IV. SIGNALLING AND TRAIN CONTROL

LAST month we showed how the signalling of railways developed from crude beginnings to the perfect system of to-day, and we explained the use of the principal signals, "home," "distant," "starting" and "advanced starting." To complete our account we must add that sometimes signal boxes are not far enough apart to allow the "distant" signal to be placed at the standard distance from the "home" signal, and where that is the case the "distant" is placed on the same post as the "advanced-starting," "starting," or "home" signal of the previous box, its position always being below the other signal.

Protecting Junctions

Junctions are usually protected by two "distant" and two "home" signals. The two signal arms are arranged on a "bracket" as shown on page 21, the left-hand and right-hand arms applying respectively to trains proceeding to the left or to the right at the junction. One of the arms is generally placed higher than the other, the higher arm applying to the more important line.

In addition to the signals already described, there are many others employed for special purposes, such as shunting, backing, etc.

The approaches to and the exits from important stations present a bewildering array of lines, points and crossings, and at such places sets of signals are often carried over the rails on a sort of bridge called a "gantry."

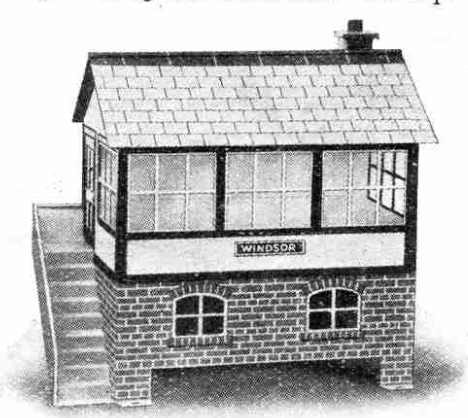
Signalling Miniature Railways

The signalling of miniature railways as far as it is carried out should follow the principles on which real railways are signalled. Generally speaking, however, the fewer the signals used the better, unless the layout is on a very elaborate scale. A large number of signals scattered about a miniature system may look pretty, but if they are not serving some railway-like function they are worse than useless.

A great deal depends upon the size of the layout. If it is very small it may be advisable to dispense altogether with "distant" signals, using only "home" and "starting" signals. In a layout of fairly large size, however, the employment of "distant" signals adds considerably to the interest and realism of the railway.

The diagram in last month's issue showed the signalling arrangements for a simple station, where there is a double track and either a cross-over as illustrated or a siding branching off beyond the "home" signal. If there is no cross-over or siding, or if a single track is being used, only "distant," "home," and "starting" signals are necessary. The arrangements in this diagram may be followed successfully in a Hornby layout using the Windsor station.

The best fun is obtained by working the signals along with brake rails. The trip-pieces on these rails may be set either to stop the train or allow it to pass, according to whether the signals are at "all right" or "danger." With a little ingenuity the signalling of trains into and out of a station may be made quite a realistic operation, adding very greatly to the interest of the layout.



Windsor Signal Cabin (Hornby Series)

Providing Real Fun

Most boys do not get half the fun out of their Hornby railways, a fact that is due very largely to working without any definite plan. Running trains aimlessly round and round the track, and starting and stopping them at random without any particular object in view, soon becomes monotonous. The best method is to decide beforehand exactly what is to be done. For instance, if two locos are available, so that two trains can be run, the first train may be made a passenger express stopping only at the Windsor station or perhaps at one wayside halt, while the other train may be a goods train calling at various points and being shunted into sidings in order to allow the express to go through. Such a scheme at once introduces a purpose into the layout and therefore provides real interest. If a third loco is available the interest may be further increased by putting on a slow passenger train, and so on.

If two or three locos and a fair number of carriages and wagons are available, it is a good idea to draw up a simple time-table and run a regular service of trains in accordance with it. The main thing in every case is to work to a plan, however simple this may be. Once the owner of a Hornby railway has experienced the fascination of running a service of trains he will not rest until he has brought his layout to the highest possible pitch of perfection and made it in a real sense a miniature railway.

(*Continued on page 21*)

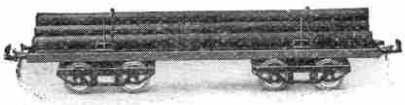
New Rolling Stock and Accessories

(HORNBY SERIES)

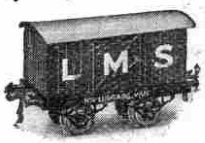
There are now 50 different train accessories—Stations, Signal-boxes, Lamps, Wagons, Level-Crossings, Foot-Bridges, Turntables, etc. Further accessories will be added to the system from time to time, and will be announced in the pages of the "*M.M.*"

All Hornby Rolling Stock and Accessories are built in correct proportion to the size, gauge, method of coupling, etc., of the Hornby Trains and all have the uniformly beautiful finish that is the great feature of the Hornby series. With these accessories you can build up a most realistic railway system, and the splendid range of rails, points, and crossings make possible endless variety in rail layout. Hornby Trains are British made, and your dealer will be able to show you specimens of the new products.

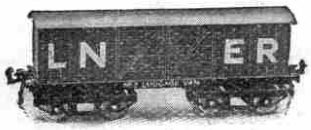
SIDE TIPPING WAGON
Excellent design and finish.
Price **3/6**



No. 2 LUMBER WAGON
Fitted with bolsters and stanchions for log transport. Suitable for 2 ft. radius rails only. Price **5/-**



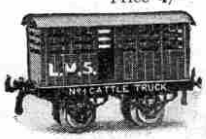
No. 1 LUGGAGE VAN
Representative colours.
Price **4/-**



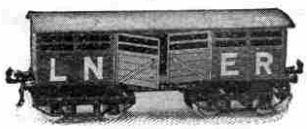
No. 2 LUGGAGE VAN
Finished in colour. Fitted with double doors. Suitable for 2 ft. radius rails only. Price **6/6**

SECCOTINE VAN
Price **4/-**

No. 2 TIMBER WAGON
Beautifully enamelled in colour and stoved. Suitable for 2 ft. radius rails only. Price **4/6**



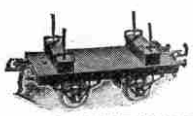
No. 1 CATTLE TRUCK
Fitted with sliding door. Very realistic design.
Price **4/-**



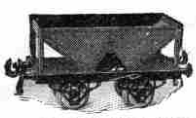
No. 2 CATTLE TRUCK
Splendid model fitted with double doors. Suitable for 2 ft. radius rails only. Price **6/6**

MILK TRAFFIC VAN
Fitted with sliding door, complete with milk cans. Price **4/6**

ROTARY TIPPING WAGON
Finished in colour.
Price **4/-**



No. 1 LUMBER WAGON
Fitted with bolsters and stanchions for log transport. Price **2/-**



HOPPER WAGON
Mechanically unloaded.
Finished in colour. Price **4/-**

CEMENT WAGON
Finished in colour.
Price **4/-**

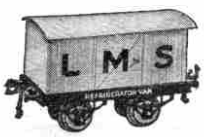
GUNPOWDER VAN
Finished in red.
Price **4/-**

BISCUIT VAN
Price **4/-**

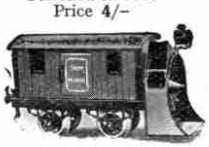
No. 1 TIMBER WAGON
Beautifully enamelled in colour and stoved. Price **2/-**

GAS CYLINDER WAGON
Finished in red, lettered gold.
Price **3/-**

PETROL TANK WAGON
Finished in colour.
Price **3/-**



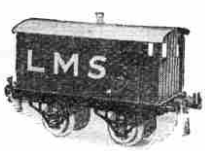
REFRIGERATOR VAN
Enamelled in white, lettered black. Price **4/-**



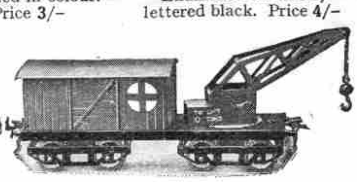
SNOW PLOUGH
Finished in grey, with revolving cutter driven from front axle.
Price **5/6**

CRANE TRUCK
Working model.
Finished in colours.
Price **4/6**

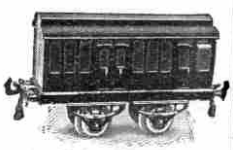
TROLLEY WAGON. Finished in colour. Suitable for 2 ft. radius rails only. Price **6/-**



BRAKE VAN
Finished in colour.
Price **4/-**



BREAKDOWN VAN AND CRANE
Excellent finish. Beautifully coloured. Suitable for 2 ft. radius rails only. Price **7/-**

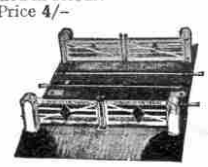


GUARD'S VAN
Price **5/-**

JUNCTION SIGNAL
Signal arms operated by levers at base. Very realistic model standing 14 in. in height. Price **5/6**

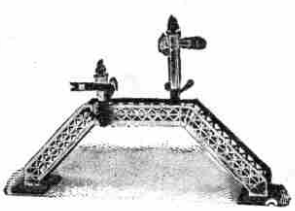
SIGNAL CABIN
Dimensions: height 6½ in., width 3½ in., length 6½ in. Finished in colour and lettered "Windsor." Roof and back open to allow signal-levers to be fitted inside cabin if desired. Price **6/6**

SIGNAL
Price **2/6**



LEVEL CROSSING
Beautifully designed in colour. Measures 11¼ in. × 7¼ in., with Gauge 0 Rails in position.
Price **6/6**

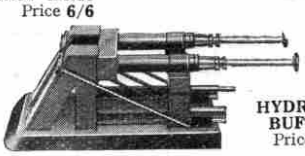
TUNNEL
Price **7/6**



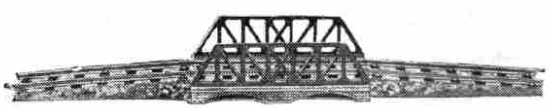
FOOT-BRIDGE
No. 1. With detachable signals. Price **6/-**
No. 2. Without signals. Price **3/6**
Signals, per pair **2/9**

WATER TANK
Brightly coloured in red, yellow and black. 8½ in. in height, with flexible tube and pump lever.
Price **6/6**

SPRING BUFFER STOP
Price **1/6**



HYDRAULIC BUFFERS
Price **5/-**



VIADUCT, complete with approaches. Price **7/6**

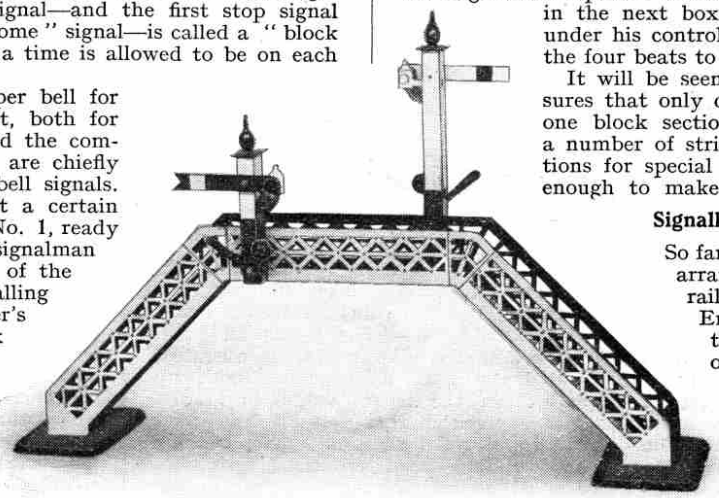
ASK YOUR DEALER TO SHOW YOU SAMPLES

Signalling and Train Control—*(continued from page 19)*

Returning now for a little while to real railways, we must see how trains are actually controlled on their journeys. Every signal box is electrically connected with the box on each side of it, and is provided with telegraph and bell instruments. Trains are worked on what is called the "block system," The length of line between the last stop signal of one box—that is the "starting" or the "advanced starting" signal—and the first stop signal of the next box—that is the "home" signal—is called a "block section," and only one train at a time is allowed to be on each section.

Every signal box has a tapper bell for each section on each side of it, both for "up" and "down" lines," and the communications between signalmen are chiefly made by means of a code of bell signals.

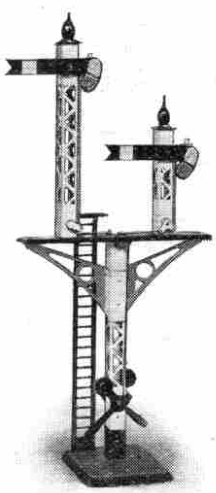
Let us suppose a train is at a certain signal box, which we will call No. 1, ready to commence its journey. The signalman in this box calls the attention of the signalman in No. 2 box by signalling one beat on the bell in the latter's box, and the man in No. 2 box acknowledges this signal by repeating it so that one beat sounds on the bell in No. 1 box. Signalman No. 1 then gives four consecutive beats on the bell in No. 2 box, which in the railway code means "Is line clear for an express passenger train?" The signalman in No. 2 box, after making certain that the line is clear for a quarter of a mile inside his "home" signal, that is, as far as his "clearing point," repeats the four beats, thus indicating "line clear" to the man in No. 1 box.



Footbridge No. 1 with Signals (Hornby Series)

At the same time signalman No. 2 brings into use his key-disc instrument. This is a box-shaped apparatus having three positions —"line clear," "line blocked," that is the normal position, and "train on line." In this case signalman No. 2 pegs his instrument to show "line clear" and so causes the "line clear" indication to appear on a similar but keyless instrument in box No. 1. This gives signalman No. 1 permission to send forward the train and he lowers his "starting" signal, and his "advanced starting" signal if there is one, and the train moves forward into the next section. Immediately after lowering his signals the man in No. 1 box gives two beats on the bell signifying "Train entering section," which signalman No. 2 acknowledges by repeating it and at the same time altering his key-disc instrument, and consequently the keyless instrument in box No. 1, to "Train on line." As soon as the train has passed the No. 1 box the No. 1 signals are restored to the normal "danger" position.

The signalman in box No. 2 does not wait for the train to arrive, but immediately calls the attention of the signalman in box No. 3 by giving one beat on the bell, and the process just described is repeated. In this way the train is passed along to box No. 3, and so on from one box to another throughout its journey, each step in its progress being prepared in advance.



Junction Signal (Hornby Series)

The Use of Tail Lamps

When the train has passed the "clearing point" at box No. 2 the signalman in that box gives to box No. 1 the "Train out of section" signal—two beats, followed by a pause and then one beat—and at the same time unpegs his instrument so that both it and the instrument in box No. 1 return to the normal position.

Before a signalman gives the "Train out of section" signal he must be certain that the whole of the train has passed and that no part of it has become detached during its journey from the previous signal box. For this purpose every train always carries a lamp at the rear. This lamp, which is called a "tail" lamp, is painted red and at night shows a red light. When a signalman sees this lamp at the rear of the train he knows that the train is complete, but if he does not see the lamp he assumes that some portion of the rear of the train has broken away and is left somewhere in the section. He then takes immediate steps to prevent any other train entering this section and at the same time he signals to the box ahead "Train passed without tail lamp," and accordingly the train is stopped at the next box and held up until the matter is investigated.

If a signalman in any particular box gives four beats on the bell, enquiring if the line is clear, and the line happens not to be clear, the signalman in the next box makes no response. The first signalman repeats his four beats at intervals, but the man in the next box does not respond until the line under his control is clear, and then he gives back the four beats to indicate this as already described.

It will be seen that this method of control ensures that only one train at a time shall be in any one block section. In actual practice there are a number of strict rules and also certain modifications for special circumstances, but we have said enough to make clear the general procedure.

Signalling on Single Lines

So far we have spoken only of signalling arrangements for double lines of railway. Thousands of miles of English railways have only a single track, that is, there is only one pair of rails for both up and down trains. For such lines there are several systems of signalling in operation, the ultimate object of them all being to ensure that the driver shall have in his possession some visible evidence that the signalman has given him permission to take his train into a particular section of line.

The simplest method of single-line working is that known as the "train staff" system, and this is very suitable for a short length of line worked by one loco only. The staff is either a piece of wood about 14 inches in length and two or three inches in thickness, or a light hollow rod of steel of similar proportions. It is marked with the names of the stations at each end of the section. On a branch line of this kind there is obviously no possibility of collision, and the staff therefore serves merely as the driver's authority for commencing his journey.

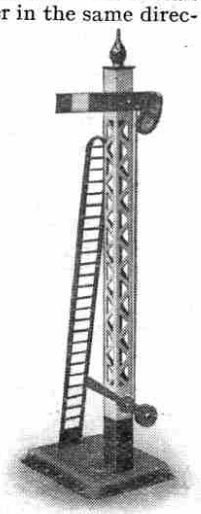
On single lines where two or more trains are operating, the line is divided into block sections in the same manner as double lines. A staff is provided for each section, and to avoid any confusion these staffs differ one from another in shape and colour. In the ordinary way the staff for a particular section is handed to the driver at one signal box, carried by him to the box at the other end of the section and handed over, and taken back to the first box by the driver of the next train in the opposite direction. Sometimes, however, there may be two successive trains in the same direction without an intermediate train in the opposite direction, and consequently the staff is not brought back to the box from which it was issued, ready for the second train.

