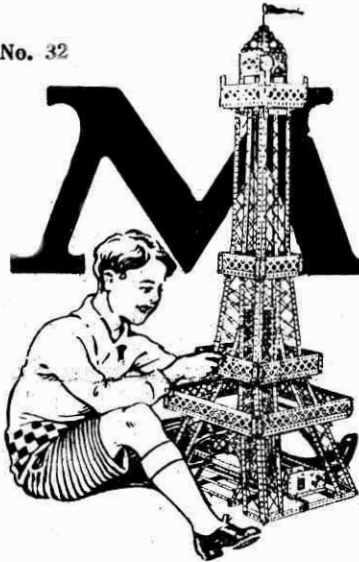


No. 32

MARCH 1923



MECCANO

MAGAZINE

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PUBLISHED IN THE INTERESTS
OF BOYS



EDITORIAL

NO doubt many boys wish they could imitate the exploits of the great Sherlock Holmes. Now, the greatest asset of a detective is his power of observation. A detective is, after all, a human being. He does not derive his power to track down criminals from any supernatural gift.

He owes his prowess to his capacity for observing those little details that often escape the notice of the ordinary person. A finger print on the window through which a burglar has entered; the remainder of a cigarette that he had smoked; a button from his waistcoat which, unknown to him, fell upon the floor. All these are trivial objects that might escape the notice of any but a detective, trained in observation.

Some months ago at Grimsby some goods were bought and paid for with a Bank of England note for £50. The buyer was under the impression that the note tendered was a £5 note, and the shop-keeper took his word for it. The £50 note subsequently passed through the hands of four people who never troubled to inspect it, each thinking it was a note for £5 only. The fifth person to receive it was a cashier in a draper's shop. Although he had keener powers of observation than the others, his cleverness eventually secured him two months' imprisonment for dishonesty. On discovering the error that had previously been made, he decided to take advantage of it and quietly pocketed the balance of £45!

When the customer who first launched the note on its travels ultimately discovered his mistake, the note was traced to the dishonest cashier and all the facts

revealed. The cashier was sentenced to two months' imprisonment, in which to ponder over the fact that it is better to be honest than clever.

With this part of the story we are not concerned, but I want to point out the extraordinary fact that four intelligent individuals handled this £50 note in such a careless manner that they were under the impression its value was only £5. The opportunity of examining £50 notes is probably not given frequently to many readers of the "M.M.", but it is surprising to find how many boys miss noticing other important facts in their everyday life.

Keep your Eyes Open. £50 note in such a careless manner that they were under the impression its value was only £5. The opportunity of examining £50 notes is probably not given frequently to many readers of the "M.M.", but it is surprising to find how many boys miss noticing other important facts in their everyday life.

Special Articles in this Issue :

- A Town that Travels
- New Serial Story : "A Night at the Pool"
- Competitions
- "Hearing" a Base-ball Match
- The Men Who Gave Us Radio
- Guild Notes and News

It is a good game to imagine that you are a detective, and to observe every detail of each person that you meet. You should endeavour to observe them so closely that, even some days later, you could give a sufficiently minute description of the person to enable him to be arrested, even though he might be in a different part of the country. You will be surprised to find how, by training your mind, important details will be quickly brought to notice and how you are able to remember them.

It is from their power of observation that many men have made great dis-

£250 Given Away

Are you entering the Great Meccano Model-building Competition?
£250 in Prizes.

Closing Date : 15th April.

For full particulars see page 5

coveries. During a service in the cathedral at Pisa, Galileo noticed the gentle swinging of a lamp, hanging from the roof. This led him to the discovery of the pendulum and many of its applications. Sir William Herschel, the illustrious astronomer, noticed that one of the stars in his telescope appeared slightly different from the others. Following up this discovery he found that this star was not a star at all, but was in fact a new planet. Some years later, keen observers noticed that this new planet Uranus was not just where it should be in the heavens. The discrepancies between its actual position and the calculated position, although extremely minute, were sufficient to enable mathematicians to say that they were caused by the effect of the attraction of another hitherto unknown body upon Herschel's planet. Astronomers set to work to find this unknown body, and subsequently discovered still another planet, which was named Neptune.

