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MECCANO MAGAZINE

6D.

A MOBILE CRANE ON ACTIVE SERVICE

(See Page 290)

Next Month: "ALL AMONG THE BOMBERS"

MECCANO MAGAZINE

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With the Editor

"M.M.s" from the Sea Bottom

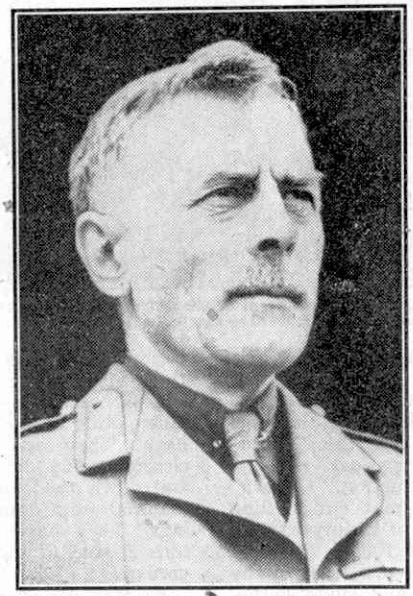
In spite of all the efforts of the enemy, the "*M.M.*" has continued to reach its readers in Canada, South Africa, Australia, New Zealand and elsewhere with great regularity. A few parcels have been lost at sea, however, and unfortunately, owing to the strictly limited number of magazines that can be printed each month, their contents could seldom be replaced. I was therefore particularly interested to receive the following letter from Mr. Arthur E. Harris, our General Agent for the Union of South Africa.

"We thought you would be interested in receiving copies of the March 1943 Magazine which reached us in a very sodden condition due to having been recovered from the bottom of the sea. We have managed to sun-dry these and those in better condition we are supplying to clients.

"We are sending you one representing the worst condition and one representing the best.

"We thought you would like to have these as it is a unique experience for South African boys to have their Magazines after same had been to all intents and purposes lost. They were glad to have them as it keeps their volumes complete and a wonderfully unbroken record of every copy safely reaching them since October 1939."

So even the Germans cannot keep the "*M.M.*" down!



Lieut.-General Andrew G. L. McNaughton, C.B., C.M.G., D.S.O., General Officer Commanding-in-Chief, Canadian First Army.

Leaders in the War

Lieut.-Gen. A. G. L. McNaughton

Lieutenant-General A. G. L. McNaughton was born at Moosomin, Saskatchewan, Canada, in 1887. At McGill University, Montreal, he gained the degrees of B.Sc. and M.A. He joined the Army, served in the war of 1914–18, and was wounded twice and mentioned in despatches three times. In 1917 he was awarded the D.S.O.

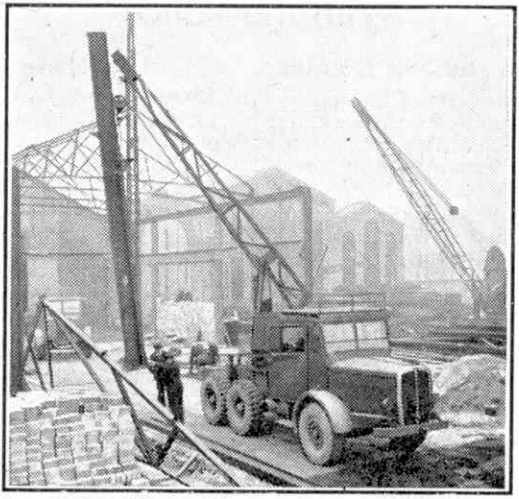
After the war he passed through the Royal Staff College, Camberley, and the Imperial Defence College, London. He attained the rank of Major-General in 1929, and from that year until 1935 he was Chief of the Canadian General Staff. He was Adviser with the Canadian Delegations to the Imperial Conference at London in 1930 and to the Disarmament Conference at Geneva in 1932, and in 1935 was President of the National Research Council of Canada.

In the present war he commanded the 1st Division, Canadian Overseas Force, in 1939–40, and from 1940 to 1942 he was General Officer Commanding, Canadian Corps. Last year he became General Officer Commanding-in-Chief, Canadian 1st Army.

Mobile Cranes and their Work

THE crane is one of the oldest of all appliances devised by man to help him to carry out his engineering schemes. In crude forms it dates back thousands of years, and to-day there are literally hundreds of types in regular use.

The engineer makes use of cranes to help him to solve one of his commonest and most pressing problems—that of raising, lowering, transporting and placing in position loads that are too big and too heavy for hand manipulation. This problem crops up in almost every branch of engineering and industry, and there seems to be no end to the variety of the loads to be handled and to the conditions in which this handling has to be done. This state of affairs has resulted in the development of cranes of many specialised types, the number of which still continues to grow.



Coles Cranes help in urgent building of new war factories. Our photographs are reproduced by courtesy of H. J. Coles Ltd., Derby.

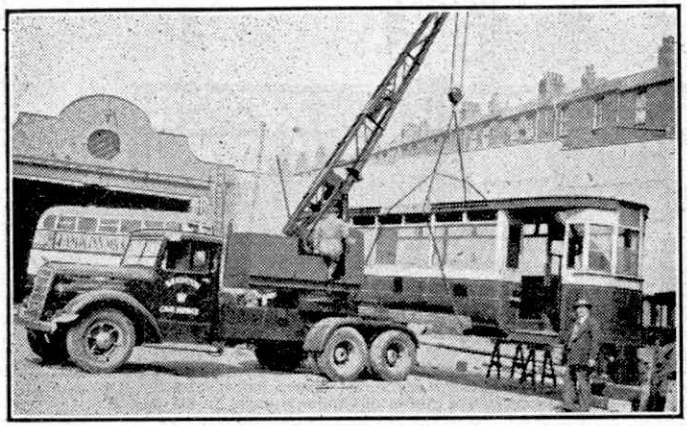
We have at one extreme simple arrangements of block and tackle, and at the other mighty monsters such as the "Titan" cranes used for setting huge concrete blocks in harbour construction, "Goliath" cranes that travel on great girders, and floating cranes capable of lifting loads of 250 tons to a height of 100 ft. or more.

In between these extremes come many types of medium-sized and small cranes designed either for general purposes or for special jobs. These may be divided into two main classes—cranes for working on a fixed site, and mobile or portable cranes capable of travelling under their own power to wherever the job may be. It is with cranes of the mobile type that we are now concerned. The use of these cranes for dealing with material-handling problems has increased rapidly during the past ten years or so, and especially under the stress of wartime conditions.

Our cover this month shows one of many different mobile cranes manufactured by Henry J. Coles Ltd., the largest makers of such cranes in the world, to whom we are indebted for the photograph on which our cover picture is based, and for the technical details included in this article. The crane shown is known as the Coles Mark VI and it is seen at work on an airfield where it is employed in aircraft repair work. Conditions here are hard, and only a mechanism of the most robust construction can stand up to the job. These cranes seem to thrive on difficulties, however, and have been put to a great variety of tasks in all parts of the world. During the Battle of Britain and the period of heavy bombing they were in the thick of it, lifting precious engines out of crashed aeroplanes and transferring the fallen pride of the Luftwaffe to the scrap heap. They were also of great help in clearing away debris in blitzed areas up and down the country, and in salvaging material from damaged works and buildings. They have unloaded thousands of tons of steel at the docks or in the goods yards.

By way of contrast we are told that a Coles crane that had been working with the British Army in the Desert was called in to assist in a very delicate and intricate spinal operation that had to be carried out at one of the advanced dressing stations! This surely must be a unique episode in the life of a crane.

The Mark VI crane shown on our cover is built on a lorry chassis running on giant pneumatic tyres. It has a lifting capacity



A Coles lorry crane handling a weighty problem.

of up to two tons at a maximum radius of 7 ft. 9 in., and travels at a road speed of 20 m.p.h. The power unit is a four-cylinder petrol engine coupled to a variable voltage generator. The travelling mechanism is independent of all other motions, and the patent steering mechanism allows complete control whatever may be the position of the jib.

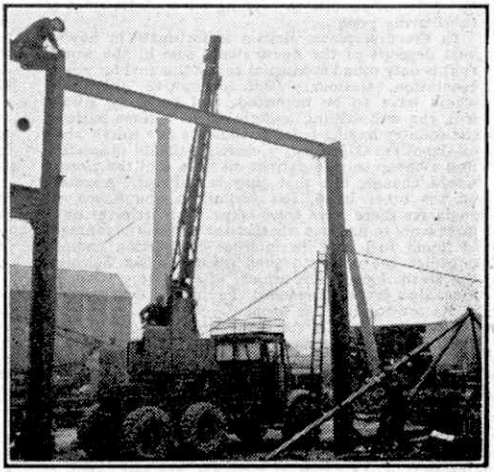
The superstructure revolves through 360 degrees and the driver turns with it so that he may always watch his load. It often happens that he may wish to travel in the direction he is facing when he has turned through 90 degrees and is not actually facing the rear. Normally, such a situation would involve all the complications of steering a car in reverse gear, but an ingenious mechanism automatically alters the steering controls while in this position, so that the steering becomes normal when driving backward, which considerably simplifies the driving problem. The controls are again reversed when the superstructure is turned to the forward position.

A more popular model is mounted on its own chassis and can travel on the road under its own power at 20 m.p.h., or can be towed in convoy. Models are available for lifting 1, 2 and 3 tons, while the larger cranes built on lorry chassis lift 2 and 5 tons.

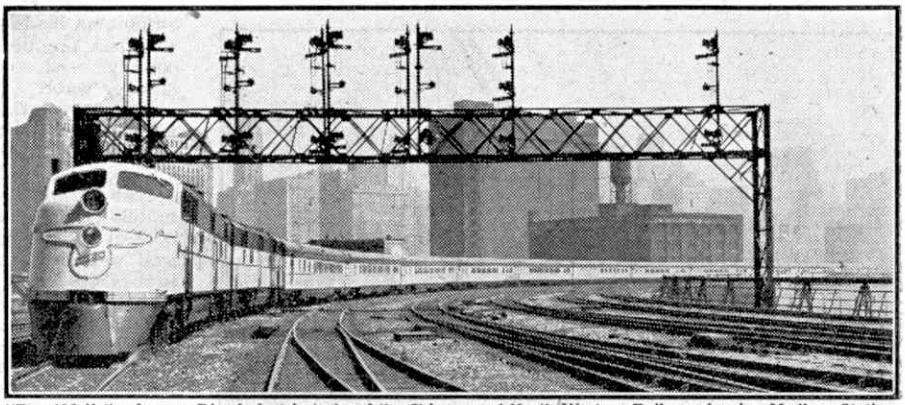
Coles cranes travel either on solid steel wheels, on giant pneumatic tyres or on crawler tracks, according to the locality and the conditions in which they have to operate. There are also floating types, and even amphibian models that can function equally well on land or water.

Slewing of the jib is an important feature in the successful operation of a mobile crane, and control of this is well provided for in the Coles design. The crane can revolve through a complete circle with its load, even when working in a confined place, this being made possible by eliminating the projecting tail that usually is a prominent feature. Derricking and lifting, like the other operations, are controlled from the driver's seat, which revolves with the superstructure and allows the driver a complete view of his load at all times.

Another useful item of the mechanism is an electrical device that gives visible warning when the jib is lowered to such a degree that the load approaches the maximum safe working radius. A special mechanism is sometimes incorporated to prevent the jib being turned more than 180 degrees at one setting when working in a very confined space, for example between two lines of trucks. (*Cont. on page 322*)



A Coles Mark VI lorry crane erecting a steel frame building.



"The 400," the famous Diesel-electric train of the Chicago and North-Western Railway, leaving Madison Station, Chicago, on its run to Minneapolis. The run of 407 miles is made in 405 min.

A Trip on a Diesel-Electric Train

"The 400" of The Chicago and North-Western Railway

By Edward H. Livesay

DIESEL-ELECTRIC locomotives have taken a firm hold in the United States. Many trains, sleek and streamlined, capable of high speed, are hauled by them, particularly in the West, where oil is plentiful and coal scarce. Immense freight trains are also now being handled by this type of engine, and it looks as if more and more railway motive power across the Atlantic will come from oil instead of coal in the future. There are reasons for this trend that do not appear on the surface, and one should not assume that because these interesting machines with their strings of close-connected coaches are not seen sweeping through Britain, conservatism or lack of technical ability to build them is responsible. There are other quite reasonable explanations, arising from the different conditions existing on opposite sides of the herring pond.

In the first place, Britain is fortunate in having vast deposits of the finest steam coal in the world, so it is only sound economics to use this fuel for power generation, stationary and locomotive alike. Oil would have to be imported, and probably always will, the well drilling undertaken in various parts of the country having failed to indicate any worth-while oil deposits. Of course, if chemists should ultimately find a cheap way to extract oil from coal the picture would change, but that time is not yet. America, on the other hand, has fuel-oil in abundance, so engineers there have freer scope to experiment on a large scale to find out whether the obvious advantages of liquid fuel used in internal combustion engines outweigh the manifold good points of Old Faithful, the steam locomotive, which, after a very long innings, has probably reached the limit of development in its present familiar form.

Secondly, British railways are privately owned, and must pay their way; there is no bottomless State purse into which they can dip when traffic falls off, or when they would like to experiment with new types of motive power and rolling stock. This is where American railways score over their British contemporaries. It is not generally realised that, at any rate before America entered the war, a large number of the leading American railroads were "broke," in the hands of receivers, and only kept in operation by substantial Government aid. Others were badly run down, unable to replace worn-out equipment, much of which had become inefficient and outmoded. The State had to step in and rescue these moribund lines, and provide the sinews of war, making it possible for them to launch out on a building programme of super-locomotives, steam and Diesel, and corresponding super-trains. Without this assistance they would have had to stagger along as best they could with their old material, and probably there would have been no greater originality displayed by American railway equipment than by British.

Apparently America has gone quite a long way towards State operation of railways, though somewhat "under the rose," as it were, and apart from the fact they are Government-controlled "for the duration," just as in Britain. So these impressive Diesel-electric trains present somewhat of a paradox; the more "broke" an American railway is the more apt it is to be found operating superb up-to-the-minute trains and locomotives! The Chicago and North Western Railway, responsible for *"The 400,"* is a case in point.

Lastly, these creations are still largely experimental, as nothing but extensive use over a long period can prove definitely whether or not they will pay in the long run. British lines have not got the large sums necessary for building equipment to demonstrate this.

So much for the why and wherefore of contrasting rolling-stock in the two countries. Britain has no reason to hang her head or apologise for conservatism —it is justified. She deserves full credit for the fine locomotives and trains, and for the efficient way they are operated under very difficult conditions.

Now something about the engine and train composing *"The 400,"* both very typical of American Diesel-electric streamliners. The former consists of two similar vestibule-connected units, placed back-to-back, with a cab at each end, so the engine can run round the train at terminals and ignore turntables. Each unit runs on two six-wheeled bogies, the outer axles being motor-driven as on a tramcar. There are therefore eight traction motors on the two units, receiving current from four generators direct-driven by 12-cylinder V-type Diesel engines of 1,000 h.p. Thus there are 48 cylinders, producing 4,000 h.p.; the tractive power is 105,000 lb., and with 188 tons adhesion weight the factor of adhesion—

weight in pounds on the axles divided by power applied to them—is 4.00.

The many auxiliaries include four generators for lighting, etc., eight water pumps for circulation, two Clarkson oil-fired boilers for steam heating the train, and so on. The Westinghouse brake is used, with an additional electro-pneumatic system acting on air-cooled drums fitted to the axles, motor-car fashion. The suspension includes shock-absorbing gear that ensures extremely smooth and steady riding, far superior to that of the finest steam locomotive. The engine's total weight is 278 tons, and its maximum speed 117 m.p.h.

Ten 8-wheeled air-conditioned cars make up the train, very quiet and smooth-running, simplicity both inside and out being a prominent feature. By the use of aluminium, light alloy steels and welding, the weight has been cut to about 40 tons per car, so the total weight of the train is roughly 400 tons, approximately half what it would be if the cars were of the older American pattern.

I joined "*The 400*," so called because it covers the 407 miles from Chicago to Minneapolis in 405 minutes, at Madison Station, Chicago, showing my credentials to Engineer or driver Miller, a courteous, quiet-spoken veteran engineman nearing his retirement, who had only a few more trips to make to "put in his time." Inviting me into the cab, he introduced me to his son, an equally well-mannered and likeable University student, who was making his first and long-desired trip with his father; and to the two "maintainers," skilled mechanics who dance attendance on the mass of machinery in the engine rooms. The crew therefore numbered three, all "top link" and highly paid.

The cab looked very novel, it was the acme of simplicity and cleanliness, and in complete contrast to the footplate of a steam locomotive, with its numerous controls, wheels, levers and gauges, spread over a backplate festooned with writhing pipes. It was a bright, spotless little room, well lit by windows on both sides and in front, furnished with two comfortable revolving armchairs, plus the bare minimum of operating gear. On the right, in front of Miller's seat, there was a controller, something after the tramcar pattern, fitted with a "Dead Man's" pedal, similar to the accelerator of a car, on which the driver's foot rests, so that in the event of his fainting or, worse still, dying, power is cut off automatically. This device is necessary, as sometimes the driver is alone in the cab. There was a brake handle, speed indicator and whistle trigger, and nothing else, in my recollection. In front of my seat on the left were two gauges, fuel and water, these making up the sum of controls and indicators. A tram has almost as many! At the back a sound-proof door led into the engine room, where one of the Diesels was turning over idly; in front were the two wiper-cleaned windows extending the full width of the car, giving a perfect "look-ahead." Another contrast to steam locomotives, from which the outlook becomes more and more circumscribed as boilers and fire-boxes grow bigger! A little further in this direction and we shall need periscopes or television.

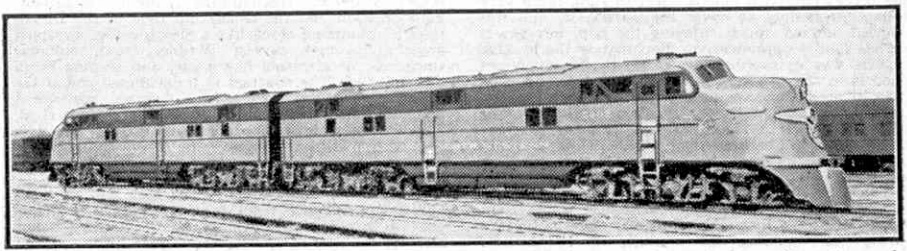
A walk through the engine rooms brought an acute attack of mental indigestion. The mass of gear called for a day or two's study if the import of everything was to be grasped, and the time available was insufficient to do it all justice. There was a passage way right round the engines, and from one unit to the other, so most of the machinery can be attended to en route. It was easy to see why a 4,000 h.p. Diesel-electric locomotive costs double the most advanced American steam engine; in this case about £70,000, I was told. "*The City of San Francisco*," a three-unit engine, costs the company running it over £100,000. Half-a-dozen L.M.S.R. "Princess Coronations" could, I imagine, be built for this.

The inspection over, starting time drew near, and I settled in the comfortable seat, which young Miller insisted upon my occupying, in keen anticipation of coming events. The mutter of the idling Diesel behind me suddenly swelled into a deep diapason; the other three engines had sprung to life, the whole quartette were speeding up ready for the get-away, and a responsive quiver began to run through the cork-carpeted floor. One of the maintainers was looking back from the window for the conductor's signal. He turned inboard; "*Right away!*" and on the stroke of 3 p.m. "*The 400*" began to move, at first so gently it was scarcely perceptible, and then, with a surge more reminiscent of a powerful car than a locomotive. It felt as if the hand of a giant were pushing me forward out of my seat.