"Train Staff and Ticket"

This difficulty is surmounted by the use of the "train staff ticket." Where one train has to follow another in the same direction the driver of the first train is *shown* the staff and *handed* a train staff ticket as his authority to proceed. Train staff tickets are made of the same shape and colour as the staff of the section to which they apply, and they are kept in a special box, the key of which is attached to the end of the staff, thus making it impossible to remove a ticket without having the staff.

In cases where a number of trains may have to be run in one direction without an intermediate train in the opposite direction, one or other of the various electric staff or tablet systems is used. In these systems an instrument containing the staffs or tablets is provided for each section of the line. These instruments are electrically connected and are fitted with mechanism which ensures that a staff can only be withdrawn by the combined action of the signalmen at both ends of the section, and also that only one staff for a particular section can be out at one time. We shall refer to these electric staff systems in a later article.

(To be continued)



Signal (Hornby Series)

World's Mightiest Electric Loco:

Weight: 283 Tons Horse-power: 4,200 Speed: 65 miles per hour

The use of Electricity is daily increasing in almost every walk of life, and railways are not behind in the movement. This article, specially written for the "*M.M.*," describes the latest developments in this direction in America. Huge electric locomotives are now used to haul the Olympian, famous trans-continental train, for 650 miles over four mountain ranges between Chicago, Spokane, Seattle, and Tacoma.

ROBERT LOUIS STEVENSON, writing of a journey on the railway, said: "Herein, I think, lies the chief attraction of railway travel. The speed is so easy, and the train disturbs so little the scenes through which it takes us, that our heart becomes full of the placidity and stillness of the country; and while the body is borne forward in the flying chain of carriages, the thoughts alight as the humour moves them at unfrequented stages; they make haste up the poplar alley that leads towards the town; they are left behind with the signalman as, shading his eyes with his hands, he watches the long train sweep away into the golden distance."

Stevenson was, of course, writing of steam railways. Had he had the experience of travelling for hundreds of miles on an electrified railway he would certainly have been even more enthusiastic. We can imagine our readers asking:—"Yes, but where is there an electrified railway hundreds of miles in length?" Not in Great Britain, certainly, but such a railway exists in the United States, known as the Chicago, Milwaukee and St. Paul Railway.

A Unique Railway

This railway crosses the American continent from Chicago to the Pacific coast, and 649 miles of its vast length are electrified, forming by far the longest stretch of electrified railway in the world. The first section of this project, moving from east to west, is that between Harlowton, Montana, and Avery, Idaho, a distance of 440 miles. In this section the railway crosses the Big Belt, the main range of the Rockies, and the Bitter Root Mountains, where the winter weather is so severe as to make steam operation very difficult. The whole of this region, regarded from a scenic point of view, is one vast expanse of rugged grandeur. The towering mountains, the impressive walls of the canyons, and the wonderful tangle of rocky streams provide an ever-changing panorama that alternately awes and delights. The electrification of one engine-division of this section was completed in December 1915, and the whole section by the end of 1916.

After two years of severe test the result of this electrification proved so satisfactory that a second zone of electrification was sanctioned. This includes the extreme western end of the line between Othello and Tacoma, Washington, a distance of 209 miles, in which occur heavy grades crossing the Cascade Mountains. This section was opened for traffic in November 1919.

Electricity Beats Steam

The ease with which the trains on these electrified sections are handled shows that electricity gives smoother, more reliable and quicker running than steam. The great trans-continental trains of the company—"The Olympian" and "The Columbian"—are started, operated, and brought to a standstill, both up and down the severe mountain grades, with a precision that only electric power can supply. In addition, great economy has resulted from electrical operation. The 61 electric locomotives now in use on the two electrified zones have released for service elsewhere on the system no less than 162 steam locos, and they effect an annual saving of 265,000 tons of coal and 35,000,000 gallons of fuel oil.

As regards the comfort and pleasure of the passengers the improvement is most remarkable. Where previously an otherwise very pleasant journey was marred by smoke and cinders from the steam locomotives, struggling up mountain grades or steaming through mountain tunnels, it is now possible for passengers to revel in the delights of open observation cars, a most desirable feature for summer travel through a picturesque mountainous country. On this railway for the first time passengers enjoy a full-vision view of the wonderful scenery through which the train passes, and also have the experience of riding in the open air through mountain tunnels from one-and-a-half to three miles in length at elevations of as much as 6,000 ft. above the sea.

Waterfalls Drive the Trains

As all our readers know, the steam locomotive is a complete power plant in itself, but the electric locomotive must receive energy from some outside source. In the case of the Chicago, Milwaukee and St. Paul Railway this source consists of a number of water-power stations in Montana and Washington, in which waterfalls are harnessed and made to produce electric current. Some of these power plants are more than 200 miles from the nearest point on the railway.

By means of transmission lines, electrical energy is delivered to the railway in the form of three-phase alternating current at 100,000 volts. This voltage is too high to be used direct, and therefore, at intervals of approximately 30 miles, sub-stations are provided to reduce the pressure and at the same time convert the alternating current into continuous current at 3,000 volts. At this pressure the current is passed to a heavy copper cable that runs parallel to the track throughout the electrified zone. At frequent intervals this cable is connected to the trolley wire, consisting of two copper wires about ½ in. in diameter, supported over the centre of the track at a height of about 25 ft. above the rails. From this trolley wire the locomotives pick up the current by specially-designed overhead collectors.

Giant Locomotives

The locomotives that haul the magnificent passenger trains over the western electrified zone have been built specially for the work and they have many interesting mechanical and electrical features. They are of a gearless type, with the motor armatures mounted directly on the driving wheels. The great advantage of this system lies in its simplicity, for all gearing and transmitting devices are eliminated. The locomotives weigh 265 tons each and have 14 axles, 12 of which are driving axles and the remaining two guiding axles. Of the entire weight of the locomotive, 86 per cent.—229 tons—is distributed over the 12 driving axles. Each locomotive is designed to handle in normal service a 12-car passenger train weighing 960 tons against a two per cent. grade—a rise of 116 ft. per mile—at sustained high speed. Each has in reserve enough power to haul in emergencies trains with as many as 14 cars up a two per cent. grade at even greater speed in continuous operation.

"Quill" type locomotives, weighing 283 tons, are employed on the other electrified section of the road. They are equipped with six twin-armature continuous-current motors and six driving axles. They are rated at 4,200 h.p. for short periods and 3,400 h.p. in continuous service and are capable of hauling a 13-car passenger train, weighing 960 tons, up a two per cent. grade at sustained high speed. In all these locomotives "pantographs," a sort of overhead sliding bow, are used for current collecting.

All these locomotives are operated by the same men who formerly drove the steam locomotives. It would be dangerous to have the 3,000 volts from the trolley wire actually in the cab, and therefore

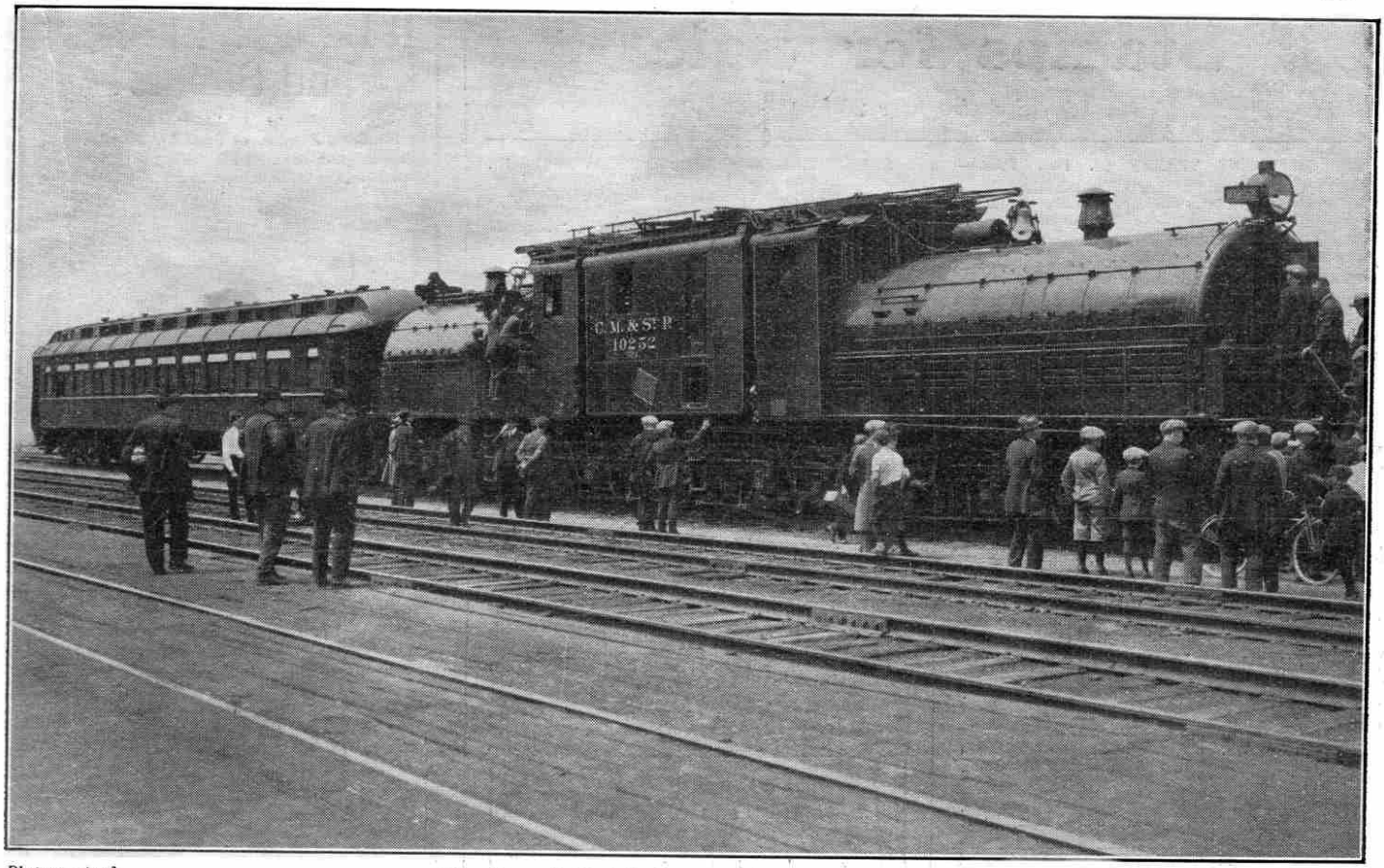


Photo courtesy] **The Largest Electric Locomotive in the World** [*General Electric Co. Inc.*

all switches that are in contact with this high voltage are operated by compressed air or low voltage electro-magnets. The high voltage circuits are all confined in a separate compartment, which nobody is allowed to enter while the current collector is in contact with the trolley wire.

Wonderful Braking System

A particularly interesting feature on this line is the use made of what is called "regenerative" braking. By this system, energy is recovered on descending grades by reversing the usual function of the motors and using the momentum of the train to drive them as dynamos. In order to control a 2,500-ton train travelling at 17 miles per hour down a two per cent. grade, 4,700 h.p. must be dissipated, and using the ordinary air brake it is not surprising that the brake shoes sometimes become red hot. With the electric locomotives the air brakes are used only in emergencies, or for bringing the train to a dead stop. The energy that would otherwise be wasted in heating the brake shoes is thus converted into electric current and used for pulling other trains up the hill or returned to the power station. Regenerative braking strictly controls the speed of the train, and the jerking so often experienced with the air brake is eliminated, the train descending long slopes with remarkable smoothness. From 40 to 60 per cent. of the energy required to pull the train up the hill is recovered in the descent, and approximately 12 per cent. of the total energy drawn from the power plant is returned, or in fact merely borrowed.

Edison's Prophecy

Our illustration shows one of the wonderful locomotives on this railroad, built by the General Electric Company. The huge size of this engine may be realised by comparison with the throng of interested spectators.

While this locomotive was on exhibition at Newark, New Jersey, a few weeks ago, it was visited by Thomas A. Edison, the famous inventor. Edison, who seemed in the best of health and spirits, was accompanied by his son Charles and representatives of the railroad and of the General Electric Company. He made a close inspection of the locomotive, examining every working part and keeping up a running fire of technical questions. He was clearly delighted with the engine. Afterwards, as he was just stepping into his car, he was asked for a statement, and waving his hand towards the locomotive he said: "This is an indication of what can and will be done with 'white coal' or electricity. Every railroad must come to it eventually. Every motor vehicle, truck and pleasure-car will some day be propelled by electricity. Its powers and uses are still but little known."

How Far do You Cycle?

Nearly every cyclist sooner or later feels the desire to know exactly how far he has travelled, and in due course he fits a cyclometer to his machine. The foremost essential of a cyclometer is reliability, and the excellence of the Veeder Cyclometers in this respect has won for them such popularity that over four millions have been sold. For bicycles the Veeder is made in two forms, both of which register up to 9999.9 miles, when the next registration brings the dial back to zero ready to repeat. The more expensive model has a second dial that can be returned to zero at will, and therefore may be used to show the mileage covered on each ride. Veeder cyclometers are guaranteed for twelve months against imperfections in material or workmanship, and if accidentally broken they can be repaired provided the damage is not too extensive. (Lists from Messrs. Markt & Co. Ltd., 98, Clerkenwell Road, London, E.C.1).

For Model-Builders

At one time it was almost impossible to obtain the various small parts necessary for the complete equipment of a model-builder, but to-day requirements are catered for in a remarkable manner. The well-illustrated catalogue, price 6d., of the Electro Supplies Co. (19a, Broadway, Wimbledon, London, S.W.19) contains an astonishing variety of small parts for the builder of model boats and engines of all kinds. For those whose tastes run in the direction of electrical apparatus there are dynamos, motors, transformers, voltmeters, and ammeters. A useful feature of the catalogue is a number of tables giving the maximum current permissible for various copper cables, the decimal equivalents of wire and letter gauge drills, and details of B.A. and Whitworth threads.

Springs of All Kinds

Many of our readers no doubt find themselves requiring springs at some time or another, and it is useful to know of a firm like Messrs. Clarkes (Station Approach, Redditch) who supply springs for almost every conceivable purpose. This firm also make spring paper clips, spring washers, and in fact spring articles of every description.

"The Quickness of the Hand . . . . !"

Most boys like to be able to perform one or two conjuring tricks to amuse and mystify their friends. Those in search of good tricks that can be performed without elaborate and expensive apparatus will do well to get the 6d. catalogue of "The Magical Mart" (Alston Buildings, 17, Spiceal Street, Bull Ring, Birmingham). This catalogue describes a large number of highly effective tricks varying in price from a few pence to shillings. For those who want greater variety there are cabinets of high-class tricks at very reasonable prices.

Stamps for Sale

(*See also page* 26)

100 DIFFERENT STAMPS 6d. Post Free.—Dickinson, 733, High Road, Leyton.

BRITISH COLONIALS ON APPROVAL, one third Gibbons, good copies.—Barlow, 18, Wish Road, Hove.

200 ASSORTED UNUSED STAMPS, 7d.—G. P. Cranwell, 55, Cowslip Road, London, E.18.

FREE. 50 Stamps, 4d. in the shilling discount.—Stobbs, 175, Warminster Road, Norton, Sheffield.

1,000 MIXED STAMPS, all countries, 1/3 post free.—R. Radcliffe, 2, Montague Street, Clitheroe.

1,000 FOREIGN 1/-. Guaranteed unpicked.—S. Huckle, 53, Birkenhead Ave., Kingston-on-Thames.

NYASSA PACKET FREE with approvals, ½d. and 1d. each.—Bodman, 6, Alderman Road, Ipswich.

IRISH STAMPS. 120 well mixed, including rare Railtas and Saorstat overprints, Swords, Arms, Cross, Maps, 1/9.—Laws, Park Avenue, Old Trafford.

NEW YEAR OFFER. Mint British Colonials. Face value 2/-, for 1/7½.—J. Pickering, Holt, Norfolk.

FREE. Sheet 50 unused stamps to genuine applicants for approvals, good value, farthing upwards. Cheap sets. Send Postage.—Croft, Adel, Leeds.

100 DIFFERENT STAMPS FREE to applicants for approvals. All ½d. each.—Cox, 135, Cambridge Road, Seven Kings.

SPACE FILLERS, ½d. to 3d. About 500 sent on approval. A useful selection.—D. Pratt, 10, Lion Gate Gardens, Richmond, Surrey.