These are three of many illustrations furnished by Astronomy that show what wonderful discoveries observation may lead to. Similar instances are found in every science, and many books would be required to enumerate the discoveries that have been made, due solely to the power of keen observation.

It is surprising how little-developed is this power of observation in our everyday life, and it is good and profitable that we should cultivate it wherever possible.

A Town that Travels 6,000 Miles each Month

A TRIUMPH OF MODERN SHIP-BUILDING

IN that famous book "Gulliver's Travels" we are told of a wonderful floating island, and of the adventures of its inhabitants. The celebrated author, Dean Swift, could scarcely have imagined that his fantastical story could ever come true, yet the super-liner "Majestic," the latest achievement in modern ship-building, exceeds in wonder even the dream of Dean Swift. This amazing ship may correctly be described as a floating town, for it has its 5,000 inhabitants, its palatial restaurants, lounges, gymnasiums, swimming and medicinal baths. Its theatre, hospital, bakeries and fire-station, electric lifts, telephone exchange and wireless stations. Indeed, almost every detail of a town's organisation is to be found on board.

Feeding a Town

To provide for the feeding of the population of this floating town for five or six days, the food-stuffs carried on one voyage must include among other items such huge quantities as 200,000 lbs. of fresh meat, 50,000 eggs, 26,000 lbs. of vegetables, 500 gallons of milk and 3 tons of tea, not to mention hundreds of chickens, ducks, geese, and game. As a complete description of the wonders of the "Majestic" would fill a very large volume, we are only able to mention the more interesting features in the space at our disposal.

Under the command of Sir Bertram Hayes, the first merchant captain to be knighted, the "Majestic" sailed on her maiden voyage across the Atlantic on the 10 May last year, having been placed on the mail and passenger service between Southampton, Cherbourg and New York. She sailed from Southampton, the same port from which, some three hundred years ago, the "Mayflower," a sailing vessel of 180 tons, set out with the Pilgrim Fathers and their families. They, too, were undertaking a voyage across the Atlantic, but under conditions that were totally different, both as regards comfort and accommodation, from those that are experienced to-day by passengers in the "Majestic."

300 Years' Progress

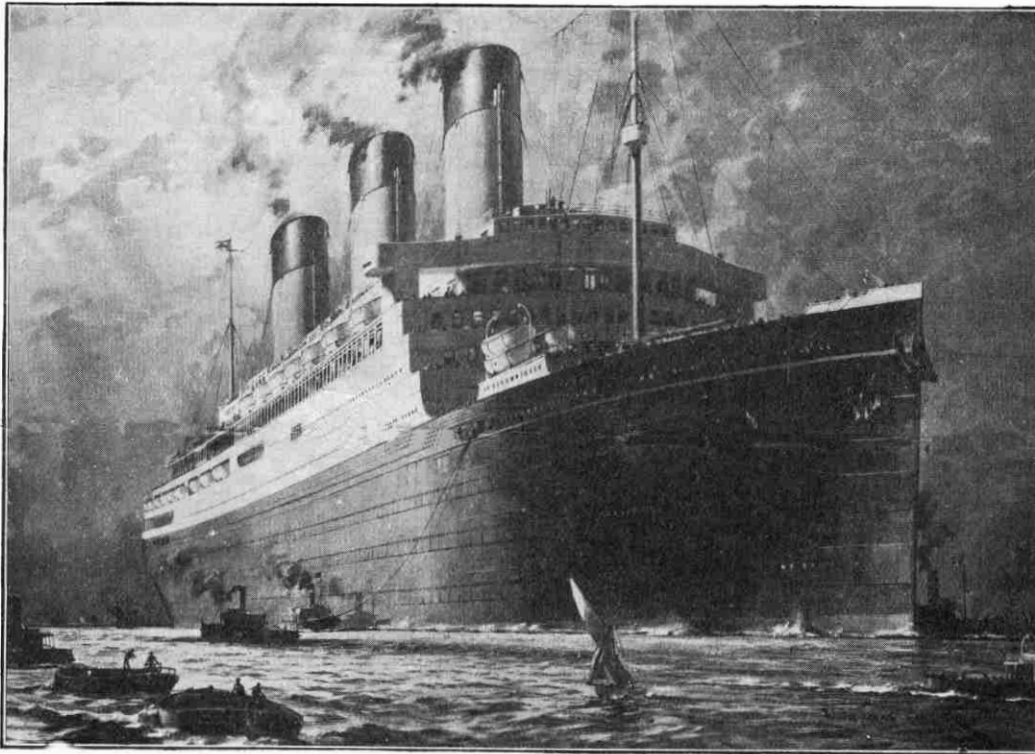
Since the time of the little "Mayflower," ship-building has continued to make remarkable progress, especially in the case of trans-Atlantic liners. It would almost seem as though each of the "Mayflower's" successors had nibbled at one side of Alice-in-Wonderland's cake, for ships have continued to grow until to-day they have reached gigantic proportions.

