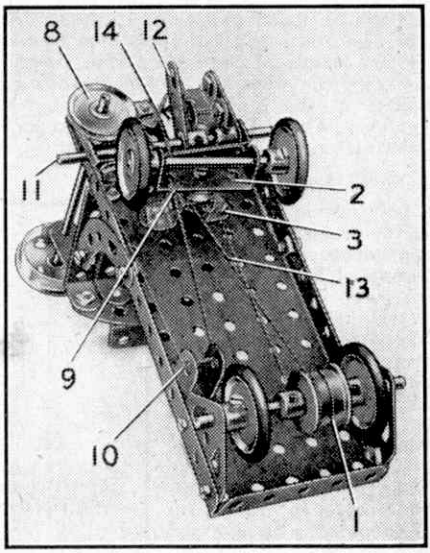


Fig. 2. An underneath view of the truck showing the arrangement of the steering and brake cords.

4 of No. 6; 3 of No. 6a; 2 of No. 11; 1 of No. 12; 1 of No. 12a; 1 of No. 15b; 1 of No. 16; 1 of No. 16a; 1 of No. 20; 2 of No. 20b; 5 of No. 22; 1 of No. 23; 1 of No. 35; 34 of No. 37; 1 of No. 40; 1 of No. 44; 1 of No. 45; 1 of No. 48; 7 of No. 48a; 1 of No. 52; 3 of No. 59; 3 of No. 90a; 1 of No. 115; 1 of No. 126; 2 of No. 126a; 4 of No. 155.

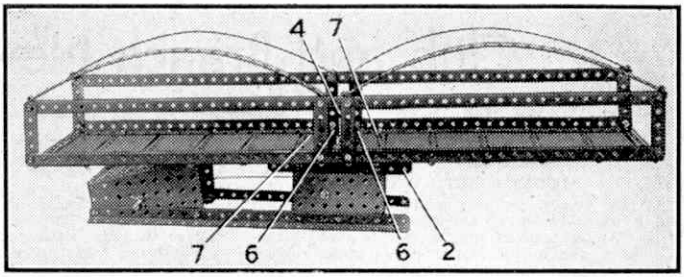


Fig. 3. A simple swing bridge operated from a Crank Handle.

Swing Bridge

The swing bridge shown in Figs. 3 and 4 is very easy to build. It is best to commence by constructing the pier support on which the moving span pivots. This is built by bolting 3½″×2½″ Flanged Plates and Flanged Sector Plates to two 12½″ Angle Girders 1. These are connected by a 3½″×2½″ and a 5½″×2½″ Flanged Plate 2, and also by a 2½″×½″ Double Angle Strip 3. A 1″ Pulley Wheel on the Crank Handle drives a second 1″ Pulley on a 3″ Rod journalled in the sides of the 3½″×2½″ Flanged Plates. A Worm on this Rod engages with a ½″ Pinion on a 5½″ by 12½″ Strips. Four 12½″ Strips curved to represent arches are attached to the sides by angle Brackets.

Parts required to build model Swing Bridge: 8 of No. 1; 4 of No. 2; 8 of No. 5; 6 of No. 8; 8 of No. 12; 1 of No. 15a; 1 of No. 16; 1 of No. 19g; 2 of No. 22; 1 of No. 24; 1 of No. 26; 1 of No. 32; 1 of No. 35; 72 of No. 37; 5 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 3 of No. 53; 2 of No. 54; 10 of No. 59; 2 of No. 189; 10 of No. 192.

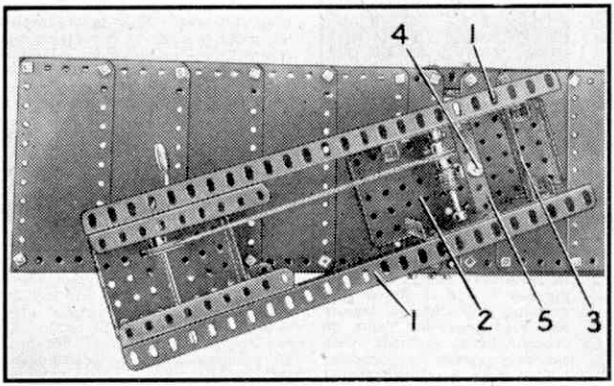


Fig. 4. An underneath view of the bridge pier showing the swivelling mechanism.

Rod 4, which is mounted in the 5½″×2½″ Flanged Plate and in a 2½″×½″ Double Angle Strip 5.

The bridge span is built from two compound girders each consisting of two 12½″ Angle Girders overlapped three holes. They are joined at the ends by 5½″ Strips, and a Bush Wheel is bolted to two other 5½″ Strips 6. The roadway is then filled with 5½″×2½″ Flexible Plates and two 5½″×1½″ Plates 7. The sides are extended upwards by 2½″ Strips and braced across

A FINE COMPETITION FOR ALL MECCANO BOYS

Every Meccano boy should enter the model-building competition announced here, for there is a good chance that he may win one of the fine prizes offered. All that is necessary to take part in the contest is to build a Meccano model. This may be of any type, and the only condition is that it must be the competitor's own unaided work. Every "*M.M.*" reader is eligible to compete in this contest, no matter what his age may be.

Any size of Outfit may be used in building the model, but good workmanship and constructional details that show ingenious uses for Meccano parts will attract the attention of the judges far more that the mere size of a model.

After the model is built the next job is to obtain a suitable illustration of it. This should be a photograph, but a sketch will do quite well if a good photograph is impossible. The competitor must write his age, name and address on the back of the illustration, and enclose it, together with a brief description of the model, in an envelope addressed "*April General Model-Building Contest, Meccano Ltd., Binns Road, Liverpool 13.*"

Entries will be grouped into two Sections, one for competitors living in the British Isles and the other for Overseas competitors. Those from competitors in the British Isles may be sent in at any time up to 31st May 1950. Entries from readers living Overseas will be accepted until 30th September 1950.

The following prizes will be awarded in each Section for the best built and most interesting models received. First, Cheque for £2/2/–; 2nd, Cheque for £1/1/–; 3rd, P.O. for 10/6. There will be also five consolation prizes of 5/– each and Certificates of Merit.

It should be noted that successful entries become the property of Meccano Ltd., but illustrations of unsuccessful models will be returned to senders provided that a suitable stamped addressed envelope is enclosed.