FREE. 50 Stamps including Bulgaria (Pictorial), Holland (Jubliee) to approval applicants, selections from ½d. upwards.—Rixon, 22, Rathmore Rd., S.E.7.

AN IDEAL GIFT. Collector's complete Outfit and 250 good Stamps, 14/6; without illustrated album, 10/-.—Webster's, 32, Joseph Street, Grimsby.

112 Different Stamps including Jamaica, Nicaragua, Tasmania, Travancore, Peru, 6d.—Kraus, 137, Cheapside, London.

LATEST. 250 Stamps. Pictorial, Asiatic, good Colonial, War Stamps, Obsolete Sets, etc., complete for 3d.—White, 6, Stourbridge Road, Lye, Stourbridge.

None Free—None as Cheap!! Farthing approvals—abt. 1,000 to choose from. Responsible applicants only.—J. V. Wyk, 439, City Rd., O.T., Manchester.

1,000 BRITISH COLONIALS including Dollar, Rupee and Shilling Values, 3/- post free.—H. Theobald, 54, Antill Road, London, N.15.

A 1½d. STAMP BRINGS PACKET OF 50 (all different) free with approvals. 15% discount on purchases. Fine specimens to choose from.—Hull & Rae, 419, Holloway Road, London.

STAMPS. Dispersing Collection 22,000 (also Collection entire £1 and £25). Approvals 8d. and 9d. in 1/- discount, cash or exchange Meccano or anything useful.—"Olivet," Stretton Road, Addiscombe.

GREECE, LORD BYRON COMMEM. 2 dr. FREE with "Set" Pkt., 50 diff. includes 5 1911 Persia, 14 Ukraine 1921, 8 China Ship, 2 Jamaica Pict., Gold Coast, Nigeria, etc., post free 6d. Approvals for beginners. Many bargains.—R. A. Clipston, 11, Cromwell Avenue, Bromley, Kent.

FINE MIXED PACKET OF 40 and set of 5 King George Ceylon to all applicants for approvals. Further free packet of 15 Colonials including 5 Malta to purchasers remitting 2/- or over.—Empire Stamp Co., 2, West Bank, Stamford Hill, N.16.

AIR-FLOWN CARD FREE with 50 Portuguese Cols., 10d., or 50 Br. Cols., 8d.; 20 S. America, 6d.; 12 Irish 6d.; 10 Nyassa, 6d.; 50 Roumania, 9d.; all diff. Approval buyers get albums free. Ask for them.—J. D. Martin (N.R.P.), 68, Whetley Hill, Bradford.

"THE PHILATELIC MAGAZINE," 46, Victoria St., London, S.W.1. Best stamp newspaper. Order from your newsagent. 3d. fortnightly, or send 4d. for specimen and bonus form worth 2/6. Album catalogue free.

WANTED

COLLECTOR DESIRES TO PURCHASE small collection of stamps. No rubbish. Send particulars in first instance to Box 101, c/o Editor, "*M.M.*"

TO READERS ABROAD. Collector desires to purchase stamps of all countries, old or recent, single copies or dozens. No common ½d. or 1d. stamps wanted but best prices paid for such values as 6d., 1/-, 2/6 and upwards. Used or unused. Box 102.

STAMPS, PACIFIC ISLANDS AND NEW ZEALAND. Thirty varieties, 1/-; Fifty, 2/6; One hundred, 15/-. Better quality (no common), Twenty varieties, 1/-; Thirty, 2/6; Fifty, 10/-. Sixteen different Islands, 1/-; Twenty-five, 2/-. Send 2/6 for a "Surprise Packet."
M. Leather, Avondale, Auckland, New Zealand.

LORD BYRON 2 Drachma Greece 1924 FREE. Fine used copy of this interesting stamp free to all applicants for 25% discount approval sheets, sending postage.

J. H. GAZE, Didsbury, Manchester.

1,000 Stamp Mounts Free to approval applicants enclosing 1½d. postage.—Holloway, 28, Heyburn Rd., Liverpool.

Foreign Stamps On Approval, all ½d. each, suit beginners.—J. Gleave, Market Hall, Inverness.

Six Revolutionary Crete Free to "Big Discount" approval applicants.—H. Scott Johnson, C.P.A., Room C, 49, Felden St., S.W.6.

FIVE DANZIG AIRPOST STAMPS, 25, 50, 100, 250, 500 Mks. and 25 Portuguese Colonials Free with approvals.—Kearley, 142, Purves Road, London.

FREE. 300 stamps. Send postage.—Douglas Hulse, 13, Silverdale Road, Wolstanton, Staffs.

50 FOREIGN, 25 COLONIAL, 8d. Approvals at ½d.—2d.—Masters, 208, Milkwood Road, Herne Hill.

YOU WILL LIKE THIS—FREE. 100 different picked stamps, including British Colonials, N. & S. American, China, European, but NO NEW EUROPE. To applicants for my famous Approvals, including stamps from ½d., and enclosing 1½d. for postage.
Fleming, St. Winifred's, Christleton Road, Chester.

GOOD JOKES TO TAKE BACK TO SCHOOL

Parcel contains:—Musical Seat, Platelifter, Joke Match Boxes and Cigarettes, Barking Dog, Black Eye Joke, Japanese Handcuffs, etc., etc. Just the things to amuse yourself and your school chums.

2/6, 3/6 and **5/-** parcels. **Post Free.**
Postal Orders, or 1½d. Stamps accepted.
Herberts, 27, Adys Rd., Peckham, London, S.E.15.

THIS CONCERNS YOU. NOTE OUR PRICES.
VALVES.

	R. Type.	Dull Emitters.
FRENCH ...	6/9	17/6
DUTCH	4/9	13/6 & 14/6
PHILIPS ...	7/3	18/6

Post Free in lots of three and over. Trade enquiries solicited. Write:
THE DUTCH VALVE AGENCY,
(Gerrard 8606) (G. R. THOMAS).
19, CRAVEN STREET, STRAND, W.C.2.

ELECTRIC BELLS

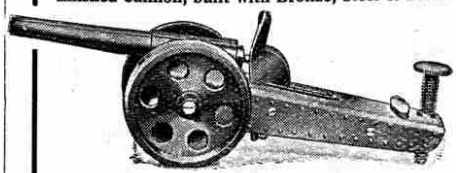
are essential in every house, so send for a complete outfit, which can be easily fixed up, to:—
A. W. NORTH (*Dept.* 40),
47, Parchment St., WINCHESTER
for a "Beam" Bell Set, comprising Best Quality Soft-toned Electric Bell, Strong Battery, Push (flat or pear), flex, and box of copper staples. Complete outfit only 5/6 post free, or with spare battery 7/-.
NORTH'S FOR BARGAINS.

THE AUTOMATIC PEA REPEATER

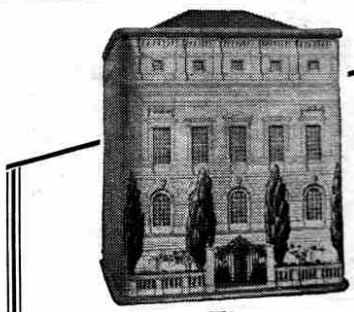
The most reliable pistol on the market. Takes 25 shots at one loading, best black finish, each in box with instructions and supply of ammunition, post free **2/6.**
Latest Novelty—The **PIGMYPHONE.** A real miniature gramophone, plays just like a big machine, complete with records, post free **5/6.**
R. DILNOT, 125, Chiswick High Rd., London, W.4

VEST POCKET FOLDER PCKT. STAMP MOUNTS 50 DIF. FINE STAMPS **ALL FREE** to genuine intending purchasers applying for **Blue Label Approvals No. 6** and enclosing postage.
M. CORYN, 10, Wave Crest, Whitstable, Kent.

It Bangs! Flashes! and Shoots!
7½ in. long
No Caps, Powder, or Special Ammunition. Practise and Beat Father with this beautifully finished Cannon, built with Bronze, Steel & Brass



SOME HOWITZER! A BRITISH TOY!!
4/9 post free.
Money returned if you do not approve.
HANWELL'S TOYS,
38, Alexandra Road,
NORTHAMPTON.



The
Queen's Doll's House
MODELLED IN DECORATED METAL.
Profits to the Queen's charities.
Complete in every detail, illustrating in colours the front, sides and interior, and adapted as a money box.
A UNIQUE GIFT. MADE IN ENGLAND.
Obtainable everywhere.
PRICE: With lock and key. Packed and posted 6d. each extra. **1/-** **Actual Dimensions:** 4½ in. wide, 2⅝ in. deep, 3⅜ in. high.
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Messrs. A. W. NORTH,
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beg to announce that they have opened a
TYPEWRITING DEPARTMENT.
where Stories, Poems, Letters, Circulars and every description of typewriting can be accurately and quickly executed at the low rate of 10d. per 1,000 words. Carbon copies 3d. each. Special quotations for large quantities.
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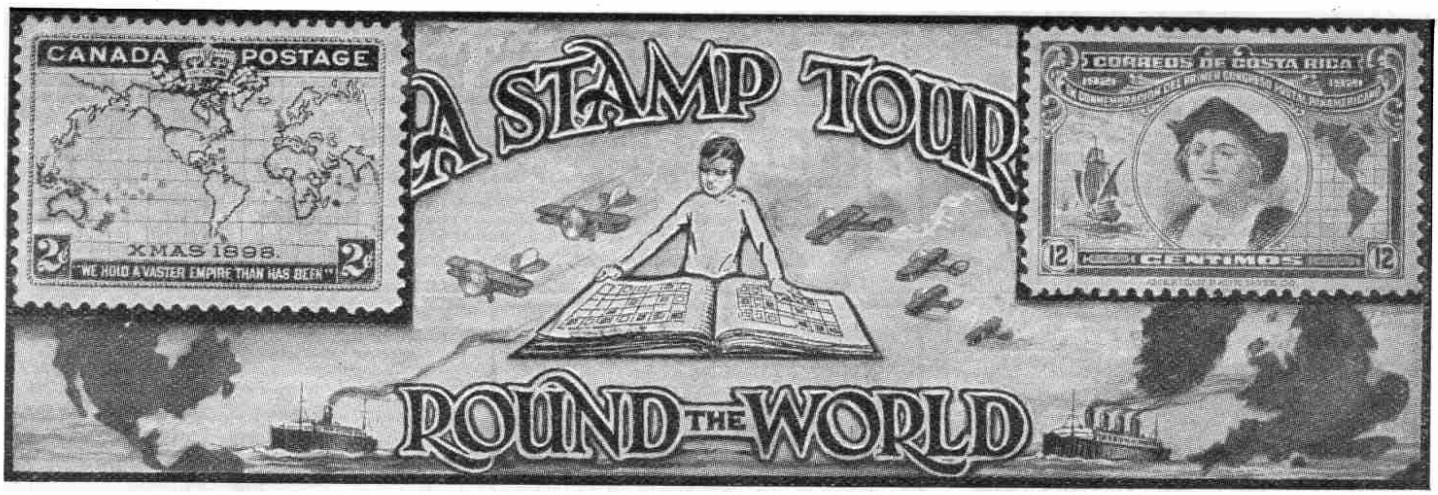
GIVE US A TRIAL.
Please address all letters "Typewriting Dept."

CUT THIS OUT. **'Meccano' Pen Coupon, Value 3d.**
Send 5 of these coupons with only 2/9 direct to the **Fleet Pen Co., Fleet Street, E.C.4.** You will receive by return a splendid British 14 ct. Gold Nibbed Fleet Fountain Pen value 10/6 (Fine, Medium, or Broad Nib). If only 1 coupon is sent the price is 3/9. 3d. less for each extra coupon up to 4 (Pocket Clip 4d.). Satisfaction guaranteed. Your own name gilt letters, either pen 1/- extra.
Lever Self-Filling Model with Safety Cap, 2/- extra.



V. CENTRAL AMERICA

HAVING fully studied the Panama Canal, we leave our liner and board our aeroplanes to explore the states of Central America.

Flying northward we first come to Costa Rica, which is Spanish for "rich coast," and is a very appropriate name for this beautiful country. As was the case with the remainder of Central America, Costa Rica was under Spanish rule until 1821, when there was a revolt throughout the area resulting in the overthrow of the Spanish regime and a union with the Mexican Empire. Two years later, however, when Mexico became a republic, there was a renewal of civil war and Costa Rica joined the newly-formed Republic of the United States of Central America. This was in 1824, but the authority of the central government was never great and the position of Costa Rica was indefinite until 1848, when an independent republic was again proclaimed.

Port Limon, illustrated on the 5c. of the 1901 issue, is the chief Atlantic port of the country and is the terminus of the railway that crosses the continent to the Pacific coast. The view on the stamp shows the sea-wall that protects the harbour. Turning inland we arrive at San José, the capital, where we notice the national buildings, including the monument pictured on the 1c. of the 1923 issue.

Commemorating an Indian

On the Pacific coast is a peninsula, now called Guancaste, that was incorporated with Costa Rica in 1824. A centenary commemorative set of stamps has recently been issued, designed by Senor G. Noriega and printed by the American Bank-Note Co. The values below 15 cents show a map of the area, the higher values a church with a tree and horseman in the foreground.

Guancaste was formerly known as Nicoya, and was so called in memory of an Indian of that name who was converted to Christianity, in company with his tribe, during the 16th century.

Nicaragua and its Volcanoes

Our visit to Nicaragua, the next country, is confined to a small portion in the interior near Lake Managua, on the way to which we pass Lake Nicaragua, over 100 miles in length.

Managua, the capital of the country, stands at the south end of Lake Managua, and here we see the Government Building or Palacio Nacional, erected shortly after Managua became the capital in 1855. This building is shown on various values, including the ½c. and 1c. of the 1914–15 issue. Managua is a modern city with many flourishing industries, and has an important export trade in coffee, sugar, cocoa and cotton.

At the extreme north of Lake Managua is the Momotombo Volcano (4127 ft.), pictured on all the values of the 1900 issue. This is one of the many volcanic cones crowded close together in this area, as is evident from the design of many stamps of Nicaragua from the first issue in 1862 until the series of 1912.

A few miles further north, and on the same railway as Managua, is Leon, the largest city of the republic. Here are located some of the finest public buildings in Central America. The massive and elaborate cathedral, built between 1746 and 1774, is in the Renaissance style of architecture, and is shown on the remaining values of the 1914–15 issue.

Over-Printing a President

Salvador, the smallest and the most densely populated of the states of Central America, consists of a strip of land about 60 miles in breadth and 140 miles in length, lying on the Pacific coast. The country is chiefly mountainous and contains many volcanic cones, one of which is shown in the early stamps of the country, 1867 to 1888, and in the 1891 issue.

San Salvador, the capital of the country, is centrally situated, and although in a valley is 2115 ft. above sea-level. In this town we find the National Palace (1907 all values and 1912, 29c.), the Independence Monument (1912, 19c.), and the National Theatre (1916 all values).

Salvador is an unpopular country with stamp collectors owing to the large number of scarce provisionals it has issued since 1889. The series that was put on sale on the 1st January, 1895, and which only remained current for a fortnight, is interesting as it is one of the few sets of stamps that have been deliberately spoilt before issue. When printed, the series bore the head of President Ezeta, but as he had been overthrown before the stamps were issued they were overprinted with the arms of Salvador, which effectively prevented anyone seeing the ex-President's face! The stamps were superseded a fortnight later by a new series showing the arms.

A Wonderfully-Engraved Stamp

Guatemala is the next country on our journey, and here we visit the capital, which also is called Guatemala. The city is situated on the top of a high table-land over 5000 ft. above sea-level.

As in the case of most Central American towns Guatemala possesses wide streets flanked with avenues of trees. Here we find most of the views pictured on the handsome series issued in September 1902. The Museum (5 cents value) was erected in 1831; the Cathedral (20 cents, illustrated here) is situated in the Plaza Mayor, one of the chief open spaces of the city. The Theatre (50 cents) is one of the best in Central America and

(Continued on page 27)

Stamps for Sale

(*See also page* 24).

1925 GREETINGS

To all "M.M." Readers!

START THE NEW YEAR WELL, by sending for my **GREAT HALF-PRICE SALE** Catalogue.

Penny Black English, 8d. each. Triangular Capes from 2/6. A marvellous selection of approvals, all stamps half price this month. Send to-day.

HILLIER, Stamp Mart, HORSMONDEN.

A Genuine New Year's Gift

To all who purchase one of the following lots for 2/6 nett, from my approval sheets, I will present a collection of 250 all different British Colonial and Foreign stamps.

"The Gem Packet" contains 25 Fine Pictorials, 25 Br. Colonials, Sudan "Camel," Newfoundland "Caribou," Barbados "Victory," Jamaica, Nyassa, etc., in all 100 diff. **2/6**

Siam (5), Belgium (10), Mozambique (4), Greece (5), Br. Colonials (25), Bulgaria (6), Persia (4), Australia (6), Switzerland (12), Turkey (7), Poland (8), S. America (8) **All Diff.** **2/6**

A Fine Collection.