A unique sight was seen recently at Southampton docks, when three of these

alongside, Big Ben—the famous clock-tower overlooking Westminster Bridge—would indeed appear dwarfed in comparison. The "Majestic" is, in fact, almost twice as long as the Blackpool Tower is high. She measures 100 ft. in breadth and 186 ft. from keel to smoke-stacks, thus rising to about the height of a twelve-storey building.

She has nine decks, seven of which are for the use of passengers. Above the top

deck rise the three funnels, each 30 ft. in diameter. If either of these was placed horizontally, two trains could pass each other in it with ease! Her massive rudder-posts and plates weigh 140 tons, and the stern-posts, with their brackets for the four propeller shafts, weigh over 300 tons. She has five anchors, the largest weighing 15 tons, the total weight of the anchors and their cables being over 230 tons.



The World's Largest Liner: The "Majestic"

modern leviathans—"Berengaria" and "Mauvetania" of the Cunard Line and "Majestic" of the White Star Line—berthed together. The "Mauvetania," once the largest ship in the world, seemed to "have her nose put out of joint" as the saying is, by her two giant sisters. Even her passengers looked up with respectful admiration at the upper deck of the "Majestic" as she passed by, outward bound for New York.

The "Majestic" is well-named, for she represents the last word in luxury, as well as in size. This wonderful ship accommodates 4,100 passengers, and carries a crew of nearly 1,000. The little "Mayflower" was only of 180 tons burthen, but the "Majestic" is of 56,000 tons, or about the same weight as the whole of the 135 vessels that formed the Spanish Armada. When fully laden she displaces about 64,000 tons of water.

Funnels like Tunnels

The "Majestic" is 956 ft. (or nearly one-fifth of a mile) in length. If laid

Guarding against Fire

In building so large a vessel, every care had to be taken to provide the very best means of protection in case of accident. This was the first consideration when the watertight bulkheads were designed. In order to aim at still greater safety, however, the ship was also provided with a double "skin" for part of her length.

To guard against fire the steel bulkheads are coated with fire-proof material, and provided with special fire-proof doors that will resist a temperature of 2,900 degrees Fahrenheit. The main staircases can be isolated, thus ensuring a means of escape to the upper decks. The 450 fire alarms, placed at different points throughout the vessel, work automatically. From them, the officer on watch can tell the exact part of the ship in which fire has broken out.

Comfort and Luxury

The huge vessel is designed almost exclusively for passenger traffic, and no provision is made for cargo. In addition

A Town that Travels

to the accommodation of passengers and

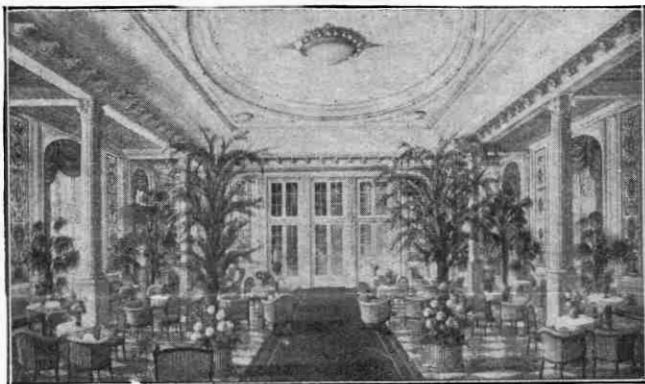
crew, a considerable amount of space is used for the storage of fuel, fresh water, provisions, baggage and mail.

