

THE NEXT NUMBER OF THE "M.M." WILL BE PUBLISHED ON 15th MARCH

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MECCANO MAGAZINE

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OF BOYS



EDITORIAL

OF all the bad habits that human beings acquire, I think the one of indulging in gloomy and depressed thoughts is the worst and the easiest to fall into. We all know those people who habitually look on the black side of everything. To such, a cut finger calls up visions of certain blood poisoning! A bad cold means nothing less than premature death from pneumonia!

The same boys will say harsh ungenerous things of their Headmaster, and will speak with contempt and scorn of the accomplishments and character of their form-masters or teachers. These boys, with habitually pessimistic, grumbling and complaining minds, are to be pitied. Not only does their state of mind give rise to miserable thoughts in others, but they are unhappy themselves, because they have fallen into bad habits of thought, which are souring their lives.

It is just as easy to acquire good, healthy, happy thoughts if you really wish. To "look on the bright side of things" is a phrase that we often hear, but one to which we too seldom pay serious attention. Yet happiness is largely dependent upon our being able to see the silver lining and to ignore the dark clouds.

Do you enjoy grapes because of their fine flavour, or do you detest them because they contain so many seeds? Do you think rain is a blessing because it makes things grow and lays the dust, or a nuisance because it makes mud? Is a bee a creature producing gloriously flavoured honey, or is it a horrible buzzing insect with "a sting in its tail"? Everything

that happens in life can be looked at from two points of view—the bright and the gloomy. It is up to ourselves to take our choice and to be happy or miserable, as we elect.

One of the finest qualities in a boy is the quality of seeing what requires to be done, and doing it without being told.

The Boy in Demand. A gardening tool is left out on the lawn, there is a nail off the fence, a lock has come away from the door or a window-frame has "gone" somewhere. The boy who attends to these things, without specific instructions, is the boy who—other things being equal—will be in demand when he gets out into the great world. It is the attention to the little things, and the habit of observing that which needs to be done and then doing it, that enables boys and girls to become exceedingly useful men and women. There is always a position open for such persons and there will always be a call to "come up higher."

Good Things Coming

There are many interesting articles, with splendid illustrations, in store for future numbers of the "M.M." In an early issue we shall publish an article describing the world's greatest liner, the "Majestic." Articles dealing with giant cranes, turbines, and other remarkable machinery are only waiting an opportunity to be published.

In the Radio Section several articles of great interest to Radio enthusiasts are in hand, including illustrated articles dealing with the world's largest Radio stations.

We have also arranged for a special series of articles—extending over several issues—describing the work of the early pioneers of wireless telegraphy and giving a short account of their inventions. The articles will show how Marconi formed the first practical system of wireless, and the history of the subject will be traced up to the time of the first trans-Atlantic message transmitted from Cornwall to St. John's, Newfoundland, in 1901.

Whoop! Whoop!! Whoop!!! Red Indians!

RED HAWK, THE IROQUOIS INDIAN, IS COMING



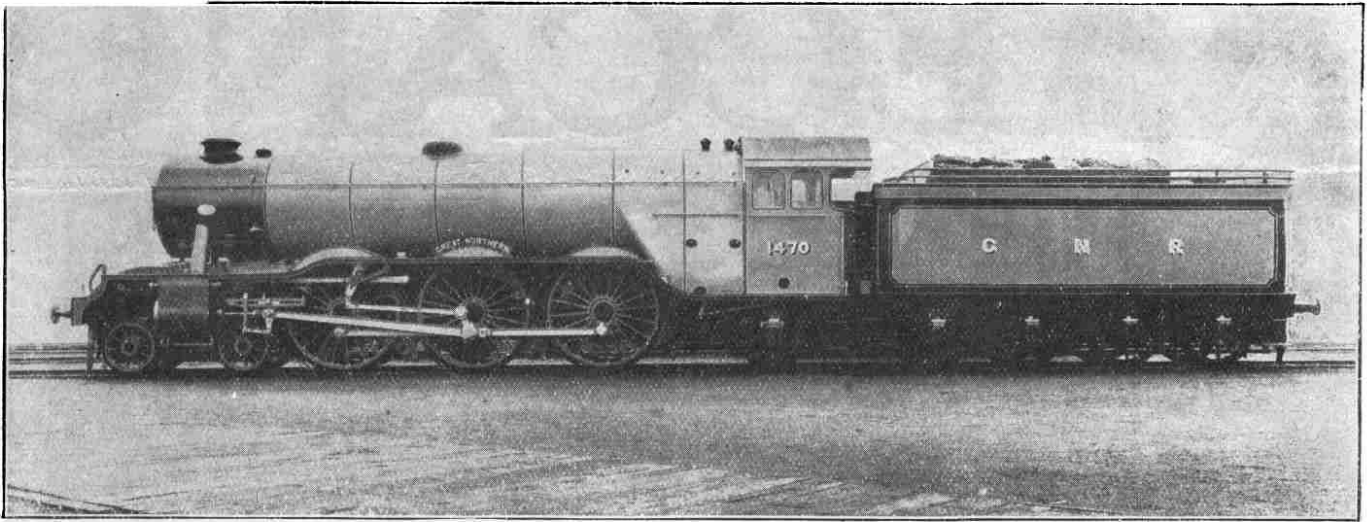
He will arrive on the 15th March in a splendid serial story "A Night at the Pool." This story, which will run over three issues of the "M.M.," has been described as being one of the best Red Indian stories ever written.

"A Night at the Pool," the first serial to appear in our pages, is printed in response to hundreds of requests for a serial story. Whether further serials appear in future numbers depends on the views of our readers, and we invite them to express their opinions.

There will be a big demand for the Meccano Magazine and you should ensure your copy by placing your order NOW, either through your dealer or direct with this office. Sixpence will cover six issues or one shilling twelve issues, sent post free.

Super Locomotives and Their History

WHAT THE FUTURE HOLDS FOR US



Photograph by permission of the

[Great Northern Railway Co.]