"The Pictorial Packet," 60 all different, **2/6.**

All stamps above Mint or used, clean and off paper, ready for mounting in your collection.

The first 12 applicants will receive a set of 8 Epirus Mint, in addition to the 250 lot, this applies to clients from abroad also.

Every one above a bargain. Send early to secure them.

For further selections write or call.

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Dept. A., 26, Meadows Road, Sale, Ches.

PORTUGUESE COLONIALS FREE:

Any **two** of the following Free Gifts will be sent to applicants for approvals enclosing 1½d. postage.

12 unused Angola.
12 ,, Cape Verde.
12 ,, Mozambique.
12 ,, Portuguese Guinea.
11 ,, St. Thomas & Prince.

E. T. COX
13, Britannia Road, Parkstone, Dorset.

CHEAP ATTRACTIVE SETS

5	Austrian Charity, 1924	1/–
5	Hungary Bolsheviks, 20–80 f.	6d.
5	Japan, 1914, 30, 50s, 1, 5, 10 Yen, used ...	4d.
17	Roumania, Austr. Occup., 2nd issue compl....	1/6
10	Nyassa, 1911, 2½–300R surch. "Repub." ...	1/6
8	Spain, Cervantes, compl.	1/9
20	Austria, Hochwasser compl.	9d.
16	Bosnia, 1906, Pictorials, compl., used ...	3/9
3	Holland, Jubilee, 2, 5, 10c., used	3d.
9	Libia, 1921, Pict. 1–55c.	1/–
4	Italy, Victory, compl.	6d.
2	Switzerland, P.U. Jubilee, 20 & 30c. ...	8d.
3	Switzerland, Peace, used	4d.
14	Jugo-Slavia, 1921, compl., used	10d.
3	Japan, Peace, 3, 4 & 10 sen.	9d.

APPROVALS of British, French, Portuguese, Dutch Colonies, etc., willingly sent on approval. All applicants enclosing postage will receive the new issues of French Colonies: A.E.F. on Gaboon, Tchad, Congo, etc.

ESCOTT C. BLAND,
16, Mansfield Road, Parkstone, Dorset.

START THE NEW YEAR WELL

and write for a selection of my approvals. Fine packet of Pictorials given away to all applicants.

A Postcard will do.

L. C. JONES, 61, West St., Bourne, Lincs.

FREE

TRANSVAAL 1897 2/6 unused, to purchasers of each lot of

GREAT BRITAIN 1500 for 1/3 (Guaranteed unpicked). **SCARCE** and **RARE** varieties of **WATERMARK, PERF., DIE,** etc., have been found in these **BARGAIN PARCELS.** A few Colonial and Foreign are included.

PHILIP J. DYKE, 122, Gladstone Rd., S.W.19.

FREE! EGYPTIAN WAR-CENSORED ENVELOPE & 25 DIFF. PORTUGUESE COLONIALS FREE!

The above will be given entirely FREE to serious collectors asking to see my approval selections of stamps, which cannot be excelled for condition and price. 6d. in the shilling discount is allowed on **all** purchases, whether large or small. Send a postcard and mention Gift M.M.3.

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Stamp Collectors
LOOK HERE!

A fine new, up-to-date STAMP ALBUM, British made, and fully illustrated, for only **1s. 3d.** post free.

A New Book, full of interesting information, entitled—**"Stamp Collecting for All,"** which gives just the help you need in starting a collection, identifying stamps, etc., **1s. 3d.** post free. (Coloured picture cover, many illustrations).

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STANLEY GIBBONS LTD.
Dept. 15, 391 Strand, London, W.C.2.

THE "1,000" PACKET

1,000 500 well-mixed Foreign Stamps containing many usually sold at ½d. and 1d. each. 100 UNUSED (a complete sheet), 25 well-mixed BRITISH COLONIALS, a 12-page booklet for holding duplicates and 375 Patent "Strip" Stamp Mounts.

4½D.

Postage 2½d. extra. Abroad 6d. extra.

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FREE!

TO INTRODUCE OUR NEW PRICE LIST

to readers of this Magazine, we shall present to each applicant for a copy a superb packet containing 110 different stamps, including AUSTRALIA (Kangaroo), BARBADOS (Sea-horses), obsolete CEYLON, DOMINICAN REPUBLIC, GWALIOR, obsolete IRAK, South Australia, TASMANIA pictorial, TRAVANCORE, VICTORIA, etc., etc. Enclose 3d. to cover cost of postage and packing, and request Gift M.M.1.

Only One Packet to each applicant, and the offer will only remain open for a limited period; a quantity will, however, be reserved for customers abroad. Write **at once,** for "he who hesitates is lost."

NORRIS & CO. (Dept. M.M.), LEABROOKS, ALFRETON, Derbyshire, England.

FREE! FREE! FREE! FREE!

THE "MIDLAND" SERIES

No. 1.	500 Assorted Stamps	6d.
No. 2.	1000 ,, ,, ...	1/–

(Postage 3d. extra).

These packets contain British, Colonial, and Foreign Stamps. Being guaranteed absolutely unpicked mixed stamps, there is always the possibility that something really good may be found.

THE MIDLAND STAMP CO. LTD.,
78, WARWICK STREET, LEAMINGTON SPA.

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(*See also page* 24)

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Stamps Recently Issued

Costa Rica

A particularly handsome set of pictorial stamps is issued by Costa Rica. The 1c. value shows the interesting National Monument; the 2c. a native woman gathering cocoa; the 4c. native plants; 5c. the Post and Telegraph Office; 10c. Columbus before Isabella; 20c. the landing of Columbus;

40c. a map of Costa Rica; and 1 colon a portrait of Manuel Maria Gutierrez. In addition there is the 12c. value which is the subject of our illustration. This shows, in the centre, a portrait of Christopher Columbus, while on the left is his flagship and on the right a map of the two American continents.

Manuel Maria Gutierrez, whose portrait appears on the highest value in the series, has obtained this honour in perhaps the most unusual manner yet recorded. In the year 1852 the Government of Costa Rica was preparing a State welcome for some important British visitors. For diplomatic functions it is essential that an independent nation, such as Costa Rica, should possess a national anthem. Unfortunately, the Government had not thought of this requirement before, and so the band-master, Gutierrez, was ordered to compose one at once! This was no pleasant duty for Gutierrez, who, although quite an able composer, was too much of a musician to enjoy turning out music to order. However, it had to be done, and in consequence we find his portrait figuring on a stamp by way of reward for his accomplishment!

The whole set was designed by Señor Gamaliel Noriega, the Director-General of Posts, and engraved and surface-printed by the American Bank Note Co. on unwatermarked wove paper, single-line perforated 12. The punches of the perforator appear to be rather worn, since poor and blind holes are frequent.

The 10c. and 12c. are in commemoration of the first Pan-American Postal Congress, 1921, although the whole set was issued at the same time.

Nauru

Nauru, an island in the Pacific Ocean and one of the Marshall Group, was occupied by Australian forces in November 1914, before which it was a German colony using German colonial stamps inscribed "Marshall-Inseln." To-day it is a British possession, mandated direct to the British Government, and from October 1915, until early in 1924 it used stamps of Great Britain overprinted "Nauru." Now, however, a special series has been issued on

paper without watermark, perforated 11. There are fourteen values ranging from ½d. to 10/-, all line-engraved and printed by Harrison, at the Commonwealth Treasury, Melbourne, Australia. The design is the same for all values and is copied from a photograph showing a portion of the rocky coast of Ocean Island and one of the boats belonging to the Phosphate Company, which has important quarries both at Ocean Island and Nauru.

A Stamp Tour Round the World

(*continued from page* 25)

was founded in 1858. The barracks are shown on the 75 cents, and a native school on the 2 dollars.

Water is brought to the town by two old aqueducts, one of which was pictured on a stamp issued in 1922. The 6 cents of the 1902 series shows the Palacio de Minerva and is notable for the minute engraving of the inscription on the front of the palace which can be read quite clearly under a strong magnifying glass.

Breakwaters at Vera Cruz

Mexico, the largest of the countries usually classed with Central America, affords several views for our inspection. Vera Cruz, the most important port of the republic, is situated on a slight indentation of the coast of the Gulf of Mexico. Formerly, the harbour was not strong, but large breakwaters now afford complete protection from storms. The lighthouse was the subject of the 1 peso value of the 1915 issue.

At Mexico City we see the Post Office (1915, 5 pesos) and about twenty miles south-east of the city we find the snow-clad volcano of Popocatepetl (1899, 1 peso), a giant of 17,888 ft. Popocatepetl means "Smoking Mountain," but although formerly an active volcano, it is now extinct.

Some 275 miles north-west of Mexico City we find the city of Guadalajara, near which is the Jaunacatlan Fall, pictured on the 50 centavos value of the 1899 issue. This Fall, on the Rio Grande, supplies electricity to work the tramways and factories and to light the buildings and streets of Guadalajara.

NEXT MONTH:—
SOUTH AMERICA

An Idea for Your New Year's Party

Two happy Meccano boys who won prizes at a recent Fancy Dress Carnival. The "strips" and "plates" are made from cardboard covered with silver paper.

Discoveries in Meccanoland

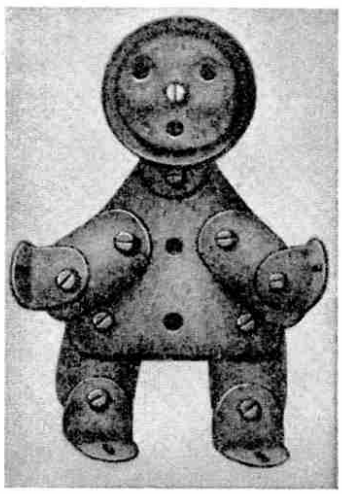
By R. C. Manning

This is the concluding instalment of the article, commenced last month, in which our contributor has depicted some of the more humorous aspects of Meccano model-building. We have built all the models illustrated, and they all work in a very realistic manner. They all provide great fun, and our young readers will be interested to know they may all be made with a No. 1 Outfit.—EDITOR.

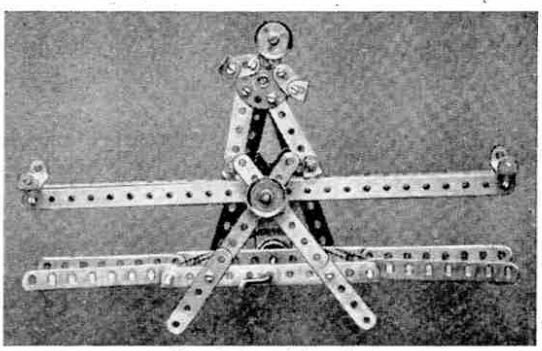
AS I wandered further with King Meccano I became more and more fascinated with the wonders he showed me, and I actually began to feel regret that I should have to return to the great outside world again. I was comforted to remember, however, that I now owned a Meccano Outfit and that I could quite easily become a regular "inhabitant" of Meccanoland. I began to think of all the fine things I should be able to show Jack, and it seemed to me that he certainly would have to "give me best" this time.

Filled with these exciting thoughts, I began walking quicker and quicker, a fact that I only realised when I found that I had left my royal guide some distance behind, where he was panting and gasping while his bodyguard plied their screwdrivers, for in his hurry he had worked all his joints dangerously loose!

"Hi! there! not so fast," he cried, as soon as he had regained his breath. "I want to introduce you to my friend Professor A. Flat Trunnion," His Majesty continued when he caught me up. "He is in charge of our Meccano Schools."



"He looked at me in sheer astonishment. '*Liked* going to school, did you say?'"



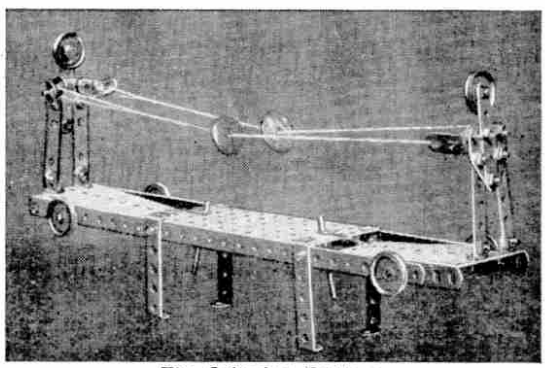
Acrobat and See-Saw

The Professor bowed a swift acknowledgment to me and as I returned his greeting I had a horrible fear that this highly-placed personage of the scholastic world might begin to question me on general knowledge or logarithms or something equally boring. However, to my surprise he began merrily chatting away on the most interesting subjects. Indeed, he seemed such an amiable gentleman that I plucked up sufficient courage to ask him if his scholars liked going to school. He looked at me in sheer astonishment. "*Liked* going to school, did you say?" he exclaimed, "Why, they like it so well that I sometimes have a job to get them to take any *holidays*!"

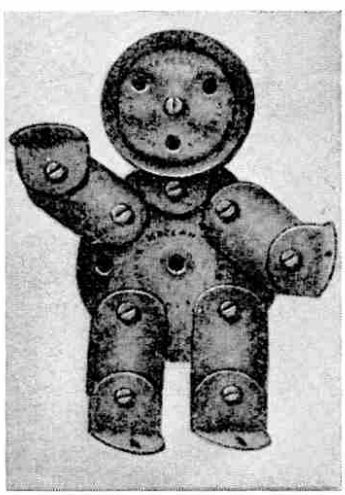
"Of course," interrupted the King, "the reason for that is that the Professor demonstrates all his lectures with Meccano. In fact, he can work out the principles of the most abstruse and complicated movements in this way, and you may be sure his pupils find it really fascinating."

Having left the Professor on the broad steel steps of the Sprocket Institute, we strolled down the beautifully laid-out Architrave Drive. We had not walked very far before His Majesty drew my attention to an acrobat going through some extraordinary "stunts" on a see-saw, much to the amusement of a crowd of admirers. Here I also saw two Meccanitians rocking to and fro at the end of what appeared to be another see-saw, while between them two huge discs—not unlike cart-wheels—whirled round and round with tremendous speed.

[ACROBAT AND SEE-SAW. In this model the beam, composed of three 12½" Strips, rocks about an Axle Rod passed through the four 5½" Strips forming the legs of the model. Two 5½" Strips are bolted to the Flanged Plate in the base of the model, and meet to form a bearing for a short Axle gripped by the Bush Wheel, which represents the body of the Acrobat. The bearing is reinforced by a ½" Reversed Angle Bracket, and the short Axle carries a 1" Pulley Wheel which is connected by cord to the Crank Handle. A Flat Trunnion is bolted to the centre of one of the side strips of the rocking-beam and is connected by thin pieces of elastic to each end of the 5½" Flanged Plate. By using a few additional parts little figures can be fitted to each end of the see-saw.



The Spinning Buttons



"... Captain Bush-Wheeler became quite excited and waved his arms about."

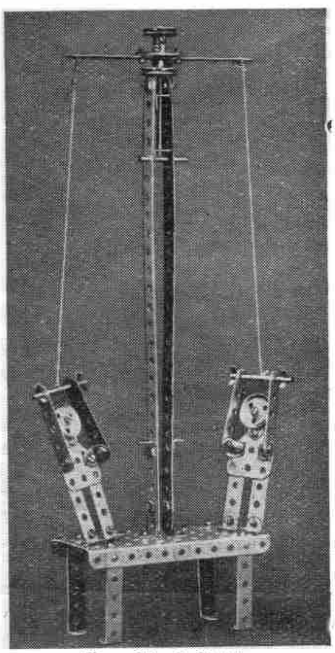
Another method of operating this model is obtained by connecting the pieces of elastic to the Sector Plates shown; a slight touch upon either of the latter then being sufficient to send one side of the beam up or down.

THE SPINNING BUTTONS. The Sector Plates, to which the Meccanitians are bolted, are pivoted to the base as shown in the photograph. It is evident that what are described as "cart-wheels" in Meccanoland might in real life be merely good-sized buttons mounted on strong thread, for that is what they are! Now start the model as follows:—Twist the threads a little with your fingers, pull the Meccanitians outwards, then release them sharply. As soon as the buttons are spinning, a slight downward touch on the feet of each figure is sufficient to keep them going.]

A little further along my companion once more drew me aside to point out a daring motor-cyclist, who was revolving round a miniature racing-track at an

extraordinary speed. I could not help thinking that the brave little fellow would get terribly giddy, but he did not fall off, in fact he seemed to be thoroughly enjoying it!