The acceleration was wonderful in spite of a slight drizzle and slippery rails; we swept round the curve outside Madison station with easy, serpentine grace. Switches, crossovers and transition from the outer track to the inner fast metals were alike imperceptible and entirely free from shock or lurch. It was fascinating. The silky motion, the quiet comfort of the cab, the faint musical hum of the gears beneath the floor—everything was so novel and pleasant that several miles dropped behind before I could fit in, and get my bearings. I just sat there letting things soak in, watching the track rush towards me, trying to get the *feel* of being in the grip of 48 cylinders and almost unlimited oil-electric horse power. Suddenly Miller said: "*What do you make the speed?*" I hazarded 40. "*Guess you're a bit out. Look at the indicator.*" It said 65½. What a bloomer! But it was all so deceptive, the quiet smoothness, the absence of exhaust noise, thresh or rhythmic rattle, all made it difficult to judge velocity. There was no feeling whatever of wheels in contact with rails; we were gliding, not rolling along.

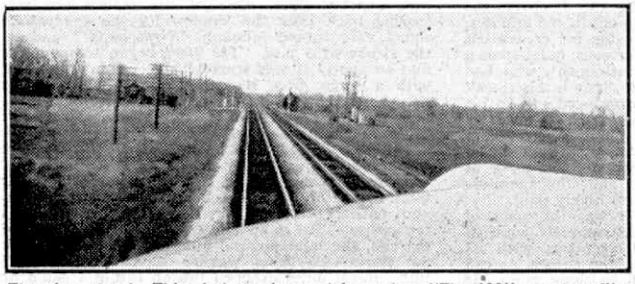
Some degree of caution was imposed at first, in the vicinity of Madison, but on entering a straight five miles out I felt a surge forward, and in a few yards the indicator showed 80. The riding was absolutely perfect, vibrationless, shockless; just a smooth humming flight with an occasional slow, gentle side sway, like that of a big ship in a heavy swell. A curve was run into and left at 85; I should never have noticed it at all had I not seen it sweep towards me and disappear under the prow.

The first stop was at Evanston, 12 miles in 13¼ min., including a reduction to 30 m.p.h. and cautious running. Again I felt that tremendous thrust forward



A 4,000 h.p. Diesel-electric locomotive of the C. and N.W.R. It is made up of two similar units, with a cab at each end, so that turntables are not required, and it houses eight traction motors.

at the restart, with its sense of superabundant power. When 4,000 h.p. is applied to a 400-ton train things happen quickly! The weather had cleared too, and the rails were dry; the wipers, previously flicking to and fro, had come to rest, and from my grandstand seat with its perfect look-ahead I watched the sun-lit track pour towards me and flow smoothly away under the humming floor. It was like sitting in the front seat of a powerful, big-bonneted car; everything was spread out plainly, ahead and on both sides, and the telegraph poles flashed by, flick-flick-flick. We took a curve at 90 and only a slight canting of the floor told the tale. Switches and crossings swept underneath, seen but not felt. The cab was quiet and cool; it was never necessary to raise one's voice when talking across it. Only a muffled drumming came from behind the closed door into the engine-room, and a faint musical singing from the gearing under the floor, rising and falling as the speed changed. But when the door was opened a roar burst in; upwards of 4,000 h.p. was being generated in there.



The view ahead. This photograph was taken when "The 400" was travelling at 100 m.p.h.

Only one thing worried me, "*The 400*" was super-fast and silent, and we were whirling along open country at nearly 100 m.p.h., through good-sized towns and round "blind" bends galore at from 70 to 80, yet much of the right-of-way was not even fenced, and innumerable level-crossings both inside and outside towns were ungated. Many streets paralleled the track, and others crossed it at right angles, minus any protection or warning device. It seemed extraordinary; I certainly could not approve of it. Obviously considerable risks were being taken. I pictured jackasses trying to "beat the train to the crossing" and miscalculating things; a truck stalling on the track just as the flyer swept round a blind bend; all sorts of unexpected and unpleasant things happening, and the resulting mess, with myself one of the central figures in the funeral ceremony. It was disturbing!

I mentioned my disquiet to the crew. Yes, they agreed, things *might* happen, as a matter of fact, they already had! I devoutly hoped they wouldn't on this occasion, and there I sat, right out in front of the procession, with only a sheet of glass and a very collapsible bonnet to cover my nakedness, and was whirled onward, much enjoying the trip, but nevertheless faintly apprehensive. Fortunately the braking system was extraordinarily good, I felt we might need it in the worst way at any moment, and even then it might not save us from a pile-up.

And still the speed rose. At Fort Sheridan it was 95, followed by a rapid slowing demonstrating the perfection of the brakes, which acted with tremendous power and smoothness. No juddering, jerky squealing; we slowed down as if a giant had grabbed us by the tail. I wanted to fall forward out of my seat, and had to brace my feet against something solid. Near Lake Forest we took a bend at 97, as sweetly as a racing car rounding the banking at Brooklands. Spinning through Waukegan, with Lake Michigan lying blue on our right, I asked if 100 might be worked up to; I wanted to take a picture at that speed, and this was a fine opportunity. Assent obtained, I stood up in front of the window with my camera, asking the maintainer to sing out the readings from the speedometer. The song of the gears took on a rising note—"*94!*" came the hail—"*96—98—100!*" Click! The picture on this page is the result. Yet the speed continued to rise, 103 being reached before a curve called for braking.

The snapshot shows a straight track with a flag-station and crossing in the middle distance, of course ungated. At this high speed the engine simply floated along like a Rolls-Royce on a perfect road, and though looking ahead gave little impression of super-fast travel, a glance through the side window at the telephone poles flicking by led to a very different judgment. This was the highest speed I had ever reached on land, the nearest approach to it having been a little over 90, near Lavington, on "*King William III*" with the "*Cornish Riviera Express.*"

Another stop at Racine; the 50 miles from Evanston had been covered in 38 minutes, 79 m.p.h. Only 23 miles remained to Milwaukee, during which we touched 104, the route being very tricky, with many curves, some blind, crossings and switches, and we came to a stand at 4.13, two min. early. The 85 miles from Chicago, with two stops, had taken 73 min., an average of 70.

On the return trip, "*The 400*" left Milwaukee at 8.10 p.m., 10 min. late, in rain and failing daylight. I pretended the afternoon's performance had been a little disappointing; "*I thought this outfit could do 125?*" "*Well, hardly that,*" I was told, "*but we'll do a little better farther along,*" and on the same straight where 104 had been reached I gleefully watched the needle go round to 110, again breaking my personal record. Shortly afterwards the headlights were switched on, the lower one being a special "Mars," the beam swinging to-and-fro across the track in a horizontal figure-8 manner, to attract additional attention to the flyer's approach. Only one stop was made going back, at Evanston, 73 miles in 57 min., 76.9 m.p.h.

"*The 400*" came to a final stand in Madison station at 9.25, still 10 min. late; 85 miles in 75 min., 68 m.p.h., nothing much out of the way. I said good-bye to Engineer Miller, his wife and family, who had all travelled in the train from Milwaukee; I was left with the recollection of charming, courteous people whom I should much like to meet again.

As to the train, and the fascinating engine, that too had impressed me. I wondered if I had seen the writing on the wall. Could the long day of the steam locomotive I am so fond of be nearing its end? I thought of it, hammering and pounding, lurching and nosing, somewhat mechanically crude and inefficient, hard on itself and the track, and then of the Diesel-electric, humming along like a sleeping top, sweeping gracefully round curves, flexible, quiet, sinuous, smokeless, accelerating like a car, and slowing down like one too. The contrast is tremendous, and if the steam locomotive is to have a deferred sentence I imagine it will assume much of the shape of its rival; a gear-driven, high-speed enclosed engine, multiple unit design. But I will leave the future to look after itself; thank goodness, the steamer will last out *my* time, at any rate!

They try to offset some of the high cost of these Diesels by keeping them moving. Should a defect develop in one of the engines, the locomotive is not laid up; the roof is opened, the cripple lifted out and a spare engine fitted in. Did the 110 m.p.h. seem to approach the limit

(*Continued on page 322*)

Plan of turf maze cut in floor of church porch, Alkborough, Lincs.

Turf Mazes

By Edward Richardson

HAVE you ever seen a turf maze?

Those that are left from the many which existed centuries ago are not well known, but there are still examples in several parts of the country. Three of the best known ones are at Wing, in Rutland; at Alkborough, in north Lincolnshire; and at Cranborne Chase, in Wiltshire. Others are at Hilton, near Huntingdon; Troy Farm, Somerton, Oxfordshire; Breamore Down, three miles north of Fordingbridge (inside a crown of trees one mile west of the Fordingbridge-Salisbury road); and Terrington, seven or eight miles due west of New Malton, in Yorkshire.

The Alkborough maze is cut in the turf of a hill overlooking the junction of the river Trent with the Humber. It is known locally as "*Julian's Bower*"; other names being "*Mix-maze*," "*Shepherds' Race*," and "*Troy Town*." It is 44 ft. in diameter, the track being so narrow that one can only just walk round it. The names "*Troy Town*" and "*Julian's Bower*" probably originated in the game of "Troy" described by the Roman poet Virgil, which was led by a man called Julius.

These mazes are not puzzles, like the hedge maze at Hampton Court, but consist of a single continuous track which leads inevitably to the centre—though by the most circuitous route possible within the area covered. Both the Alkborough track and that at Wing, which is smaller in lay-out, double on themselves 10 times in each quarter of the circle. Assuming that the radius of the path decreases regularly from 22 ft. to 6 in. in units of 1½ ft. (not an actual measurement, but a guess from memory), a rough calculation gives the total length of track as approximately 230 yards. Since no ingenuity is required to reach the centre, it is a simple matter to walk this distance round the maze in a minute or two. But these mazes were not constructed for walking, but for crawling on hands and knees.

The Alkborough maze is close to the village church, in the porch of which is a plan of the maze cut into the stone of the floor. This serves as a guide for the trimming or re-cutting of the maze, which is very necessary, as it lies in an open field without any protection from cattle or humans. The porch diagram also indicated the ecclesiastical origin of the maze, which is believed to have been made by the monks of a small monastery which ceased to exist in the year 1220.

Turf mazes are thought to have been used by the church as a punishment for sinners. The repentant man or woman was obliged to crawl on hands and knees from circumference to centre, stopping from time to time to pray. Some of the plans, such as that at Sneinton, Nottingham (ploughed up in 1797), contained "stations" or empty spaces, in which a halt was made for prayer. The centre came to be known as "Ciel" or "Jerusalem."

The Wing maze lies just outside the village of Wing, near Uppingham, beside the road. It differs very slightly from the Alkborough maze, and is 40 ft. in diameter. The one formerly at Sneinton had a diameter of 51 ft., with a track 535 yards long. Another existed at Boughton Green, Nottinghamshire, with a diameter of 37 ft. This, too, seems to have vanished.

The following mazes also existed at one time, but may all have gone by now; Comberton, Cambridgeshire; Leigh, Dorset (overgrown in 1868); Saffron Walden, Essex; St. Catherine's Hill, Winchester (re-cut in 1858—reputedly by a schoolboy); and at Ripon, Yorkshire (ploughed up in 1827). There is still a maze at Asenby, in north Yorkshire—or was in 1908—sunk in the hollow at the top of an oval hillock. At that date this was unknown to most of the villagers, although there were many people still alive who had trodden it on a summer evening and knelt at the centre to "listen to the fairies singing." The site is called the "*Fairy Hill*." The turf maze at Cranborne Chase, which is 34 yards across, is surrounded by a yew hedge. This maze was in quite good condition in 1938.

Mazes of this type were widely spread on the Continent, but were not cut in the turf. They are still to be found incised in the floors of churches, as in the Alkborough porch. The one in Lucca cathedral, Italy, is similar in track to the Alkborough and Wing mazes, but is only 19½ *inches* in diameter. It is incised on a pier supporting the porch, and is meant to be traced with the finger.

Turf Maze by the side of the road at Wing, Rutlandshire.

Air News

Boeing Complete 7,000th Trainer Aircraft

The Wichita, Kansas, Division of the Boeing Airplane Company, U.S.A., recently delivered their 7,000th Primary Trainer to the U.S. Armed Forces. This number is greater than the total of military aircraft owned by the U.S. Army and Navy at the start of the present war.

The Boeing PT-17 "Kaydet" Primary Trainer is used by many Allied Nations, and more U.S. fighter pilots have been taught in machines of this type than in any other type of American primary training aircraft. It is also in service with the U.S. Navy as the "N2S-3." The "Kaydet," like its big brother the famous "Flying Fortress," with which it is seen in the photograph on this page, has earned a reputation for stability and ruggedness. Not one of these trainers has been lost in flight testing during the three years or so that the type has been in production.

Canadian Government Transatlantic Service

The first outward flight of the new war-time transatlantic air service operated by Trans-Canada Air Lines for the Canadian Government was completed on 23rd July last, with the arrival in Great Britain of a transport aircraft carrying 1 ton 3 cwt. of mail and three passengers. The machine had flown non-stop from Montreal and accomplished the trip in 12 hrs. 26 min., which was 25 min. shorter than the previous best time for an eastward crossing. The return flight was completed on 26th July.

The new service is mainly for the quick transport of mail to and from the Canadian Forces in the United Kingdom, but, as indicated above, official passengers also are being carried.

Fine Air-Sea Rescue Work

The R.A.F. Air-Sea Rescue organisation excelled all previous achievements by rescuing 101 airmen from the North Sea within 50 hrs. during the spell of heavy bombing raids on Hamburg and other targets in Germany by British and American aircraft, between the 21st and 28th July last. More than 200 machines, drawn from R.A.F. Coastal, Fighter, and Bomber Commands, and from the U.S. Army Air Force in this country, took part in the day and night searches over the North Sea for the airmen, and in protecting rescue craft from enemy interference. On several occasions airborne life-boats, as described in last month's "*Air News*," were dropped by parachute. Most of the rescues were effected more than 100 miles out to sea.

British Air Service to Moscow

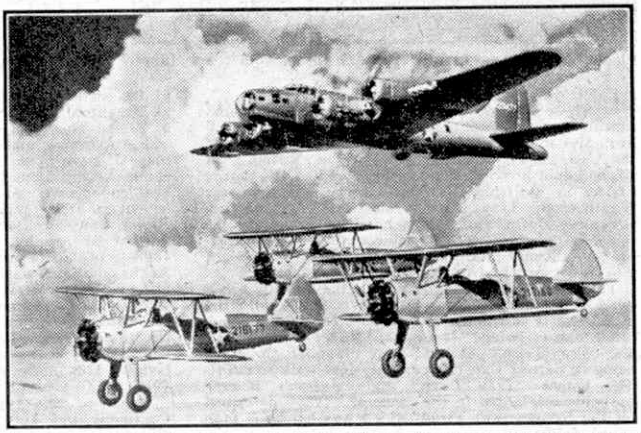
British Overseas Airways are operating a frequent, but irregular, through air service between this country and Moscow, by way of North Africa, Cairo, Habbaniyeh in Iraq, Pahlevi in Iran, Astrakhan and Kuibyshev. The service is for the transport of Government officials and urgent freight, and the passengers travel all the way in the same machine. The journey takes three days, including a 24-hr. stop at Cairo.

D.H. "Dragon Rapides" for Turkish Airways

Four de Havilland "Dragon Rapide" six-passenger light transport aircraft are being supplied to the Turkish Government for use on internal airways served by Devlet Hava Yollari, the Turkish State system which has been operating a fleet of these machines and 4-engined D.H.86s since 1936. Both these types are fitted with 200 h.p. "Gipsy Six" engines. It is probable that another four "Dragon Rapides" will be supplied to the Turkish Government later this year.

Manufacture of this de Havilland type has continued throughout the war, and under the name of "Dominie" it is extensively used by the R.A.F. as a flying classroom for wireless and navigational training of air crews. These R.A.F. "Dragon Rapides" are fitted with an improved engine called the "Gipsy Queen" III. Aircraft of this type are also in service in the Middle East and other war areas, on light transport duties. Owing to their reliability, economy, and simplicity of structure, they have proved to be ideal "half-ton utility trucks" for linking aerodromes where only limited maintenance facilities are available.

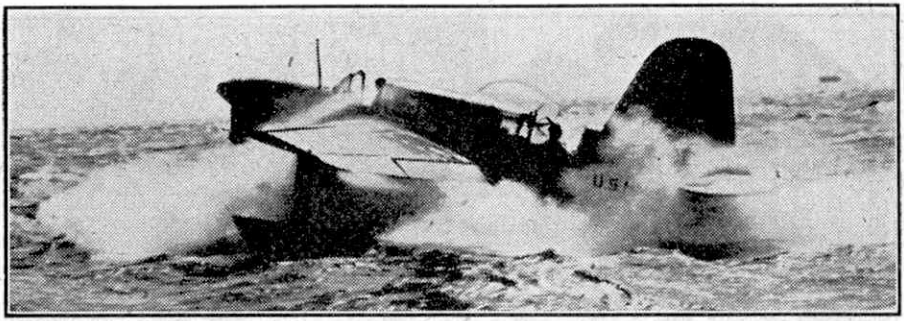
The "Dragon Rapide" carries its six passengers or ½-ton of payload at 135 m.p.h. for a fuel consumption of 7½ miles per gallon. It has always figured as a most economical pioneering branch air liner and tramp aircraft, and has been extensively used in every continent.



The Boeing 17s get together. A B-17 "Flying Fortress" and three PT-17 "Kaydet" Primary Trainers in an unusual formation. Photograph by courtesy of the Boeing Airplane Company, U.S.A.

N.A. "Mustang" as a Dive-Bomber

Modifications to the North American 73, known in the R.A.F. as the "Mustang," have brought this type into service equipped with four 20 mm. cannon instead of machine guns. It is also in service with the U.S. Army Air Force in Sicily as a fighter-dive-bomber. This version, called the A-36, has a bomb rack fitted to each wing, and four hydraulically-operated dive brakes, two on the top and two on the underside of the wings. With these brakes in operation the machine has a normal diving speed of 450 m.p.h. This version has four 0.5 in. machine guns, two synchronised to fire through the airscrew disc, and two mounted in the wings.



A striking photograph of a Curtiss "Seagull," a type that can be easily landed in rough water. The "Seagull" is a 2-seat Scout Observation machine with an exceptionally long cruising range. Illustration by courtesy of the Curtiss-Wright Corporation, U.S.A.

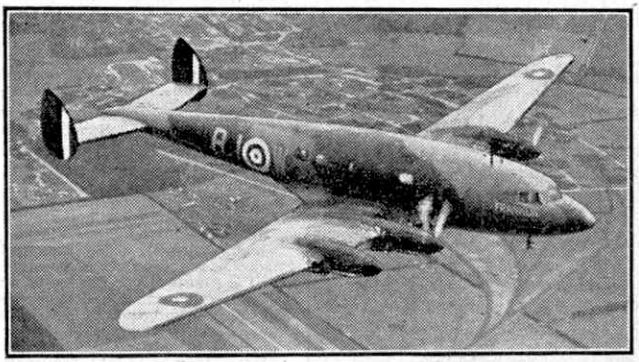
B.O.A. Blind Flying Training

The Beechcraft training aircraft used by British Overseas Airways at Baltimore, U.S.A., has a new system for obstructing the outside view of pilots under instruction. Removable panels of a green material are fitted to the windshield and side windows, and the pilot, wearing a special pair of red goggles, cannot see outside the cockpit but can see the instrument panel quite clearly. The instructor, who does not wear red goggles, has a clear view all round through the green panels.

The new method does away with the old type of blind flying hood, which has always tended to obstruct the view of both the pilot being taught and of the instructor. It has proved very satisfactory, and pilots report that there is no evidence of eyestrain after completing about 90 min. periods of instrument flying.

Remarkable Aircraft Vertical Dives

Lieut.-Col. C. S. Hough, Technical Director of the U.S. Army Eighth Fighter Command, has been awarded the United States D.F.C. for "independent flight research." While flying a Lockheed P-38 "Lightning" in England in September 1942 he put the machine into a power dive when at 43,000 ft. and did not pull out until down to 18,000 ft., a feat that is said to be the longest vertical dive ever made. He made another remarkable vertical dive in February this year, also in this country, when he put a Republic "Thunderbolt" into a power dive at 39,000 ft., and again maintained the dive until down to 18,000 ft.