Space, ventilation, and decorations have been given the most careful thought, and no expense has been spared to make the vessel as luxurious as possible. We can imagine that were the Pilgrim Fathers able to inspect the "Majestic" they would shake their heads and hold up their hands in marked disapproval at the astonishing luxuries provided!

The Wonderful Palm Court

The public rooms include the restaurant, which is the loftiest ever built on board a ship, covering an area of over 11,000 sq. ft. It is capable of seating 700 persons, and is furnished with 170 small tables for parties of from two to twelve in number.

This restaurant opens on to a beautiful Palm Court, with palm trees and flower



The Palm Lounge

boxes to delight the lover of Nature. Beyond is a vestibule and a luxurious lounge, with a wonderful glass dome, the area of which is nearly 4,000 sq. ft. The wine-coloured carpet may be rolled aside disclosing an inlaid floor, ready polished for dancing. A stage at one end enables the lounge to be used as a theatre or for concerts.

The large smoke-room adjoining is beautifully panelled in unpolished oak, carved with oak leaves and adorned with the crests of the colleges of the English Universities. Near-by are the card-room, and the library containing 4,000 volumes. Here also is the beautiful swimming bath, with a depth of 8 ft. at the deep end, and tiled in green with marble steps. The bath can be filled with warmed sea water in about 25 minutes. There are thirty dressing rooms for bathers, and surrounding the swimming pool is a gallery for spectators. Shower, Medicinal, Electric, and Turkish baths are also available, as well as a gymnasium.

(To be concluded).

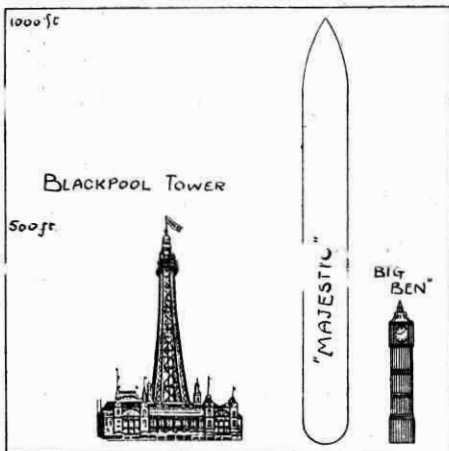
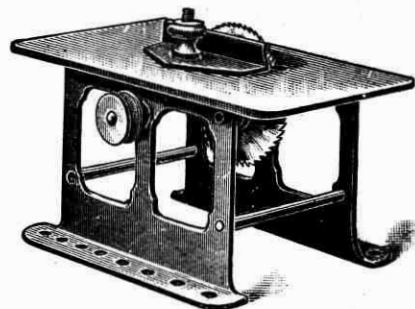


Diagram showing comparative sizes of the "Majestic," the Blackpool Tower and Big Ben

Model Saw-benches



We have a number of model saw-benches suitable for use with electric motors or vertical steam-engines. Our stock is limited and readers are advised to take advantage of this offer immediately, as the stock will be quickly exhausted.

Model saw benches as illustrated, each 4/- (postage 7d).

A Useful Tool

Our illustration shows a type of screw-driver useful for reaching bolts in inaccessible places on models. For this reason the



blade has been made so that it may be passed through the standard Meccano hole to reach bolts so placed. We are disposing of these screwdrivers whilst our stock lasts, at the special price of 10d. each, post free.

Interesting Paragraphs

A fourth pipe-line from Thirlmere, in the Lake District, is to be laid to Manchester. The cost of the work, which is to be undertaken by the Manchester Corporation, will be over £1,000,000.

* * * *

The work consists of the laying and joining of a line of 54 in. welded steel pipes. The line passes through Kendal, Kirkby Lonsdale, Lancaster and Horwich. Work will be provided for a large number of men for many months, and the most modern types of excavating plant and equipment will be employed.