Club and Branch News

WITH THE SECRETARY

LOOKING BOTH WAYS

At this time of the year we look both backward and forward—backward to pick out the highlights of the Winter Sessions with a view to doing better still when the indoor season comes round again, and forward to the summer with hopes of fine weather and jolly times out of doors. Many Leaders have already written to tell me what they are going to do when summer comes and it is they who will find that their Clubs will not lose ground then, in spite of counter attractions, and will start the activities of the next Winter Sessions with confidence.

In both Clubs and Branches programmes must be arranged that will keep members in touch with each other. There should be no difficulty whatever about this. Interesting short excursions, with outdoor games, and visits to stations and selected positions on lines within easy reach for observations of locomotives and train working will provide a good programme for Branches, and for Clubs with Hornby and Hornby Dublo Railway interest, and there is always something to be done in the Club or Branch room to fill in wet or gloomy days.

CLUB AND BRANCH PHOTOGRAPHY

Clubs and Branches in which Photographic Sections have been formed will take full advantage of the opportunities that summer brings, and where there is no Photographic Section now is the time to create one. Even here the competitive spirit that has done so much to enliven Club and Branch life can be brought into play by arranging competitions. For instance, when an excursion is made that offers prospects of good pictures, a time should be arranged for members to display prints of photographs they have taken, and small prizes should be awarded to those judged best by the Leader or Chairman, or whoever is regarded as the photographic expert. It is often possible to find a photographer of repute who would be pleased to judge the entries and to make suggestions that would help members to get better results.

S. Wood has been Secretary of the Borden Grammar School M.C. since it was revived under Leadership of Mr. J. H. Weekes in November 1948. The Club pursues a fine all-round programme, and a special feature has been made of Talks on Model-building methods, with special reference to particular models such as clocks, cranes and road vehicles.

PROPOSED CLUBS

TIPTON—Mr. D. Mobley, 3, Florence Road, Glebe Estate, Tipton, Staffs.

LONG EATON—Mr. J. B. Allen, 24, Carrfield Avenue, Long Eaton, Nottingham.

PROPOSED BRANCH

LICHFIELD—Mr. J. Simpson, 37, Levetts Fields, Lichfield, Staffs.

CLUB NOTES

BARKER'S BUTTS BOYS SCHOOL (COVENTRY) M.C.—A two-day Exhibition attracted about 1,000 visitors and Club funds benefited by over £21. There was a splendid display of models and a miniature Railway, and an illuminated sign at the entrance was built by members. Proceeds will be used for increasing the Club's stock of Meccano Parts. Club roll: 40. *Leader:* Mr. F. Batten, Barker's Butts County Secondary School for Boys, Banks Road, Coundon, Coventry.

FALLOW COURT (FINCHLEY) M.C.—This new Club holds meetings weekly. Three groups have been formed in order to foster the competitive spirit, the members of each wearing a distinctive ribbon flash. Models of higher standard are now being built and a Dinky Toys Town is under construction. Club roll: 13. *Leader:* Mr. W. Laming, 88, Fallow Court Avenue, Finchley, London N.12.

HORNSEA M.C.—Meetings continue along the usual lines. In addition to model-building, Talks have been given on "*How We Get Our Water*," "*Italy*" and other topics, and Film Shows also have been enjoyed. Club roll: 14. *Secretary:* R. Lancaster, Carlton House, Carlton Avenue, Hornsea.

WHITTINGTON M.C. — Construction has continued of embankments and tunnels for the Club's Hornby Train Layout and a low level station has been planned. Now photography, including practice in developing and printing, has been introduced under the guidance of Mr. F. Haywood, Leader, and a Film Show also has been given. Club roll: 9. *Secretary:* P. W. Sharp, 17, Hill Top Road, Old Whittington, Chesterfield.

NEWCASTLE-UPON-TYNE ROYAL GRAMMAR SCHOOL M.C.—More new members have been enrolled and attendances at meetings is excellent. In a Model-Building Contest a high proportion of entries of real merit were entered. A Visit has been arranged to a railway shed in the neighbourhood. A new venture is the formation of a Library of magazines of engineering and aeronautical interest. Club roll: 23. *Secretary:* G. S. Miller, "Fairholme," 10, Countess Drive, Newcastle-upon-Tyne 5.

BRANCH NEWS

STROUD—Operations on the Club's Hornby Train layout have been continued. Further events have included a very lively Debate, in which many modern motions were very keenly discussed. *Secretary:* D. Hargest, 6, Folly Lane, Stroud.

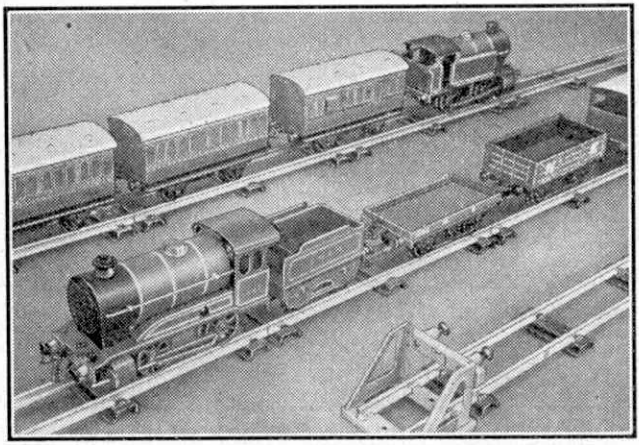
HIGH CRAIGIE (PERTH)—Plans have been drawn up for a layout to incorporate new track and rolling stock received by members during the Christmas season. More Hornby-Dublo stock and Dinky Toys have been acquired and useful railway books have been added to the Branch Library. Members make frequent visits to Perth General Station. *Secretary:* J. Duncan, "Dunrae," 41, Evelyn Terrace, Perth.

MAGDALEN COLLEGE SCHOOL (OXFORD)—The chief recent activity has been the completion of a bridge for a gap in the layout. Useful additions have been made to Rolling Stock. Good use is made of the Branch Library. *Secretary:* R. A. Bowen 33, Richmond Road, Oxford.

Cleaning and Oiling Hornby Trains

THE experienced Hornby Train owner knows that careful attention should be given to the cleaning and maintenance not only of the locomotive, but of the rolling stock and track as well. As a rule he arranges to give this at more or less regular intervals. For the beginner we will try to explain what should be done, and why.