A D.H. "Albatross" of the "Frobisher" class built for Imperial Airways. Machines of this type were taken over by the R.A.F. as military transports. Photograph "The Aeroplane" Copyright.

New K.L.M. Air Service

Royal Dutch Airlines, generally referred to as the K.L.M., have been granted authority by the Civil Aeronautics Board, U.S.A., to operate a regular air service between Curacao, Netherlands West Indies, and Miami, in Florida. The new service will be a twice-weekly one, and the machines will fly to Miami by two routes, used alternately; one from Curacao and the other from Aruba, with calls on the way. Passengers, mail, and express freight will be carried, and Lockheed aircraft, probably "Lodestars," will be employed.

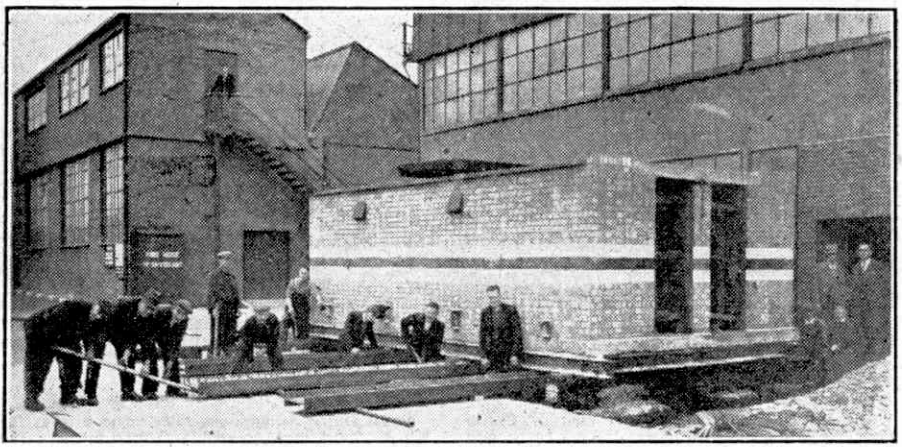
Fine Record of British Overseas Airways Pilot

Capt. H. H. Perry, A.F.C., a Senior Commander of British Overseas Airways, has completed 28 years of flying, and is the second oldest commercial pilot in the world engaged on air transport services. He joined the Royal Flying Corps in 1912 and served first as a mechanic and after qualifying as a pilot in 1915 he served in that capacity in France. He was one of the original members of the "*Dawn Patrol.*" Leaving with a load of four 50 lb. bombs, he would drop these and remain in the air for a further two hours, engaged in artillery observation.

From 1920 he has been a commercial pilot, and he was the pilot on the first commercial flight across Europe from Cricklewood to Bucharest—in an aircraft carrying one passenger. Capt. Perry joined Imperial Airways in October 1924, and until the present war most of his activities were on the European routes. On 2nd September 1939 he flew the first R.A.F. officers to France in an "Ensign" air liner. He made two flights, on each carrying 30 officers, mechanics, and their equipment. Three other "Ensigns" did likewise. He is now stationed at British Overseas Airways West of England landplane base.

U.S. Internal Air Line Traffic

Details just issued by the Air Transport Association of America reveal a great increase in air mail and freight traffic on U.S. internal air routes during 1942. Air mail carried that year reached the huge total of 40,101,657 lb., just over double the figure for 1941, and the quantity of air mail dealt with last year was 55 per cent. more than in 1941.



An air raid shelter weighing 66 tons that was moved 110 ft. The shelter was jacked up and levered on to rollers for its removal.

Of General Interest

Removing Buildings Bodily

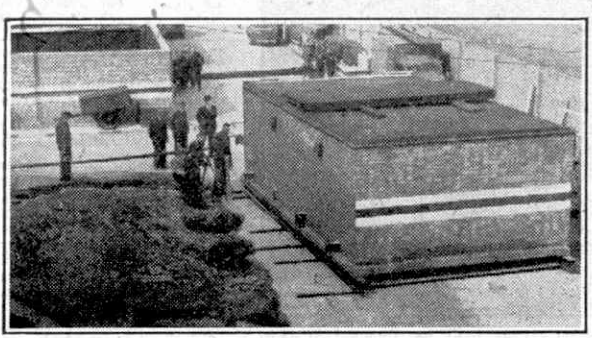
The illustrations on this page show stages in an extraordinary engineering feat, in which large air raid shelters that had to be removed were bodily transferred to new positions instead of being demolished and rebuilt. Each was 24 ft. long and 14 ft. wide and weighed 66 tons, and they had to be moved 110 ft. away in order to make room for a building extension. Each shelter in turn was jacked up 18 in., levered on to rollers, and shifted by means of cables and winch gear.

Earth Movements

When we wake up in the morning and look out, we see the countryside and everything in it in exactly the same place as it was the day before, apart of course from catastrophes of some kind, and this occurs so regularly that we are apt to think of the Earth's surface as fixed and immovable. This is far from being the case, but the changes in general are so very slow that it takes hundreds or even thousands of years to bring them to a stage at which they thrust themselves on our notice. There is clear evidence of movement if we look for it, however. For instance, many ancient ports and towns near sea coasts have disappeared. Good examples are Dunwich in East Anglia, and Ravenspur in Yorkshire, places that once were important ports and nowadays are non-existent or nearly so. The movement of the Earth's surface here has been in a downward direction, and this is characteristic of most of Great Britain and Europe; large areas of the continental mass of which they form part are still being submerged. An exception is part of Norway, which in contrast is slowly rising.

In the Mediterranean the change at present seems to be taking place in an upward direction. Certain old docks in Crete, for instance, are now 30 ft. above the sea. Thus Europe seems to be oscillating, sinking on one side and rising on the other side.

There are times when changes occur more rapidly than this. Such changes take place in districts subject to earthquakes and marked by volcanoes. One good example is the coast of Chile in South America, part of which rose 10 ft. during an earthquake in 1835; and more recently a part of the Alaskan coast was heaved up to a height of 40 ft. during an earthquake in 1899.



The air raid shelter on the way to its new position. It was hauled by cables and winch gear.

What's in a Name?

Many animals have common names that are curiously misleading. Good examples are the prairie dog of the Western States, which is not a dog at all, but a marmot; and the ground hog of the Eastern States, which is not a pig of any kind, and indeed is a rodent and a near relative of the prairie dog. The mountain goat, another creature of the Western States, is certainly goat-like in appearance, but in reality it is an antelope. In contrast there is in the States the so-called pronghorn antelope, which sheds its horns annually, a thing no true antelope can do.

Engineering News

The World's Largest Diesel Engine

Many people regard Diesel engines as suitable only for driving vehicles such as lorries, buses or even locomotives; they may be not aware that these compression ignition engines, as they are also known, are extensively used for propelling ships and often for driving generators in large power stations. An interesting example of the latter, which incidentally is the largest Diesel engine in the world, is shown in the accompanying illustration.

This particular engine was built by Messrs. Burmeister and Wain in Copenhagen, and is installed in the H.C. Orsted Municipal Electricity Works in the same city. The bore and stroke of the engine are respectively 840 mm. and 1,500 mm., that is approximately 2 ft. 9 in. and 5 ft., and running at 115 r.p.m. it develops 22,000 b.h.p.

This massive eight cylinder double acting two-cycle Diesel engine is used during periods of peak load, as well as under normal conditions, in conjunction with the steam turbo-generators. The normal output of the alternator to which it is coupled is 12,500 kw. or 15,000 kw. under continuous overload. The total weight is 1,400 tons, the overall length 45 ft. and the height 30 ft.

Some impression of the size of the engine can be gained from the accompanying illustration; a lift is fitted at one end to save the operator's time and energy! When the R.A.F. has more time to cripple the Nazis through the occupied Scandinavian countries, this particular engine will probably attract their attention as much as it did mine when I saw it running before the war.

D. REBBECK.

Road Magnets Prevent Tyre Damage

Roads in Missouri, in the United States, are now freed from metal objects by running over them a lorry fitted with powerful electro-magnets. The magnets can deal with metallic objects weighing up to 3 lb. and their use is thought well worth while as part of the campaign to preserve tyres, which are only too ready to pick up nails and other sharp pieces of iron or steel. In its first 55 days of operation more than 2½ tons of metal was picked up, and in one densely populated area practically the same amount of metal was recovered in a month. In practice the magnets remove from 5 lb. to 10 lb. a mile.

Three round magnets are used, each with a diameter of 2 ft., and they are hung 4 in. above the road surface. A 5 h.p. engine is used to drive the generator that supplies current to their windings. The magnets are heavy, weighing considerably more than a ton altogether, and as reserve supplies of petrol and oil have to be carried, the vehicle had to be fitted with special springs. The width covered is 8 ft. and three trips are necessary to clear the average road.

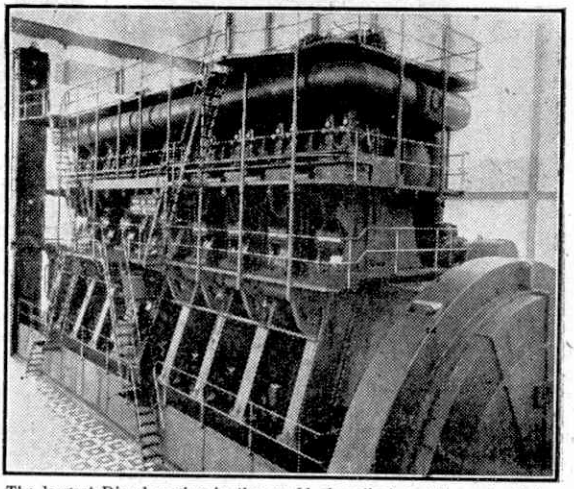
Intensive Barge Construction in United States

Concrete and timber barges are among the types of small marine craft now being produced in large numbers in the United States. The reinforced concrete barges are about 360 ft. long, with bottoms 7 in. thick and side walls 6 in. in thickness. The reinforcement takes the form of steel bars encased in the concrete, making the craft strong enough to withstand heavy loads. The forms, or moulds, for the hulls are erected in dry docks, and when the completed hulls are ready water is admitted to float them. The forms then float away free.

The demand for the material used in the construction of these barges has become so great that timber barges also are being built by several shipyards. These craft are about 200 ft. long and are designed like ships.

Long Service of Automatically-Controlled Hydro-Electric Plant

A fine record of 25 years' unattended service has been achieved by the Cedar River automatically-controlled hydro-electric plant of the Iowa Electric Light and Power Company, U.S.A. This plant has been claimed as the first of its type to operate in this manner, and during its quarter century of "self-service" the only replacements necessary in its equipment have been the brushes on an exciter, and a single relay.



The largest Diesel engine in the world, described on this page. It has a lift at one end to save the time of attendants. Photograph by D. Rebbeck, Belfast.

Highway Across Canada Completed

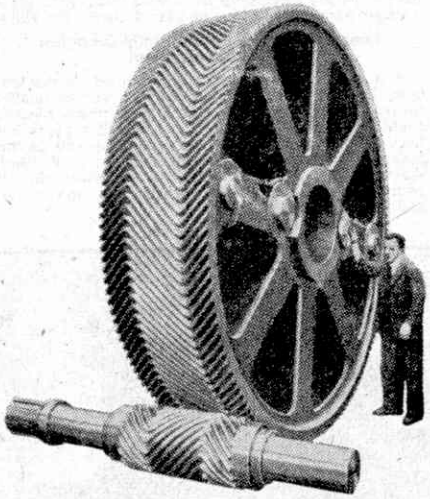
It has been announced that the Trans-Canada Highway is now open from the Atlantic to the Pacific Coast. The last stretch of the 3,000-mile road to be completed was that between Geraldton and Hearst, in the north western part of the province of Ontario, and traffic has started moving over it. Actually this final link was finished in November of last year, but it was not kept open throughout the winter season.

Glass Fibre in Army Huts

The American Army are now using huts in which use is made of glass fibre for insulating purposes. Blankets of this material are inserted in the walls and flooring, and it has been found that owing to the good insulating properties of glass considerably less fuel is required to keep the huts at a reasonable temperature during winter. The new hut units are so light and compact they can be carried by air. They are so designed that huts 16 ft. wide and in lengths that are multiples of 8 ft. can readily be built, and no metal is used in their construction.

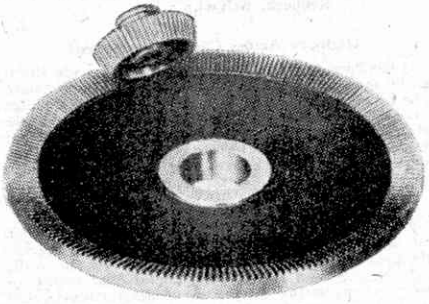
Gears and How to Identify Them*

The illustrations and descriptions on this page supplement the information on the Identification of Gears given in the June 1942 "M.M."



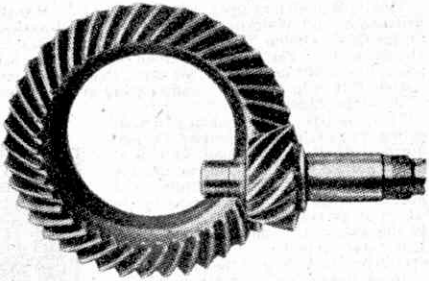
Triple Helical Gears

TRIPLE Helical Gears are functionally identical with Double Helical Gears. At one time it was thought that helical gears should always run with apices leading, and with reversing drives, triple helical offered leading apices in either direction. We now know that helical gears run equally well either way, and the use of triple helicals is entirely a matter of personal choice.



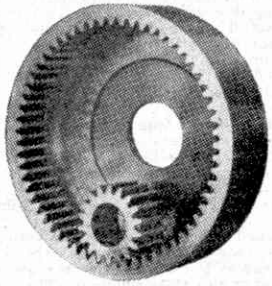
Angle Bevel Gears

Angle Bevel Gears are basically the same as straight bevels in that the teeth of the wheel and pinion taper to a common apex, but the axes are not at 90° and may form either an acute or an obtuse angle.



Hypoid Gears

Hypoid Gears were developed from spiral bevel gears to meet the requirements of modern car designers in permitting a low, uninterrupted floor level. These gears are easily identified by the pinion shaft being substantially out of line with the wheel centre.



Internal Gears

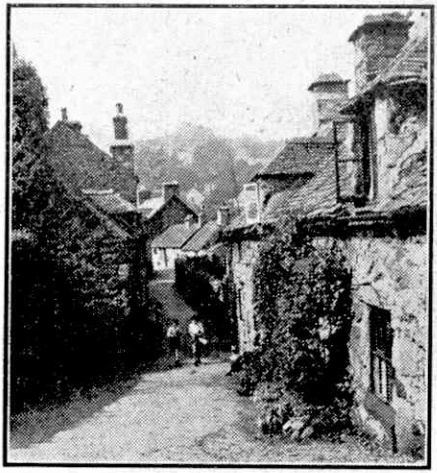
Internal Gears are easy to identify as the name is self-explanatory. The main functional difference is that an internal gear and its pinion both revolve in the same direction while, in external spur gears, wheel and pinion rotate in opposite directions.

*Reprinted, by courtesy of the Editor, from "Contact," the journal of David Brown and Sons (Huddersfield) Ltd. and associated Companies.

Photography in September

By A.R.P.S.

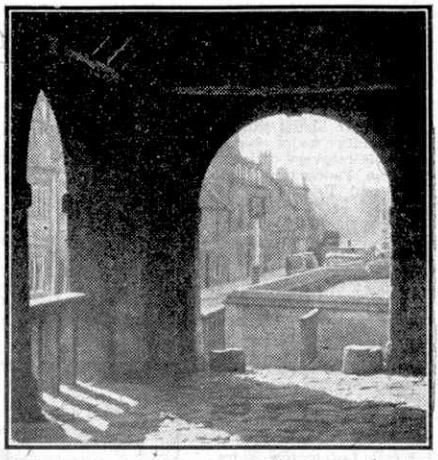
MANY of you at this time of year will still be on holidays or visiting districts where there are places of historic and other interest. Records of such places in an album or collection of prints create an extraordinary amount of interest to your friends, and you will find an additional pleasure to your ordinary photography both in the taking and recounting information concerning the items.



A Street in Dolgelly. Photograph by J. Cowperthwaite.

There are many towns and villages where you will find the inhabitants have a pride in an old house or monument. For instance, a few days ago I was in Hereford. It was my first visit, and I only had about one hour in which to look round, but I found in the market place a "Jacobean" house built early in the 17th century, and some old and quaint courts and narrow streets, on which the camera soon got busy.

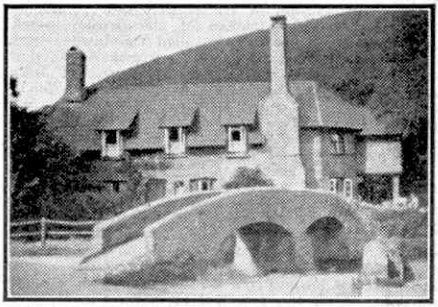
A few enquiries will soon put you on the track of similar places. The old market halls, the whipping posts and ducking stools, the fine old bridges across the river, the Tudor house where Queen Elizabeth stayed a night, that old hotel with its galleried courtyard dating back to the "posting" days of coaches—these are just a few of the items you should look for in your visits. There are hundreds of others, but what you should always aim at getting is a true story about each item you photograph.



Old Wool Market. Photograph M. W. Taylor, Southall,

Should the item be in a public place you may be troubled with the traffic, but do not let this deter you. First get the best position for taking, and having got the view right and shutter, lens and stop all set, wait for an interval in the traffic. Avoid, if you can, mixing your pictures; by this I mean, if you are taking an ancient building do not include a modern motor car standing in front of it.

As regards exposure I can only suggest something for bright sunny days, in the absence of dark shadow or closed-in places. For Selochrome film, 1/200th at F8 or 1/100th at F11. If the building is occupying all the film space and is dark, it will require 1/50th at F8 or 1/25th at F11.



A pack-horse bridge in Somerset. Photograph by P. Parkinson, New Malden.

Railway News

Time Recovery on the G.W.R.

The more liberal timings at present operating give opportunity under favourable conditions for considerable recovery of lost time along the level tracks between Paddington, Swindon and beyond, on the Bath and Bristol route. The up morning Bristol express, headed by 6001 *"King Edward VII,"* with 12 on weighing over 400 tons full, which calls at Didcot, left Chippenham 12 min. late, but was in Paddington to time at 10.30 a.m. The 6.30 p.m. from Paddington, with 70 more tons of coach load hauled by "Castle" 4–6–0 No. 100A1 *"Lloyd's,"* made a non-stop run over the 94 miles to Chippenham in 110 min., so arriving about 4 min. early, although delayed to the extent of some 7 min. by signals near Reading and a further 2 min. by relaying slack at Pangbourne. The net time represented an average of 55.7 m.p.h. overall.

L.N.E.R. Locomotive Notes

The re-numbering scheme for ex-Great Eastern engines which was put into partial operation last year has been suspended. There are still 18 2–4–0s remaining in service; these are all of the former G.E.R. Holden 5 ft. 8 in. mixed traffic design, of which there were 100, numbered 7407–7506, when the L.N.E.R. re-numbering took place in 1924–5. They were built between 1891 and 1902, with stovepipe chimneys and domes placed well forward, as on the "J15" goods locomotives, with similar boilers, and they have proved very useful on country services particularly. One was noticed, most unusually for these days, on an empty stock train at Liverpool Street last spring. Several may be seen at Cambridge, in which region they have been noted on the Mildenhall branch as well as working local goods trains.

Of the newest "Green Arrow" 2–6–2 express mixed traffic engines, class "V2," No. 3680 is at York and Nos. 3681–2 in Scotland. It is reported that these have a separate set of Walschaerts gear to actuate the inside cylinder instead of the Gresley patent combining lever, which controlled the inside steam distribution from the outside motion, hitherto standard on L.N.E.R. 3-cyl. locomotives. The second 4–6–0 of the new "Antelope" series is No. 8302 *"Eland"*; these engines are class "B1" and in order to make that possible the two pioneer Robinson Great Central 4–6–0s numbered 5195–6 have been transferred from "B1" to "B18."