[MINIATURE CYCLE TRACK. A $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip forms the cross-bar of the cycle, and the front wheel forks and handlebars consist of two $2\frac{1}{2}''$ Strips and one $2''$ Axle Rod. The two back wheels are mounted in a Cranked Bent Strip bolted to the second hole from the end of the cross-bar, and set at a slight angle so that the cyclist travels in a circular direction. A Flat Trunnion forms the rider's body, while each leg is constructed from a $\frac{1}{2}''$ Reversed Angle Bracket and one Angle Bracket, and his arms are formed by Flat Brackets and Angle Brackets. His feet are bolted to the first and third holes respectively of the Strip secured to the Crank Handle in the centre of the track. The circle of cardboard forming the track may, of course, be cut to any desired size.]

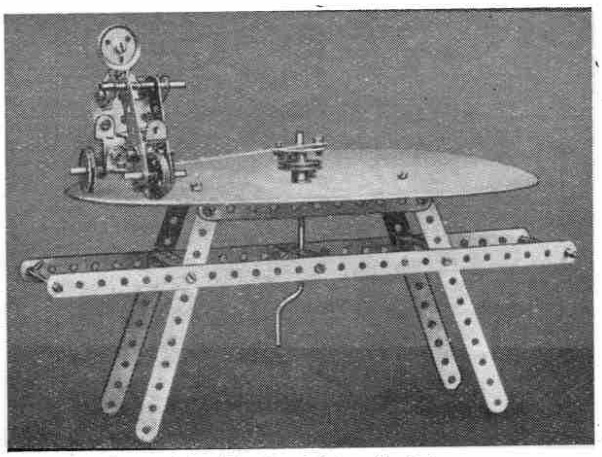


The Giant Stride

While we were standing here I noticed a little figure bustling towards us.

"Hullo!" exclaimed the King, "here is Captain Bush-Wheeler. He's my Chief Engineer and Director of Amusements." In a few moments that gentleman was deep in a discussion with His Majesty concerning some plans for forthcoming improvements in Meccanoland. The conversation developed into quite a heated discussion, the Captain becoming very excited and waving his arms about to such an extent that I feared they would work loose!

"Meccanoland grows almost faster than we can keep pace with," he said excitedly. "Only a few minutes ago I met several hundreds of Meccano boys who have just arrived full of splendid new ideas. I tell you, your Majesty, that these boys are making this the brightest and best country under the sun!"



The Racing Motor-Cyclist

"Yes, and my friend here is one of our latest recruits," replied the King, waving his arm in my direction.

Presently, the King having dismissed Captain Bush-Wheeler with a "good-day," we moved off again on our tour of inspection.

"How would you like a ride on that?" he asked, as we stood watching two Meccanitians, suspended by ropes from the top of a high pole, and flying round and round in space. "I don't think I should like it over much," I replied. "But then I'm not as strongly built as your subjects, you know."

[GIANT STRIDE. This is quite easy to make, for the details are well shown in our illustration. We imagine our Meccanitians must find this a very exhilarating pastime, for a slight turn of the $1''$ Pulley Wheel at the top of the model will send the little men flying round in space in a most thrilling manner.]

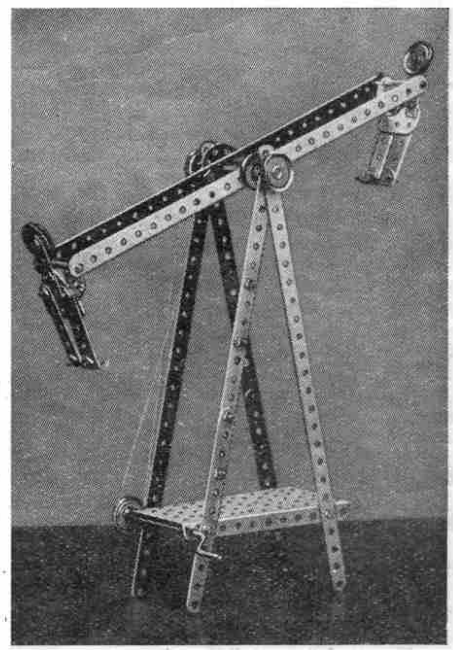
The King next showed me two more exciting "stunts" indulged in by these little people. One that made me feel dizzy to look at was two gymnasts, who, holding on to long revolving arms, were whizzing round like a catherine wheel! In the other one, a little chap was having a fine ride by means of a wheel running down an inclined rope.

[REVOLVING GYMNASTS. This is quite a simple model to construct, but care should be taken to see that the little figures have sufficient clearance within the revolving strips. Their arms should be rigidly fixed in the position shown.

AERIAL FLIGHT. The entire frame rests upon two $1''$ Pulley Wheels, the Axle passing through a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip bolted to the underside of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate in the base. When the joy-rider has reached one end of the cord, the model may be tilted so that he returns to the other end.]

It would take pages and pages to describe half the other amazing things I saw and did, or the wonders the King of Meccano described to me. We must have covered many miles altogether, at times riding through the streets on little trolleys that went as fast as you wished, or in the King's splendid limousines. Sometimes we covered mile after mile in the beautifully-fitted Hornby Pullman cars of what must be the finest and most efficient miniature railway system ever built.

However, all good things must come to an end some time or another, and at last the King reminded me that he must now take me home, for it was getting late. I was quite downcast at the thoughts of leaving this sunny land, but he told me that I could enter his country as often as I liked, since I had become a Meccano boy. This cheered me up, and

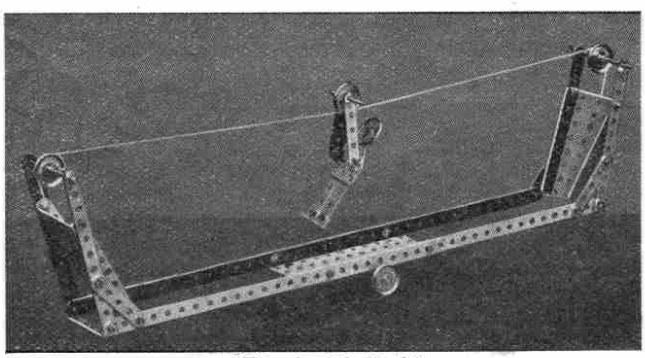


The Revolving Gymnasts

when I thought of all the things I could tell Jack and show him with my Outfit, I even became eager to get back.

Alighting at Theodolite Palace, the King's residence, he led me inside. Passing down a long corridor we came to a wooden door, which the King opened, bowing gravely as he did so. As soon as I passed through, the door shut with a bang behind me, and I found myself returned to my normal size and once more sitting in my chair with the fire nearly out! As I sat up hurriedly, Jack burst into the room yelling out to me to come and join in a charade. Even as he spoke there seemed to be a hasty movement in my Meccano Outfit, and I was almost certain I saw a Flat Trunnion and a $1''$ Pulley Wheel jump back into their places just in the nick of time!

THE END.



The Aerial Flight

Lives of Famous Engineers—(*cont. from p.* 15)

and the distance between the points of suspension of the main bridge was 579 ft. Including the embankment and a stretch of new road on the Carnarvon side, together with the toll-houses, the total cost of the bridge was £120,000.

A Bridge for Conway

Soon after the Menai bridge was begun the authorities decided that a bridge of similar design should be built over the estuary of the river Conway opposite the old castle. As in the case of the Straits, the crossing here had previously been made in an open ferry boat. Work was commenced in April 1822, and by the summer of 1826 the structure was completed. The operations involved in the building of this bridge were on closely similar lines to those we have described in the case of the Menai bridge, and therefore it is unnecessary to go into details. In the Conway bridge the width between the centres of the supporting towers was 327 ft., and the height of the underside of the roadway was only 10 ft. above the level of high spring tides.

Telford's Death

By this time Telford was approaching 70 years of age, an age at which most men lay aside serious work, but he still had the health and mental activity to carry out other important schemes. Among these were the St. Katherine Dock on the River Thames, which was regarded as a masterpiece of harbour construction, and a number of bridges, the most important of which was a stone bridge across the Clyde at the Broomielaw, Glasgow. He also carried out important drainage works in the Fen district. His last professional work was to prepare a report, at the instance of the Duke of Wellington, on the best method of improving Dover harbour.

A few months later Telford became seriously ill, and he died on the 2nd September, 1834, at the age of 77. He had directed that he should be buried at St. Margaret's, Westminster, but the Institute of Civil Engineers, a body that he had largely helped to establish, urged upon his executors the desirability of interring him in Westminster Abbey, and accordingly he was buried there near the middle of the Nave. The adjoining stone bears the inscription "Robert Stephenson, 1859," for Stephenson had expressed the wish to be buried near Telford.

His Success as an Engineer

Telford's success as an engineer was due to a remarkable combination of natural ability and unceasing labour. He endeavoured to excel in whatever task he took in hand, and was never satisfied with his own accomplishments but always strove to improve his work still further. He regarded his apprenticeship to masonry as having been of more value to him than passing through a University.

In a letter to a friend regarding a young man who wished to become an engineer, Telford pointed out that the profession was over-crowded and that the prizes were few and the blanks many. "But," he added, "if Civil Engineering, notwithstanding these discouragements, is still preferred, I may point out that the way in which both Mr. Rennie and myself proceeded was to serve a regular apprenticeship to some practical employment—he to a millwright and I to a general house-builder. In this way we secured the means, by hard labour, of earning a subsistence; and, in time, we obtained by good conduct the confidence of our employers and the public; eventually rising into the ranks of what is called Civil Engineering. This is the true way of acquiring practical skill, a thorough knowledge of the materials employed in construction, and last, but not least, a perfect knowledge of the habits and dispositions of the workmen who carry out our designs. This course, although forbidding to many a young person who believes it possible to find a short and rapid path to distinction, has proved to be otherwise by the two examples I have cited."

NEXT MONTH:—

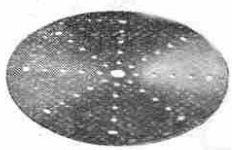
THE BRUNELS, FATHER AND SON

The Meccano Works F.C.

The Meccano Football Club, which was formed at the commencement of season 1924–5, has its ground on the Thingwall Estate, Broad Green. The club's record so far is won 4, lost 2. Goals scored: for 22, and against 10. The club is affiliated with the Liverpool County F.A. and is expecting to give a very creditable show. Longlin heads the list of goal scorers with 11 to his credit.

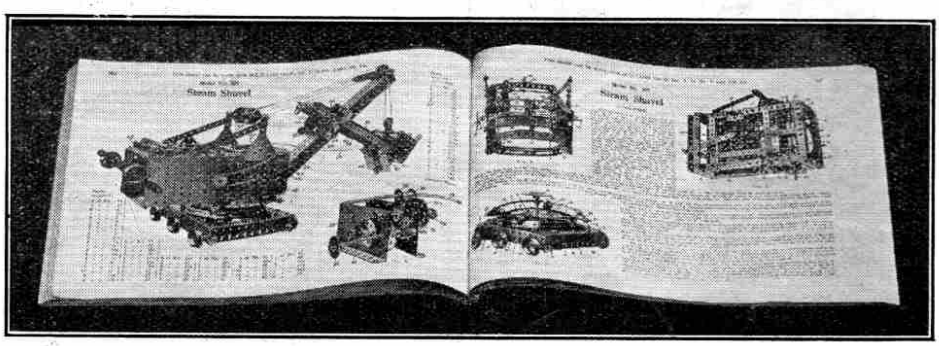
New Meccano Parts

145. Circular Strip (7″ over all) each 1/–



146. Circular Plate (6″ diam.) each 1/3

The New Meccano Manual



There are three Manuals, the 0 Manual for simple models built with the 00 and 0 Outfits, the 0–3 Manual comprising models built with any of the Outfits up to and including No. 3, and the Complete Manual, which comprises a selection of models that may be built with every Outfit up to a No. 7.

This latter Manual is a very fine publication and should be in the hands of every Meccano boy. It includes instructions for building 389 models, including most of the models shown in the former No. 3 Manual, the publication of which is now discontinued. The new edition (No. 24) of the Complete Manual is beautifully illustrated in half-tone and most of the models have recently been revised, and very greatly improved by the introduction of new parts that have been added to the Meccano system during the past year. Several new models have been included for the first time, including some of those published in recent numbers of the "*M.M.*"

Prices of Manuals.

0 Manual	(postage free)	6d.
0–3 ,,	,,	1/2
Complete Manual	,,	2/10

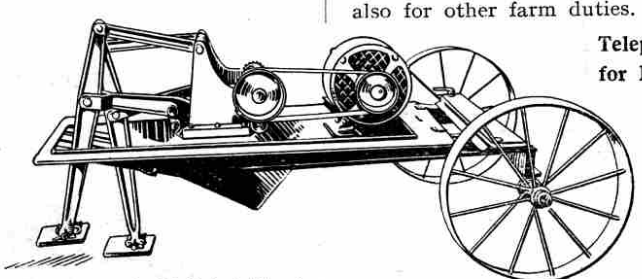
OUR BUSY INVENTORS

RECENT INTERESTING PATENTS

Every day new inventions and ingenious labour-saving devices are being brought into existence. From time to time the most interesting of these will be described and illustrated in these columns. Readers are invited to send particulars (accompanied, if possible, with photos, sketches, or cuttings) of any interesting inventions or devices that may come to their notice. Payment at our usual rates will be made for any contributions used.

A Walking Tractor

IT is not always possible to use vehicles with wheels, especially when the ground is heavy and the surface uneven. The problem of overcoming the difficulty has long occupied the attention of inventors, and a new type of transmission was evolved when caterpillar action was used for the tanks during the War. One of the latest inventions in this connection is that of Mr. Nilsson, of Stockholm, whose novel "walking tractor" has recently been tested by the Swedish Government.



A Walking Tractor

This tractor moves forward, and hauls or carries a load, without the use of driving wheels or caterpillar action. It uses levers or legs to retain a fixed grip on the ground, and is driven by a motor, mounted midway between the legs and a pair of wheels, which run free. Power is transmitted through gearing to produce a movement of the legs, and this movement is almost identical with that of the legs of a horse, when the animal is hauling a load. The addition of a heavier load to the tractor causes the legs to take an increased grip on the ground. It is only necessary, therefore, to provide the tractor with suitable shoes, which vary according to the nature of the ground on which the vehicle is working.

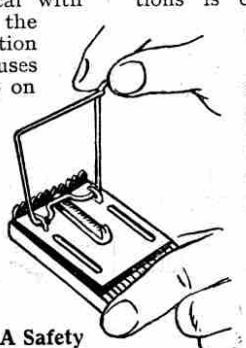
The legs are directly-geared members without cams, springs, or chains, and their movement is so timed that both legs are always planted on the ground before a leg is raised. When a leg is lifted, the movement is speeded up and then is greatly decreased, until the leg reaches the ground again, at which point the speed is the same as at the beginning of the step. Thus the action does not force the shoe into the ground, as it might do if it came down with full force in places where the ground is soft.

The method by which the tractor is steered is interesting. The gearing from the motor is connected to the legs in such a way that, when it is so desired, one leg moves forward more swiftly than the other. This movement is under control of the driver, so that the tractor will move forward in any desired curve. Apart from this, the tractor may be steered by the front wheels.

It is anticipated that the tractor will be particularly useful for agricultural work, for it may be used for hauling ploughs and harrows over rough land, and used also for other farm duties.

Telephone Silencer for Navy

The "Hush-a-phone" is the latest device invented for use in our Navy. This device enables control officers, crowded together in the fighting-top of a battleship, to transmit ranges and other information connected with the firing of the big guns without disturbing each other, or without the noise of gunfire disturbing the officers' speech. The use of this device will increase accuracy in transmitting firing data, and so eliminate errors which often arise when the transmission of the officers' instructions is confused with outside noises.



A Safety Mouse-Trap

Safety Mouse-Traps

Apparently suffering from the fact that many mouse-traps catch more fingers than they do mice, an inventor has devised a new form of trap. By means of a simple twist of wire the trap may be set without danger. The spring is released when the mouse steps upon the raised platform to take the bait.

For the Kitchen

Control of the temperature of the water for the kitchen sink is easily obtained by the use of a newly-patented mixer, connecting the hot and cold taps. This fitting consists of a "T-pipe" with a baffle plate, cast in its centre, which gives perfect mixing, regardless of unequal pressure under which the water may be supplied. The device is installed by turning the two taps inwardly to a horizontal position, where they are fastened together by means of two sleeves. These screw on to the mixer and are provided with rubber washers at the ends that go over the taps.

OUR MAIL BAG

In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here. Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

Geo. Campbell (Buenos Aires).—For one who has suffered so much, you are extraordinarily cheerful—a regular Meccano Boy in fact! Let us know how your leg is progressing and if you can now get around again. Thanks for your very interesting account of life in Buenos Aires. Write us again soon.

A. C. Sandwell (Brentwood).—If we can find room for your article on "The Great Bear" we will publish it. Stephenson was really responsible for the Steam Blast we believe, although others claimed the invention.