Everything should be cleaned regularly, especially locomotive mechanisms. After a period of running they tend to become sluggish, as the oil in them mixes to a certain extent with dust picked up when running, and this results in loss of power and speed. The mechanism can be cleaned by means of a small "mop" paint brush dipped in petrol, or any suitable cleansing medium. Remember that petrol is extremely inflammable, and carry out your cleaning operations away from the fire. Paraffin should not be used as it takes a long time to clear from the mechanism. It mixes with the oil used subsequently and seems to find its way just where it is not wanted.



Typical Hornby Train formations are shown in this picture. The engines shown are respectively a No. 501 on the goods train and a No. 101 on the passenger train.

After cleaning, the axles, gears and the spring should be lubricated with a thin oil of the quality used for sewing machines. Do not use an oil can; it is sure to deliver too much oil, which will certainly find its way on to the wheels and the rails, causing slipping and poor performance. Simply apply the least amount of oil with a wire dipper or even a sharpened match stick.

It may be found that after a period of service the wheels of engines and rolling stock will have picked up a coating caused by oil and dust. If this is allowed to collect it will result in poor running and in extreme cases it may even lead to derailments. This coating can usually be removed from the wheels by wiping with a rag. If the wheels are taken off the coaches and wagons for this part of the job, care should be taken when replacing them to make sure that the wheel frames are not pressing inward on them and causing them to bind. The bearing holes, and the axle boxes where fitted, should not be forgotten in the cleaning process.

To ensure good running it is essential that the rails are perfectly clean and free from oil. Wipe them over periodically with a dry cloth.

After the cleaning process, attention should be paid to the condition of track and rolling stock. Test the track by means of the rail gauge formed by the handle of the winding key. Examination of the rail ends is advisable from time to time, as these are liable to get opened out from constant assembly and dis-assembly. A small pair of pliers is useful for pinching in the web or flat vertical portion of the rail ends. To prevent damage to the hollow rail heads, while this pinching is being done, it is advisable to inset a spare connecting pin or some similar pin of metal or wood. Points should be examined and cleaned, and care should be taken to see that the moving switch rails line up correctly.

Bent couplings and buffer beams on rolling stock can be put right with the aid of pliers. Careful handling is necessary however, in order to prevent possible breakage. Great care should always be taken of your Hornby Trains. If this is the rule very little attention will need to be given in the way of repairs.

Power and Wiring of Hornby-Dublo Layouts

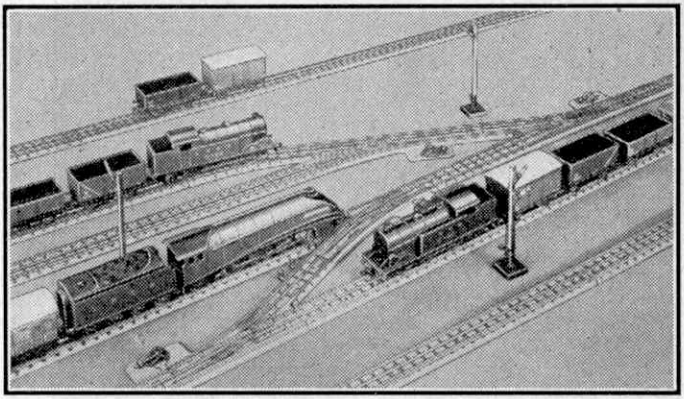
EVERY owner of a Hornby-Dublo Train Set begins at the first opportunity to expand his set into a more interesting railway. With Uncoupling Rails, Isolating Rails and Points a railwaylike system can be built up, and recent articles in these pages have referred specially to various isolating and uncoupling schemes.

Sooner or later there arises the familiar question: *"How can I run two or more trains?"* This forms the main point of many enquiries dealt with at H.R.C. Headquarters. The answer depends on the circumstances on particular layouts and the equipment that is to hand.

On a simple layout, even with sidings or loop lines, but without any isolating sections, with a single Transformer and Controller, no more than one engine can be in motion. The inclusion of isolating sections, as we have seen in recent articles in these pages, makes it possible to have two or more engines on the track at once, but we can still have only one of these in motion at one time. Any others must stand on sections of the track that can be cut out electrically by the use of Isolating Rails and Switches. This arrangement works satisfactorily as long as the placing of the Isolating Rails and the sequence of engine or train movements are thought out with care.

So far, so good; the next step very often is the development of the layout into a double track system with the idea of allowing up and down trains to be run. To make this possible we need a further Transformer and Controller, so that each main track has its own separate power supply. Each track can have sidings and loops connected to it, and no problems are likely to arise until it is required to put in a running connection between the up and down main lines so that trains can pass from one to the other. This means introducing Points, two Left-Hand or two Right-Hand, according to requirements, being used to form a crossover between the two tracks. As the two electric circuits would then be connected together, the centre rail connections being continuous, we have to provide some means of separating the circuits electrically, otherwise independent control will not be possible and various other difficulties will arise.

One method of avoiding any of these



A Hornby-Dublo Isolating Rail separates the Points connecting up and down main lines. The sidings in the background form a separate section as described in this article.

is to introduce an Isolating Rail between the two Points, this rail not being connected to a switch. This provides a gap in the centre rail but the running rails remain continuous. The gap in the centre rail is the only requirement for complete independent control of each track, so long as each track has its own separate power supply.

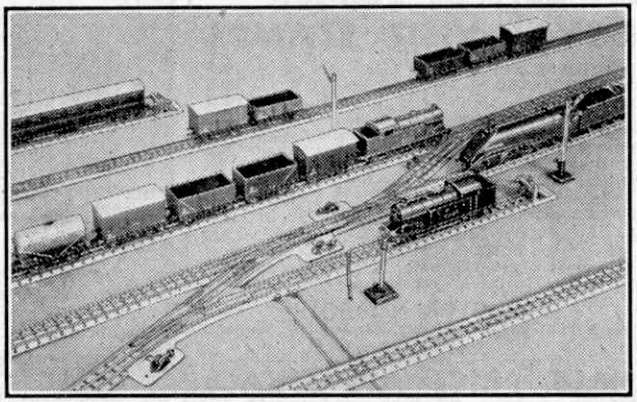
Two engines, one on each track, can travel either forward or backward as required and each will act quite independently of the movements of the other. The same thing applies as the layout is extended further and possibly another main section in the form of a series of sidings, a shunting yard or a principal station of the terminal variety is added. This additional section will of course have its own Transformer and Controller. It is this kind of situation that is shown in diagram form on page 183. There are the two main lines independently con-

trolled but connected by Points with an Isolating Rail between them; the Left-Hand Points lead to a goods yard where shunting movements can be carried out clear of the main lines and again without interfering with traffic passing on them.