No. 2005, now running in Scotland again, but as a 4–6–2 instead of a "P2" Mikado 2–8–2 express, is classed "A2" in its rebuilt state. It thus takes the allocation previously given to the short-lived Raven "Pacifics" originated by the former N.E.R. These were named after cities and numbered 2400–4.

Both American and British built Ministry of Supply 2–8–0 freight locomotives are at work in considerable numbers on all the principal main lines in England and Scotland. 2–8–0 No. 8510, constructed at Doncaster to the standard L.M.S. "8F" design, bears on the date plate the wording *"Built by and on loan to the L.N.E.R."* Gresley 3-cyl. 2–6–2Ts are working on ex-Metropolitan passenger trains between Rickmansworth and Aylesbury.

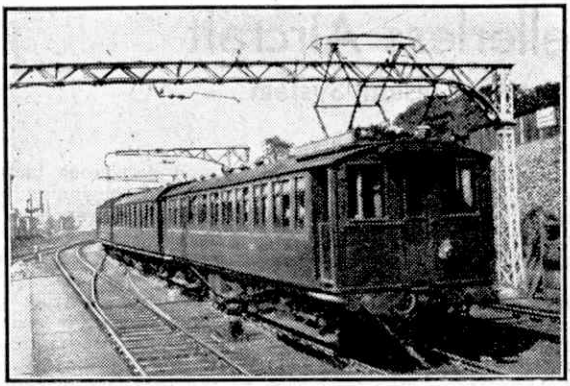
Representatives of the following types have recently been seen at work in the neighbourhood of Grantham, on the East Coast main lines, which until comparatively recently was very much a Great Northern stronghold; 4–6–2 of classes "A1–4"; "V2" 2–6–2; "C1," "C2" and "C4" 4–4–2 of former G.N. and G.C. origin, as were the 2–8–0s of classes "O1," "O2" and "O4," and 4–4–0s of the "D2," "D3," "D10" and "D11" series. There were G.E. 0–6–0s of class "J20," their largest; ex-N.E. "B16" 4–6–0 mixed traffic and "Q5" 0–8–0s; G.N. 2- and 3-cylinder 2–6–0s, "C12" 4–4–2 and "J52" 0–6–0 tanks, also 0–6–0s of classes "J1–6" as well as standard "J39" and G.C. "J10–11" goods, and some Ministry of Supply 2–8–0s.

L.M.S. "Pacific" No. 6231 "Duchess of Atholl" at full speed. Photograph by courtesy of the L.M.S.

Southern Tidings

Two more veteran Stroudley 0–4–2Ts of class "D1," numbered 2229 and 2284, have been lent to the L.M.S. and were observed on the Midland line at Cricklewood, near London, while in transit. Considerable interest was recently aroused among railwaymen as well as locomotive enthusiasts along the West of England main line by the appearance on temporary service of a "Schools" class 4–4–0, hitherto little known west of Salisbury. They are now working stopping trains through to Exeter from Basingstoke shed.

Nos. 658–9 are believed to be the last survivors of the famous Adams outside cylindered 4–4–0 classes still regularly in service, although several more are still standing in the works yard at Eastleigh. They were built in 1895, with 6 ft. 7 in. driving wheels and cylinders 19 in. diameter with 26 in. stroke, as part of a series of 30. The other 30 forming the complete batch, which constituted Mr. Adams' last express design for the former London and South Western Railway, had 7 ft. 1 in. coupled wheels. His two earlier and smaller types were also provided respectively with large and medium sized driving wheels in the same way that his successor, Mr. Drummond, catered for the more hilly and also the level sections of main line by turning out 4–4–0s with 5 ft. 7 in. and 6 ft. 7 in. coupled wheels respectively.



A train on the L.M.S. electrified line between Lancaster and Heysham, which is described on this page. Photograph by W. S. Garth, Preston.

A Premier Electric System

One of the various electrified sections forming part of the L.M.S. system is that belonging to the former Midland Railway between Lancaster and Heysham. The line is little known probably, except locally. It commenced operations in 1908 and it is interesting in that it was the first example in this country of an electric line worked on the 25-cycle alternating current single-phase system at 6,600 volts: the "South London" electrification of the old L.B.S.C.R. on the same system commenced working in 1909. This system was extended during subsequent years but has since given place to the 600-volt direct current third rail arrangement standardised by the S.R. The direct current system indeed has formed the basis of most British electrification schemes. The Lancaster and Heysham line therefore remains the only one of its kind and has a route mileage of some 9½ miles.

The upper illustration on this page gives a good idea of the general construction of the overhead wire standards and of the special motor coaches that were constructed with pantagraph collectors on the roof. Unlike most Midland vehicles of the period, which had clerestory roofs, the Lancaster and Heysham motor cars and trailer cars have plain roofs. The two trailers shown in the illustration are not of the original stock but are normal side-door vehicles. Like the vehicles used on most of the earlier electric systems and still used to quite an extent to-day the Heysham stock is of the centre-gangway end-door type. Unlike most electric systems however the Heysham line employed the automatic vacuum brake, not the Westinghouse air pressure system.

Special Track Working

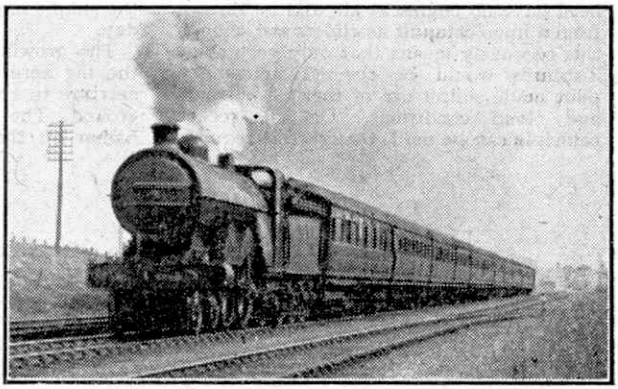
Many readers will be familiar with the general principles of the temporary single line working regulations, under which trains in both directions are run on one track when the other line on a normally two-track section is blocked on account of a mishap, or is in possession of repair gangs. No train or light engine may proceed through the section concerned under such conditions unless the pilotman, wearing a red armlet, either rides on the engine or gives permission to the driver personally.

Sometimes it is necessary for trains to use wrong lines on sections where there are four tracks. For example, on the Great Northern main line of the L.N.E.R. or on the Western section of the S.R., where the down and up fast and slow lines are together in pairs, it may facilitate permanent way work if the ballast train, perhaps with crane and other equipment, stands on, say, the down slow line while the down fast is being relaid. The Engineer then has complete possession of both down roads for a number of hours, probably at night or on Sunday. Traffic is kept moving by means of what is called "Special Working," as distinct from "Single Line Working," which will provide for all down trains to use the up fast line between two signal boxes equipped with the necessary crossovers under the direction of a pilotman or regulator; all up trains use the other remaining clear line, that is the up slow or local track. On other occasions where two or more lines exist for traffic in each direction, it is possible to work all trains over either the main or slow road for the time being, without any "wrong direction" running.

L.M.S. Non-Stop Runs

Although we are in the fourth year of total war, long non-stop runs figure to a remarkable extent in the L.M.S. summer timetable; the total is greater than in 1942 and a great increase on the number provided during the latter part of the war of 1914–18. The volume of through passengers is so great that many long distance trains make as few stops as possible, thus reducing platform user and enabling traffic to be kept moving at more even speeds.

The 8.40 p.m. relief express to Glasgow (St. Enoch) is booked to run every night without a halt from Euston to Kingmoor, north of Carlisle, where engines are changed, a distance of 301 miles. This is two miles further than the longest advertised break of 299 miles from Carlisle to Euston scheduled for the up "*Royal Scot*" as in peacetime years, though at the considerably reduced average speed of 46½ m.p.h. The "Night Scot" is still timed to cover the 243½ miles from Glasgow to Crewe over Beattock and Shap summits without a stop.



A King's Cross-Grantham express in G.N.R. days. The engine is Ivatt "Atlantic" No. 1415, now numbered 4415.

Propellerless Aircraft

The Jet Propulsion System

By Patrick Hamilton

WILL aeroplanes with propellers become as out of date as paddle-steamers? To most of us who regard a propeller as the characteristic feature of an aeroplane the idea may seem fantastic. Yet for nearly 40 years inventors have been working upon it, and experts now calmly consider it as the next, and not far distant, big advance in aeroplane design. For at least one propellerless aircraft is known to have made successful flights; the designer is an Italian engineer, S. Campini, and the demonstration was given last year at the Forlanini Aerodrome, Milan. The Italian experiment, which is being financed by the Caproni Company, is the first publicly successful trial, though this does not mean of course that the Italians are either the only or the most successful experimenters.

What are the attractions of a propellerless aeroplane? In perfected form, there would be greater speed, less noise, ability to reach greater heights and to use cheaper fuels.

An aeroplane does not fly simply *because* it has a propeller. The propeller is there simply to make the aeroplane move forward at such a speed that the huge volume of air displaced by the wings will generate enough "lift" to make and keep the machine airborne. There are several alternative ways in which we could do this without a propeller. The aeroplane need have no engine at all, and be thrown from a huge catapult as gliders are, though this obviously means that only very short distances would be covered unless the pilot made skilful use of thermal currents and cloud conditions. Or the rocket principle can be used, though this requires fantastically costly and dangerous fuels. The third system, which is beginning to leave the laboratory, is the "jet propulsion" method.

Up to now the propeller has held the field against all comers as being the simplest and safest way of getting a machine into the air and keeping it there. Now the aeroplane is beginning to outgrow its old servant. The pilot of the future may look back to the propeller machine as the sailor of to-day looks back on the wooden walls of England! Already our biggest bombers have to reach about 90 miles an hour before they can take off. Only at such speeds do the wings develop enough lift to overcome the 38 or 40 lb. of dead weight with which each square foot of wing surface is burdened. For this, over 5,000 h.p. is needed, calling for propellers nearing 20 ft. in diameter. They are highly complicated, electrically or hydraulically operated mechanisms, which can vary the pitch of the blades to suit conditions, thus giving the pilot the equivalent of the motorist's gear-box to assist in getting the best out of the engines. Even so, the latest 2,000 h.p. engines create grave problems for the propeller designer.

Recourse is even being had to contra-rotating propellers—that is, two propellers mounted one behind the other. One rotates in a clockwise, the other in an anti-clockwise direction. So far have we travelled from the simple hand-carved timber of Bleriot's day.

The growing size of propellers compels the big aeroplanes to use a huge undercarriage to enable the blades to clear the ground. The pilot's seat of a "Stirling" is higher off the ground than the top of a

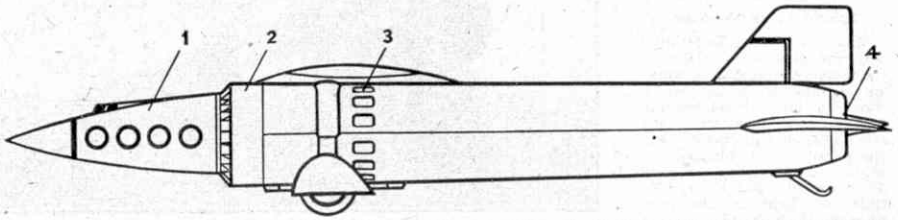
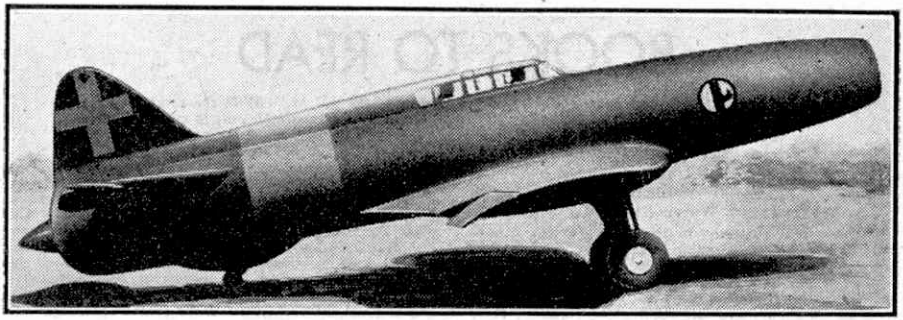


Diagram of an early proposed type of Campini jet propulsion aeroplane. 1, Pressure cabin for passengers; 2 and 3, Annular entry ports for air intake; 4, Jet controller and exhaust port.



The Caproni-Campini C.C.-2 jet propelled aeroplane that flew from Milan to Rome. It weighs nearly five tons. Photograph from "The Aeroplane."

London bus, and the landing wheels are 5 ft. in diameter! Complicated and vulnerable hydraulic gear is needed to retract the huge undercarriage and stow it neatly within the bomber. Added to this, propellers are noisy, they spoil the pilot's view, upset the steering and have a propensity for collecting ice. Worse still, they set a definite limit to the speed which could be reached by the most powerful propeller-driven aircraft.

Broadly put, as soon as the rate of air-flow past any part of an aeroplane reaches a certain critical speed, 770 m.p.h., "shock waves" are set up, causing great loss of power and increased drag. Since the propeller is not only rotating but also moving forward, it is the first part of the aeroplane to reach the critical speed, and consequently the first to suffer from these shock waves. Once this point is reached no increase in power, however prodigious, is likely to increase the speed of the machine—the extra power would be largely wasted in heat and drag. This means that the level speed of the propeller-driven aeroplane itself must always remain much lower than 770 m.p.h., the rate of air-flow past the propeller being always much faster than round the machine as a whole.

In fact the modern fighter, which habitually reaches level speeds of about 400 m.p.h. in dog fights, has probably reached almost the peak of propeller aeroplane performance.

The jet propulsion system is the only really practical alternative to the propeller system, and has been known and studied since 1908. Since it begins to be efficient only at speeds above 440 m.p.h. it has naturally had to wait until aeroplane design reached its present pitch. The details of the system, as evolved by various inventors, differ slightly, but the general principle is the same.

Air is sucked in at the nose of the aircraft, compressed and cooled. It is then allowed to expand through a battery of nozzles into a large specially-shaped tube at the rear of the plane. As the air expands, a certain amount of fuel (petrol or oil) is injected into it and burnt. This tremendously increases both the volume and speed of the gases ejected, and the "thrust" developed, as they rush rearward in a dense jet, supplies the power to propel the aeroplane. The forward speed of the machine should very nearly equal the rearward speed of the gases, when a very high efficiency is realised.

The jet system scores over the propeller in that it could carry the machine through the critical 770 m.p.h. phase, the speed of sound, and beyond to speed at which the laws governing air-flow appear to change completely and the shock-wave phenomenon is not encountered. In other words, the jet aeroplane opens the door to stratosphere speeds in the neighbourhood of those demanded by rocket aeroplane enthusiasts.

Though poor Boswell was once publicly ridiculed by Dr. Johnson for suggesting that coaches might travel at 20 miles an hour, and scientists even of the nineties vowed that attempts to reach 100 miles an hour would have the direst effects on the human frame, it is now known that there is no real limit in speed for the human body in level flight.

Given proper protection and warmth, we can stand all speeds that are even remotely within human grasp. Acceleration must be fairly gradual, and no sharp turns can be attempted. But in a straightforward long-distance flight, say from London to San Francisco, the jet aeroplane would have ample time to show its paces. Above 35,000 ft. the air is free from bumps and the highest clouds (Cont. on page 322)

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, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 6d. for postage.

"LOST WORLDS"

By ANNE TERRY WHITE (Harrap. 7/6 net)

There is real romance in the story of lost worlds that the author tells us in this book. Until comparatively recently only a few legends spoke of great empires that had ruled in various parts of four continents thousands of years ago, but there were no histories of them, and no other clear signs of their existence were readily visible. One or two determined men were sure that something could be done to give life to the legends, however, and in spite of discouragement and ridicule they set to work to dig out from the earth the remains of the lost empires. The explorers themselves must have been startled by the revelations that followed of the daily lives and stories of vast populations that once flourished in Asia Minor, Crete, Egypt and the Near East, and in Central America.

The first indication of what was in store came to Schliemann, a German merchant who even in childhood had dreamed of buried treasure, and when he had made a fortune tried to realise his dreams. Schliemann began with Troy, the city of Asia Minor besieged by Greeks in legendary days. The result was almost fantastic, for when he dug down on the site where he believed the city to have existed, he unearthed not one, but many cities, each of which had decayed and fallen into ruin in turn before another was built on top of it. More wonderful still, the treasure of which he had dreamed as a boy was actually there!

This was the beginning of a series of astounding successes, in which ancient civilisations of Crete, the Middle East and Central America were successfully brought to light. Every reader of the "*M.M.*" will revel in the stories that the author has to tell, not only of the discoveries themselves, but of the dreams of the discoverers and of their hardships and adventures.

Results did not always come easily. For instance, the ruins of the great cities of Central America were buried in jungles that were almost impenetrable, and had to be hacked out painfully inch by inch with the knives of Indians; one of their greatest hoards of treasure was sunk deep in mud at the bottom of a great well, and was only recovered by an explorer who donned a diving suit and searched the crevices of the rock bottom after a dredge had cleared away the covering of thousands of years. The hardships were well worth while, however, for the results of this and of other laborious excavations were dazzling in their revelation of the wonders of long lost civilisations.

The story is delightfully told, without the technicalities that only the expert can understand; and a splendid series of illustrations gives readers a fine idea of the wonderful finds and of their discovery.

"THE A.B.C. OF SOUTHERN LOCOMOTIVES"

(J. ALLAN, 225–7, Laleham Road, Staines. Price 1/6)

We reviewed the first edition of Mr. Allan's excellent booklet in our March issue. The present is the fourth edition, which includes many additional illustrations. For the benefit of new readers we may add that the booklet gives a numerical list of S.R. engines with their classes, together with a list of named engines, principal dimensions of S.R. locomotives, and the class allocations to the three sections of the railway. Other interesting details included are the nicknames of the various classes, power classification on the Western Section, and the names of the locomotive superintendents and chief mechanical engineers of the constituent companies from their beginnings and of the S.R. itself.

Owing to wartime difficulties, it is impossible to guarantee prompt delivery of books ordered as described at the head of this page, but every effort will be made to ensure speedy despatch.

"ENGINEERING WORKSHOP MANUAL"

By E. PULL (Technical Press. 6/– net)

This is the 10th edition of this invaluable manual, previous editions of which have been reviewed in the "*M.M.*" Much of the information in it has been revised and brought into line with up-to-date practice, and various additions include a new chapter on tube and strip metal bending. The book provides the apprentice, the improver and the beginner in the various branches of engineering workshop practice with concise and practical information that will meet all his needs, and its value is indicated by its adoption for use in Government training establishments and in many engineering firms. Due attention is given to workshop arithmetic and the best means of making the necessary calculations for the setting of tools, etc. and all workshop operations, and useful tables and rules are included at the end. There are 228 half-tone illustrations and line drawings.

"BUILDING A GALLEON"

By H. S. COLEMAN (Modelcraft Limited, 12/6 net)

There are few more fascinating hobbies than that of building old-time ships, and this book gives those who are attracted by it an opportunity of learning the secrets of established masters of the craft. It deals thoroughly with every aspect of the building of old-time ships, from constructional principles, and the tools and materials used, to the building of each part and the painting and embellishing of the finished model, and it includes a useful glossary of old-time nautical terms. A wallet at the end of the book contains a complete set of plans and working directions for building a model of Drake's famous ship the "*Golden Hind*" designed by Mr. L. B. Price, whose excellent drawings illustrate also the text of the book and provide valuable guidance to the constructor.

"AERO MODELLER PLANS SERVICE," SERIES 1, 2 and 3

(Harborough Publishing Co. 4/6 each)

Each of the three series of this production contains scale model plans of 24 well-known aeroplanes. The first deals with British productions, including such well-known machines as the "Lancaster," "Halifax," "Stirling" and "Mosquito," while the second and third cover in equally thorough fashion American and German machines. In each case there is a plan, with side and head-on views, with sections at various positions and drawings of details where these appear to be desirable, so that they provide the model-builder with all he needs.