J. Barton (Wood Green).—We enjoy reading your letters and are glad to hear all about your home friends, including Snooker. We hope to hear more of the cutting machine that you are designing.

J. Barton, Jr. (Wood Green).—The weather up here has been just as bad as your own, probably worse. We hope you will have better luck with Jane than you had with Snooker. We will ask Rover to say something useful on motor cycles later on.

H. Woodman (Melksham).—Thank you for telling us all about your Meccano class and the Meccano exhibits at the Hospital Carnival. These events are excellent—they keep boys busily and intelligently occupied, and they bring together Meccano boys under the happiest conditions. Your own model, published in our September issue, has provoked much favourable comment.

R. Savill (Longton).—"Why I was fool enough to give up the '*M.M.*' I cannot say, but since I have begun to take it in again my repentance has been sincere." There is much joy in the Editorial office, R. S., over the sinner who has repented. We will send you all the back numbers available, but unfortunately many are out of print.

D. Marsden (Halifax).—According to the Mohammedan legend related in the Koran, King Solomon's Magic Carpet was of green silk. The King's throne was placed upon it when he travelled, and the carpet was large enough for all his forces to stand on it. When all was in order Solomon told the wind where he wished to go, and the carpet with its contents rose in the air and alighted at the place indicated. You will agree, Harry, that this was a very convenient arrangement, to say the least.

V. J. Ruseton (Kirkcaldy).—Congratulations on your school successes. We intend to continue illustrating Meccano models and articles on Railways. Your own article is not quite up to standard. Try again, V. J.!

F. L. Tyler (Oswestry).—We are not surprised to hear that your boy took a prize at the Carnival. His Meccano costume is both ingenious and attractive judging by the photo that you have sent us. Please convey our congratulations to him.

E. G. Cowe (Midlothian).—We shall remember your promise to send us an account of your experiences working in a coal mine, and shall be most disappointed if it does not arrive soon. We will find a suitable correspondent for you in France.

A. T. F. Reynolds (Chesham).—Thanks for photo of yourself with your Meccano model, which, we are pleased to learn, took a prize at your Hospital Carnival.

T. Hatt (12, Osborne Road, ?)—We have received two letters from you, Tony, and 7d. for a Guild Badge, but we *must* know where you live before we can send the latter to you. Write us again and give your full address this time!

W. T. Kay (Baxender).—We were very sorry indeed to hear of your accident, and we congratulate you on being still alive. We hope you are all right again now. We should be glad to see a sketch or photo of your new model.

J. E. Goran (Fort William).—Five prizes in one year is good work, just the kind of thing we should expect from an old Meccano boy like yourself. We certainly count you as one of our old friends.

N. E. Ngee (Singapore).—We read your long letter with much interest, and we have sent out to you full instructions for running your loco and hope you will find these helpful. We will pass on your suggestion regarding the Meccano Jersey to the makers.

R. O. Riordan (Ealing, W.5).—Now that you mention it, our covers certainly have been rather "hot" for the summer months! As the summer hasn't really been summer at all, however, perhaps we shall be forgiven! We think that the 1925 "*M.M.*" covers will be considered altogether better than any we have used up to now.

The Secretary's Notes

My first task this month is a very pleasant one, and it is to wish every member of the Meccano Guild a Happy and Prosperous New Year. This is the time to make good resolutions, and I hope that every Guild member will include among his resolutions the determination to do his utmost to make this the record year in the history of the Guild. I have always been optimistic in regard to the Guild's future, and with the opening of 1925 I am more sanguine than ever. During the past few months new members have joined the Guild in record numbers, new clubs have come into being, and the existing clubs have given ample evidence that their vitality is as strong as ever. My great ambition is that by the end of 1925 the membership of the Meccano Guild throughout the world shall have been doubled, and I ask every member of the Guild to resolve to recruit at least one new member during the year and so enable me to realise my ambition.

Good Resolutions for 1925

Club Leaders and Secretaries will be glad to hear that the Meccano Guild Map promised in our last issue is now ready, and we give a reproduction of it on this page. This map will prove of value in a great variety of ways, especially in the arrangement of inter-club football or cricket matches, rambles or cycle outings in the summer months, and social evenings, etc., during the winter. Then again, clubs situated within reasonable distance of one another may be able to form a combined concert party for the winter evenings. In all such cases a glance at the Guild map will show at once the approximate distance of the nearest clubs, and the addresses of their Leaders or Secretaries can be obtained immediately from headquarters. In the near future it is intended to publish a complete list of all Meccano clubs in this country with their full addresses, and a copy of this list, together with the Map, should be in the possession of every affiliated club. It is hoped also that the Map will be of assistance to the "lone" member or to the new Meccano boy who wishes to join a club in his district, and full particulars of any particular club will be sent to any reader who is interested.

The Guild Map

Very few words are necessary to explain the map. Each town or city in which there is an affiliated Meccano Club is marked with a black circle. Where there are two or more clubs in a particular place, the circle is divided accordingly. For example, the circle representing Birmingham is divided into four parts indicating four clubs; the circle for Glasgow shows that the city has three clubs, and so on. Unaffiliated clubs are not featured. Copies of this map will be sent out shortly to any Club Leader on request. It should be pointed out that two or three new clubs have become affiliated since the map was prepared and therefore they do not appear. New editions of the map will be prepared from time to time in order to keep it up-to-date.

For some time I have had in mind the possibility of introducing shooting with air rifles as an additional attraction for Meccano Clubs, and therefore it was with very great pleasure that I read a report from one of our most active clubs describing the formation of a miniature rifle section. I believe that such a feature would increase the popularity of most clubs, and therefore I take this opportunity of giving a few hints regarding the best method of carrying out shooting practice.

Miniature Rifle Shooting

First of all I must emphasise the importance of using only air rifles, as any other kind of rifle is dangerous for indoor use. Many people appear to be under the impression that air rifles are of no use for accurate shooting, but this is a mistake, for modern air rifles are very accurate within their range. In addition to safety such rifles have the further advantage of using cheap ammunition, the necessary pellets costing only a small sum per thousand.

Card targets may be purchased for about 1/– per hundred. These, of course, must be backed with something sufficiently solid to stop the pellets, and for this purpose a large wooden box filled with sand is excellent, the card target being tacked to the front of the box. The target should be placed as far away from the firing point as the length of the room permits.

Before any shooting commences certain rules should be made and strictly adhered to. The most important rule of all is that no person shall be allowed to go in front of the firing position while the rifles are in use, and it is a good plan to have a bell in the room and to ring it once as a

Two Important Rules

signal that firing is about to commence, and twice when shooting has ceased and the targets may be changed and examined. Another important rule is that a rifle should never be pointed at anyone in the room, whether it is thought to be loaded or not. These two rules should be strictly enforced, and any breach of them should be punished by the infliction of a penalty of some kind to be determined by the Leader, who should always be present during shooting practice.

How to Aim

Shooting is carried out, of course, in a lying-down position, and it is a good plan to have a piece of old thick carpet or felt to lie on. This can be rolled up after use and stowed away in a corner. The marksman should lie at full length with his left elbow resting on the carpet and his left hand supporting the barrel of the rifle. The butt of the rifle is firmly pressed up against the right shoulder and the forefinger of the right hand is placed round the lower part of the trigger. In aiming, the left eye is closed and the sight is taken with the right eye, looking along the barrel through the backsight to the foresight and the target. The two sights are aligned at a point slightly below the "bull," the top of the foresight being seen in the centre of the notch of the backsight. The eye must not be fixed on the foresight, however, but must look past it to the target. In the case of those who find it necessary to use the left eye for sighting, the order of things is, of course, reversed, the rifle being pressed against the left shoulder and the right eye being closed. In order that the aim shall not be disturbed at the last moment, it is necessary to hold the breath during the time the trigger is being pressed.

Studying the Target

Every boy who goes down to fire should shoot off, say, five shots, and then, after the bell has been rung for the target to be changed, he should closely examine the results of his shots, noting whether he has aimed too high or too low or too much to the right or to the left. He should then make a careful mental note as to how he has failed. Improvement in marksmanship can come only as the result of careful study of the position of the shots on the target. Keen rivalry between different members of the club will also help towards a steady increase in accuracy of firing. In regard to scoring, I suggest that five points be counted for a "bull," three for an "inner" and two for an "outer." It is a good plan to have a small prize for the member having the highest average for a period of a month, and further interest may be aroused by arranging teams of three or more members and offering a small prize for the winning team.

As regards expenses, it should not be a difficult matter for an active club to purchase a rifle, and later other rifles may be added as funds permit. The only additional cost—apart from the extremely small one of targets—is for pellets, and the best method of dealing with this is to make a small charge for so many shots, the amount being adjusted so as to make a small profit to meet running expenses.

I should be glad to give any additional information to clubs desiring to take up air-rifle shooting, and I hope later to be able to introduce some scheme of inter-club championship.

Blackburn Holy Trinity M.C. Football Team

The Holy Trinity Blackburn M.C. became affiliated with the Guild in March 1922, and since then has made marked progress. We reproduce here a photograph of the Club's Football Team, which has played many hard-fought games and has helped considerably to keep up the spirit and enthusiasm of the members. In addition to being keen sportsmen, the members have held many successful concerts and exhibitions, and from time to time have greatly assisted various local efforts to raise money for religious or charitable purposes. A noteworthy feature of the club's summer activities has been a Rambling Club combined with many pleasant picnics, and it is hoped to continue this feature during the year.

Affiliated Meccano Clubs of the British Isles

First List

Town.	Club.	Secretary.
ACCRINGTON	ACCRINGTON M.C.	V. Waterhouse, 45, Ramsbottom St.
ANDOVER	ST. MARY BOURNE M.C.	Douglas L. White, " Rosedale," Stoke, Andover.
BARNETBY	BARNETBY (ST. BARNABAS) M.C.	R. H. Ward, Laurel Villas, Victoria Road.
BIRMINGHAM	BEARWOOD M.C.	C. White, 72, Katherine Road, Bearwood.
"	KING EDWARD'S M.C.	N. J. Robertson, 30, Hinstock Rd., Handsworth.
"	SMALLHEATH M.C.	W. Edge, 131, Whitehall Rd., Smallheath.
"	SPARKBROOK M.C.	Francis Hubball, 71, Turner St., Sparkbrook.
BLACKBURN	HOLY TRINITY M.C.	H. Jepson, 11, Pine Street.
BLACKPOOL	BLACKPOOL SPORTS M.C.	J. Fraser, 10, Clifton Grove, South Shore.
BOSTON	BOSTON (LINCS.) MODEL-MAKING M.C.	R. Robinson, 30, Woodville Road.
BROMLEY	BROMLEY COUNTY SCHOOL (BOYS) M.C.	H. Searle, 14, Broadway, Bromley, Kent.
BUCKFASTLEIGH	BUCKFASTLEIGH M.C.	H. I. Parsons, Bell House, Fore St.
CHARD	COMBE ST. NICHOLAS M.C.	Leonard Bailey, Combe St. Nicholas School, nr. Chard.
CHELTENHAM	CHELTENHAM GRAMMAR SCHOOL M.C.	E. W. Griffiths, Hadleigh, Naunton Park Rd.
CLAYGATE	CLAYGATE JUVENILE CLUB—MECCANO SECTION—BOYS AND GIRLS	(Leader) J. W. Haynes, " Fontmell," Covers Road.
EASTBOURNE	MEADS M.C.	F. Laycock, 10, Victoria Place.
EDINBURGH	BOROUGHMUIR SCHOOL M.C.	James D. Watson, 1, Alvanley Terrace.
"	LOANHEAD BOY SCOUTS M.C.	B. Warnock, R. P. Manse, Loanhead.
ELLESMERE PORT	ELLESMERE PORT M.C.	W. H. Hope, 41, Princes Road.
GLASGOW	VICTORIA M.C.	T. Calderwood, 63, George St., Whiteinch.
GLOUCESTER	GLEVUM M.C.	(Leader) Mr. L. C. Hobbs, 32, Vicarage Rd.
GRIMSBY	GRIMSBY CENTRAL M.C.	J. H. Boreham, 277, Cleethorpes Road.
HERNE BAY	1ST HERNE BAY MECCANO AND HOBBIES	C. W. Russell, 4, Clifton Villas, South Road.
ILFRACOMBE	ILFRACOMBE M.C.	W. Webber, 14, Springfield Road.
KNUTSFORD	KNUTSFORD LECTURE HALL M.C.	Charles Morris, 3, County Terrace.
LEAMINGTON SPA	LEAMINGTON M.C.	A. R. Mannall, 12, Lansdowne Circus.
LISCARD (CHESHIRE)	LISCARD HIGH SCHOOL	A. B. Warburton, 11, Brisbane Ave., New Brighton.
LUTON	LUTON M.C.	L. Goldsmith, 69, Tennyson Road.
MELTON MOWBRAY	UNITED SCHOOLS M.C.	H. White, 25, Bayswater Road.
NEW MALDEN	NEW MALDEN M.C.	E. Alcorn, 7, Poplar Grove.
NORWICH	NORWICH ENTERPRIZE M.C.	C. R. Agar, 73, Vincent Road.
NOTTINGHAM	WEST VIEW M.C.	(Leader) Mr. H. W. R. Cousens, 494, Mansfield Road, Sherwood, Nottingham.
PARKSTONE	PARKSTONE CONGREGATIONAL M.C.	T. W. Andrews, " Milton," Hillcrest Road.
PETERBOROUGH	PETERBOROUGH M.C.	A. Marsh, 88, Granville Street.
PORTHCAWL	2ND PORTHCAWL M.C.	G. S. Morgan, 20, Park Avenue.
REDRUTH	REDRUTH M.C.	L. Trenberth, Tunnel Stores.
ROLLESTON	ROLLESTON M.C.	Phin Toon, Sherbourne House, Tutbury Rd., Rolleston, Burton-on-Trent.
ROSYTH	ROSYTH M.C.	T. Hunter, 79, Admiralty Rd., Rosyth, N.B.
ROTHERHAM	GOLDTHORPE M.C.	E. Turner, 73, High St., Goldthorpe, Rotherham.
ST. ANNES-ON-SEA	ST. ANNES-ON-SEA M.C.	Master E. King, 109, Church Road.
STOCKPORT	DAVENPORT M.C.	A. D. Stoker, 124, Bramhall Lane.
WESTCLIFF-ON-SEA	WESTCLIFF & DISTRICT M.C.	D. S. Cecil, 22, Valkyrie Road.
WHITE NOTLEY	WHITE NOTLEY M.C.	F. W. Fox, 2, Station Rd., White Notley, Witham.

The Meccano Guild

A Great Fellowship of Boys

Objects of The Guild

1. To make every boy's life brighter and happier.
2. To foster clean-mindedness, truthfulness, ambition and initiative in boys.
3. To encourage boys in the pursuit of their studies and hobbies, and especially in the development of their knowledge of mechanical and engineering principles.

How It Commenced

More than a million boys in Great Britain derive their greatest indoor pleasure from Meccano. Before the Guild was formed, hundreds of these Meccano boys wrote to us every week. They told us how they wished they could be put into communication with other Meccano boys and how they longed to be able to meet them. They asked if arrangements could be made so that their wishes might become an accomplished fact. We responded to their repeated and increasingly numerous appeals, and as a result the Meccano Guild came into being.

What It Means

The Meccano Guild is an organisation for boys, started at the request of boys, and conducted as far as possible by boys. In joining the Guild a Meccano boy becomes a member of a great brotherhood of world-wide extent, every member of which has promised to observe its three great objects; wherever he happens to be—even in strange countries—he will know he has met a friend whenever he sees the little triangular badge. The Meccano Guild is bringing together Meccano boys all over the world, and is helping them to get the very best out of life.

Why You Should Join

Every Meccano boy should be a member of the Meccano Guild. All who have studied its objects must agree that the Guild cannot fail to have a profound effect for good on the lives of its members. It is ready to be of service to each individual member—to help or give advice whenever requested. At the head—guiding and controlling, and taking a personal interest in this great movement—is the President, Mr. Frank Hornby, Inventor of Meccano and Managing Director of Meccano Limited.

THE GUILD RECRUITING CAMPAIGN

Every Meccano boy should become a member of the Guild and do his utmost to help to make the objects of the Guild widely known. With this end in view, a special medallion (illustrated on this page) is presented to each member of the Guild who obtains three new recruits. As a mark of further merit the medallion is engraved with the name of the recipient and with the words "Special Award" when six more members are recruited. Full particulars of the Recruiting Campaign, together with a supply of application forms, will be sent on request.