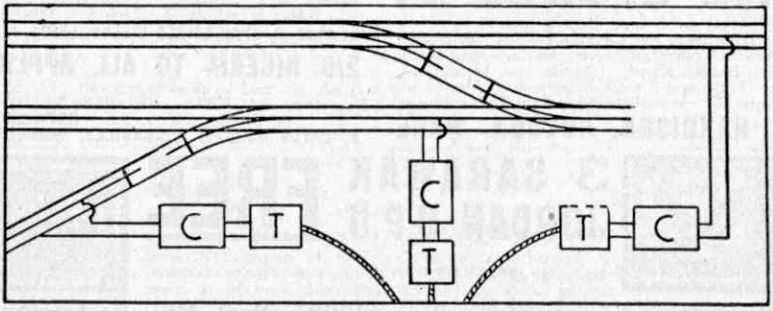
When it is required to pass a train from one main section to the other, as would occur with a train coming out of the yard on to the main line, or crossing from one main track to the other, the control routine is quite simple. The main section that is to receive the train must be clear; any train that is on it should stand in an isolated section. The handle of the Controller of the "receiving" section must be moved to the same position as that of the first Controller, ready to take over easily and smoothly. With very little practice the operator will find that he can handle both Controllers in a satisfactory manner. The speed of the train should be reduced, as it would be in actual practice, and possible annoying mishaps will be avoided.

Sometimes the requirements of a layout do not permit an Isolating Rail to be fitted between the Points connecting two tracks. To provide the required insulating gap therefore we have to use a piece of thick paper or thin card, about three-quarters of an inch square, between the centre rail clips at the joint between the Points. This arrangement is quite satisfactory as long as suitable material is used and care taken in fitting the points together.

If a common power supply is used, as might be the case where a non-standard transformer of large capacity, or an accumulator, forms the source of power, then the single insulating gap in the centre rail at Points between the main sections will not be sufficient, even though each main section has a separate Controller. The running rails also must include an insulating gap or independent control of each section will not be possible. Except on permanent layouts this is not always easy to arrange. The removal of fishplates is a possible method, but this means that the running rails have to rely on the track being screwed down in order to maintain alignment. To keep matters simple, therefore, it is always best to have a separate supply for each main section wherever possible.



The yard in the foreground includes an engine road or "spur" where a Hornby-Dublo 0-6-2 Tank is standing. The Isolating Rail allows the spur to be cut out electrically when required.



Power supply, connections and arrangements for independent control of three main sections of a Hornby-Dublo layout are shown here in diagram form.

For other Stamp Advertisements see also pages 186 and xv.

Stamp Collecting

The Voortrekker Story

By F. Riley, B.Sc.

SOUTH AFRICA has produced another set of stamps commemorating the great trek northward more than 100 years ago that led to the foundation of the Transvaal and the Orange Free State, and also to the settlement of Natal. This movement was one of the most remarkable in history. The Voortrekkers, as those who took part in it are called, were Boer farmers of Cape Colony who became dissatisfied with conditions there and decided to seek new homes beyond the Orange River. Most of them came from the eastern districts of the Cape, and in increasing numbers they sold their farms, packed their belongings into their hooded oxcarts and set off northward.

The new life was one of great hardship. In their

covered wagons they travelled over the veldt, across mountains, and either forded rivers or built rafts on which to ferry themselves and their belongings across the water, which often was infested by crocodiles. As they approached the Vaal they advanced into country under the sway of the Matabele, a hostile and warlike tribe. Some parties of the adventurers were attacked and massacred, but the great trek continued, and eventually the Matabele, unable to withstand the fire of the Boers from armed camps or lagers made by chaining their wagons together in a circle, with thorny brushwood under them, were decisively beaten and driven farther north.

The greatest tragedy in the story of the Boer trekkers came when a party under Piet Retief turned eastward over the Drakensberg, the mountain range that crossed their way into what is now Natal. When they reached Natal everything at first seemed favourable. From Dingaan, the King of the Zulus, they received a grant of land, and looked forward to settling down in the rich country around them. But Dingaan really had other ideas, and at a festive gathering to celebrate the signing of the treaty with him he suddenly ordered his warriors to kill Retief and the Boer leaders who had gone unarmed to the feast. Then the Zulus spread over the country, killing many parties of Boers and creating terror among the rest. The scene of one of the most dreadful of these massacres is known to this day as Weenen, the place of weeping.

When news of these events spread, fresh parties of Voortrekkers, burning to avenge the slaughter,

made their way into Natal, and there, under the command of Andries Pretorius, a capable leader, they broke the power of Dingaan in a decisive battle at Blood River. Some time before the battle the Voortrekkers made a solemn vow that if the Lord gave them victory over their enemy they would consecrate the day and keep it holy as a Sabbath. Since then 16th December, the day of the great battle, has been known as Dingaan's Day. They vowed also that they would build a church, and when Pietermaritzburg was founded they did build one in that city. Later, when a new church was built, the old one served as a shop and a warehouse, but eventually it was re-purchased by public subscription and to-day the Church of the Vow is the Voortrekker Museum.

It is only natural that such a wonderful story should provide subjects for commemorative stamp designs, and South Africa has made good use of it. Looking forward to the Voortrekker Centenary of 1938, a series of stamps was issued in 1933 on which a small surtax was charged to raise funds with which to build a memorial to those who joined in the movement. The centenary issues followed in 1938. Four stamps with surcharges then appeared, in the pairs that distinguish many South African issues, one of each pair in English and the other in Afrikaans. The 1½d. + 1½d. value, reproduced on this page, shows the signing of the treaty between Dingaan and Retief. Two other values show a Voortrekker ploughing and a wagon descending a steep and rocky slope in the Drakensberg respectively, while the highest value shows the proposed Memorial, flanked by representations of a hooded ox wagon fording a river and descending a mountain slope. Two other stamps issued at the same time pictured a Voortrekker's wagon wheel and a Voortrekker family looking out over the new lands into which their arduous journey was bringing them. These were the actual commemorative stamps, which had no surcharge.