Have You Ever Thought About This?

V.—What is Horse Power?

MOST readers who had this question suddenly hurled at them would look a little surprised at the ignorance of their questioner. Clearly it is the power that a horse can exert. At any rate they would think so until they reflected that after all horses may be large or small, strong or weak, old or young and lazy or willing, while some horses are obviously born to pull heavy loads, and others are fit only for prancing about in processions or leaping gaily over walls and hedges. Which of these horses is meant when we speak of horse power?

To get at this important point we have to go back a long way, to the days in fact when engines were being introduced for the purpose of doing work that horses had previously carried out. There had to be some measure of what we may call roughly the strength of an engine, that is the rate at which it can do work. The standard that was applied so that engines could be compared with each other, and so that buyers of engines would know what they were getting, was worked out by the great Watt himself. He decided to use the horse for this purpose and to measure the capabilities of engines in horse power, but the unit had to be made a little more exact than this, in view of the great variation in horses. After all, even if an engineer knew which was the right horse, he could scarcely measure the power of an engine by starting a tug-of-war with it! Watt therefore tried some experiments and came to the conclusion that he had better use for what we might call the standard horse one that could work at the rate of 33,000 ft. lb. per minute.

This sounds too technical altogether, but it is perfectly easy to understand—when it is explained! An engine strong enough to raise a weight of 33,000 lb., which is nearly 14½ tons, through a height of 1 ft. in 1 min., would be of one horse power. An engine that could lift a weight of 1 lb. through 33,000 ft. in the same time also would be of 1 h.p., and so would one that could lift 100 lb. to a height of 330 ft. in the same time.

The surprising thing about a horse power is that it is not the power of a horse, which could not possibly continue work at this rate for more than a very short time. This is the result of caution on the part of Watt. He is said to have deliberately fixed the rate above that of the average horse so that he would not raise too high the hopes of those who bought his steam engines! He thought it much better to speak modestly of, say, a 5 h.p. engine, and so be sure that he had provided an engine that would meet the expectations of his customer, than to describe it as, say, 8 h.p., and leave his customer to wonder if there were really as many horses in the engine as Watt declared, and perhaps get annoyed if the engine turned out to be weaker than he hoped.

Some readers may have been puzzled by the initials b.h.p. applied to the power of an engine, while at other times in "*M.M.*" articles they may have seen the initials i.h.p. The latter stand for indicated horse power, or the rate of working in the cylinder or cylinders of an engine; and b.h.p., or brake horse power, is the power an engine can give out. Some of the work done in the cylinders is wasted in friction and the production of waste heat, and until there is a perfect engine, without friction or losses of any kind in transmission, i.h.p. will always be greater than b.h.p. Shaft horse power or s.h.p. is another form that this unit sometimes takes. For instance, we may read that the engines of a great liner are of 90,000 s.h.p. This simply means that the actual power transmitted by the propeller shafts is 90,000 h.p. The indicated horse power of course will be greater than this.

As if the brake, shaft and indicated horse were not enough, there is another one, kept in stock for the special benefit of motorists. Anybody who owns a motor car pays a tax that is based on the alleged horse power of the engine installed in it. But this horse power is only a measure of the size and number of cylinders, and the tax authorities never dream of measuring either the actual brake horse power, or the indicated horse power. This is perhaps just as well, for a good modern car engine develops far more power than the calculation from cylinder capacity would suggest, and there would be deep groans from motorists if they had to pay £1-5-0 for every b.h.p. their engines give out. The Treasury horse is hopelessly out of date as a measure of power, although it can still rake in millions in taxation!

The Boeing "Strato-Trainer"

THREE years ago the research engineers of the Boeing Aircraft Company, of Seattle, U.S.A., constructed a cylindrical steel laboratory called the "Strato-Chamber," in which they can "fly" to a height of 40,000 ft. in a few minutes without leaving the ground. It was first used for checking the working of the cabin supercharging equipment for comfortable flight at "above the weather" heights, made for the Boeing "Stratoliner" transports; and, by enabling the engineers to carry out any necessary adjustments on the ground, avoided undue expenditure of flight-test time, which is very costly. A description of the Strato-Chamber appeared in the November 1940 *M.M.*"

The Boeing company have used it also for training flight-test crews for high-altitude flying. At the present time they have five such crews, averaging 10 men each, who spend a good part of their working time in the regions above 30,000 ft. In this thin air zone, where the temperature seldom changes and where no life can exist without special aids such as oxygen systems, these crews carry on their daily tasks with care and precision, and none of the members has suffered injury as a result of a high-altitude research flight. There are six to 10 of these men aboard every "Flying Fortress" that makes one of these flights, and every man must know exactly what to do and how to do it in an emergency. In the performance of flight duties at great heights it is too easy for a man to become careless and accidentally pull his flexible rubber oxygen line off the outlet. Safety precautions under high-altitude atmospheric conditions therefore have been an important part of the air crew training carried out in the Strato-Chamber.

Observing a flight test crew in the Strato-Trainer through one of the 3-layer glass windows. Photograph by courtesy of the Boeing Aircraft Company, U.S.A.

Now the Boeing flight test engineers have constructed a second and improved chamber, and this is being used exclusively for the training of high-altitude crews, and for physiological research. The original Strato-Chamber will continue to be used for mechanical research work. The new chamber is appropriately called the Boeing "Strato-Trainer."

The primary purpose of the new equipment is to train air crews in safety precautions necessary while breathing oxygen at great heights, and it is large enough for a complete flight crew to "ascend" together. They dress just as though they were really about to take off on an actual flight to above 30,000 ft., because their stay in the chamber will be made in conditions that are exact reproductions of those during such a flight. The crew put on heavy high-altitude flying suits, clamp on their oxygen masks, and exercise for 30 to 40 min. before stepping into the chamber. This exercise is to reduce the amount of nitrogen in their blood, and to prevent gas bubbles forming in the blood.

A man familiar with the proper procedure during the forthcoming "flight" enters the chamber with the crew. When all are inside, the door is sealed, and the motors begin pumping some of the air out of the huge metal cylinder. The air inside grows thinner and thinner, exactly as though the crew were climbing thousands of feet above the Earth in a "Flying Fortress." The men are able to do all the breathing they wish, however, as their masks and attached tubes feed pure dry oxygen to them.

At a pre-arranged height the crew go through what may be described as a strato-version of a first-aid drill. One of the men pretends to faint, and it is up to another member of the crew to remove the man's oxygen mask and substitute an emergency one in a matter of seconds. The faint may be only make-believe, but there is no fooling about the next step. That change of masks has to be swift and sure; for at 35,000 ft. there are only 30 sec. in which to effect the change-over, or the maskless man will relapse into a coma and die, for lack of oxygen to breathe. The experienced man with the crew supervises the job, and if necessary he lends a hand to get the emergency mask fitted within the limits of safety. Outside the chamber, the medical unit keeps a doctor on duty. This quick-change act is repeated until each member of the crew has had his mask changed.

The strato-drill inside the chamber can be watched from outside by as many as 12 persons, who peer through windows of 3-layer glass. These observers can remain in constant communication with the trainees by loud-speaker sound equipment. For conversation inside the chamber each occupant has a set of head-phones and a microphone.

The Strato-Trainer itself is constructed on the lines of an overgrown thermos bottle, with the cork packed along its cylindrical walls instead of in its mouth. The cork, in thick layers, preserves the temperature inside the chamber. The temperature, which moves up and down the scale to match the cabin heat of an aircraft at varying heights, is manufactured by a large refrigeration unit mounted on top of the chamber. The Strato-Trainer can reproduce in 2½ min. an atmosphere equivalent to that at 35,000 ft.; in 4 min. the equal of the atmosphere at 50,000 ft., and well over that figure in a few more minutes. This swift rate of "climb" will enable scientists and medical authorities to study the factors that contribute to "aeroembolism," the aerial equivalent of the "bends" that afflict the deep-sea diver when he rises too quickly to the surface.

The Strato-Trainer is controlled from outside, with the operator stationed at an instrument panel at one end of the cylinder, where he can watch all the occupants. Inside the chamber there is a set of recording instruments.

From Our Readers

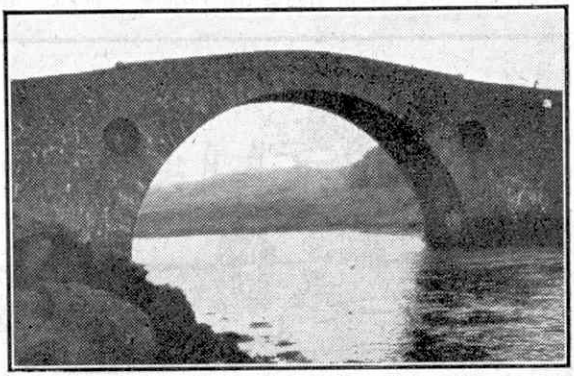
This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs 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.

THE EARLIEST ATLANTIC BRIDGE

The modern world is familiar with bridges that step across the Atlantic to islands, including such structures as that across the Menai Strait leading to Anglesey, and the famous bridge to Key West, Florida, on the American side of the ocean. A smaller example is the stone bridge that crosses the Sound of Seil, between the mainland and the Island of Seil, off the west coast of Scotland, some 12 miles south of Oban.

This bridge is believed to be the earliest ever erected across the waters of the Atlantic. It was built in 1792, and its construction was then regarded as one of the outstanding feats of the 18th century. The bridge has been credited to Thomas Telford, but it is not certain that he had any connection with it. The span is 70 ft. in length and the height 40 ft. above the channel through which the tides go. The height of the arch was raised to allow ships of up to 50 tons using the inner and narrow channel of Clachan Sound to pass.

H. BRIERCLIFFE (Glasgow).



A bridge across the Atlantic! It is Clachan Bridge, which spans the Sound of Seil, Argyllshire. Photograph by H. Briercliffe, Glasgow.

UNUSUAL FRIENDS

One of the attractions of Chester Zoo, which I visited a short time ago, was the sight of a lion and dog in the same cage. The dog was a Sealyham terrier called Peter, and although in the accompanying photograph he is seen sitting peacefully beside Mowgli, the lion, much of the time while I was there he was pulling the lion's ears, while Mowgli playfully struck him with his paws.

Sometimes Mowgli became slightly annoyed and Peter must have realised it, for he ran through the connecting door into the rear cage with Mowgli lumbering after him in pursuit. He was never caught, however, and romped back and into his kennel at the side of the cage, from which he very soon appeared again, as playful as ever. This unusual "cat and dog" friendship was a source of great interest to visitors.

J. M. HOWE (Blackpool).

A lion and a dog occupying the same cage. Photograph by J. M. Howe, Blackpool.

A RUINED CAPITAL IN CEYLON

Anuradhapura, which is reached from Colombo after a drive of four hours, is known to-day as "the buried city of Ceylon," for now only ruins remain of once complete palaces, temples, dagabas, which contain relics of Buddhist saints, and other buildings. The city was founded in 437 B.C. by a Sinhalese King named Pandukhabhaya, and the first ruin that catches the traveller's eye as he enters this once great capital is the Brazen Palace, which contained no less than 9,000 rooms and had nine stories. In it Buddhist priests were housed according to their rank, the priests of the highest order living in the ninth storey. The roof was covered with brazen tiles, a detail from which the palace received its name.

The Ruanweli Dagaba has a diameter of 279½ ft. at the base. Inside it precious stones, pearls and golden images were placed by the ancient kings. Work was begun on it in 144 B.C. Until about 15 years ago it was covered with thick jungle, but it has now been completely reconstructed and has a golden pinnacle. Like the Brazen Palace it was built by King Dutugermunu, the greatest monarch the Sinhalese ever had.

There are many other dagabas, including the Jetavanarama, which was the first to be built, but Anuradhapura's most sacred relic is the Bo-tree, which grew from a branch of the tree under which Lord Buddha attained Buddahood. It was brought to Ceylon from India in 256 B.C. by Princess Sangamitta, and is now enclosed in a quadrangle surrounded by iron railings. On Wesak day, on which Lord Buddha was born, attained Buddhahood and died, Anuradhapura is visited by many thousands of Buddhists from all over Ceylon. Many come too on Poson Day, on which Buddhism was introduced to Ceylon from India.

From the second century onward wars with Tamils from South India resulted in almost all the buildings being destroyed, and little but ruins remains of the once flourishing capital of ancient Ceylon.

S. MOLEGODE (Ceylon).

Suggestions Section

By "Spanner"

(613) Uses for the Threaded Pin

("Spanner")

The Threaded Pin, Part No. 115, is one of the most useful in the Meccano range of parts and it enters into the construction of models of all kinds. At the present time, when it is not easy to obtain the variety and quantity of Meccano components necessary to form a really comprehensive Outfit, the Threaded Pin can often be put to good use in building up some substitute for other unobtainable components.

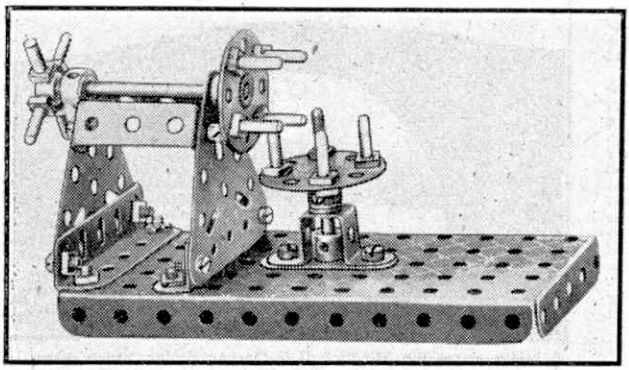


Fig. 613.

As an example, a right-angle drive is often required, and as Bevel Wheels are now difficult to purchase the model-builder who lacks these parts must fall back on substitutes. Here the Threaded Pin can be utilised, and a really good right-angle drive can be arranged as shown in Fig. 613. It will be seen that this is formed from Threaded Pins used in conjunction with Bush Wheels. Four Pins are secured in the faces of each of two Bush Wheels and the latter are then fixed on Rods so that the Pins of one Bush Wheel engage at right angles the Pins of the other Bush Wheel.

A further novel use for the Threaded Pin is in the construction of handles for handwheels, and an example of this is also shown in Fig. 613. In this case the handwheel consists of four Threaded Pins screwed in the tapped bore of the spider from a Swivel Bearing.

A model-builder who does not possess Rubber Rings or Motor Tyres, and wishes to build a model motor vehicle, will find Threaded Pins useful in building up the clutch. An example of their use for this purpose is shown in Fig. 613a. The device illustrated consists of a Swivel Bearing spider to which are locked four Threaded Pins that engage four similar Pins secured in a Bush Wheel. The spider is fixed on the Rod, and the Bush Wheel, mounted loosely, is connected by a Socket Coupling to a 1" Gear or another suitable gear wheel. The whole unit is free to slide longitudinally on the Rod, and its movement is controlled by the action of a Compression Spring. The Socket Coupling should be linked to the clutch pedal of the car. This can be arranged by connecting the pedal to a Coupling, two holes in which engage the groove in the Socket Coupling.

(614) A Simple Make and Break Switch

("Spanner")

Most of the simple types of electric switches are easy to construct in Meccano and work efficiently, but some mechanisms demand more complicated types in which it is possible to obtain instantaneous and clean "make and break" contacts. In cases where such a switch is required the type shown in Fig. 614 will be found useful. It consists of two Pendulum Connections, the tip of one of these being bent at right angles so that its edge

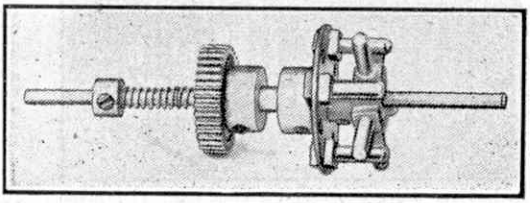


Fig. 613a.

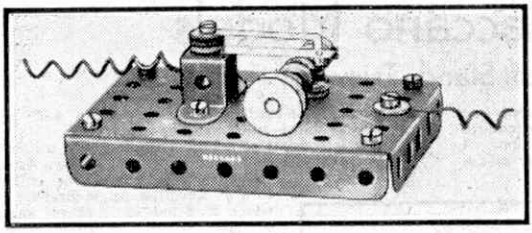


Fig. 614.

makes contact with the face of the other when a cam driven from an auxiliary drive provided in the model is rotated. The Pendulum Connections should be mounted together on a ½" 6 B.A. Bolt secured to, but insulated from, a Double Bent Strip or other suitable Meccano part in the model. As it is much easier to incorporate a switch of this type in a model by fixing both Pendulum Connections on the same Bolt it is necessary for the lower one to have its hole enlarged to the same diameter as the holes in a Meccano Strip so that it will take an Insulating Bush. It is secured so that it makes electrical contact with the frame of the model, but is insulated from the ½" 6 B.A. Bolt. The Bolt is fitted with a Terminal and provides one of the connections to the switch, as it is in contact with the upper Pendulum Connection. The other contact is provided by the framework.

The design of the cam will depend on the duration of contact required during each revolution of the shaft. In the switch illustrated the cam is a Collar fitted with a 7/32" Grub Screw and mounted on a Rod journalled in Handrail Supports, each of which is spaced by two Washers from the base. A ½" fixed Pulley transmits the drive to the Rod.

(615) A Simple Dish-Rocker for the Dark Room (F. Schernewegen, Antwerp)

Fig. 615 shows a simple device which will rock a photographic developer dish, and so prevent air bubbles from forming on the surface of the film and causing undeveloped patches. The device works continuously without constant attention and thus eliminates the tedious task of rocking the dish by hand, which is specially tiring when a slow developer is used.

The mechanism is operated by an E6 or E20B Electric Motor mounted on one end of a base constructed as shown in the illustration. A ½" Pinion mounted on the armature shaft of the Motor meshes with a 57-teeth Gear 1 fixed on a Rod that also carries a second ½" Pinion. The latter engages a 57-teeth Gear 2 fixed on a Rod 3 journalled in the sideplates of the Motor. This Rod 3 also carries a Worm that meshes with a ½" Pinion on a vertical shaft 4, and this Pinion rotates a second Worm 5 that engages with another ½" Pinion, the Rod of which also carries a 1" Sprocket 6. The drive is then transmitted from Sprocket 6 to a 2" Sprocket 7 that is mounted on a 3½" Rod journalled in two Architraves bolted to the base.

The developer dish is held in place on a 5½" × 2½" Flanged Plate between two Spring Buffers that are mounted on Flat Brackets bolted to the ends of the Plate. The Flanged Plate is pivoted in the position shown on the 3½" Rod supported in the end holes of two Architraves attached to the base, and its front end flange engages the teeth of a 1" Sprocket 8 carried on the Rod of the Sprocket 7. As

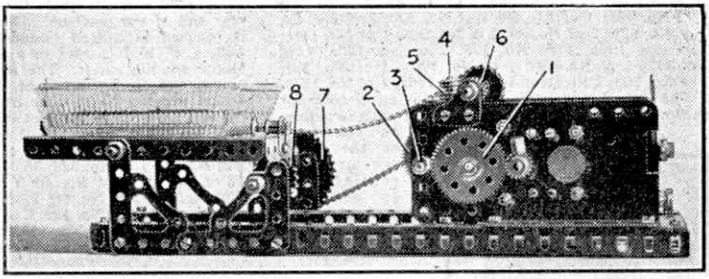


Fig. 615.

the Plate is pivoted off centre the front tips and so always contacts the teeth of the Sprocket 8.

When the Motor is operated the Sprocket 8 rotates at a very low speed, and causes the dish to move up and down just sufficiently to agitate the developer solution, without splashing over the rim of the dish.

New Meccano Models

Watch Stand—Tricyclist

THE first of our two new models this month is the useful watch stand shown in Fig. 1, which requires very few Meccano Parts for its construction. A 5½" × 2½" Flanged Plate, given curved sides by means of 5½" Curved Strips, is supported by means of Strips connected at their lower ends to it by 2½" Curved Strips at each side. At the rear, a 3½" × ½" Double Angle Strip spans the legs.