The 'Pacific' Type: "The Great Northern."

Interesting Details.

Although using shorter tubes, its designer added 5 inches to the diameter of the boiler, and yet retained the same general character of the exceptionally large and long boiler of the "Great Bear." A Robinson superheater is fitted and Wakefield mechanical lubricators are employed for the steam-chests and cylinders.

The tender, which is mounted on eight wheels without bogies, has a water capacity of 5,000 gallons as compared with the 3,500 gallons of the "Great Bear," and is also fitted with a water pick-up apparatus.

The "Great Northern" has three cylinders, two of which are outside the frame and placed horizontally above the bogie to drive the middle pair of coupled wheels. The third cylinder is inside the frame, placed at an inclination of 1 in 8 and located over the rear axle of the bogie.

Novel Valve-Gearing.

A difficulty with a three cylinder locomotive, as compared with one of two or four cylinders, is that of arranging for an efficient distribution of steam without the necessity for separate valve gearing for each cylinder. Mr. Gresley had previously devised and patented a form of gearing in which the system of steam distribution for the inside cylinder is on similar lines to that of the outside cylinders, and this form of gearing was adopted in the "Great Northern."

All three cylinders drive on one axle, the three crank pins being set at relative angles of 120 degrees to each other. There is thus always a piston in position ready to take steam. This is a decided advantage, for when an engine comes to a standstill with its pistons on "dead centre," it cannot "get going" again until it has backed a foot or two, to enable the pistons to be moved into position to take steam for forward progression.

THE END.

Details of the "Great Bear."

Cylinders	Four
" diam.	15 in.
Piston Stroke	26 in.
Working pressure, per sq. in.	225 lbs.

Wheels—

Coupled, diam.	6 ft. 8½ in.
Bogie "	3 ft. 2 in.
Trailing "	3 ft. 8 in.

Heating Surfaces—

Fire Box	158 sq. ft.
Tubes	2596 "
Superheater, heating surface	505 "

Total .. 3259

Grate area .. 41.79

(Conclusion.)

The "Great Northern" includes almost every known improvement and its footplate has been stated to be the most comfortable and convenient to be found on any British locomotive. This wonderful locomotive was built at Doncaster to the design of the Great Northern Company's Chief Engineer, Mr. H. N. Gresley, by whose courtesy we are able to reproduce the accompanying photograph.

Prior to the introduction of this new locomotive, there was considerable speculation among the railway engineers as to the form that any new locomotive would take. At one time it was rumoured that an engine of the 2-6-2 type was being built at Doncaster, this wheel arrangement being favoured because of the very high speeds (of 70 miles and over) that have been reached and maintained by engines of this type. The new locomotive proved to be a 'Pacific,' however, and it has naturally been the object of a great deal of interest.

Details of the "Great Northern."

Cylinders	Three
" diameter	20 in.
Piston Stroke	26 in.
Working pressure, per sq. in.	180 lb.

Wheels—

Coupled, diameter	6 ft. 8 in.
Bogie "	3 ft. 2 in.
Trailing "	3 ft. 8 in.

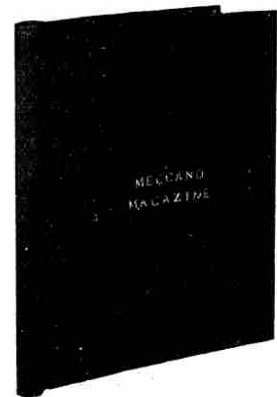
Heating Surfaces—

Fire Box	215 sq. ft.
Tubes	2715 "
Superheater, heating surface	525 "

Total .. 3455

Grate area .. 41.25

Magazine Binder.



In response to numerous requests we have introduced a spring-back binder for *Meccano Magazines*. The binder has a strong stiff back, covered with imitation leather, tastefully tooled. It takes a large number of copies and keeps them neat and clean. In black, lettered gold. Price 3/- each, post free.

GIVING AWAY £250

Not so Easy as it Looks



AS readers of the "M.M." know, the closing date for the 1923 Meccano Model-building Competition is now drawing near. We hope that every Meccano boy will enter this Competition, and that he will send in his entry well before the 15th April next.

Already entries have been received in large numbers, but the judges will not set to work until after the 15th April.

The task of adjudicating is always difficult. Imagine the thousands upon thousands of entries with their accompanying photographs or drawings, each one of which has to be carefully scrutinised and the model's original points examined. Meccano boys are found in nearly every land, and so entries come from all parts of the world. Those in foreign languages have first to go to our translation department, so that they may be translated into English. French, Dutch, Spanish, Italian, Norwegian and Swedish, are the languages generally used, although occasionally entry forms are received in the weird characters of Chinese, Russian or Bulgarian. Of course by far the greater number of entries are in English, from the United Kingdom, our Colonies and Dominions overseas, as well as from the U.S.A.



I am sure all Meccano boys wish they could be here to help Mr. Hornby and his assistants in their great task of making the awards. Well, although you boys cannot be here, you can help the judges a great deal by carefully and correctly filling up your entry forms, and more particularly by writing legibly. If the judges cannot read what you have written there is not such a good chance of their being able to understand the important points of your model. A brief description of your model, what it is, what it will do, and what are its original features—helps considerably and claims the attention of the judges. Do not make your description too long. One Meccano boy in a former competition used up twenty sheets of foolscap, and then wrote us that he could not finish all he had to say about his model because he was short of paper!



That was in war-time, of course, when paper was controlled, but now that paper is not rationed, I hope neither he, nor any one else, will inflict twenty sheets of descriptive matter upon the overworked judges!

Some boys have the happy knack of attracting the judges' attention. One entry was a model of a hay wagon—just an ordinary little wagon such as hundreds of boys enter in every competition. But before photographing his wagon this boy loaded it with hay, making it look so attractive that its original points were at once apparent.