The Memorial to these pioneers has now been erected and it was unveiled last year. This was the occasion for a further issue of three stamps, all of which are shown here. The 1d. value shows one of the famous hooded wagons on trek. The Memorial itself is pictured on the 1½d. value, framed in the design by a representation of the gable of the Church of the Vow. The design of the 3d. value is in three parts, the central panel showing a lighted candle, the symbol of hope, with an open Bible in front of it, and the others a mounted Voortrekker and a Voortrekker woman looking out over the mountains of the new lands where they hoped to find homes and freedom.

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For other Stamp Advertisements see also pages 184 and xv.

Stamp Gossip

and Notes on New Issues

By F. E. Metcalfe

IT seems to be all East this month, for the two most interesting sets I have to chronicle come from India and Ceylon. Let us take the Indian set first. On January 26th India inaugurated its new status as a republic. How it can be a republic and still a member of our British Commonwealth only politicians can see, but that is their job anyhow, and all the writer need talk about is the new stamp set issued to commemorate the great event.

Having been pegged down to dull prosaic issues by an unimaginative post office as long as ever it has been using stamps, one cannot wonder if India indulges in a spot of imagination now that it has a free hand. This new "inauguration" set shows clearly that new tendency. The stamp illustrated is the lowest of four values, which have a total face value of 21½ annas, roughly 2/–, so half a crown will buy an interesting set. The stamps were designed by Messrs. D. J. Keymer, Calcutta, and printed by the India Security Press Nasik, which is the printing works that produced the stamps bearing the portrait of King George VI. There is nothing very artistic about the new stamps. Arty would be the best way to describe them, but at any rate they could not help but be more interesting than the last set which India had under British rule.

And now we come to Ceylon. This also is a pictorial set, but of five values, and the face value is about 3/4½d., so again the outlay will not be too much. Of course we get a picture of the Sigiriya or Lion Rock, which stands 600 ft. above the jungle which surrounds it—the same picture is to be seen on the 10c. of the present set—and whereas it does not look much on a stamp, it is actually a wonderful sight. On it we see Ceylon's "Stonehenge," a circular shrine of monolithic pillars. Let us hope it is more interesting to look at than our own Stonehenge, which according to an American, as recently reported, is the most disappointing spectacle in Europe.

Another new set which is full of interest comes from Cyrenaica, the territory in North Africa that was taken from the Italians. A full set will cost over £1, but it should prove a good investment, for it may have a very short life. A short set to a shilling will cost about 3/–, so that should not be beyond our reach.

As collectors will know, British stamps have been overprinted for various territories which were captured from the Italians. These were overprinted Eritrea, Somalia and Tripolitania, and part of the overprint read B.M.A., which meant British Military Administration. Now apparently the military administration has been changed to a civil one and the overprint has been altered to B.A. The stamps which have just gone off will prove scarce in time, but perhaps the new ones will prove scarcer still, for they might have a very short life indeed, and with dealers holding large stocks of other stamps, and not being able or willing to put many away, here is a real chance of a good investment. So if you can afford it buy a set of each while they are current, and in time to come you'll have something very nice indeed.

I have mentioned that dealers have large stocks of other stamps and this is true, but in time they'll get cleared, for it is wonderful how K.G. VI stamps are holding their place in the affections of collectors. It is true that stamps of the previous reign have lost ground badly, but collectors of issues of the present reign can congratulate themselves on the steady popularity of their favourites. Some sets which were overbought have dropped a bit, but others have more than made up for them.

Within the last few months three stamps of Ascension came out, with a total face value of 4½d. They now sell from 15/– to £1. In the same period a 3c. British Guiana stamp appeared. That costs 2/6d. as I write, and there is news just to hand that the 6c. (3d.) is also off sale, so there is another handsome profit for holders. Only a month or so ago the 5/– Jamaica was issued in a new perf. A rush resulted and now that stamp is being offered at 27/6d. wholesale. I could go on giving examples, so can one wonder that British and American collectors are partial to our own Commonwealth stamps. Keeping the money in the family pays in this instance.

We have mentioned nothing this month about foreign issues, so we will make our last illustration an interesting stamp from that prolific country Hungary.

Recently I mentioned thematic collecting and one collector wrote to say that she collects foreign stamps which bear either portraits of Britons, or buildings etc. that have been built abroad by our countrymen. The stamp illustrated will earn a place in that collection, for it shows the famous "Chain Bridge" over the Danube at Budapest. This bridge was built by British engineers a century ago.

In the last war the Hungarians fought on the side of the Germans. Actually they loathe the Germans, and their position was forced upon them. During the war, the Germans occupied Budapest, but were finally pushed out by the Russians. Now Budapest is really two cities, Buda and Pest, and the Danube separates the two. The Germans moved out of Pest over the river to Buda, and destroyed all the bridges as they went. The Chain Bridge was one of them. Now the Hungarians have rebuilt it exactly as it was before, and the stamp celebrates the feat. Those Hungarians love that bridge, and politics notwithstanding, they have great respect for the people who first erected the object of their esteem, built in 1839-45 by W. Tierney Clark.

There is news that many colonies have new sets in preparation, but more about this next month. In the meantime fill up all the blanks you can, for K.G. VI stamps which are current will never be as cheap again.

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 Would Be Your Greatest Thrill?

Even in a world that has discovered atomic energy and in which almost fabulous speeds have been achieved, with such miracles as radio and television thrown in, there are still many wonderful thrills that might be experienced, and almost every day we read in our newspapers of remarkable exploits of many different kinds. Readers of the *"M.M."* naturally are interested in these, and for our competition this month we are giving them an opportunity of expressing their own opinions on the thrills they would like to experience.

In the panel on this page twelve experiences that undoubtedly would arouse real excitement are listed. They cover a wide range, including both experiences of the past and possible thrills of the future, and we are sure that every reader will find something in the list in which he is specially interested. Entrants in the contest are invited to do two things. The first is to state which of these experiences would give them the greatest thrill, and the second is to place the twelve experiences in the order of popularity in which they think the votes of competitors will put them.