THE MECCANO GUILD CERTIFICATE

MECCANO CLUBS

Meccano Clubs are founded and established by enthusiastic Meccano boys under the guidance of the Guild Secretary at Headquarters. At the present time there are over 100 active clubs in various towns and villages in this country, as well as many Clubs Overseas and in foreign countries. Each club has its Leader, Secretary, Treasurer and other Officials, all of whom, with the exception of the Leader, are boys. If the nearest club to you is too far away for you to join, or if you are unable to join for any other reason, consider the possibility of forming a new club in your own district. A special booklet explaining "How to run a Meccano Club" is now ready, and will be sent to any reader (post free) on receipt of 2d. in stamps.

HOW TO BECOME A MEMBER

Membership of the Guild is open to every boy possessing a Meccano Outfit, or Hornby Train Set, who satisfactorily fills in the prescribed application form. The only conditions are that members promise to observe the objects of the Guild and to wear their badges on all possible occasions.

The price of the Guild membership badge is 7d. (post free) and stamps for this amount should be sent along with the form of application. The Guild badge is beautifully enamelled in blue and white and is made for wearing in the lapel of the coat. Any boy wearing the Guild badge is at once recognised by other Meccano boys as being a member of the Guild and one who has undertaken to live a clean, truthful, and upright life.

SPECIAL MERIT MEDALLION
(About half actual size)

In addition to the badge, each member receives a membership certificate, measuring 7″ × 9½″. This certificate is printed in orange and sepia and is a smaller edition of the large club certificate.

Write to the Secretary of the Meccano Guild, Binns Road, Liverpool, asking for an application form and full particulars. Then fill in the form and return it to Headquarters, when you will be enrolled and your badge and certificate will be sent to you. Write to-day, and put M.J. after your name for reference.

BADGE OF MEMBERSHIP

AFFILIATION WITH THE GUILD

When a Meccano Club has been successfully launched and good progress is being made, affiliation with the Guild is granted. A beautiful club certificate, suitable for framing and hanging in the club-room, is presented, and the club becomes entitled to such privileges as the loan of interesting lectures and club membership cards. Members are also eligible for the Merit Medallion (illustrated on this page) which is awarded to members who display special ability in connection with club work.

THE CORRESPONDENCE CLUB

Members of the Guild are able to join the Correspondence Club, by which they are placed in communication with other Guild members in some other part of the country or abroad. To those boys who are interested in foreign languages the Correspondence Club presents a splendid opportunity of obtaining a correspondent in the particular country in the language of which they are interested. They are able to write to a Meccano boy in his native language, and as he would probably reply in English, the correspondence will be of mutual benefit. Stamp collectors also find the Club of value, as they are enabled to exchange stamps with their correspondents. Full particulars and enrolment form will be sent on application.

RECRUITING MEDALLION

CLUB NOTES

Ilfracombe M.C.—Commenced activities in October when an interesting syllabus was arranged, including Model-building, Lectures and Games. It was decided to hold an Exhibition and Social at the end of the session. Members are very keen to improve the club and have acquired a Chess set, a Microscope and a No. 3 Meccano Set, which it is hoped to enlarge in due course. Club roll: 13. *Secretary*: Master W. Webber, 14, Springfield Road, Ilfracombe.

Parkstone Congregational M.C.—Has celebrated its third birthday by a special re-union of all old members. The Secretary, Master S. Bridle, has resigned, and Master T. W. Andrews has been elected in his place. Wireless is in great demand and excellent results have been obtained from the club's two-valve and crystal sets made by members. Club roll: 25. *Secretary*: Master T. W. Andrews, "Milton," Hillcrest Road, Parkstone, Dorset.

Redruth M.C.—Is steadily increasing its membership and making good progress. The Fretwork Section is very popular, and a Savings Bank, Library and Museum have been introduced. The Football Team have played some good matches and done very well. Club roll: 36. *Secretary*: Master L. Trenberth, Tunnel Stores, Redruth.

Leamington M.C.—Many interesting and instructive meetings have been held. The Assistant Leader, Mr. G. Hare, gave a lecture on "*Taking and Showing Moving Pictures*," explaining to the members the principles of the cinematograph, which he illustrated with his own machine. Papers have been read on "*The Motor Car*," and "*Building the Canadian Pacific Railway*," by the Secretary. *Secretary*: A. R. Mannall, 12, Lansdowne Circus, Leamington.

Victoria (Glasgow) M.C.—Propose to hold an Exhibition at the end of January. Among the club's activities during the session have been Lectures, Model-building, Competitions and Games. Club roll: 37. *Secretary*: Master T. Calderwood, 63, George Street, Whiteinch, Glasgow.

Herne Bay M.C.—The session has proved the best yet experienced. Recruiting has been one of the club's marked features, and on one evening fourteen new members joined. Hobbies Nights and Fretwork figured in the programme, with Meccano Model-building predominating. A novel feature has been the introduction of a Rifle Range. A very interesting lecture was recently given by the Rev. E. E. Robinson on "*My Experiences in Canada*," and this was highly appreciated. Mr. Robinson promised to continue his experiences on the next lecture night. Club roll: 19. *Secretary*: Master C. W. Russell, 4, Clifton Villas, South Road, Herne Bay.

Melton Mowbray United Schools M.C.—About 50 persons were present at a recent Social Evening. The programme included recitations, instrumental solos and dialogues, and at the conclusion of this very enjoyable entertainment, presided over by Mr. C. Goldspink, refreshments were served. The club-room was beautifully decorated and illuminated by coloured electric lights. Meetings are held on Wednesdays at 7 p.m. Club roll: 24. *Secretary*: Master H. White, 25, Bayswater Road, Melton Mowbray.

Goldthorpe M.C.—Owing to being unable to secure a room members have held their meetings in the Leader's house, but now that a public hall is being built in Goldthorpe it is hoped to obtain a room there for weekly club nights, when the membership should be considerably increased. Club roll: 6. *Secretary*: Master E. Turner, 73, High Street, Goldthorpe, nr. Rotherham.

Holy Trinity (Barnsbury) M.C.—Members have held a very successful Concert and Exhibition, which helped considerably to pay the club's expenses. Other club events include Radio, Lectures, Fretwork and Model-building. A camera given by Meccano Ltd. for good work in model-building, etc., for the Exhibition was won by W. Kebell. "Esperanto" was introduced and its syntax explained by the Leader, Mr. Stuart H. Wilson. Club roll: 30. *Secretary*: Master Stanley A. G. Bone, The Rosary, Kents Hill Road, South Benfleet, Essex.

The St. Mary (Newington Butts) M.C.—Very interesting Building Competitions have taken place, in which all members were encouraged to invent new models. A Guild Rally was recently held at Holloway and several of the club officials and members were present. Club roll: 116. *Secretary*: Mr. C. A. E. Curle, 37, Pullen's Flats, Peacock St., London, S.E.

West View (Nottingham) M.C.—A recent Exhibition proved most successful, the exhibits including a Motor Chassis, Wire-Rope Maker, Locomotive, Band Saw, Hornby Trains and mats made on Meccano Frames. Bonfire night was celebrated "en masse" and was quite a gala night. Debates, Model-building, Competitions, Games, Lectures and Wireless figure in the session's programme. All members are very enthusiastic. Club roll: 28. *Leader*: Mr. H. W. R. Cousens, 494, Mansfield Road, Sherwood, Notts.

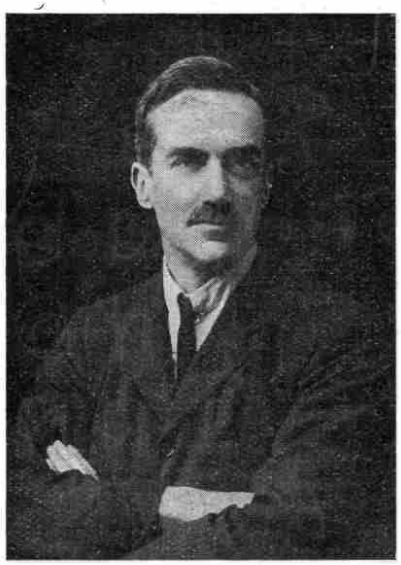
St. Barnabas (Barnetby) M.C.—Members have been busy preparing Meccano Models, Fretwork, Wireless, and a Hornby Train System for their Christmas Exhibition. An interesting lecture was given by Mr. Yarker, on "*The Making of Fireworks*," with some experiments. Another feature was a Painting Competition. The average attendance at meetings is 18. Club roll: 25. *Secretary*: Master R. H. Ward, Laurel Villas, Victoria Road, Barnetby, Lincs.

Accrington M.C.—The session's programme has included a musical evening to which parents and friends were invited. Another interesting item was a lecture on "*Engineering*," by Mr. Aivey. Two members of this club have recently won school scholarships. Club roll: 21. *Secretary*: Master V. Waterhouse, 45, Ramsbottom Street, Accrington.

Blackpool M.C.—Has made excellent progress and since our last report has increased its membership by eleven. The members' many activities have included papers on "*Iron and Steel*" and "*Ships*," and a practical demonstration of the Steam Engine and its different types. In the Model-building competition a Mill won the first prize, an Electric Locomotive second and a Crane third. Club roll: 35, average attendance 24. *Secretary*: Master J. Fraser, 10, Clifton Grove, South Shore, Blackpool.

Meccano Club Presidents

No. 3. Col. The Hon. Sidney Peel, D.S.O.



Col. The Hon. Sidney Peel, D.S.O., was educated at Eton and Oxford. He served in the South African War, and in 1900 was awarded the Queen's Medal with three clasps. From 1914 to 1918 he was on active service, and during this time he won the D.S.O. In 1918 he was elected M.P. for Uxbridge and he held the seat until 1922.

Col. Peel has always been keenly interested in young people and their various activities, and when the Southall Meccano Club became affiliated with the Meccano Guild in January 1923 he readily agreed to become its President. Since that time Col. Peel has never failed to show the greatest interest in the progress of the club, and his generosity and kindness are greatly appreciated by both Leader and members.

Davenport M.C.—A Bazaar held in October and lasting four days proved a great success, and visitors expressed their high appreciation of the splendid display. All members worked very hard to secure this good result. Further club activities during the session have included Lectures, Model-building and Games. Club roll: 36. *Secretary*: Master A. D. Stoker, 124, Branhall Lane, Stockport.

Southall M.C.—Has been unfortunate in having to vacate its club-room owing to this being required for another purpose. Strenuous efforts have been made to procure another room, but up to the present without success. The members are not downhearted, however, and they intend to keep on trying until they succeed. In the meantime the Leader is keeping the boys together by organising a Cycling Club, and by visiting their homes. Should any reader know of a suitable club-room will he please get into communication with Mr. E. C. Carpenter, Club Leader, 56, Hammond Road East, Southall, Middlesex.

Bromley Country School M.C.—Members have been very busy constructing models for a bazaar. The principal model is that of the Eiffel Tower, on which most of the members are concentrating, while others are building a Crane and an Aeroplane. It is intended to hold more frequent meetings as it is found that the time available on club nights is not enough for the bazaar preparations. Club roll: 8. *Secretary*: Master H. Searle, 14, Broadway, Bromley, Kent.

Claygate Juvenile Club, Meccano Section.—Members have spent enjoyable and instructive meetings, devoted largely to Model Engineering, Carpentry and Indian Club exercise. The club is in a very sound financial position and arrangements are already being made for the next series of Sports and Outings. Club roll: 86. *Leader:* Mr. J. W. Haynes, Fontmell, Covers Road, Claygate, Surrey.

Boston (Lincs.) M.C.—Have recruited new members by exhibiting Fretwork and Copperwork models in St. James' Debate Society's Exhibition. A Lantern Lecture was held on "*The Secrets of Fleet Street*," the slides being lent by the "*Daily Mail*." Club roll: 30, average attendance 25. *Secretary*: Master R. Robinson, 30, Woodville Road, Boston, Lincs.

Grimsby Central M.C.—Owing to the resignation of Mr. Haw through business reasons, Mr. Gebler has kindly consented to become the Leader. Members are busy building a model for a local Church Bazaar, and it is hoped to help to raise funds for the Church by charging visitors a small amount to guess the number of separate parts in the model, the winner gaining a prize. The new Leader has promised a prize for the best model built during the Winter Session. It is proposed soon to visit Immingham Docks and also the local Flour Mills. Club roll: 16. *Secretary*: Master J. H. Boreham, 277, Cleethorpe Road, Grimsby.

St. Annes-on-Sea M.C.—Has now become affiliated with the Guild and has excellent prospects. Since the commencement of the session marked progress has been made and many new members have joined. Good results are anticipated from a proposed Social Evening. *Secretary*: Master E. King, 109, Church Road, St. Annes-on-Sea.

South Africa

Observatory M.C.—Has held interesting and instructive meetings. A special evening was set apart for a lantern lecture given by Mr. Cartwright on "*Glass Manufacture*," when the history of glass was traced back to a very early age. Slides of some beautiful glass specimens were shown on the screen and fully explained to a large attendance of members and parents. Another item of interest was a lecture by Mr. J. Piek on "*Stamp Collecting*," at the close of which the President, Mr. Geo. Barrett, gave over 400 stamps to members interested in collecting. Club roll: 73. *Secretary*: Mr. Joe Wilson, Observatory Meccano Club, P.O. Box 1247, Cape Town, S.A.

Wynberg M.C.—The annual meeting was held in September and there was a large attendance. A prize was offered by the Chairman, Mr. Barrett, to the boy who during the year comes nearest to the high ideals of life. Arrangements have now been made for the club meeting to be held in the Town Hall. *Secretary*: Mr. E. H. Hall, Boundary Road, Rondebosch, Cape Province, South Africa.

India

Calcutta M.C.—The club is making good progress and it is hoped to get more members this session. An Exhibition was held in October in which the public took keen interest. Some excellent electrical and mechanical models were exhibited, including Electric Lifts, Telegraph, the Dragline model, etc. Successful Radio Evenings have been held and members have listened-in to the concerts broadcast from the Radio Club of Bengal. Other items in the programme have included Musical Evenings, Model-building and Lectures. Club roll: 32. *Secretary*: Mr. A. N. Roychowdhury, 35/2, Beadon Street, Calcutta, India.

Clubs not yet Affiliated

Birkenhead M.C.—Has succeeded in obtaining a suitable club-room and application for affiliation will be made shortly. The Chairman of the Ellesmere Port Meccano Club recently visited this club and gave an illustrated lecture on the usefulness of various Meccano models. Club roll: 15. *Secretary*: Master A. Kerr, 27, Plumer Street, Birkenhead.

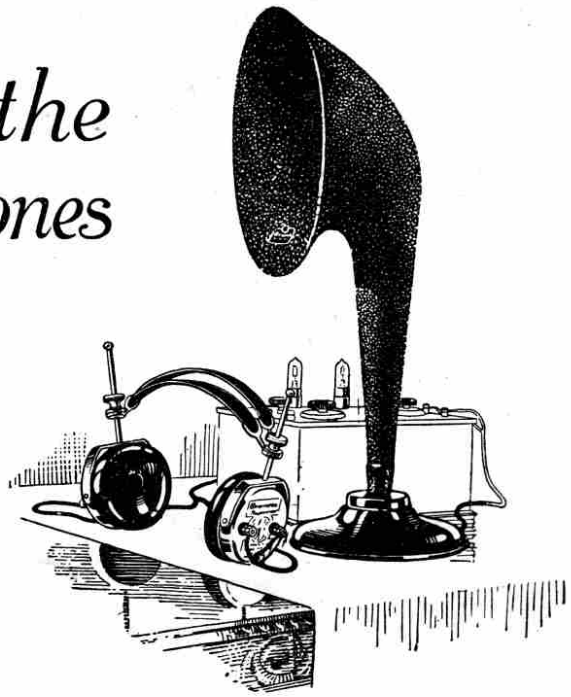
Wellesley School (Croydon) M.C.—A club has been formed in the school and the necessary officers have been elected, one of the Principals acting as Leader. The club is proving popular with the boys. *Secretary*: Master W. Tompkins, Wellesley School, 20, Addiscombe Road, Croydon.

Victoria (Salop) M.C.—Has adopted a novel and excellent idea for recruiting, each member promising to bring at least one new member during the session. It is hoped soon to double the present club roll of 12. *Secretary*: Master L. Saxton, 46, Haygate Road, Wellington, Salop.

Delhi Children's M.C.—Very successful meetings have been held under the Presidency of Mr. Girdharilal Puri, B.Sc., and good attendances have been recorded. During the session an interesting lecture was given by Dr. Nabhi Ram Joshi who explained how he made his recent discovery of an oil having medicinal qualities, and also the value attached to it. *Secretary*: Mr. R. Raman, Children's M.C., Charkhe Walan, Delhi, India.