The watch hook is a large Crane Hook, held on a Bolt passed through Angle Brackets bolted to the Plate in the positions shown. Two compartments 3, formed from 1½" Angle Girders and 1½" × ½" Double Angle Strips, are provided to hold trinkets such as studs.

A Meccano Headlamp and a Pea Bulb can be used to illuminate the dial of the watch as shown. A switch is formed from a Double Arm Crank 1 fitted at the top of the stand. The Crank is fixed on a 2" Rod fitted with a Compression Spring and journalled in the Flanged Plate, a Double Bent Strip and a ½" Reversed Angle Bracket fixed in place by Bolt 2. A Collar on the Rod carries a Bolt that slides in the slot of the ½" Reversed Angle Bracket and prevents rotary movement of the Rod. When the Crank is depressed the lower end of the Rod makes contact with a Pendulum Connection insulated from a ½" × ½" Angle Bracket fixed to the rear of the Flanged Plate. The Pendulum Connection forms one of the contacts to the Pea Lamp. The other contact from the Lamp goes direct to the source of current supply.

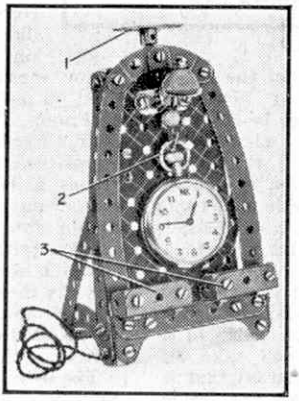


Fig. 1. How to make this useful model watch stand, fitted with a lamp, is explained on this page.

Parts required to build model Watch Stand: 2 of No. 2; 3 of No. 3; 2 of No. 5; 2 of No. 9f; 11 of No. 12; 1 of No. 12b; 1 of No. 16a; 40 of No. 37a; 40 of No. 37b; 10 of No. 38; 1 of No. 45; 2 of No. 48; 1 of No. 48b; 1 of No. 52; 1 of No. 57c; 2 of No. 59; 1 of No. 62b; 2 of No. 89; 3 of No. 90a; 1 of No. 111c; 1 of No. 120b; 1 of No. 125; 2 of No. 133a; 1 of No. 172; 1 of No. 182; 1 of No. 182a; 1 of No. 201; 1 of No. 203; 2 Elektron Parts No. 1562; 1 of No. 1573.

The second model this month is the novel tricyclist shown in Fig. 2. This is most amusing when in action, as the legs of the figure are operated realistically by means of a simple crank mechanism. The model is driven by a No. 1 Clockwork Motor, and is quite easy to construct.

The cycle consists of a Flat Trunnion 1 to which a 1½" × ½" Double Angle Strip 2 is bolted. At its pointed end the Flat Trunnion is bolted to a ½" Reversed Angle Bracket 3, which is fitted to it at an angle so that when the front wheel mounting is secured to it the cycle will rotate around the centre pivot, which is formed by the Motor shaft. The upper end of the Reversed Angle Bracket is bolted to a Double Bracket 4, the arms of which are bolted to two 2½" Curved Strips, each of which is spaced by a Washer from the Double Bracket. A second Double Bracket similarly spaced is attached at the upper end of the Curved Strip, and the handlebars are formed from a 2½" Cranked Curved Strip bolted to it.

A Collar is placed on each end of the front wheel axle, and a second Collar is bolted to each of these by a ⅜" Bolt, a Washer being used for spacing purposes. A 1½" Strip forming the lower part of each leg is lock-nutted to one of the tapped bores of each of the second pair of Collars; 2" Strips are lock-nutted to the 1½" Strips, and these are pivotally connected at their rear ends to ½" × ½" Angle Brackets bolted to the body of the cyclist.

The cyclist's body is formed from a Trunnion, to which is bolted a Flat Trunnion representing the shoulders. The Trunnion is attached to the Flat Trunnion of the bicycle by a Double Bracket. The arms are 1½" Strips, the head is a 1" loose Pulley.

The tricycle is connected to the Motor by a 3½" Rod inserted in a Rod and Strip Connector bolted to a ½" Reversed Angle Bracket attached to the rear end of the machine. The other end of the Rod is inserted in a Rod Connector, which connects it with a 4" Rod carried in a Coupling fitting on the Motor winding shaft. The Motor can be wound up on disconnecting the rod at the Rod Connector, the actual winding being done by the 4" Rod.

Parts required to make model Tricyclist: 2 of No. 6; 4 of No. 6a; 1 of No. 10; 3 of No. 11; 4 of No. 12; 1 of No. 15b; 1 of No. 16; 1 of No. 16b; 1 of No. 18a; 3 of No. 22; 1 of No. 22a; 35 of No. 37a; 31 of No. 37b; 16 of No. 38; 1 of No. 40; 1 of No. 48; 8 of No. 59; 1 of No. 63; 2 of No. 90; 1 of No. 90a; 2 of No. 111c; 2 of No. 125; 1 of No. 126; 2 of No. 126a; 1 of No. 142; 1 of No. 142c; 2 of No. 155a; 1 of No. 212; 1 of No. 213; 1 No. 1 Clockwork Motor.

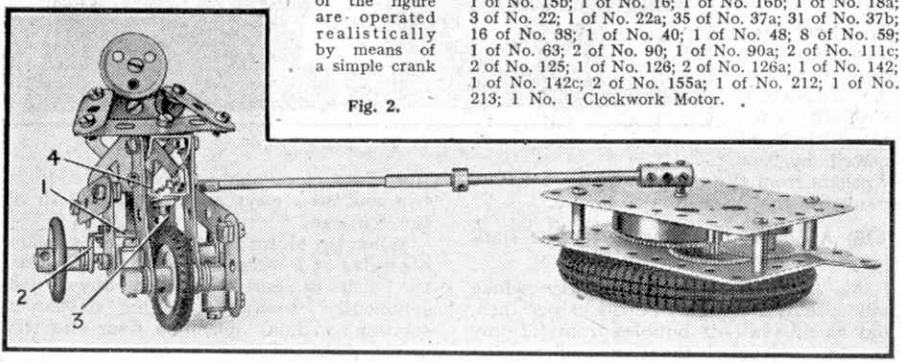


Fig. 2.

Meccano Model-Building Competitions

By "Spanner"

"Simplicity" Contest Results

This month we are able to publish the names of the successful competitors in the "Simplicity" Competition, details of which appeared in the May and June issues of the "*M.M.*" Those awarded prizes are as follows:

1st Prizes. Section A: J. Smith, Bristol; Section B: A. Short, Birmingham 17. 2nd Prizes, Section A: T. Jones, Birkenhead; Section B: P. A. Walters, Billericay. 3rd Prizes, Section A: W. S. Roberts, Halifax; Section B: R. C. Thomson, Glasgow. Consolation Prizes: R. Meadowcroft, Prestwich; W. R. Timms, Sheffield.

A group of four interesting and exceptionally well-built little models won a First Prize for A. Short, Birmingham 17. They represent a lawn mower, a cinematograph, an Autogiro and a three-wheel motor delivery van, and the first two are illustrated on this page. I think I prefer the lawn mower as the best of this collection, although I must admit that the motor van runs it very close for pride of place. I congratulate Short on his ingenuity in making use of the few Meccano Parts incorporated in his models.

A pair of models, featuring a microscope and a giant block-setting crane respectively, were submitted by P. A. Walters, Billericay, Essex, and they won for him a Second Prize. Unfortunately it was not possible to illustrate either of these models. The stand of the microscope is constructed from two Obtuse Angle Brackets, one Double Bracket and one Angle Bracket. The reflector is represented by the head of a Pivot Bolt, and the slide stage is a Flat Bracket bolted to an Obtuse Angle Bracket fixed to the base. Focussing adjustments are represented by Collars, and the lens tube is a Coupling. These brief details will give readers an idea of the simple construction of the model, and I can assure them that it has a very realistic appearance. The block-setting crane is rather more elaborate, and the Second Prize in Section B was awarded to this entry mainly for the good work done in the microscope.

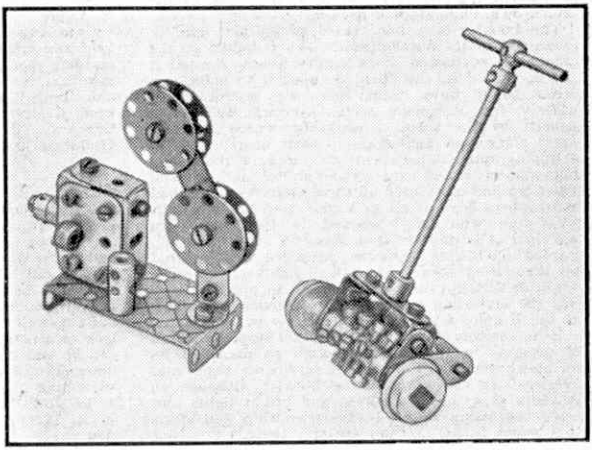
A particularly neat model of a tractor hauling a gun carriage and ammunition wagon was the subject of the entry sent by W. S. Roberts, Halifax, which earned for this competitor Third Prize in Section A.

This entry owes its success entirely to its realism and if it had been rather more simple in construction I feel sure the competition judges would have given it a higher place in the awards list.

Among the remaining entries were many really good models that only just failed to reach the standard necessary to qualify for one of the principal prizes. One of these was an attractive pistol sent by R. Meadowcroft, Prestwich. This consists of only three parts, excluding Nuts and Bolts, and these comprise a Rail Adaptor, a Flat Bracket and a small piece of Spring Cord. The Rail Adaptor forms the barrel and the Flat Bracket is attached to it to represent the butt. The Spring is gripped between the Rail Adaptor and the Bracket and forms the trigger. This model was awarded a Consolation Prize.

Judge These Simple Models

A series of exceptionally interesting models of a very simple character began in the July "*M.M.*," with an attractive swing boat and a fine little model mobile crane, and ends in this issue with the two splendid models illustrated and described on the opposite page. In all there are seven of these models, and we are making them the subject of our model-building competition this month. What we want model builders to do is: 1, to say which of the models they like best, and arrange the seven in the order in which they think the votes of competitors will place them; 2, suggest three new subjects for model-building competitions. This is an easy contest in which all readers of the "*M.M.*" have a splendid chance of winning a handsome cash prize.



Two of the four models that won first prize in Section B of the recent "Simplicity" Contest for A. Short, Birmingham 17. The others were an Autogiro and a delivery van, and the group formed a very effective entry.

We give a list of the models concerned, with the month in which each was described and illustrated.

Mobile Crane	...	July.
Swing Boat	...	,,
High Jump	...	August.
Aerial Flyer	...	,,
Army Mule	...	,,
Watch Stand	...	September.
Tricyclist ...	...	,,

The contest is divided into two sections, A for competitors in the British Isles, and B for competitors Overseas. The prizes in each section are £2/2/–, £1/1/– and 10/6, with consolation awards of 5/–, and entries should be addressed "*Model Judging Contest, Meccano Limited, Binns Road, Liverpool 13.*" Closing dates: Home, 30th September; Overseas, 31st March, 1944.

Club and Branch News

WITH THE SECRETARY

A CLUB THAT BOYS BUILT

One of the secrets of success of Meccano Clubs and H.R.C. Branches is that they are run not for, but by boys, for every member, however young or inexperienced he may be, takes some part in the general conduct of the Club. I have therefore been interested to find from a booklet telling the story of the Edinburgh Hobbies Club, which is affiliated with the Meccano Guild and incorporated in the H.R.C., that its founders lay stress on the fact that the members run the Club, organise it, act as section leaders and control nearly every aspect of its activities. The very title of the booklet conveys this idea, for it is *"The Club That Boys Built."* It is written by Mr. H. W. Govan, and is illustrated by means of excellent photographs, mostly selected from the work of the Club's own Photographic Section.

The booklet is a fine record of an idea and of enterprise in its development. The founders of the Club took possession of an empty house, cleaned it and decorated it, and then equipped it to make it a dream to all boys. Soon there was a fine model railway, an aeroplane section turning out model aircraft by the score, a workshop where members could plane, saw and chisel to their heart's delight, a photographic department with a dark room and full equipment, and even a radio section and canteen. The Club had more than all these, however, for it had as members boys of all ages who were full of bright ideas and who fully believed in the democratic principal of letting the members run their own Club instead of having activities arranged and ordered for them from above. Many high lights in the story are dealt with in this booklet. One of the finest of these was the invitation to the Club to provide an exhibit at the Empire Exhibition in Glasgow in 1938.

Even the coming of the war did not stop the march of progress in the Club, although so many of its members were called upon for service at home and overseas. In the words of the booklet, although no longer a place of "workshops and bright lights and noisy engrossing activities, the friendship and ideals that made E.H.C. a Club are still there."

CLUB NOTES

KILROOT M.C.—Membership has increased and a splendid summer programme, including swimming, has been followed under the leadership of Mr. L. E. Pavitt. A Treasure Hunt and a Party have been other outstanding events. Fretwork is to be introduced and arrangements for an Exhibition are being made. Club roll: 13. *Secretary:* J. C. Mulvagh, Dobb's Cottage, Kilroot, Carrickfergus, Co. Antrim.

GRASMERE M.C.—An enjoyable outdoor programme has included a cycle race. Model Boat Racing also has been carried out, and a Sports Meeting has been arranged. This it is hoped to make an annual event. Indoor Competitions such as Crosswords and a Railway "Quiz," have been held. Model-building Competitions also have been continued and the Club Library continues to be well supported. Club roll: 18. *Secretary:* I. H. Hardman, "Bainriggs," Grasmere, E. Lakes.

CROSLAND LODGE M.C.—"Spotters" tests have been held and cricket matches played. Members are now building models at home and bringing them to Club meetings for criticism and judgment. The "Nuts" and "Bolts," the two sections of the Club, are showing keen rivalry in this. Club roll: 14. *Secretary:* D. Graham, 19, Moorside Avenue, Crosland Moor, Huddersfield.

BRANCH NEWS

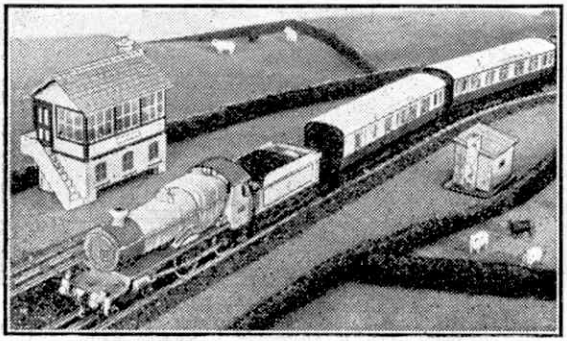
GUISELEY—A permanent continuous track with two through stations has been built, with an extensive goods yard, and really interesting operations can be carried out on it. The track is completely signalled, and tests are being made to allow timetables to be worked out. A non-continuous track 30 ft. in length also has been constructed. *Secretary:* Miss Nora Barrett, 4, Ashcrofts Mount, Guiseley.

FOREST SCHOOL—Meetings continue in spite of the lack of a permanent room in which the Branch track can be laid down. During the summer good fun has been enjoyed with Hornby Speed Boats in the School swimming pool, and further meetings for this as well as for train operations are being planned. *Secretary:* P. L. Wood, Forest School, Nr. Snaresbrook, London E.17.

Members of the Edinburgh Hobbies Club M.C. camping in the Moorfoot Hills. Standing are two of the Leaders, Mr. H. Govan and Mr. W. Skinner. Mr. Govan wrote the story of the Club reviewed on this page.

Fun with Hornby Single Line Working

THIS month we shall try to show that it is possible to have a great deal of fun from the operation of a single-line layout. Naturally a plain circle or an oval track does not offer any great possibilities in the way of realistic traffic operations. Both are useful for test running, however, such as for finding out the capabilities of individual engines, or for seeing how engines and vehicles behave after a periodical overhaul and cleaning up. The addition of a siding, however, makes quite a difference to things. It can be used for the storage of our train in between intervals of running, and even the shunting in and out of the vehicles will be found quite entertaining. The setting of the points and the careful movement of the train either into or out of the siding are elementary operations, but they are an essential part of the great game of "railroading," as our friends in the United States would say.



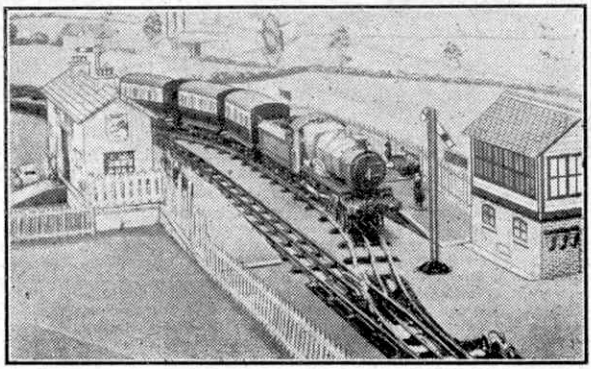
Away to the west! A G.W.R. express on a Hornby layout.

Beginners, and at times old hands too, often make the mistake of trying to carry out these operations at too high a speed. The result is not realistic, to say the least, even if actual derailment or a buffer stop collision does not occur, and either of these can be most annoying especially if some damage is caused. The electric operator should practise with the controller handle until he gets the "feel" of different loads and types of vehicles and can make a smooth backing-in movement or a reasonable exit of his train from the siding. The clockwork enthusiast has a smaller degree of control, but if he puts into operation the scheme of winding the engine just sufficiently for the movement to be carried out, he will not go far wrong. A fair effort is required of the engine with a heavy load that has to be backed over the reverse curves usually found at the entrance to sidings, so that the engine may tend to run too far once the straight track has been reached. However, if the "driver" makes a smart application of the brake on the engine, all will be well. On a short siding allowance must be made for the slight stretching out of the couplings when the train is retarded.

The ordinary dead-end siding of course has its limitations, especially where there are two trains to be run in opposite directions on the same single main line, and these require to pass one another. This is where the development of the siding, the loop line, comes in so useful. The loop line requires an additional set of points, but where these are available their use in this way is well worth while from the operating point of view. It allows a straight run in or out at either end, and avoids the necessity for the time-taking reversing movements that are necessary in one direction or the other with a dead-end siding. Thus smoother working is possible, which is an advantage where timetable operation is in practice.

The length of a loop line, especially if it is used at a passing place or "crossing station" on the main line, is important. It should preferably be long enough to hold comfortably the longest train that we may want to run. If the length of the loop is restricted, then the number of vehicle composing the trains must be limited as suggested in last month's article. Sometimes the use of a longer type of engine than usual will prevent a "maximum load" train from standing in the loop clear of other traffic on the opposite track; this point must be watched when arranging for up and down trains to cross one another. Thus in the lower illustration on this page the train shown is using the loop at the station in order to "keep to the left" as is the rule in this country. While it is standing at the platform, however, it cannot be passed by another train, as it is just too long to stand clear. The use of a tank engine, say a No. 1 Special Tank, would improve matters. The working in one direction of the "County" class engine with the load shown would have to be timed so that no crossing would be necessary at this particular point.

On a continuous layout the placing of the crossing loop will depend to a certain extent on space and on the convenience of the operator. On a non-continuous line the most convenient place will probably be at a point about midway along the line. Operations then become quite exciting, for if the correct "meetings" of up and down trains are to be observed, time must be kept by all trains concerned.



A G.W.R. stopping train in charge of a "County of Bedford" locomotive at a passing station on a single track main line.

Working a Simple Hornby-Dublo Layout

THE layout shown in the diagram on this page is a good example of the simple development of the circular and oval tracks with which we are all familiar. The system thus formed can be accommodated within a space 6 ft. by 3 ft.