1. Driving a car in the Monte Carlo Rally.
2. Climbing Mount Everest.
3. Crossing the Atlantic in a small sailing boat.
4. Piloting a de Havilland 108.
5. Playing in the F.A. Cup Final at Wembley.
6. Entering the House of Commons as a member.
7. Making the First Trip to the Moon.
8. Taking part in the Olympic Games.
9. Making a trip in a long-distance submarine.
10. Building a giant bridge.
11. Making a footplate trip on "The Flying Scotsman."
12. Going round the Horn in a sailing ship.

Entries in this competition should be addressed *"April Thrills Contest, Meccano Magazine, Binns Road, Liverpool 13."* In it there will be two sections, for Home and Overseas readers respectively, and in each there will be prizes to the value of 21/–, 15/– and 10/6. There will also be Consolation prizes for other deserving efforts, and in the event of a tie for any prize the judges will decide on the novelty and neatness of the entries. Closing dates: Home Section, 31st May; Overseas Section, 31st August.

What Engine Parts are These?

A locomotive is a very complicated machine. It contains a remarkable number of parts, each of which has a very definite task to carry out, and these have been made the basis of our second competition this month. In it clues are given to ten different locomotive parts. The clues indicate what the part is or does, and readers are asked to find out from them which parts are meant. In each the working of the part concerned is hidden to a certain extent.

Here are the clues to the 10 locomotive parts.

1. Comforting on a cold day.
2. There is two-way traffic inside.
3. Not old, but takes the shocks.
4. A gritty affair.
5. Ensures a good drink.
6. There's nothing in this.
7. Keeps an unruly prisoner under control.
8. A way of escape.
9. Not on a cathedral.
10. Don't be frightened of it.

Entries must be addressed *"April Engine Parts Contest, Meccano Magazine, Binns Road, Liverpool 13."* As usual, there are two sections, for Home and Overseas readers respectively, and in each prizes of 21/–, 15/– and 10/6 will be awarded. If there is a tie for any prize the judges will take the novelty of the entry into consideration. Closing dates: Home Section, 31st May; Overseas Section, 31st August.

April Photographic Contest

There is an obvious choice of subject for the fourth of our 1950 competition series. This is Spring. Competitors therefore are asked to submit any photographs that illustrate conditions or events of the Spring season. Otherwise there are no restrictions, except that each entry must have been taken by the competitor himself and that on the back of prints entrants must state exactly what they represent.

There are two sections in the competition, A for readers aged 16 and over, and B for those under 16, and the appropriate section letter must be given on the back of each print.

Entries must be addressed *"April Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13."* There will be separate sections for overseas readers, and in each section prizes of 21/–, 15/– and 10/6 will be awarded, with consolation prizes for deserving efforts. The closing dates are 29th April in the Home Section and 31st July in the Overseas Section.

* * * *

A CORRECTION

The word PLANTS in the fifth example in our March Doublets Contest should be PLANT.

Competition Results and Solutions

HOME

NOVEMBER 1949 LORRY FACES CONTEST

1st Prize: I. Rose, Glasgow W.3. 2nd Prize: A. Sams, Redhill. 3rd Prize: B. S. Baxter, Salisbury. Consolation Prizes: R. Hotson, Woodlands, Nr. Southampton; J. Heath, London N.9; K. Butler, Huddersfield.

DECEMBER 1949 ADVERTISEMENT CONTEST

1st Prize: Miss C. Barlow, Romiley. 2nd Prize: A. S. Hooper, Epsom. 3rd Prize: M. Smith, Devizes. Consolation Prizes: F. Whiteman, London S.W.8; Miss E. Vail, London N.W.11; D. Morris, High Wycombe; D. H. Earle, Wembley Park.

DECEMBER 1949 QUIZ CONTEST

1st Prize: J. Lawrence, Lowestoft. 2nd Prize: J. J. Phillips, Carlisle. 3rd Prize: L. Charnley, Blackpool. Consolation Prizes: M. Cookson, London S.W.2; B. Roberts, Rhyl; J. Littlemore, Ludlow.

DECEMBER 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: P. Lambert, Harrogate; Section B: R. H. Weeks, Carlisle. 2nd Prize, Section A: C. Saul, Liverpool 11; Section B: R. S. Hall, London S.W.7. 3rd Prize, Section A: E. Gordon, London E.4; Section B: B. Chamberlain, Bolton. Consolation Prizes, Section A: J. Denton Robinson, Darlington; H. E. Williams, Kenley. Section B: I. Reid, Aberdeen.

JANUARY 1950 PHOTOGRAPHIC CONTEST

1st Prize, Section A: A. C. A. Benda, Weybridge; Section B: D. Bottomley, Isleworth. 2nd Prize, Section A: Mrs. V. Neish, Pinwherry; Section B: Miss E. Martin, Newcastle-under-Lyme. 3rd Prize, Section A: H. W. Farr, Belfast; Section B: D. Hudson, Purley. Consolation Prizes, Section A: W. E. Turnbull, Edinburgh 7; B. I. Nathan, Sevenoaks; G. R. Harvey, Surbiton; J. Brooks, Saltcoats; Mrs. J. Eaton, Birmingham 28. Section B: C. R. Bradley, Mansfield; J. P. Powell, Colwyn Bay; S. C. Spencer, Maidstone.

OVERSEAS

JULY 1949 CAR REAR VIEW CONTEST

1st Prize: P. Mackley, Lower Hutt, N.Z. 2nd Prize: J. A. Nel, Gordons Bay, S. Africa. 3rd Prize: T. W. Coulter, Palmerston North, N.Z. Consolation Prizes: L. Alley, Durban, S. Africa; F. Tiernon, Dublin, Eire; D. F. Sutherland, Dunedin, N.W.2, N.Z.

JULY 1949 LOCOMOTIVE SQUARE CONTEST

1st Prize: A. Hall, Johannesburg, S. Africa. 2nd Prize: L. Ferron, Wellington, N.Z. 3rd Prize: D. J. White, Christchurch N.1, N.Z.

AUGUST 1949 POINTWORD CONTEST

1st Prize: D. J. White, Christchurch N.1, N.Z. 2nd Prize: Miss P. Gnanadurai, Trichinopoly, S. India. 3rd Prize: J. S. Manduca, St. Julians, Malta, G.C. Consolation Prize: L. Phillips, Westport, N.Z.

AUGUST 1949 SPORTS CONTEST

1st Prize: J. H. Passehl, Adelaide, S. Australia. 2nd Prize: C. Formby, Johannesburg, S. Africa. 3rd Prize: P. P. Singh, Dehra Dun, U.P., India. Consolation Prize: I. C. Dyer, Bombay, India.