* * * *

A new ray which, it is claimed, will pierce the thickest fog, is to be tested at the London Docks. The new ray is one of reflection, not of projection, is incandescent, and is given off by a half-inch flame. It is reddish-blue in colour, and in shape the flame resembles the sharpened end of a pencil. The inventor suggests that by this new ray vessels will be able to enter dock during fog.



Master Jim Timms

Jim's Poultry Win Prizes

I have pleasure in publishing a photograph of Master Jim Timms, of Brackley, Northants. Jim is one of my regular correspondents, and is very keen on poultry-keeping, which—next to Meccano—is his favourite hobby. As a true Meccano boy Jim puts his whole heart and soul into his hobbies, and his enthusiasm is being well rewarded. Already he has had considerable success with his exhibits, his latest triumph being at the Syresham Show, where he won a prize for eggs laid by his pullets.

In addition to poultry-keeping, Jim also finds time to take a keen interest in gardening, in which he is equally successful. With these three hobbies it is no wonder that he always finds himself so fully occupied that he has no time to be down-hearted or lazy!

My young friend tells me that he is soon going to a boarding school, and I am sure

(Cont. foot of next col.)

all readers of the "M.M." will join in wishing him a very happy and successful career there. We hope to hear of him winning further prizes, but in this instance for tasks of a different nature!

OUR NEW SERIAL

A NIGHT AT THE POOL

BY

Bernard Sexton

CHAPTER I.

MANY are the little rivers of the great North American

Continent, but there is none more beautiful than the Housatonic. It flows across the State of Connecticut from north to south. At no place is it more than three hundred feet wide, and through most of its course it is too shallow to float a rowboat for more than a few miles. Yet what it lacks in size it more than makes up in beauty and variety. There was a time, long ago, when it was a favourite resort for the red men, because of the abundance of fish and eels, and the tribes whose territory touched its shining waters counted themselves fortunate as the inheritors of a beautiful and sacred stream.

A few miles to the east of the Housatonic, and within the limits of the present township of Kent, there is a curiously-shaped round hill. Even to-day this gives the traveller the impression of being "an Indian Mound." It is so perfectly circular, so symmetrical in its roundness that it is difficult to imagine the blind forces of Nature as instrumental in its formation. Strange to say, this tradition of an artificial origin is one that has persisted through the centuries. Each generation has attributed the formation of the hill to mysterious and powerful craftsmen of some vanished civilization. Even among the Indians it was held semi-sacred. The bravest of them could hardly be induced to pass a night near it, and only the boldest and most powerful, that is the medicine men, had succeeded in gathering sufficient courage to actually stand upon it.

At the time when this story opens, nearly three hundred years ago, two Indian youths were sitting crouched near a little fire at the very base of this sacred hill. Their tribal markings proclaimed them to be members of the great Iroquois confederation. In fact, they were Mohawks scouting far into hostile territory, bent upon one of those daring enterprises dear to the heart of the Five Nations. The young men were lithe, powerful, intelligent-looking. Evidently they were among the very best of their kind. The fact that they had so far survived was alone sufficient proof of their daring and skill.

It was dusk. They sat crouched over a small and smokeless fire. Dense woods were all about, and a little brook, winding through the forest, circled the mysterious hill at whose base they were encamped for the night. The two young warriors had adopted every precaution that savage woodcraft could devise to keep themselves hid from the eyes of their kind. The fire

was their only recklessness, and in that they indulged themselves because they felt assured that there was small chance of anyone following them into the vicinity of the sacred mound, the existence of which coloured all the superstition of the neighbourhood.

One of the young men fished noiselessly with his hands. The little brook at this point was rounded into a deep, golden-hued pool, overhung with rocks. Upon one of these the fisherman lay motionless. With eyes alert he searched the deeps of the pool. When he saw one of the great lazy trout the young Mohawk would sink his hands below it with infinite care and, gently tickling its underpart, would mesmerise it. A quick snap of the fingers and the fish was caught, and flung to land. The only sounds were an occasional splash as he threw ashore his catch, and the slight crackling noises made by the burning of light sticks. At last it grew too dark to see, and the fisherman stood up, stole in and sat by the fire.