Send all the particulars about your model at one time. The competitor who



wrote: "If you think I shall win a prize tell me, and I will send another and better photograph of my model" could scarcely expect to have much chance! When you enter the Competition try hard to win a prize on merit. Do not feel like the boy who wrote: "I don't want a prize and I am

only sending in my model for the good of the other fellows."

If possible the illustration of your model should be a photograph. If you cannot obtain a photograph, however, a good clear sketch will serve the purpose, with a short description. We receive hundreds of photographs that can only be understood by the boys who have sent them. Some appear to have been taken by the light of a candle. The prints of others are not even "fixed," and they very quickly turn black and the once beautiful model exists no longer!

When describing or photographing a model remember that the judges have never seen your model and know nothing at all about it. You have probably thought about it and worked on it for weeks, or even months, so that every little detail is clearly impressed upon your mind. You should describe or illustrate your model so that these details may be fully understood by the judges. There is no necessity to go to any expense over the illustrations, for it is not the merit of the photograph but of the model depicted, on which a decision is made. Whether photographs or drawings they must be clear so that the judges may at once see the model's best points.

Write on one side of clean paper only. One entry that we received looked like an announcement of a sale. It advertised farming machinery, etc., by auction and a free lunch at noon to those who attended the sale. The judges were just putting on their hats and coats to attend the sale when they accidentally saw from the other side of the announcement that it had a model sketched on it and was an entry for the Competition! You may imagine their disappointment!



Don't forget to write your address on the entry form. If you win a prize the postman won't be able to deliver it, if he only has your name to go by!

The choice of names for competing models is not always happy.

One model was called "My Journey Over the Mountains," but it was not at all clear what connection this title had with the model, which appeared to be a combination of a dentist's chair and an electric tram-car! Then again a title such as "The Old Oaken Bucket" cannot truthfully be applied to a model made of "shining steel and brass." The name given to a model is not everything, however, for the boy who called his model "Hope" did not win a prize, nor did another, who chose for his model the extraordinary name of "Buldozer."

All the models submitted are not attractive—a remark that applies to a model of a new type of gallows: scarcely a suitable subject for inventive Meccano boys! Sometimes the competitors are not lacking in a sense of humour. One competitor pointed out that although it was a condition of the competition that the models should be made of Meccano, he had made his "out of his head!" Another



gave a description of the underneath part of a motor-car and entitled it "worm's-eye view"—the opposite, we suppose, to a "bird's-eye view."

Some competitors embellish their drawings with humorous touches. A hay-stacker was decorated with comic men and horses, and part of a model "A New Idea in Swings" was shown supporting a sketch of a parrot.



Models that actually work and models that do what they are intended to do, are naturally more appreciated by the judges than those models that fail in both respects. A crane that refuses to hoist, and a Meccano glass-cutter that won't cut glass, are robbed of much of their interest.

In every Competition there are numbers of old friends. By this I do not mean boys who have won in previous years, but models that we have seen many times. Aeroplanes by the hundred, motor-cars and cranes, many of them taken direct from the Manuals. Sometimes an entry form bears the legend "here is a new device I have invented for the Competition." Often it is such an old friend that we recognise it at once, although it may be a new invention to the boy who sent it in.



We realise it must often happen that when building, say, a model motor-wagon a boy may think of a new tipping device. Although already known to motor-wagon builders, the fact that the boy thought out the device himself causes him to describe it as being new.

From the letters we receive there is no doubt that Meccano boys obtain a vast amount of pleasure from our annual Model-building Competition, and they do not hesitate to tell us so. The building of the models is itself a pleasure, and the prospect of a prize adds zest to their endeavours. The overcoming of difficulties and the inventing of new movements encourages boys to persevere and to think intelligently. There is pleasure and there is profit in this great Meccano Competition, so send in your entry now. **If your dealer cannot supply you with an entry form, send us a postcard, and we will mail one to you by return. Closing date 15th April next for the United Kingdom, and 30th May for Overseas and foreign countries.**

Photographic and Photo-Essay Competitions.

Results—Overseas Sections.

The overseas section of the Photographic Competition has been a great success, the entries being very numerous and the standard of work high. There is no doubt that Meccano boys overseas are keen competitors with the boys in this country in photography as well as in Meccano model building.



First Prize: by Master Billimoria.

Many excellent photographs were submitted, the subjects generally being of a very interesting nature and including elephants, Zulu warriors, Indian temples, etc. After careful consideration I have pleasure in announcing the result as follows:—

- (1) Master B. K. Billimoria, Kandy, Ceylon.
- (2) " E. H. Whitney, East London, S.A.
- (3) " R. Bandiera, Florence, Italy.
- (4) " G. Adamson, Eshowe, Zululand, S.A.

The Prizes have been despatched to the winners, and I congratulate them on their well-earned successes.

PHOTO-ESSAY COMPETITION

I have much pleasure in announcing the winner of the Overseas Photo-Essay Competition

Master J. F. Parker,
Salisbury,
Rhodesia, S. Africa.

I congratulate Master Parker on his well-written and well-illustrated essay, and would say that this competition brought some very interesting essays from overseas. I sincerely hope that I shall see more of the work of the entrants in future Competitions of a similar nature.



Second Prize: by Master Whitney.

In the Canary Islands

BY MASTER M. WHITCOMBE

An apprentice on a tramp steamer, I found myself convalescing last October in the Island of Tenerife, after being put ashore for an operation. When this was over and I was able to walk about and see the place, I soon made friends with some native boys. These boys frequently used to take me for walks over the island, generally to a very pretty village which is called La Laguna. As the Canary Isles belong to Spain, everybody or course speaks Spanish there, and being a very easy language I soon picked up quite a lot.

One day, they explained to me that a captain of an English steamer had given them a No 4 Meccano Outfit, amongst other things, in recognition of some small service they had done for him. Unfortunately there was no Manual of Instructions with the Outfit, and being unacquainted with nuts and bolts, gear wheels, girder strips and other engineering parts, the native boys were very puzzled as to what use they might be put. This is not as surprising as it may seem, for I may mention that there are no great bridges, cranes or other engineering wonders in the Canaries—except a tram service, which is

so ancient that I imagine the rails must have been laid by Noah or his family!