AUGUST 1949 PHOTOGRAPHIC CONTEST

1st Prize, Section A: B. Stringer, Melbourne, Australia; Section B: D. Crowley, Hamilton, N.Z. 2nd Prize, Section A: J. Bellis, Victoria, B.C., Canada; Section B: C. Beavan, Southampton, Bermuda. 3rd Prize, Section A: G. Thomas, Durban, S. Africa; Section B: M. Byrne, Arklow, Eire. Consolation Prizes, Section A: G. F. Partridge, Waterford, Eire; P. J. Fritz, Leiden, Holland. Section B: P. O'Neill, Taranaki, N.Z.

SEPTEMBER 1949 RAILWAY CONTEST

1st Prize: D. Foreman, Alberta, Canada. 2nd Prize: B. Wells, Perth, Australia. 3rd Prize: M. Anderson, St. George, Bermuda. Consolation Prizes: V. Kergan, Nairobi, E. Africa; R. Kelly, Calcutta, India.

SEPTEMBER 1949 HOLIDAY DRAWING CONTEST

1st Prize: H. W. Kensley, Goodwood, S. Africa. 2nd Prize: M. Ring, Auckland S.2, N.Z. 3rd Prize: T. L. Humphreys, Rosario, Argentina. Consolation Prizes: J. Lindsay, Manitoba, Canada; B. Beauchesne, Dublin, Eire.

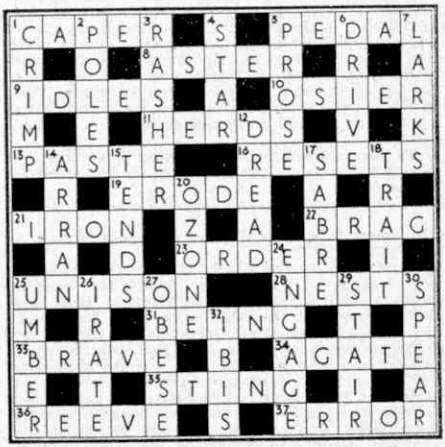
SOLUTIONS

OCTOBER 1949 LOCOMOTIVE NAMES CONTEST

No. 1. 2920 "*St. David*," "Saint" 4–6–0, W.R. No. 2. 32332 "*Stroudley*," N15X 4–6–0, S.R. No. 3. 34028 "*Eddystone*," "West Country" 4–6–2, S.R. No. 4. 45706 "*Express*" 5XP 4–6–0, L.M.R. No. 5. 62429 "*The Abbot*," "Scott" 4–4–0, Sc.R. No. 6. 5069 "*Isambard Kingdom Brunel*," "Castle" 4–6–0, W.R. No. 7. 45730 "*Ocean*," 5XP 4–6–0, L.M.R. No. 8. 60072 "*Sunstar*," A.3. 4–6–2, E.R. No. 9. 60099 "*Call Boy*," A.3. 4–6–2, E.R. No. 10. 4000 "*North Star*," "Castle" 4–6–0, W.R. No. 11. 45658 "*Keyes*" 5XP 4–6–0, L.M.R. No. 12. 35010 "*Blue Star*," "Merchant Navy" 4–6–2, S.R.

NOVEMBER 1949 LORRY FACES CONTEST

1. Fordson "Thames." 2. Bedford. 3. Foden, 15-ton vehicle. 4. Albion, CX5. 5. AEC "Mammoth Major." 6. Guy "Otter". 7. Dennis "Max." 8. Commer, 5 or 7 Tonner, with under-floor engine. 9. Scammell, Rigid Eight-Wheeler. 10. Maudslay "Mogul." 11. Leyland "Comet." 12. Thorneycroft "Trusty."



October 1949 Crossword Puzzle Solution.

Workers of Sydney Harbour Bridge—

(*Continued from page 170*)

service, he has been with the bridge since the pneumatic hammers first started to punch home the 10,000,000 rivets which clamp the steel mass in place.

London-born boiler-maker Thomas Charles Gatward adopts a fatherly air as he peers at a rivet showing signs of fault or age. "The bridge is like a little child the way we have to watch it," he says.

Gatward knows steel well. He served his apprenticeship with the Fairfield Shipbuilding and Engineering Co., Glasgow. There he also worked on the Australian cruiser "*Sydney*," first of three warships to bear the name. In 1922 he migrated to Australia to work at Cockatoo naval dockyard, Sydney. He joined the bridge staff in 1926, forsaking it to return to the naval dockyards when war came to the Pacific in 1942. Gatward played a big part in repairing dozens of war-damaged Australian and Allied warships. In 1946, however, he was back again with the bridge workers.

Gatward is no ordinary craftsman. He paints pictures, wielding his brushes and oil colours as deftly as he handles spanner or drill. On the wall of the bridge maintenance office hangs a delicately executed painting of Sydney Harbour and the bridge with the city in the background. It is a pleasant study in harmonising blues, greys, and pastel shades.

Ken Kinross, 55-year-old bridge cleaner and pedestrian attendant, has the unromantic but important job of keeping offices and footways clear of rubbish and stray gear. Kinross is the proud holder of the Medaille Militaire Belgique, presented to him by the late King Albert of the Belgians for bravery in the field in World War 1. Kinross has been keeping the bridge tidy for 16 years.

"The bridge once put me out of a job," says 38-year-old toll collector Leslie McIntyre, former turnstile hand for Sydney Ferries Limited, which controls a Sydney Harbour ferry service. When the bridge was opened in 1932, out of 53 ferries 36 were thrown out of service and hundreds of employees were forced to seek new jobs. The company's ships, which formerly carried 44,000,000 passengers a year, now take only 11,000,000. McIntyre's turnstile experience gained him a bridge job, and his keen interest in cars made it a continuous pleasure. He knows every make and model of the 27,000 cars which cross the bridge daily. No one is prouder of Sydney and its bridge than McIntyre, who spends his leisure hours recording the beauty of city and surroundings with his 35 mm. camera.

We are indebted to the Australian News and Information Bureau for this article and the accompanying illustrations.