The key to the lettered items on the diagram indicates suggested positions for different accessories, but of course they can be varied. Thus on a system dealing with passenger traffic the Goods Depot at "C" could be eliminated and a Station put in its place. The rails marked "X" apply specially to electrically-operated layouts; they are Isolating Rails, and in conjunction with simple electrical switches, or the special Switches D2 that were introduced for use with them, they provide the means for rendering the two siding lines "alive" or "dead" as required. If only a single locomotive is in use this refinement is unnecessary, but with two engines it adds very greatly to the fun. On a clockwork layout of course no special arrangements are necessary for dealing with two engines on the same track system at the same time. Therefore on a clockwork system, or on a "one engine" electric layout, each of the Isolating Rails will be replaced by a straight Quarter Rail.

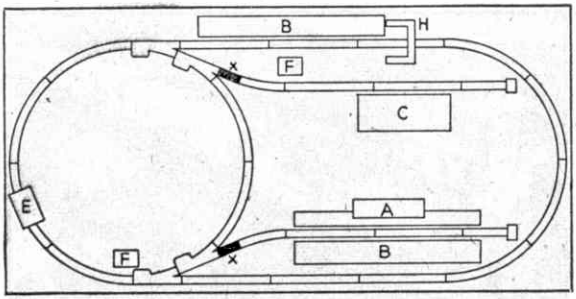
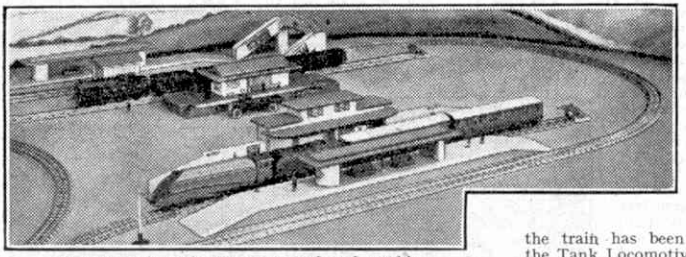


Diagram of the layout referred to on this page. The lettered items are: A, Main Line Station; B, Island Platform; C, Goods Platform; E, Tunnel; F, Signal Cabin; H, Footbridge; X, Isolating Rails.

We begin operations by assembling our train in the lower of the two dead-end branch lines in the diagram. This is shown serving a standard Main Line Station and also an Island Platform opposite to it. We will suppose that the train consists of a Two-Coach Articulated Unit and a Streamlined Locomotive and Tender, for this fits nicely in the station branch line. Having set the road and operated the necessary signals, we can run the train gently out on to the main line, not forgetting to restore the Points to their normal position immediately the train has passed.



The same layout when arranged and working.

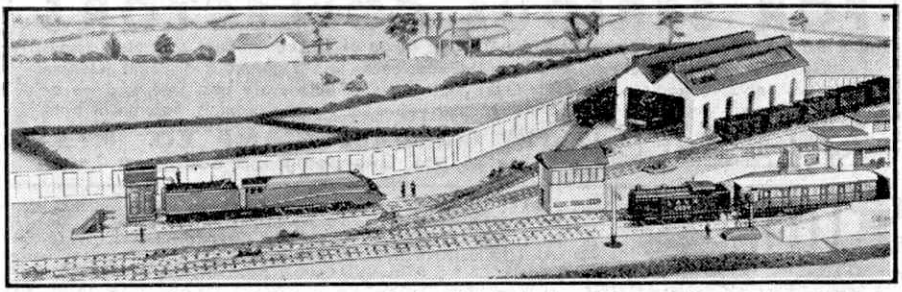
Once the train is on the main line the exact details of running can be varied according to the wishes of the operator. If a main line express run is being made, several circuits of the oval main line can be completed before a stop is made at the Island Platform that stands alongside the upper track in the diagram. This can be repeated until sufficient stops have been made to complete the journey that is represented, London to Newcastle, Edinburgh to Aberdeen, and so on. As a change, now and then the train can be diverted on to the circular "loop." This working can also be used to represent a stopping train trip, stops being made on every circuit of the track, or every two circuits, as the operator thinks fit.

On a clockwork line with two locomotives it is possible, without any alteration to the layout, to carry out the attachment and detachment of vehicles such as a Standard Goods Van or a perishable traffic Van, when the train is halted at the Island Platform station. This work will be carried out by a Standard 0–6–2 Tank Locomotive previously made to stand in the Goods Platform siding where perhaps there may be several goods vehicles. Then, when the express comes in, the Tank Locomotive has simply to draw out of the siding with the Van to be attached, and back this on to the rear of the train. When the Van is to be detached the process is reversed.

To carry out the same evolution on an electric layout it will be necessary for the length of straight track alongside the Island Platform to be made a separate electrical section. Then this section can be made "dead" when the passenger train comes to a standstill on it, and the Tank Locomotive can be run out of the siding and made to perform the necessary movements without interfering with the Express Locomotive. If Isolating Rails are used the layout will be lengthened by the equivalent of one Straight Half Rail.

To conclude the journey the passenger train can be made to arrive at the Island Platform station; after the train has been emptied of "passengers" the Tank Locomotive can come up in the rear and remove the coaches. They can be taken right round the left-hand end of the layout and drawn into that part of the circular track lying between the two inner points; or they can be drawn out of the station and then pushed into the same place. The Express engine can then be run either way round the track after the Tank has retired again to its siding, and attached to the Coaches once more for another trip. Possibly it will be desired to give the Tank a turn at passenger work; if so, the Express Locomotive can be "refuged" in either of the dead-end tracks while the other engine makes a journey.

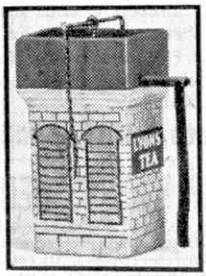
There is practically no end to the operating possibilities of this little layout.



This illustration includes the Plasticine accessories described in detail on this page. They are the water tank, the water column, and the telephone call-box.

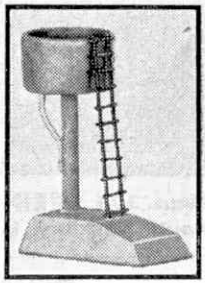
More Plasticine Accessories

IN the "*M.M.*" for April last, we described several accessories made of Plasticine that were suitable for use on Hornby-Dublo layouts. The great advantage of this modelling material is that it is easily "worked" with nothing more formidable than a penknife; in addition it can be used again and again, being made up into further models as required, and it is clean to handle. On this page we deal with further models of this kind, each of which is included in the above illustration.



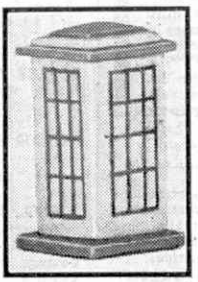
The picture shows a station and locomotive yard layout. Apart from the use of a Dublo Engine Shed, which is obviously necessary in such a situation, a prominent accessory is the water tank that stands alongside a spare track at the opposite end of the yard from the shed. The actual tank is supported on a brick-work or stone structure that often houses a pumping plant in connection with the water supply, and sometimes space for stores or appliances. From the lower part of the tank, sometimes on a swinging arm, there hangs the leather "bag" or hose for delivering the water to the engines. As a rule an iron ladder for inspection purposes is led up from the ground to the top of the tank, and from an arm or lever that projects on the top edge of the tank there hangs the operating chain. This is pulled down and held by one of the enginemen standing by the filling hole on the tender or tank, and the water flows until the chain is released.

The water tank at the shed in the illustration is made by first of all modelling the main structure supporting the tank, using buff or stone-coloured Plasticine. Note that the upper part is widened near the top. The tank is then made, using red or blue Plasticine, and placed in position in the top of the main structure. Next, the valve gear and operating chain are constructed, the former of wire and the latter of dark-coloured string. The hose can be made of any suitable flexible material; that in our model is a piece of thin insulated electric cable. Finally the brickwork and windows are marked out with the point of a penknife blade, the window frames afterwards being strengthened by the careful use of pen and ink. To add further realism miniature posters are affixed to the sides.



Another form of water tank or column is often used in shunting yards and at stations where drivers can take advantage of a stop to fill up. At times, especially with freight trains, stops for water are included in the running arrangements and it is fascinating to reproduce this in miniature. On a clockwork layout the stop provides a good opportunity for re-winding. This type of tank is circular and is supported on a substantial column inside which the supply pipe from the mains is usually led.

In the construction of this model the first step is the moulding of the base to the shape indicated. The column comes next, and this consists of a piece of wire covered with Plasticine and stuck firmly in the base. At the top of the column the wire should be twirled to make a platform on which the Tank can be placed. The ladder is then built, using thin wire. Each rung is cut separately and nipped in position with pliers. The hose is rolled to the required dimension and then pressed into the position shown.



Another effective accessory in the illustration is the telephone call-box on the station platform. To make this model is quite a simple matter. Red and stone-coloured Plasticine should be used to conform to the standard G.P.O. colour scheme. The body of the call-box is made first of all and placed on a base of red Plasticine which projects about $\frac{1}{8}$ in. all round. For the roof, layers of red and stone-coloured clay are superimposed on each other, the lower layer of red projecting about $\frac{1}{4}$ in. The window frames and windows are then realistically reproduced by means of ordinary pen and ink.

Stamp Collecting

Commemorative Stamps

By F. E. Metcalfe

IT had been my intention this month to deal with the stamps of another of the free countries, but a radio talk about that great English composer, William Byrd, has caused a change of mind, and it was decided instead to write about commemorative stamps. It is high time that our authorities decided at long last to fall in line with the rest of the civilised world and adopt what is the greatest free publicity medium which exists—the issuing from time to time of attractive postage stamps to commemorate some great event or achievement, etc.

The average Britisher knows that he is pretty hot stuff at football, and the average foreigner knows that too. Men like Stanley Mathews and Hapgood are strangers to few, but ask those same average Britishers who William Byrd, or Purcell were and they will mostly reply: "Never heard of 'em." Yet in their line they are entitled to rank with Beethoven and Wagner.

The world's greatest exponent of publicity, the U.S.A., recently issued five postage stamps honouring their composers. Now most of the world knows, so stamp-minded has it become, that America has had its musical moments, though it must be candidly admitted that not many foreigners had ever heard of men like Foster and Nevin, to name two of the five honoured, before the stamps were issued.

The U.S.A. also issued another 25 stamps, each one bearing a portrait of one of its famous sons. What a gift from heaven for the school teachers, for few of their scholars will have missed seeing these stamps, and most of them will have taken the trouble to find out who these men were and what they did. America is busy now producing stamps to give publicity to war aims, and also to honour the countries which have been overrun by the Axis.

As a matter of fact, war or no war, the whole world is busy issuing stamps to promote one object or another, and as has been already stated, nothing could be more effective or cost less. It is not quite correct to say the whole world, however, for one country and one country only stands aloof, and that is our own.

Of course there have been odd occasions when very grudgingly the Postal Authorities have agreed to issue a few stamps for a special purpose, but what a sorry uninspired lot they have been, as our illustrations show, chiefly due to the fact that generally speaking the job was gone about in the wrong way. If there is to be a change in method, there will also have to be a change in heart.

Some of the finest special stamps which have been issued by foreign governments have been designed and printed in this country. Yes, it is hard to believe that when one looks at British commemorative stamps, but the explanation is simple enough. The foreign governments saw to it that only people who understood the medium in which they were working were allowed to take a hand. It is common knowledge that there have been occasions when the Postal Authorities have questioned a certain class of collectors regarding the propriety or otherwise of issuing attractive stamps, from time to time, for some special purpose. These collectors have always advised against the idea, simply because they were against modern stamps of all kinds. The reason given was that the emission of such stamps lowers the dignity of a nation. Could anything be more ludicrous?

It would not be so bad if these particular collectors represented anybody but themselves, or even if they had ever been an asset to the hobby; but about all they have ever done is to bring ridicule upon our heads, with their nonsensical remarks about the "science of philately." That to describe the jolly little pastime of getting together a number of postage stamps!

It can also be stated that a minority section of the stamp trade, imagining that its interests will be adversely effected, is also against the emission of special stamps; but surely American dealers, who know from experience, would not ask their government for more new stamps, as they did recently, if such things injured their trade.

Now because this is an article for stamp collectors, their point of view has been given; but, and this is the rub, the whole question has actually no more to do with stamp collectors as such than it has with any other section of the community, for it is a national matter and the authorities were entirely wrong in even consulting collectors. Lowering the dignity of the nation indeed! The implication of course is that these special stamps could only be issued for the revenue they would produce, from sales made to stamp collectors. If there was no more to it than this, some kind of a case could be made out to support the "antis," but so great is the propaganda value of the right kind of postage stamps, that the money which this country would make from their sales, substantial though it might be, is not worth even taking into consideration.

The whole question has only been discussed in somewhat general terms this month, but in the next number of the "*M.M.*" the writer proposes to be more specific. Various worthy objects besides our collections that would benefit will be mentioned, but these would not benefit from stamps similar to those illustrated this month.

Stamp Gossip

and Notes on New Issues

Very shortly we may expect to see specimens of stamps which are being used in Sicily, but at the time this is being written there is no exact news regarding what these stamps are; in the meanwhile, however, it is possible to illustrate an interesting stamp received from Tunisia. As can be seen, a British, an American and a French soldier are depicted, and the shapes of their steel helmets shows which is which.

Things are stirring in Europe with a vengeance, and maybe it will not be long before the philatelic floodgates are opened and stamps pour in from the Continent. A warning about these stamps has already been uttered, and it is to be hoped that for the sake of readers' pockets it will not go unheeded. Lots of older collectors remember ruefully how they burnt their fingers after the last war.

One collector well known to the writer — no, it was not the writer himself, though he did throw away a few pounds similarly—spent over £200 on what he thought was a fine collection of scarce provisionals. If that collection was extant to-day it might be worth as many pence!

The St. Kitts-Nevis stamps, which owing to perforation changes recently became obsolete, are rising very rapidly in price, so much so indeed that the 5/- value is already catalogued £1, with the other values pro rata; moreover, few dealers can supply at any price, and when collectors do come across a set of these stamps they will have to pay at least twice as much for them as would have been the case before the advent of the latest printing. All very sad and for some of us very unnecessary, for we had plenty of warning.

As a matter of fact used specimens of stamps with the so-called new perforations have come to light bearing postmarks of 1942. This is just another instance where stamps were sent out to the colony concerned before they were released to dealers in London by the Crown Agents. It was recently stated in a philatelic paper that these changes, which have been troubling our philatelic lives, are probably coming to an end. We just don't believe it; there never was a time when a watchful eye on all current colonials which come our way would be more worth while than to-day.

A number of collectors of modern British Colonial stamps are complaining that these issues are not being given a fair show in the catalogue. Some think that some stamps recently issued showing pronounced shade variations should be listed. If the idea is that these stamps would thus become more valuable we would respectfully beg to differ, for the listing of a genuine variety makes no difference to its worth; however, it must be admitted that it is a bit odd that a foreign catalogue is doing a more thorough job in the way of cataloguing our colonial stamps than is the British counterpart. The latest stamps to be catalogued by Scotts and ignored by Gibbons are the latest printings of the £1 Bahamas and the 1d., 1½d., 2d. and 2/- values of British Solomons. Perhaps the explanation is that Scott's editor is not prejudiced against what is undoubtedly the finest range of stamps ever produced.

But whatever collectors may feel, they will be ill advised to press for more varieties to be catalogued; rather should they work for the elimination of hundreds of varieties which should never have been allowed to clutter up any catalogue.

Collectors are now feeling the pinch regarding stamp albums and other philatelic gadgets, but the fact that stamp mounts as well as album sheets can still be manufactured is something to console us. Of course neither the mounts nor the sheets now on the market are as good as those we were able to buy in peacetime, but they will serve the purpose and that's about as much as one has a right to expect after four years of war. As supplies are not unlimited it is up to all of us to use what we get as sparingly as possible. Incidentally if you find yourself short of mounts, don't be tempted to use stamp edging for mint stamps, as did our fathers, for it won't come off unless soaked, and nothing looks worse on the back of a stamp than a piece of unpeelable white paper. This warning is given because a dealer told us of a collection he refused to buy the other day. According to what he said, it was a nice little collection of George VI colonials, but most of the stamps had been mounted with stamp edging and the dealer didn't want the result at any price.

Few countries have issued more beautiful stamps than Belgian Congo, and none of their issues exceeds in this respect the current set, which was printed in England by Waterlow and Sons Ltd. We are illustrating a copy of the 50 f. and whilst it is not possible to import this particular set, many collectors will be able to get hold of a few used copies, as a fairly substantial quantity of correspondence arrives in Great Britain from the Central African colony, which is doing so much for the war effort.

F.E.M.

* * *

The "*M.M.*" stamp pages are designed to assist young stamp collectors to get the best out of their hobby, and any reader with a stamp problem that he cannot solve himself is invited to lay his difficulty before the Editor.

Trip on a Diesel-Electric Train—(*Cont. from p. 294*)

of safety on the 4 ft. 8½ in. track? Certainly not; I cannot see why 150 should not be quite safe on good, well-protected permanent way. This particular stretch did not impress me as being in any way "super," and the lack of fences and gates was a real blemish. Incidentally, "*The 400*" took the left-hand metals, as in England; the C. and N.W.R. is, I believe, the only line in the States that favours this. It was built with British capital, and left-hand running came with the money! Or so I was told.

Yes, I was very impressed, but I think if I did much running on Diesels I should get bored. Once the novelty of the speed and smoothness wore off there would be little left. It is like a highly developed tram, and the controls are about as interesting and informative! It is too close-mouthed and uncommunicative; it does things, but you can't see why, and it won't tell you. A steam locomotive talks to you all the time, and never tries to make a secret of anything. But there! I was brought up on steam.

I wish to acknowledge my indebtedness to "*The Engineer*," this story being based on data that originally appeared in that journal. E.H.L.

Propellerless Aircraft—

(*Continued from page 305*)

are far below. Sitting in their heated pressure cabin, the passengers will hardly know the aeroplane is in motion. No outside sound will reach their ears, for they are travelling at the four-figure mark, far faster than sound!

Eating his lunch under the hedge, some Cornish labourer will see, far up, an arrow-straight trail of smoke streaking across the sky, to mark the passage of the "Pacific Coast Express." Minutes after it has vanished over the horizon the faint roar of its exhaust will reach his ears: and about the same time as he is walking home to tea, the aeroplane will be touching down on some Californian airfield.

If the prospect seems fantastic, we may ask ourselves; "Who thought in 1914 that aeroplanes would be travelling at 400 m.p.h. by 1940?" The aeroplane has more than trebled its speed in the last 20 years. Future progress could be much more gradual and still realise our best hopes.

Mobile Cranes and their Work—(*Cont. from page 291*)

When derricking the jib, the load remains in a stationary position. This is an important feature of the patented mechanism because, in derricking, the end of the jib moves through an arc, and any rapid change of position would cause the load to swing. As the jib is raised the hoist drum revolves and pays out an extra equivalent length of wire rope, thus keeping the load in a stationary position. Then, when the jib is in the required new position, the hoist is again operated to lift the load vertically.

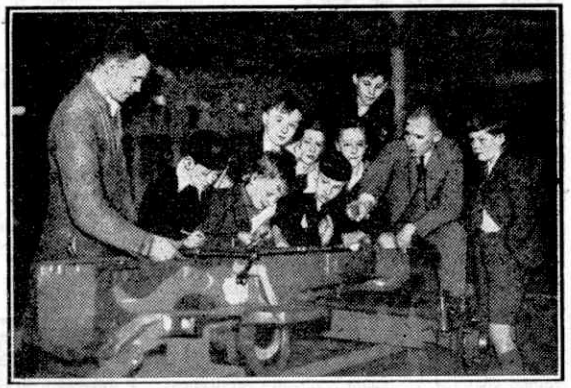
Other types of Coles mobile cranes are available suitable for lifting greater loads and with a longer reach of the jib. There is for example the Dual Race crane, which is mounted on a six-wheeled chassis and has a lifting capacity of 5 tons at a maximum jib radius of 14 ft. 6 in., or 3 tons with the load hook at a radius of 20 ft.