Being an enthusiastic Meccano boy myself, I soon enlightened them as to the uses of Meccano parts. I made them a Telpher Span, and fixing one line on the side of a steep hill, laid the gear box at the bottom; You should have heard the screams of delight when they saw the carrier come whizzing down the line on a 1 in 3 gradient!

Soon, all the children in the district wanted to work the Telpher. Then I made them a Swing Bridge, Girder Crane, and a Roundabout, and you can judge of their delight. Every day afterwards, instead of begging pennies, as they usually do, it was "Mec-y, Mec-y," whenever the native boys saw me.

One day Gregorio, one of my friends, showed me a shop window where some Meccano Outfits were for sale with a Meccano Manual printed in Spanish. So I bought the Manual for him and his friends, and by the time I left for England in one of Elders & Fyffe's boats, they had obtained a good insight into the science of engineering. Such a regretful "Adios Amica" ("Good bye, my friend") I never heard before.

Famous Poet's House.



Photo. by [Master E. H. Daniels.]

Every visitor to Stratford-on-Avon is familiar with Shakespeare's House shewn in the above photograph. The immortal Shakespeare's association with this beautiful town causes it to be the objective of large numbers of visitors, especially from America.

Results of "Best Magazines" Competition

We have pleasure in announcing that the prize has been won by master RONALD G. FARRANT, of Tonbridge, the entrant who out of a very large number, sent a list of Magazines in the correct order as voted for by the whole of the competitors.

- The winning list is as follows:
1. "The Boy's Own Paper."
 2. "My Magazine."
 3. "Chums."
 4. "The Captain."

A large number of entries were received for this Competition and many varied were the reasons given for the popularity of the selected magazines.

The first prize of a Hornby Clockwork Train Set has been awarded to Master Kenneth H. Cripps, Hertford, who chose *My Magazine* as his favourite.

A second prize of a Clockwork Motor has been despatched to Master E. W. Goate, Gt. Yarmouth, whose choice is *The Boy's Own Paper*.

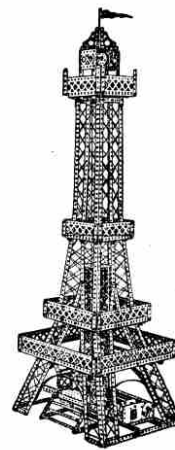
Canadian Boy says his Model Tower is a Pippin.

GREGG, MANITOBA, CANADA.

"DEAR MECCANOMAN."

I remember reading somewhere in the Meccano literature of the happiest boy in

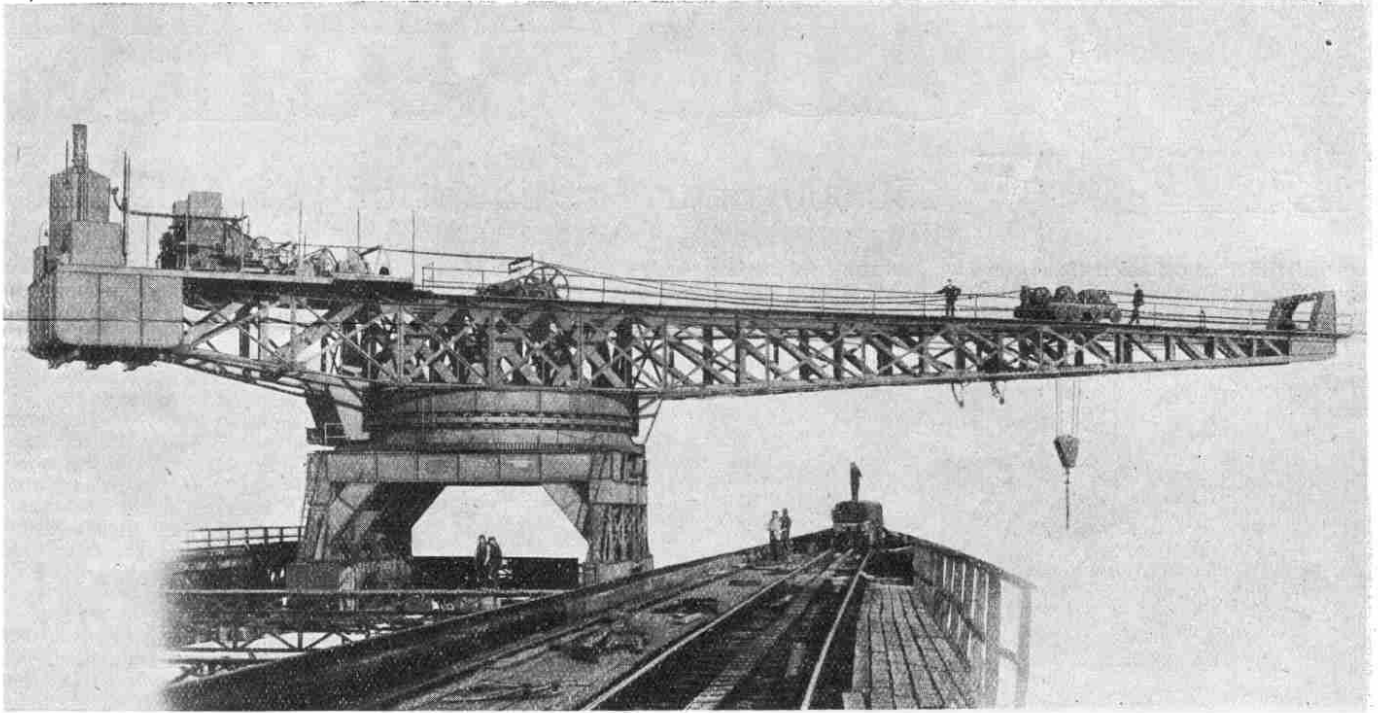
the world. He had just finished building the Eiffel Tower and I can quite believe that his claim to be the happiest boy in the world was the truth. I have just completed this same model, and for smoothness of operation and beauty of design, I think it just wonderful. Many models have I built with my Outfit during my five Meccano years, but none have made me sit back and get an eye-full like



this one. I simply had to take my hat off to it! At present it is standing in the parlour and I am as proud of it as though it was a statue of Napoleon. I'll tell the world she's a pippin!