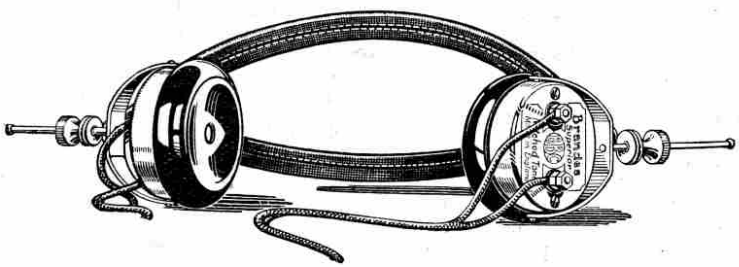
Tune the Table-Talker with the "Matched Tone" Headphones

I'LL TELL THE WORLD! The fever of the Experimenter has fired young Bill's ambition. In the picturesque vernacular of our American friends he's "cottoned on to the hull bunch"—vacuum tubes, hook-ups, new wave bands, right down to the last binding post. He tunes in the distant stations now with his "*Matched Tone*" Headphones, and is content. They bring in the faintest signals, their delicate supersensitivity making them unexcelled for long range telephony. And the *Table-Talker* is just fine. To his credit, Bill refuses to acknowledge the family's praise. "It's not me tinkering about," he says, "the *Table-Talker* always came through as if you were actually in the studio, and with no scratchy notes." *Ask your Dealer for Brandes.*



All Brandes products carry our official money-back guarantee, enabling you to return them within 10 days if dissatisfied. This practically constitutes a free trial.

The "*Matched Tone*" feature was embodied as the distinctive characteristic of Brandes' Headphones in 1908, and means that both your ears hear exactly the same sound at the same instant—and you learn a new beauty of tone. They are tested and re-tested for just this one vital point, and in addition their strength, long-wearing comfort and reliable efficiency make them undoubtedly superior. **25/-**



The *Table-Talker* is a Brandes quality product at a moderate price. The non-resonant, specially constructed horn is matched to the unit so that the air resistance produced will exactly balance the mechanical power of the diaphragm. This means beautiful sound-balance and remarkable tone qualities. It is twenty-one inches high and is finished a shade of neutral brown. **42/-**

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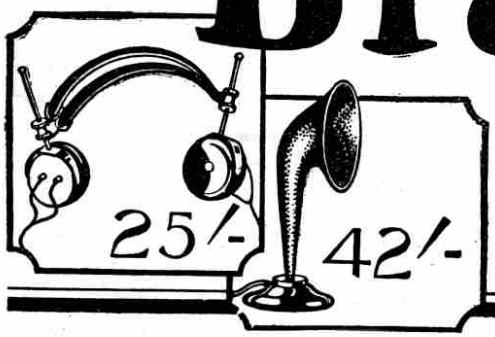

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FITTED TO YOUR BICYCLE TELLS YOU :—

How far you have been ;
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Service your Tyres give you ;
Number of Miles to Destination ;
Distance Travelled, etc.

Makes your Riding doubly interesting. Its accuracy has been endorsed by all the best authorities, and the experience of your fathers for 26 years.

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Made in Two Models :
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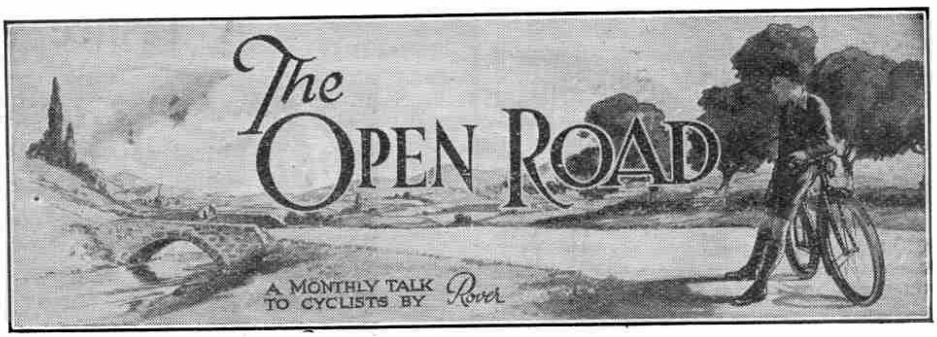
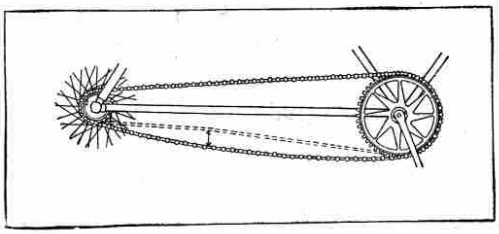


XI. THE CARE OF A BICYCLE

TO a great many cycle owners the fact that "the wheels go round" is sufficient proof that their machine is in good order, and consequently they do not give it any attention. A bicycle is a very long-suffering piece of mechanism, and it will run for a considerable period without any attention. To neglect a bicycle, however, is a very short-sighted policy, for a little time spent in cleaning and oiling results in an increased life for the machine, and makes a great improvement in the easiness of its running.

CHAIN ADJUSTMENT



When a cycle chain is correctly adjusted there should be a play of ⅜ in. to 1 in. halfway between the two chain wheels.

Removing Mud and Rust

In bad weather a bicycle inevitably collects a considerable amount of mud. This should not be allowed to remain on the machine, but if possible should be washed off at the end of the journey while it is still wet. If cleaning operations cannot be carried out until the mud has become dry, considerable care is required in its removal in order to avoid scratching the enamel. The best method is to use a wet cloth, which quickly softens and removes the dirt without injury to the polished surface. After riding in the wet or on a muddy road, wheel rims—wooden ones in particular—should always be wiped dry.

The chain, one of the most important parts of the machine, needs attention, and if by any chance it has been allowed to get into a bad condition and become rusty it should be cleaned up with a stiff brush. If the chain is in a very bad state, however, the best plan is to give it a prolonged soaking in paraffin oil, and this will usually restore it to good condition and prepare it for a coating of oil.

How, When and Where to Oil

A bicycle can give its best service only when all its bearings are working smoothly, and in order to ensure this, correct and sufficient lubrication is absolutely necessary. A diagram published in the July "*M.M.*" showed the six parts of a bicycle that are most in need of lubrication, and of these six the wheel-hubs are the most important as they have the most work to do. Special oil holes fitted with dust-proof caps are provided, and oil should be injected into these about every 150 miles. The oil used for this purpose should be a thin oil of the best quality. It is wise to use a standard make of oil, for cheap oils of inferior quality are the dearest in the long run. Variable-gear hubs require similar lubrication.

In oiling the hubs or indeed any part of a machine it is important to prevent any oil coming in contact with the tyres, for oil causes the rubber to perish very quickly.

Care of the Chain

Two different kinds of oil are required for the driving chain, a thin oil for inside the rollers and a thicker grease for the outside to protect it from the wet and to reduce friction. Various brands of chain-grease are obtainable, but tallow, petroleum jelly or a mixture of thin oil and blacklead will do equally well and are considerably cheaper.

Other parts of the machine which, though not so important as the hubs and the chain, must nevertheless be regularly oiled to ensure silent and efficient working, are the head bearings, the pedals and the joints of the brake rods. A few drops of oil are also to be recommended as a cure for creaking saddle springs, which otherwise should not be lubricated.

Making Adjustments

The chain, bearings, etc., require adjustment at intervals, but they should not be interfered with more than is necessary, as continual tinkering is harmful. Once an adjustment has been properly made, that particular part should need no further attention for a considerable time. The driving chain is an exception to this, however, for after exposure to wet it often becomes tight, and it is subject to more or less regular periods of slackening and stretching when in use. This tightening of the chain is often accompanied by harsh cracking sounds during pedalling, showing that the links have a tendency to mount the cogs of the chain wheel. This noise will usually disappear after the chain has been adjusted and well lubricated, but if it does not the trouble is due to worn links, and these should be renewed as soon as possible. The diagram on this page shows the chain adjustment that experience has shown to be the best. It will be seen that there should be ¾ in. to 1 in. play about half way between the two chain wheels.

The hubs, bracket, head and pedals all

(*Continued on page* 38)

Readers frequently write to me asking if I can recommend books that are both of interest and of use. In this column I review books that I consider specially appeal to Meccano boys. I do not actually supply these books, which may be obtained either through any bookseller or direct from the publishers.—EDITOR.

"Stamps of the British Empire."
(Stanley Gibbons. Price 6/6).

The 1925 Catalogue (Part 1) "Stamps of the British Empire," issued by Messrs. Stanley Gibbons, is a necessity to the serious collector, for Gibbons' catalogues are recognised as being standard catalogues at any rate in this country if not further afield. The 1925 edition has been very thoroughly revised and contains illustrations of all types of Colonial stamps and their watermarks, and prices for both used and unused copies.

The catalogue represents, as far as possible, the most up-to-date knowledge available of the postal issues of the British Empire, and in its compilation the publishers have been assisted by collectors all over the world, who have kept them informed of new issues and discoveries made as a result of their own studies. In the present edition there are many revisions and it has been found necessary to re-number the catalogue lists. Such a step is certainly very inconvenient to collectors who have arranged their stamps on the basis of earlier catalogues, for it means that a complete revision in the cataloguing of the stamps in their collections is rendered necessary. The publishers point out, however, that it is impossible to keep their catalogue abreast of modern research if it is to be tied down to fixed numbering, and as all collectors will agree as to the necessity of keeping up-to-date, the inconveniences caused by doing so must be overcome.

"Wonder Book of the Wild."
(Ward, Lock & Co. Price 6/–).

This book will appeal to all boys interested in adventure and discovery. It contains 256 pages and is full of interesting reading matter compiled by famous living explorers and big game stalkers, who themselves tell the story of their adventures and discoveries in the great waste places of the earth.

The book has a particular interest of its own and is beautifully illustrated with photographs of strange places and of wild animal life in a multitude of forms, of which stay-at-home folk have scarcely any conception. The illustrations include various explorers' photographs of their own remarkable subjects, and many photographs of wild beasts, birds, and other creatures at close quarters, by photographers who have made a name for themselves in this most difficult branch of their art. In addition there are twelve coloured plates of wild animal life. Altogether we feel sure that this book will appeal to the majority of our readers.

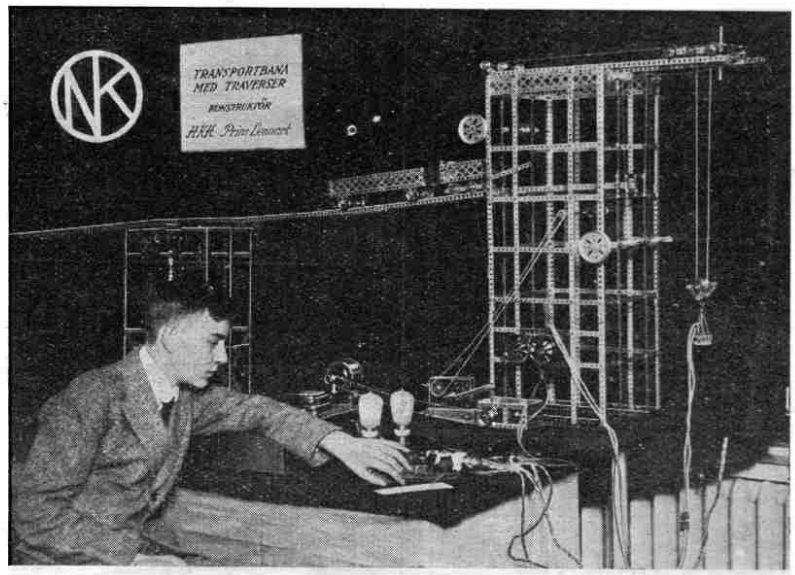
"Where to Seek for Scientific Facts."
By Alec. B. Eason, M.A., A.M.I.C.E., etc.
(S. Rentell & Co. Ltd., 36, Maiden Lane, W.C.2. Price 1/– net).

This little book will prove of considerable value to those in search of up-to-date information on scientific and technical subjects. The author states that the object of this book is to save people time in searching for information. It shows where to find lists of books on various science subjects, indexes of literature and papers on technical and scientific subjects, etc. A good index adds greatly to the value of the book.

"The Book of the Locomotive."
By G. Gibbard Jackson.
(Longmans, Green & Co. 6/– net).

Many books on railways have been written during the past few years, but these have dealt with the subject from a general point of view. In "The Book of the Locomotive," Mr. Gibbard Jackson, who is already well known as a writer on railways, breaks new ground by devoting himself entirely to the history of the British locomotive. He traces in a most interesting manner the growth of the locomotive from the first crude experiments up to the magnificent designs of the present year and winds up with an interesting chapter on the future of the steam locomotive. The book is exceptionally well illustrated by photographs and eight coloured plates, and it can be thoroughly recommended to all our readers interested in railways.

A Prince and Meccano



H.R.H. Prince Lennart of Sweden and his Electric Transporter

Readers of the "*M.M.*" will be interested to learn that the grandson of His Majesty the King of Sweden is an enthusiastic Meccano boy. Our illustration shows Prince Lennart with a fine model that is a sure proof of his ability as a model-builder. The Prince is 15 years of age and told our representative that he had been working on this model for over three years.

Prince Lennart's model represents a form of combined elevator-loader and transporter and eminent engineers who have viewed the structure say that it is correct in every detail. The model is driven by electricity and an electro-magnet serves as a hoist. This is seen on the right of the photograph, connected by wires to the electric supply.

"Wireless World and Radio Review."
(Wireless Press, London. Price 4d. weekly).

The most interesting feature of the latest issue of "The Wireless World" to hand (No. 278) is an article describing the experiments in wireless transmission of photographs carried out on 30th November between London and New York. A picture of President Coolidge transmitted by the system described shows the possibilities of this kind of transmission. In another article the employment of wireless beacon stations round our coast as an aid to navigation is discussed, and the regular features of the paper, notably "Readers' Practical Ideas," appear to be even more interesting than usual. Among the many photographs is one of Mr. J. H. Ridley (5NN), the South Norwood amateur who has recently worked with great success with three New Zealand amateurs, in addition to a number of United States and Canadian stations.

"The Children's Companion Annual."
(B.O.P. Office. Price 5/– net).

Among the many Christmas books for the younger boys, the "Children's Companion Annual" takes a prominent place. It contains a collection of remarkably good stories, many of them really exciting, together with practical articles on a variety of interesting topics. The illustrations are numerous and of excellent quality, a feature of the book being the large number of full-page coloured plates.

A New Grid Leak

The celebrated honeycomb coils made by the Igranic Electric Co. Ltd. (149, Queen Victoria St., London) may be obtained in twenty sizes, covering wave-lengths of from 100 to 25,000 metres. The winding of these coils in full view of the public attracted considerable attention to the firm's stand at the Wireless Exhibition recently closed at the White City, London. Among new items of interest shown by the firm were some attractive types of variometers, designed to give increased efficiency and signal-strength, and a greater selectivity of tuning with reduction in self-capacity. There was also shown a new type of variable grid leak constructed upon an entirely new principle which goes a long way to solving the problem of this somewhat unstable component. The efficiency of any radio set depends almost entirely upon the quality of its components and as those made by the Igranic Co. carry a six months' guarantee, they may be employed with confidence.

For Modellers

Plasticine is too well known to need any detailed description. The latest outfits are greatly improved in quality and the quantity of material they contain is increased. The possibilities of Plasticine are endless and range from the simplest figures to the most elaborate models. The firm also make "Play-Wax," an ideal medium for less serious modelling. It provides endless amusement, is easy to work and is made in twenty-eight colours. Those who are artistically inclined will find in "Novlart" picture-making a pleasant and profitable entertainment for winter evenings.

No More Punctures

A few years ago the prospect of obtaining a really satisfactory puncture s[illegible] for cycle or car tyres seemed remote, but to-day the [illegible]oblem appears to have been solved successfully. [illegible] "Fibermetic" Puncture Seal (made by the Fibrin Sales Co., 19, Villiers Street, Strand, London, W.C.2.) can be recommended as a practical means of preve[illegible]ng the annoyance of being let down on the road by p[illegible]ctures. This seal has been thoroughly tested, and t[illegible] makers are so confident in its efficiency that they offer to return purchasers' money if full satisfaction is not obtained. The seal is easy to apply and it does not injure the tyres in any way or choke up the valves. If a tyre treated with "Fibermetic" is punctured, the puncture is immediately and permanently sealed up. This firm also manufactures "Pholene," a useful preparation for maintaining the original polish of boots or any articles in black leather, and "Fibrine" for treating the soles of boots to render them waterproof and more durable.

The Open Road—(*continued from p.* 37)

need occasional adjustment and last but by no means least, the brakes should always be kept in a state of perfect efficiency. Brake rods and levers are easy to adjust, and the purchase of new brake-blocks, when necessary, is not an expensive undertaking, so that there is no excuse for inefficiency in this vital mechanism, which in an emergency may make all the difference between safety and a serious smash.

NEXT MONTH:—

USEFUL ACCESSORIES