The Tower Bridge—(*Continued from page 153*)

at night, to show that the bridge must be opened to give it room. A whistle signal marks the moment when the ship is ready to pass through. Bells then ring to announce that the bridge is to be opened, and the roadway is cleared of traffic and barriers are placed across its ends. The bolts that lock the leaves together can then be withdrawn, and the machinery that raises them is brought into operation by the movement of a lever. When the ship has passed through and the leaves have been brought together again, bolts fixed in one of them are driven by hydraulic power into sockets on the other in order to lock them, the barriers are removed and foot passengers and vehicles once more stream across the bridge.

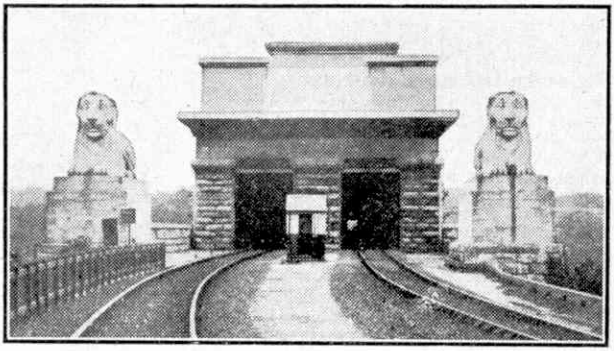
The Story of H.M.S. "Implacable"—

(*Continued from page 173*)

both ships back again to house wartime sailors. More important things were in hand, and deadly rot set in "*Implacable's*" now ancient timbers. After over 140 years constantly afloat—then the oldest vessel afloat in the world—her future had to be decided. This had to be done quickly, for she was slowly sinking and could not be repaired without the expenditure of a vast sum of money that could not be afforded. The Nautical Research Society did not feel able to take her back, scrapping was too costly, and she was unfit to make a long sea voyage back to her old home in France.

So last December, stripped of all her valuable fittings, mast, bowsprit, massive figurehead, stern galleries and the rest, she was towed out into the Channel, and with Union Jack and Tricolour fluttering from her stern, ceremonially scuttled with explosive charges in her hull to the accompaniment of full naval honours.

It was an impressive end to a gallant career, and as she reluctantly settled down in the water, slowly to disintegrate, it was good to reflect that the little "*Foudroyant*," fully repaired, is this year and for many more to come carrying on her spirit with the now traditional youth training work.



One of the entrances to Robert Stephenson's Britannia Tubular Bridge across the Menai Straits. This famous structure with its characteristic guardian lions was opened just over 100 years ago. British Railways Official Photograph.

SNAKES IN IRELAND

The pleasant legend that the absence of snakes in Ireland is due to St. Patrick is not easily abandoned, but it does seem more likely that there never were any snakes there to be driven out.

To find the cause of this we must go back some million years, when great glaciers had spread themselves southward over most of Great Britain. Then conditions became slowly warmer and the ice receded northward. As it did so it was followed by immigrant animals from the continent of Europe, for in those days there was no English Channel and Ireland too was united to Great Britain. At the same time water that for centuries had been locked up in glaciers and ice fields began to return to the seas and Great Britain was cut off from the continent, and Ireland from Great Britain, by the rising waters. Ireland apparently was cut off first, apparently before all the creatures making their way into the British Isles had spread as far away from the continent as Ireland itself. These included the snakes that Ireland lacks.

Fireside Fun

"Hey, what are you doing in that apple tree?"
"I had to come here. That notice says keep off the grass, doesn't it?"

* * * *

"Now, Wilson, where can I put this notice so that everyone will see it?"
"Put it on the clock face, sir."

* * * *

"Your writing gets worse and worse. I can scarcely read it."
"Yes, but if I wrote better you would find fault with my spelling."

* * * *

"I was run over by '*The Flying Scotsman*' yesterday."
"But you aren't hurt. How did you escape?"
"The bridge I was standing under kept it off me."

* * * *

Visitor: "Things seem pretty dull round here."
Native: "You should have been here a week or two ago. The place was properly stirred up."
Visitor: "Oh! What happened?"
Native: "We finished ploughing."

* * * *

"This circus is going to stay here a long time."
"How do you know that?"
"Haven't all the elephants brought their trunks?"

* * * *

Weary Willie: "I think I'll go and look for work."
Tired Tim: "Have you gone mad?"
Weary Willie: "No, but I've often wanted to know what it looked like."

* * * *

"I don't like this one. It makes me look like an idiot."
"But that's your own hat, sir!"

BRAIN TEASERS

DO YOU RECOGNISE THESE?

Here are the names of six well-known towns in Great Britain, the letters of which have been thoroughly muddled:
1, FUNNERMILDE; 2, DROXFO; 3, VEPROLIOL; 3, WRINCHO; 5, PRONTEW; 6, HOLMAD. What are they?

The name of a very famous city can be made with the initial letters of these towns. What is it?

* * * *

ON THE TRACK

Each of the missing words in the following sentence has a meaning connected with railways in addition to the one that it carries in the sentence itself. What are the missing words?

"The ——— of beginning to ——— for a career with the aid of a ——— was to fit himself for a better ——— in life, and the idea proved a ——— success?

S.W.C.

* * * *

NOT REALLY VERY SMALL

There must be many numbers that can be divided exactly by each of the digits 1, 2, 3, 4, 5, 6, 7, 8 and 9. What is the smallest of these numbers?

* * * *

CLEARLY A LONG WORD!

A word of three syllables is the target in this puzzle. When you have discovered it you will find that in it 26 letters are combined.

* * * *

"Oh, inspector, I'm afraid my little dog has eaten my ticket."
"I'm sorry, Madam, but you'll have to buy him a second helping."

* * * *

FORMING FOURS

It is easy to make up 500 with 125 fours. Can you make it up with eight fours?

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The fish, bird, insect and animal in the letter square of our first puzzle are SALMON, ROBIN, ANT and CAT. The eight letters left when those indicated have been removed make up the word TREASURE.

The three numbers in the first part of our second puzzle are 10, 11 and 12. Squaring these and adding gives the total of 365. Curiously enough, the squares of the next two consecutive numbers, 13 and 14, add up to the same total.

The towns indicated in our third puzzle were BLACKPOOL, CREWE, NEWARK, RYE, FLINT, NEATH, WICK, and COWES.

The sentence in the remaining puzzle was printed backward. From right to left it runs: THIS LINE READS EASILY BACKWARDS.

STAMP ADVERTISEMENTS

(See also pages 184 and 186)

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