Yours Meccanoized,

C. W. MERRY."



A Giant Block-Setting Crane

40-TON "TITAN" FOR SOUTH AFRICA.

We have already illustrated in the "M.M." large pontoon cranes and the largest hammer-head crane in the world. We now have pleasure in describing a giant crane of another type. This huge engineering structure was built for use in the construction of Table Bay Harbour, South Africa, by Messrs. Cowans, Sheldon & Co., Ltd., of Carlisle, by whose courtesy we are able to reproduce the accompanying photograph. The particular crane illustrated is one of the largest cranes of this type, and although designed for lifting blocks of up to 40 tons weight, has been tested to 50 tons.

A New Type of Crane.

The Titan type of crane was evolved some years ago when the block system came to be generally used in the construction of harbours and breakwaters. Improvements in the manufacture of cement enabled massive blocks to be cast in special yards on the shore, near the scene of operations. When placed carefully in position and locked together, these blocks present a solid front to the devastating action of the waves.

In the employment of this method it became necessary to introduce a new type of crane, the chief essential of which was that it should be mobile, not only so as to move along the pier as the work progressed but also so that it might be withdrawn to shelter in bad weather. It was also required to be capable of handling heavy blocks of 30 or 40 tons weight over a radius of 100 ft. or more.

These requirements are met by mounting a long cantilever arm on a turntable, which itself rests on a massive metal foundation, mounted on flanged wheels running on a special track. As will be seen, the girders and superstructure are lattice-built, in

order to reduce their resistance to the tempestuous winds to which the crane will be exposed.

Revolving on Rollers.

The superstructure revolves on a roller path 32 ft. in diameter, being carried on a series of turned steel rollers. These are kept in position by a suitable frame, revolving on machined pathways formed on the upper and lower circular girders. The revolving structure is centred by means of a large steel centre pivot, securely attached to the Crane carriage. Revolving motion is transmitted from the engine, through a train of spur and bevel gearing, which engages in the segmental spur rack formed round the exterior of the lower roller path. All the gearing of the crane is thoroughly protected from the weather.

The height of the rail on the cantilever is 36 ft., the cantilever itself having a total length of 175 ft., extending for 50 ft. from the centre to the tail and for 125 ft. from the centre to the nose. The counterpoise, or ballast, consists of 120 tons of concrete blocks, stored in a steel plate box beneath the boiler.

The crane weighs 425 tons and can handle a load of 40 tons over an area having a maximum radius of 155 ft. It can lift this load to a height of 21 ft., or lower it to 74 ft. below the level of the rails upon which it runs, giving a total range of lift of 95 ft.

The crane is steam driven, the engines and boiler being mounted on the "tail," or shorter end of the cantilever. The engine is of the ordinary two-cylinder type, provided with link motion, reversing gear and slide valves. The cylinders are 12 ins. in diameter and of 18 in. stroke. The boiler is 12 ft., in height and 6 ft. in diameter.

A Useful "Crab."

The load is lifted by means of a "crab," or monkey, drawn along the cantilever by steel ropes. A lifting rope, 1,341 ft. in length and 4 ins. in circumference, passes over this crab to the hoisting-block. The crab is capable of moving 10 tons at 30 ft. per minute and may be worked from the end of the cantilever, special provision being made for working a grab or dredger.

The hoisting speed upon slow gear, when lifting 40 tons, is 8 ft. per minute. When racking upon slow gear with the same load it is 20 ft. per minute, and 50 ft. per minute upon quick gear. The crane can develop a speed of 50 ft. per minute with a maximum load of 40 tons, and under the same load can slew through a complete revolution in 3 minutes.

The entire crane is mounted on 16 pairs of spring-mounted steel-tyred rail wheels (8 per side) arranged to travel on tracks of 3 ft. 6 in. gauge. Four pairs of rail wheels on each track are driven from the engine through a train of spur and bevel gearing, and finally, by link chains and steel sprocket wheels.

Pierhead Bridge in Mammoth's "Teeth"

The 200-ton floating crane "Mammoth" (which was illustrated in No. 21 of the "M.M.") has recently demonstrated its capabilities during a series of lifts in connection with the modernising of the Landing Stage at Liverpool. The giant crane brought in its "teeth" a heavy bridge from Princes Jetty, where it had been built in sections, and placed it in position on the Landing Stage. The ease with which the massive structure was handled drew many appreciations from the spectators.



RADIO SECTION

250,000 hear President of U.S.A. talking

A wonderful demonstration of the benefit that Radio may confer upon the human race was given on 11th November last year. On this anniversary of Armistice Day an