"DAVID BROWN" 3rd ANNUAL ESSAY COMPETITION

In preparation for the 3rd annual competition for the David Brown Tractors Shield, 50 boys from the Meltham Church of England, Meltham Mills National and Helme Church of England schools, accompanied by Mr. J. W. Moss and Mr. A. Roberts, headmasters, toured the works and assembly shops of David Brown Tractors Ltd. to obtain a first-hand view of production methods. Before commencing their tour the boys were given a short talk on salient features, so as to guide them in making notes.

As in earlier competitions the prizes for the best essays include a shield to be held by the winning school for one year, a medal to be retained by the winning boy, and three prizes valued at £1 each.

The trend of the war is such as to stimulate interest in mechanics, and the outstandingly keen interest of the boys more than justifies the policy of the firm in encouraging them in this before the time comes for them to take an active part in production.



Schoolboys in the works of David Brown Tractors Ltd., to whom we are indebted for our photograph. The visit was made in preparation for essay competitions for prizes given by the firm.

COMPETITION RESULTS.

HOME.

May "Go as You Please" Contest—1st Prize: J. T. Semple, Edinburgh. 2nd Prize: G. Chorley, Ambleside. Third Prize: M. Simons, Eyam. Editor's Special Prize: E. Hillidge, Runcorn. Consolation Prizes: K. Renton, Penzance; T. Moody, Bristol; H. Baxter, Upminster; A. Stephenson, Stoke-on-Trent.

June Crossword Contest—1st Prize: K. S. Duncan, Edinburgh 4. 2nd Prize: M. Malyan, Eden Bridge. 3rd Prize: I. L. Wright, Cardiff. Consolation Prize: A. Drapes, Rathfarnham.

July Photographic Contest—1st Prizes, Section A: D. Finlay, Glasgow; Section B: G. W. Peile, London S.E.1. 2nd Prizes, Section A: R. Ross, Glasgow. Section B: P. Milne, Whyteleafe. Consolation Prizes: A.C.I. Atkins, Eccles; D. Brown, Sanderstead; C. Coventry, Birmingham.

OVERSEAS

October Photographic Contest.—1st Prizes, Section A: S. Richardson, Sydney; Section B, C. R. Hutchinson, Johannesburg. 2nd Prizes, Section A: A. Martin, Cape Town. Section B: B. D. Wight, Brisbane. Consolation Prizes: R. E. Lees, Auckland; L. Poulton, Cape Town.

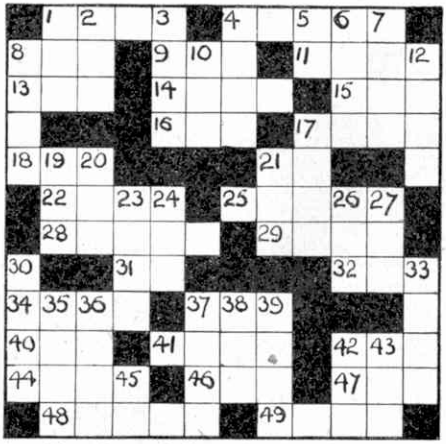
November Photographic Contest.—1st Prizes, Section A: M. Ashton, Sydney; Section B: P. L. Owen, Johannesburg. 2nd Prizes, Section A: E. T. Howard, Johannesburg. Section B: C. Lloyd, Cape Town. Consolation Prizes: A. M. Fuller, Durban; K. Galloway, Johannesburg.

November "New Words" Contest.—1st Prize: P. A. Gibbs, Durban. 2nd Prize: S. Woods, Ottawa. Third Prize: D. E. White, Brisbane. Consolation Prizes: T. Lucas, Johannesburg; L. T. Houghton, Johannesburg.

Competitions! Open To All Readers

A Locomotive Cross-Number Contest

CLUES ACROSS: 1 Devilish. 4 An African wind. 8 Hunt on the hillsides. 9 A South Yorkshire hunt. 11 A bird of prey. 13 *"Howard of Effingham."* 14 *"Bailie MacWheeble."* 15 Ancient English capital. 16 *"Viscount Churchill."* 17 *"Redgauntlet."* 18 *"Sir Lamiel."* 21 Arabian sacred city. 22 Two birds' names in one. 25 4–6–2 fitted with special smoke deflectors. 28 Famous L.N.E.R. experimental locomotive. 29 *"Blasius."* 31 A gracious lady, but not necessarily a singer. 32 A Knight with a colour. 34 His column is in a famous London square. 37 *"The South Durham."* 40 Might be taken as an insult. 41 *"The Lady of the Lake."* 42 *"Sir Gillemere."* 44 *"Arley Hall."* 46 LPT electric with name of famous statesman. 47 Played Bowls at Plymouth. 48 First class at Lloyds. 49 The battle after which the square in 34 across is named.



CLUES DOWN: 1 *"Sir Launcelot."* 2 An S.R. Queen. 3 *"Vlch Ian Vohr."* 4 An ancient name for England. 5 *"County Londonderry."* 6 Not in one place long. 7 *"Cookham Manor."* 8 *"Helmingham Hall."* 10 A unique S.R. Q 0–6–0. 12 *"The Green Howards."* 17 You will use it to send in this entry. 19 Appears to be very happy. 20 Southern bird. 21 Castle in the I.O.W. 23 "King" once streamlined. 24 *"Kincardineshire."* 26 *"Dinard."* 27 MGNJ No. 15 renumbered in L.N.E.R. stock. 30 Food in the wilderness. 33 A L.N.E.R. school. 35 A Wizard. 36 *"Abney Hall."* 37 Dominion in the New World. 38 *"Sir Ontzlake."* 39 Pre-war L.M.S. express. 42 *"Sir Urre of the Mount."* 43 Famous Elizabethan courtier.

Some of these clues are not easy, but all are straightforward and without a catch of any kind.

Crosswords are always popular with readers, and this month we are giving a special opportunity to railway enthusiasts who like puzzles of this kind. The competition is the product of a reader, D. W. Winkworth, Swindon, and might be described as a "Cross-number contest," for instead of words the clues lead to numbers of locomotives, and these fit in with each other, horizontally and vertically, in exactly the same manner as do the words given by the clues of an ordinary crossword. For example, the solution for 17 across is 2983, the number of the G.W.R. locomotive *"Redgauntlet"*; that to 7 down is 7808, and the 8 of the first number corresponds with the second 8 of the other. In some cases the names of the locomotives are given, and in others the clues lead through the names to the numbers.

As usual, there are two sections in the competition for Home and Overseas readers respectively, and in each prizes of 21/–, 10/6 and 5/– will be awarded for the best solutions. If necessary judges will take neatness and novelty into consideration. Entries should be addressed *"Locomotive Cross-Number Contest, Meccano Magazine, Binns Road, Liverpool 13."* The closing date in the Home Section of this competition is 30th October; that in the Overseas Section is 31st March, 1944.

A War Names Competition

Every reader of the *"M.M."* will enjoy this interesting contest, which has two great merits. In the first place it is topical, and in the second it is concerned with great events of recent times in which they have all been very deeply interested.

In the next paragraph we give a list of letters, from which competitors are asked to make up names of places on the Russian, North African and Sicilian fronts that have achieved distinction from battles, sieges or captures during the campaigns fought there. The prizes will go to the compilers of the longest lists. There is splendid scope in the war areas named, for the Russian theatre of war alone covers an immense area, and the country between Egypt and Tunis itself will provide hosts of famous names. There is one caution to keep in mind; only letters in the list must be used, and no letter can be used in any name more times than it appears in the list.

The letters to be used are as follows:

A A B C D E E F G H I K L L M N O O R S S U V Z.

As an example Messina can be included in the list, for each of its six letters is included in the list and the letter S appears there twice. On the other hand Catania cannot be included, for in this name the letter A is used three times, while it appears only twice in the list.

The contest will be divided into the usual Home and Overseas Sections, in each of which prizes of 21/–, 15/– and 10/6 will be awarded for the best lists in order of merit. Entries must be addressed *"War Names Competition, Meccano Magazine, Binns Road, Liverpool 13."* The closing dates are 30th September for the Home Section and 31st March for the Overseas Section.

September Photo Contest

This month's contest is the 9th in our 1943 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions: 1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired.

Entries will be divided into two sections, A for readers aged 16 and over, and B, for those under 16. They should be addressed *"September Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13."* There will be separate sections for Overseas readers. In each section prizes of 15/– and 7/6 will be awarded. Closing dates: Home Section, 30th September; Overseas Section, 31st March, 1944.

Fireside Fun

'Rastus was very much annoyed because the door of his fowl house had been left open, and the birds had flown.

"Don't worry, 'Rastus, hens always go back to their old home to roost," said his wife.

"Yes," said 'Rastus. "Dat's just de trouble."

* * * *

"Don't forget. I can get you suspended."

"Bah! I can get you lynched."

* * * *

"We are very late starting, driver," complained the old lady in the local train. "Is something wrong?"

"We're waiting for the points, mum," answered the driver.

"Oh, yes, of course," said the old lady. "You will need a lot of points for an engine."

* * * *

"Why were you absent from parade yesterday?"

"The mule kicked the sergeant, sir, and I had to fix it."

"But you're not a doctor, man."

"I mean the mule's leg, sir."

* * * *

Officer: "What's the idea of crawling about like that in the bushes?"

Sergeant: "We camouflaged the gun this morning, sir, and now we can't find it."

* * * *

Weary Willie: "Just look at that fellow rollin' along in his car. Rollin' in money too, by the looks of 'im."

Tired Tim: "An' that's more than the likes of us'll do, unless they start makin' this 'ere utility money."

* * * *

Employer: "Do you know this is the fourth time this winter that you've told me your father is dangerously ill, and always when there's a big match on?"

Errand Boy: "Yes, sir. I often wonder myself if father's putting it on a bit."

* * * *

BRAIN TEASERS

We will start with an easy one this month. What can you make of the following?

FROD; SANTIU; RICHUREAN; TAFI; ALXVLHUA; FENTIED; MULFRA; MAHLNIL; KAUS; LYIER; SRIMSO; DATSNARD.

Just to help we will add the information that they are either aeroplanes or motor cars, and although they may look strange, readers should know them all quite well.

* * * *

A MARVELLOUS COIN

Jones was boasting about his collections, of stamps, coins and almost anything else that collectors usually accumulated. In describing one of his coins he said that it had on it the date B.C. 42 to prove that it was genuine, and wondered why his friends laughed. Do you know why?

* * * *

WHAT AM I?

My first is in Meet but not in Part,
My second in Horse but not in Cart,
My third is in Stick but not in Stave,
My fourth is in Coward but not in Brave,
My fifth is in Day but not in Night,
My sixth is in Wrong but not in Right,
My last is in Brown but not in White;
My whole is a well-known constructional toy
That brings joy to the heart of a fortunate boy!

* * * *

"I'm buying this for my son."

"A surprise, eh?"

"Rather! He's expecting a tricycle."

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

The three slogans disguised in our first puzzle last month were: **"WINGS FOR VICTORY"; "SALVAGE SAVES SHIPPING"; and "BUY BOMBS FOR HITLER."**

Finding different routes from A to B in the second problem has made us dizzy, even with the restrictions that we can only move to the right or downward. We make the total 252, but if anyone knows of a few more routes they should just let us know.

The third problem is interesting. With weights of 1, 3 and 9 lb., any weight up to 13 lb. can be made. These weights subtracted from 27 lb. or added to it will take the total up to 40, and then a weight of 81 lb. combined in the same way with the weights up to 40 lb. will bring the total to the desired 121 lb. Thus only five weights are necessary and these are 1 lb., 3 lb., 9 lb., 27 lb. and 81 lb. It will be noticed that the series is extended each time by adding on a weight 1 lb. in excess of the sum of those already there.

* * * *

THIS MONTH'S HOWLER

A conservative is a green house where you can look at the moon.

STUDY AT HOME FOR MATRICULATION

Wolsey Hall (Est. 1894) will coach you **by post** for London Matric., School Cert., R.A.F. Maths., Engin. Prelim., Lond. B.Sc. Degree, etc. Tuition continued **free** if you fail; low fees, instalments. **PROSPECTUS FREE** from Director of Studies, Dept. GK1,

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SCALE BUILDINGS

	"00"	"0"
BALLAST BINS	9d.	1/-
PLATELAYERS' HUTS	2/6	5/6 &6/6
BUNGALOWS	5/6 & 6/-	8/6
COAL OFFICES	3/6 & 4/-	6/6
MODERN DET. HOUSE ...	15/6	—
BACKGROUND (Row of 4 Houses)	15/6	—
GOODS DEPOT	10/6	—
ENGINE SHEDS (Double Road) ...	15/6	—
SETS OF SIGNAL PARTS ...	1/6	3/-

Postage 4d. extra.

BOOKS

A.B.C. of Southern Locomotives **1/6**, by Post **1/8½**
British Railway Rolling Stock ... **4/6**, ,, ,, **5/-**

Tyldesley & Holbrook, 109, Deansgate, Manchester 3

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You should possess these superb kits, all 1/72nd scale. de Havilland MOSQUITO, BRISTOL-BEAUFORT and JUNKERS JU 88e, all at **4/3** post free.

You can now secure my 1943 list for THREE PENNY STAMPS.

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WANTED Dublo, Trix and Marklin "00" trains, also gauge "0" locos. for cash; or send 2½d. for our exchange list. **Box M71.**

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USEFUL PRECISION-MADE SPARE PARTS. NEW. Chart Drum and clips, **5/6**. Magnetic Clutch, 6 volt., complete, **25/-**. 9 in. Traverse Shaft, 4 in. Threaded 120 to inch, with bearings, **12/6**. Stylus, with carriage, rods and brackets, **7/6**. 5-pin plugs, with panel socket and cords, midget type, **4/6** pair. ⅛ in. Aluminium Panel, drilled 13 in. x 6⅝ in., **3/-**. Bakelite ditto, 7¾ in. x 6¾ in., **2/3**.

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SPECIAL DYNAMO BARGAINS. Rotax, 12 volts, 8½ amps., D.C., 3rd brush, size 8 in. by 4½ in., 11 lb., cost £10, unused, **15/-**, postage **2/-**; G.E.C. Double-current Dynamos, 6 volts and 600 volts, ball-bearings, 17 lb., as new, **25/-**.

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LIQUID LEVEL INDICATORS with ball float, geared to watch-dial panel gauge for range of 9 in. rise or fall, **7/6**.

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PRICE WANTED.
VIGAS & CO., 131, Coldharbour Road, BRISTOL 6

—CIGARETTE CARDS—

THIS MONTH'S SELECTION OF COMPLETE SETS

Player ...	Aeroplanes (Civil) ...	2/-
,, ...	Coronation Series ...	1/-
Phillips ...	Soldiers of the King ...	2/6
,, ...	Famous Crowns ...	10½d.
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Postage extra, 2½d. first set and ½d. each additional set. 1942-43 price list is available only until 10th October. Send 3d. for your copy now. CLEAN CARDS WANTED—ALL KINDS—GOOD PRICES PAID.

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This Month's Special Articles

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Registered at G.P.O., London, for transmission by Canadian Magazine Post.

EDITORIAL AND ADVERTISING OFFICE:
LIVERPOOL 13, ENGLAND.
Telegrams: "Meccano, Liverpool."

Publication Date. The "*M.M.*" is published on the 1st of each month.

Readers' Sales and Wants. Private advertisements (i.e., not trade) are charged 1d. per word, minimum 1/-. Cash with order. Editorial and Advertising matters should not be dealt with on the same sheet of paper.

Readers' advertisements are published as soon as possible; inclusion in the first issue after receiving them cannot be guaranteed.

Small Advertisements. 1/8 per line (average seven words to the line), or 20/- per inch (average 12 lines to the inch). Cash with order.

Display. Quotations for space bookings, and latest net sale figures, will be sent on request.

READERS' SALES AND WANTS

SALES

Stamps: Several Complete Sheets 50 Free French, 1/11 each; 25 different Vichy French Colonials, 2/6; cash with order, postage extra.—I. Paxton, Knaresborough Road, Harrogate.

"Meccano Magazines." Complete sets from 1925 to 1941 inclusive, three copies only missing. Proceeds for British Red Cross Fund, without deductions for carriage, etc. Offers to—Burrough, Nether Compton, Sherborne, Dorset.

Meccano, valued £10 before war, including Clockwork and Electric Motors, in cabinet; also "M.M.'s." What offers.—Davis, 16, Park Road, Sheerness, Kent.

Pair American Roller-Skates, size 4, ball-bearing, rubber-cushioned, 15/-.—Stevens, Essendon, Hatfield, Herts.

Hornby No. 3 Racing Boat, in almost new condition; offers above 15/-. Also No. 1 Lumber Wagon; offers above 2/-. Apply to—J. White, Knossington, Oakham.

No. 1 Tank Loco., Rolling Stock and Rails, Hornby; Bassett-Lowke Loco. similar to Hornby No. 2 Loco., Tender and Wagons; all clockwork and in good condition. Offers.—Greenacre, Bosley, Macclesfield.

Engineer disposing of Technical and Modelling Library, including Railway, Aeroplane, Engineering Books; send stamp for list.—Page, 107, Stonor Road, Hall Green, Birmingham 28.

"Meccano Magazines" Jan 1940–Dec. 1941 (inclusive) and Jan. 1943–June 1943; also 27 odd "Shipping Wonders of the World."—Hall, 4, Heugh Street, Falkirk.

Aircraft and other Books. Stamp for list.—Powell, Stanshawes Farm, Yate, Nr. Bristol.

Stanley Gibbons 1941 Stamp Catalogue, latest published, Foreign section, first offer £1 or nearest secures.—Cantwell, 3, Cecilia Street, Dublin.

Sale. 9-5 m.m. Projector, hand driven, £3.—Crabtree, 4, Westwood Grove, Bradford, Yorkshire.

Large quantity of Military and Civilian Dinky Toys, write for list.—P. R. Earl, 27, The Avenue, Hitchin, Herts.

Will exchange or sell 250 "Magnets" Aug. 1935–Aug. 1940; 100 "Gems" Dec. 1935–Dec. 1937; "M.M." 1942–1943; 30 "Schoolboys' Own," and other Magazines as new. What offers.—Templeton, Cobham Road, Moreton, Cheshire.

Hornby Dublo EDP1 Electric Streamlined Passenger Train Set with Dublo Transformer for 210-250 volts, offered in exchange for Meccano No. 9 or No. 10. Cash adjustment as necessary.—Hodgson, 5, Countess Drive, Denton, Newcastle-on-Tyne 5.

WANTS

1940 S.G. "Whole World" or "British Empire" Catalogue; state price, condition.—Rayner, 39, Hospital Road, Riddlesden, Keighley, Yorks.

"Locomotives of L.N.E.R. 1923–1937"; "L.N.E.R. Locos."; "Modern L.M.S. Locos."; "G.W.R. Engines"; new editions and good condition, if possible; good prices and postage paid. Also any "M.M.'s" before 1939, covers not necessary.—Halket, Tregothnan Road, Falmouth.

Urgent. Trix Twin Lines, Points, Trucks or Engines.—Gurney, 132, Causeway, Banbury, Oxon.

Air Pistol required; good condition. State price.—Fooks, 20, St. Andrews Road, Bridport, Dorset.

50 Nuts and Bolts; EM320 or E120 Locomotive. State condition and price to—J. Shaw, 103, Gloucester Grove, Peckham, London S.E.15.

Meccano No. 1a or No. 2 Clockwork Motor in working order. Good price paid.—Martin 54, Woodside Road, Portswood, Southampton.

Hornby Metropolitan Electric Set wanted.—Rowley, 117, Combs Road, Thornhill, Dewsbury, Yorks.

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Wanted. Good condition three Number 1 Passenger Coaches and one Number 1 Guards Van. Gauge "0".—Perry, The Lodge, Longstowe Hall, Cambridge.

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1, Nos. 20a, 94, 134, 197, 187. 2, Nos. 25, 27. 50 Nuts and Bolts 7/13ths.—L. Dalling, Whiteside Farm, Bathgate, Scotland.

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