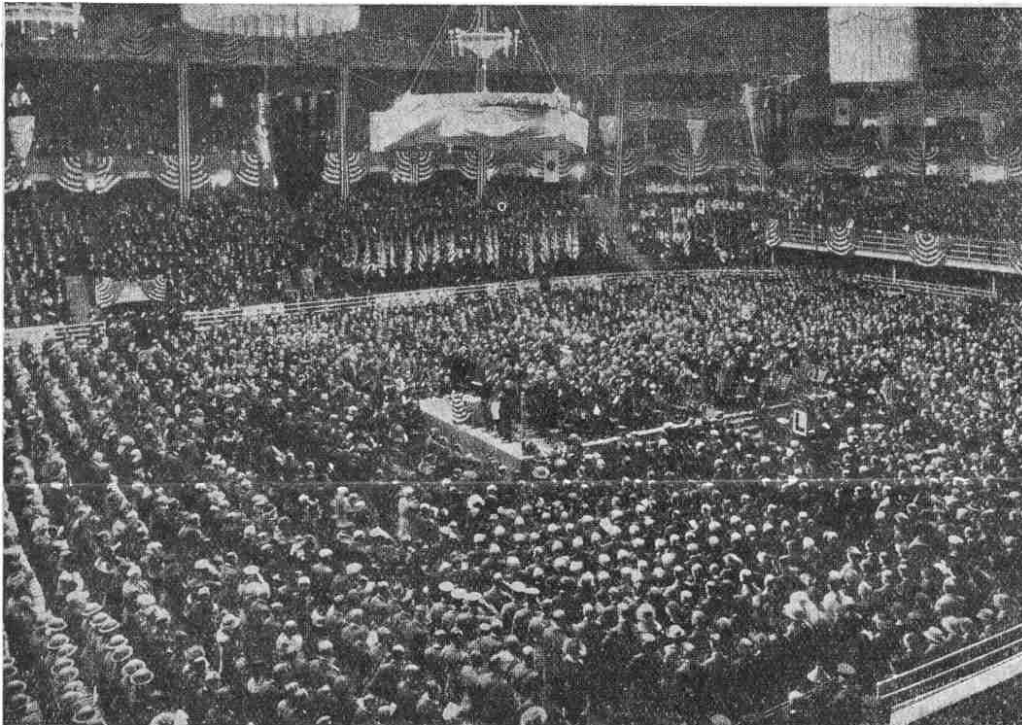
unknown American soldier was buried at Arlington, Virginia, following the lead given by Britain, when an unknown British soldier was buried at Westminster Abbey.

The President of the United States addressed a vast audience of several thousand people, who were assembled for a special service in the Memorial Theatre.

Great crowds surrounded the Theatre and were unable to gain admission, the total number of people present being about 100,000. By special arrangement the President's voice was received by microphones on the platform and transmitted to loud speakers outside the building, so that the whole of the great crowd there assembled was able to hear his address.

In addition to this, it was arranged to broadcast the President's address in some of the chief cities of the U.S.A. His voice was distinctly heard simultaneously by about 30,000 people in New York (250 miles distant), 20,000 people in San Francisco (3,700 miles). At Washington, the crowds overflowed the amphitheatre where the loud speakers were installed, and covered the surrounding hills. Our photograph shows the audience inside Maddison Square Gardens, New York, listening to the President's address broadcast from Arlington. There was not the slightest difficulty in distinctly hearing every word spoken by the President at Arlington.

This great achievement in Radio broadcast was mainly due to the work of the engineers of the Western Electric Company, by whose courtesy we are able to reproduce the accompanying photograph.



The above illustration shows part of the vast audience at Maddison Square Gardens, New York, which, by means of loud speakers (seen hanging in the centre of the photograph) and radio broadcast, heard the address given by the President of the U.S.A. at Arlington, 250 miles distant.

RADIOGRAMS



Two Daimler cars fitted with wireless apparatus recently travelled from London to Chelmsford and back. During each journey the passengers of both cars listened to conversation and music transmitted from Marconi House and Writtle.

* * *

A long-distance wireless telephone conversation was recently reported by Captain Voldborg, of the Scandinavian-American line. For more than five hundred miles he was able to maintain conversation with the shore station at Copenhagen. With

powerful wireless telegraph apparatus, he was also able to keep in touch with Nauen (Germany) up to a distance of 2,100 miles.

* * *

Electric light wires are being used in the United States as aerials for valve sets. A special adapter is used in place of the ordinary electric lamp. We do not recommend our readers to experiment in this connection, however, unless they are fully conversant with the working of an electric light installation. They may not only fuse the lights but damage their apparatus and injure themselves as well!

* * *

Mr. Marconi states that in the immediate future it will be possible to speed up wireless transmission, so that the sending of messages at the rate of 200 words a minute becomes an accomplished fact. Needless to say, such transmission will be carried out by mechanical means, as would also the reception of the messages.

The Swazis who live in the wilds of Africa refused to believe it possible to speak from one distant place to another. When radio telephony was demonstrated to them, they were dumbfounded, and at once held an "indaba" or special mass meeting. Here it was decided that, in the event of war, they wanted to be on the white man's side!

* * *

The high frequency generators, weighing several tons, and only recently installed at the great French Station of Sainte Assise, are stated to be obsolete already. It is declared that they have been superseded by a new invention.

* * *

While sailing for Rio, the Royal Mail steampacket "Darro" recently received a wireless call from the Steamer "Somme," some 70 miles away. The message stated that the chief engineer was seriously ill. Arrangements were quickly made by which the steamers met, and the suffering officer was carefully transferred to the "Darro," where an operation was immediately performed by the liner's surgeon.

Dr. de Forest and his Wonderful "Audion"

When Dr. Lee de Forest commenced his scientific experiments, in the summer of 1900, he lived in Chicago. Here he rented a room for which he paid 10/- per week, and it was in this room that he discovered an appliance that has been of remarkable importance in modern Radio work. As was the case when Edison discovered the leaping electrons, Dr. de Forest at first thought that his discovery was only a strange phenomenon, but later he realised its immense importance.

It is interesting to hear how Dr. de Forest made his discovery. One night in 1900 he was experimenting with a new detector. As he could not rely upon receiving signals from an outside source (for in those days Wireless signals were few and far between) he had to use a small transmitting set in order to be sure of receiving signals. He had installed his transmitting apparatus in the room in which he was working, operating it by means of a string, with the sparking coil in a cupboard about 10 feet away.

Coil Affects Gas Mantle.

Dr. de Forest was surprised to notice that when he closed the circuit and caused the coil to spark, there was a decided change in the light given out by the incandescent mantle that was illuminating the room. While the coil was sparking, the light decreased very materially; as soon as the sparking ceased, the light at once resumed its normal brilliance. Dr. de Forest was greatly impressed by this phenomenon, and his interest was so aroused by the peculiar set of facts described, that he commenced a series of experiments with the incandescent burner. As a result he came to the conclusion that "heated gas molecules are sensitive to high frequency electrical oscillations."

Having investigated the matter so far he shelved it for the time being and engaged in other experimental work. Three years later, however, he returned to the subject and commenced a series of extensive experiments, using various types of Bunsen burners.

As a result of these experiments he discovered that a flame of a certain type might be successfully used to detect electric waves.

The Flame Detector.

It is interesting to note that Dr. de Forest's flame detector was subsequently used successfully for receiving wireless signals from ships in New York Harbour. This type of detector required a large supply of gas, however, and as there were many other difficulties in the way of making its use commercially possible, Dr. de Forest became convinced that he was not working on correct lines. He therefore endeavoured to obtain the same results by other means, and to this end introduced an electric arc as a detector. As this method was found to be very noisy and to give irregular signals in

the telephone receiver, however, it was abandoned.

The First Valve.

Up to this time the detectors usually employed had all been solid or liquid, but in his next invention Dr. de Forest used

at work in his laboratory at Parlo Talto in California, Dr. de Forest discovered that the Audion could be made to oscillate or to generate alternating currents of any frequency. It may thus be used for transmitting purposes and it is this transmitting valve that, in its subsequent highly developed form, has enabled broadcasting to become an accomplished fact.

The Audion may also be used as telephone relay, and in this connection has been extensively employed in America.

One of the most interesting developments of the Audion is the reproduction of synthetic music. In this connection a demonstration of the musical Audion, made before the New York Electrical Society in 1915 proved of very great interest both to musicians and scientists. Further investigations in synthetic music, however, have been delayed by still another discovery in which the Audion is again the most important element. This is the invention of the

talking Cinema Film, or as Dr. de Forest himself calls it, the "Phonofilm"

In this apparatus the sound waves of the cinema actor's voice are reproduced in the form of bands of light on the film. The sounds are picked up by a sensitive microphone and transmitted as electrical energy to the

valve, which, when submitted to the influence of an electric current, develops a powerful violet light. The strength of this light varies according to the strength of the voice-current from the microphone, and so causes records of varying intensity to be photographed in the margin of the film, alongside the picture. When a "talking film" is being

shown, the process is reversed and the light bands in the margin are converted again into sound waves, enabling the original speech to be reproduced.

The Audion Camera or Projector is yet another application of de Forest's discovery, and one for which the scientist predicts a revolution in the cinema world.

Between 1904 and 1912 there were filed no less than twenty patents in which the Audion played a prominent part. To-day over a hundred patents have been granted in this same connection and the number is rapidly growing. Practically every one of these patents is dependent upon Dr. de Forest's Three-Electrode Valve.

Dr. Lee de Forest's work in connection with the Thermionic Valve is described on this page. Speaking recently at Boston, U.S.A., he said:—



Dr. de Forest predicts that within two years there will be five million Radio enthusiasts in the United States alone, and four times as many by 1927.

"It is not often the happy lot of a prophet to witness within a few years, or even in his lifetime, a full and sudden fulfilment of his prophecies, made before a world of indifference, a world of sceptics. Yet in the world of Radio, our dreams have come true. Like a tidal wave the attitude of the press and public toward Radio Broadcasting has mounted, within a few months, to a magnitude of interest.

"Radio is beginning to come into its own. I say 'beginning,' because I still feel that we are only at the start of the Wonderful Age of Radio"

heated gas for the first time. He used an incandescent filament in an enclosed glass bulb, and this was the foundation of his vacuum tube. Dr. de Forest took out his first patent in June, 1906, and realised the great importance of his discovery to Radio, expressing the opinion that "the

Audion, the most sensitive detector in the world to-day, is, I consider, my greatest achievement."

Dr. de Forest now claims that he was thus independently led to develop the Audion, and that he did not base his discovery on Fleming's Two Element Valve as is generally supposed.

Because of the very many developments of Dr. de Forest's Audion it is believed that we are but on the eve of great possibilities and that its many applications may make possible important discoveries in several branches of science.

The Many Applications of the Valve.

In the summer of 1912, when

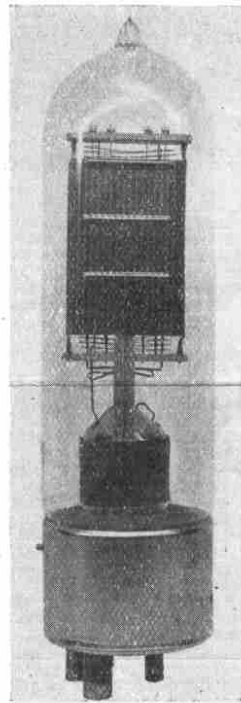
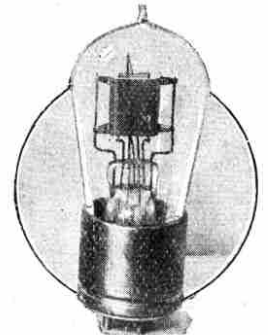


Photo by] [Western Electric Co.

A 250-watt Thermionic Valve, which operates with a current of 1600 volts on the plate.



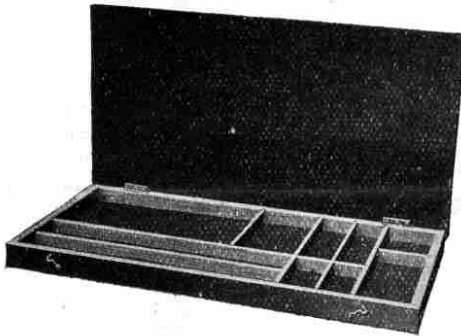
(Photo by courtesy of "Popular Science Monthly.")

A familiar type of Valve.

Used by many thousands of radio workers in all parts of the world. Although differing in detail, its principle is exactly the same as that of the larger valve illustrated on this page.

Storage Boxes.

We have in stock a limited number of boxes, in two sizes, suitable for holding Meccano parts.



Box No. 1.

Box No. 1 is stained and polished imitation Walnut. It is fitted with partitions and lined with green baize. The lid is hinged and fastens by means of two outside hooks.

Box No. 1. 20 $\frac{1}{2}$ " \times 10 $\frac{1}{2}$ ", depth 1 $\frac{1}{2}$ ".
Price 7/6; postage 1/3.



Box No. 2.

Box No. 2 is polished oak, fitted with partitions and hinged lid. This box fastens with lock and key and is provided with two drawers, also with locks and keys.

Box No. 2. 17" \times 15", depth 9 $\frac{1}{2}$ ".
Price 70/-; carriage forward.

We illustrate the two types and as our stock is only small we advise those of our readers who are interested to take immediate advantage of this opportunity.

Measuring Ocean Depths by Radio.

WONDERFUL NEW INVENTION.

The Assistant Secretary of the U.S. Navy announces that successful tests have been made with a new wireless sounding device that measures ocean depths. This method was first discovered during the war, when it was found that hydrophones (used to detect submarines) enabled the depth of the water to be judged, by calculating the time that a sound takes to travel from the ship to the bed of the ocean and back.

(Continued next column.)

Clever Young Editor's Success

Our readers will probably remember that in No. 26 of the "M.M." we gave some particulars of Master Hubert H. Lansley's publication the "Meccano Engineer." We now have pleasure in publishing a photograph of Master Lansley at work with his duplicator, by which the "Meccano Engineer" is printed. This clever young Editor, who himself writes, prints, and distributes his bright little paper, has lately been photographed and interviewed for the newspapers both of this country and of America. The "Daily Chronicle" recently stated that the "Meccano Engineer" had "Enterprise stamped on every page," and with this opinion we heartily agree.

Our young friend, who is 15 years of age, tells us that the most popular items in his paper are the unique free insurance scheme by which damaged Meccano parts are replaced and the serial story "The Pioneer." His paper has now readers in Malta, India, Canada, Germany, Australia, and New Zealand.



Master Hubert Lansley, the enterprising young Editor, at work in his study.

At present the "Meccano Engineer" is published bi-monthly and Master Lansley will be pleased to send a copy, post free, to any Meccano boy on receipt of 1 $\frac{1}{2}$ d. His address is 26, Thornton Road, Barnet.



A. Pollastrine (London, N.16).—(1) "Mfd." means "Micro-farad." As the farad, the electrical unit of capacity, is too large a unit to use in Radio, the micro-farad (or one millionth of a farad) is generally used to denote the capacity of electrical condensers. (2) With Crystal Receiving Sets a battery is only required with certain crystals such as carborundum. The Meccano Crystal Receiver is fitted with a special crystal for which a battery is not required.

G. Simon (Swindon).—The use of a valve for low frequency amplifying does not make possible reception from greater distances than is obtainable with a crystal detector alone. An amplifying valve intensifies the volume of sound only and a message which, without the aid of an amplifier is faint, becomes more clearly heard when an amplifying valve is used.

R. E. Mate (Liverpool).—You do not give the height of your window, but judging from your diagram, a double aerial will be suitable for your purpose. Though this will be parallel with the tramway wires I do not think they will cause any disturbance. An article on aerials will appear in the "M.M." shortly.

B. N. Satghar (Bombay, India).—There is a station at Bombay that transmits Morse upon a wave length of 2,000 metres, but you would not be able to receive this transmission with a standard Meccano Crystal Receiving Set, which is wound for lower wave lengths.

The invention has now been developed to such an extraordinary degree of accuracy that a depth even of only a few feet may be measured. The new instrument has taken the place of the Kelvin apparatus in which the depth of the ocean was judged by air compressed in a glass tube and recorded by a special arrangement.

P. Mostyn (London, W.4).—There is no reason why two Crystal Receiving Sets should not be worked from the same house, provided that the two aerials are kept at least 20 feet apart, to avoid inductance. Two receivers may be used on one aerial but the results will not be satisfactory.

J. C. Wylde (Bromley).—A carborundum crystal requires a special holder, to which provision is made for coupling the battery connections. The use of a low frequency amplifying valve increases the strength of the received signals, but will not increase the range of the receiver. See reply to G. Simon above.

Henry Jackson (Manchester).—Your enquiry apparently refers to the receivers used in the ordinary telephone service. As a rule, such receivers have much too low a resistance to be suitable for use with a Crystal Receiving Set.

Leslie Chapman (London, S.W.17).—With regard to the buzzing noise which makes it impossible for you to receive telephony, I would suggest that you thoroughly overhaul your Receiving Set and make sure there are no loose connections, also that there is no leakage to earth from the secondary circuit. If the trouble still continues, I would suggest that you change the position of the aerial, as it may be affected by the neighbouring telephone wires.

J. R. Smith (South Shields).—The No. 1 Meccano Crystal Receiving Set does not require an Experimenter's licence, for having been approved by the Postmaster General, it may be used with a Broadcasting Licence.

A. R. Cleaver (Lytham).—It is advisable to have your aerial as high as possible, and the total length should not exceed 100 feet including the lead-in wire. The usual method adopted to bring in the lead from the aerial is to bore a small hole, say about $\frac{1}{4}$ ", in the side frame of the window. Your lead-in wire should, of course, be insulated at the point it enters the window.

S. Williams (Salford).—I was very interested to read your description of the valve panel that you have made, and also of the contrivance made of Meccano parts that enabled you to wind your coils. Perhaps when next you write you will let me have some more information.

M. Walker (Limavady).—In order to receive messages from the British Broadcasting Stations it will be necessary for you to employ a Valve Set. A Meccano Receiver of this type is at present being considered and full details will be announced if it matures.

E. A. Hall (Cape Town).—It is difficult to advise you without some knowledge of local conditions. I think you would obtain better results if instead of a loose coupler you used a simple inductance, with either one or two slitters. This type of coil is better suited to reception upon short wave lengths.