"The trout in this pool swim into my hands," he said after a pause.

"They would not swim into anyone else's hands," answered the other, his face lighting as he flashed a glance of admiration at his comrade.

Red Hawk, the fisherman, stood up.

"They swim into the hands of Red Hawk because he is wise and cunning."

Across the face of him addressed as Red Hawk there passed a shadow of a smile at this praise from one whose praise to him meant more than life itself.

Red Hawk, though only eighteen summers old, was the leader in this hazardous expedition. He was tall and slender and had that thoughtful face characteristic of the best blood of the proud Mohawks. Pride showed in every line of his body—pride of race and pride of person—but it was not the blind tribal

pride of the average Indian. Red Hawk was a thinker, the child of the race that formed the great confederacy of the Five Nations, that association of Nations which foreshadowed in its structure the principles of the United States. He was a little above the medium height, about five feet ten.

Wolverene, his comrade, who sat across the fire roasting fish, was a little shorter and one year older. He had been the chosen comrade of Red Hawk as far back as both could remember. As little boys they had been inseparable. They possessed for each other the affection that

made either almost ill with apprehension if the other were absent or in danger. Thus they grew up, sharing that glorious life of the wilderness, which in spite of its occasional perils was almost entirely a happy adventure for the youth of the Great Confederacy. Their people had nothing to fear from armed invasion. For hundreds of years now their crops, their villages, and their women, had been secure against attack. Indeed the Mohawks could rove the wilderness for hundreds of miles and not meet any men save such as those that bowed the knee in subjection to their power.

A few months before, however, a rumour had drifted through the wilderness that set the Sachems and Sagamores thinking. It was to the effect that a settlement of white men had been started in the territory of the Massachusetts Indians. It was only a rumour, and at last these two, Red Hawk and Wolverine, each with a great name yet to make in the Tribe, offered to penetrate the hundreds of miles of perilous wilderness and find out the facts. They had done so. They had tracked their way across what are now the states of Connecticut, Massachusetts and Rhode Island. They had looked at last upon the Great Waters—and they had seen, curling up over timbered roofs, the smoke from the fires of the Pilgrims at Plymouth.

Their task accomplished they had returned swiftly. Passing through the territory of hundreds of tribes and clans they had avoided intercourse with all, for such were their orders. Their mission was to be secret—and they had succeeded in coming as far as the Housatonic without detection. Nevertheless they knew they were now in peculiar danger.

(Continued at foot of next column)



Improving the "M.M."

A TALK BY THE EDITOR

It is a terrible job being an Editor! Every week I receive large numbers of letters from my readers criticising the contents of the "M.M." If I were to carry out a quarter of the suggestions contained in these letters, I should have to enlarge the "M.M." to several hundred pages. "Then why don't you do it?" I imagine some readers saying! Well, there are many good reasons why it cannot be done and the chief reason is that printing a large magazine is an expensive business! As we cannot at present increase the number of pages of the "M.M." we must necessarily make the best of things as they are.

It is an Editor's ambition to try to please as many of his readers as possible, by giving them articles on subjects that he thinks will interest them. This is where the terrors of the Editorial chair manifest themselves, for with the tens of thousands of readers of the *Meccano Magazine* the problem of satisfying everybody becomes very difficult. What would you do if you were to receive letters from some readers who say we do not give sufficient space to Radio, while the very next post brings letters from others who think that "four pages is too much valuable space to devote to Radio matters!" Others suggest that at least two pages each should be devoted to Railway subjects, Stamp Collector's Column, Nature Study, Photography, Conjuring Tricks, Puzzles, or to the hundred-and-one other subjects in which they are particularly interested. While all these subjects are certainly interesting to Meccano boys, they cannot be dealt with in the "M.M." simply because of lack of space.

A Night at the Pool (cont.)

In the previous year the tribe, through whose territory they were now passing, had suffered an affront from some of the emissaries of the Five Nations. Although they did not dare to resent it in open warfare, it was well understood that the life of any Mohawk found in their territory would be forfeited.

Red Hawk and Wolverine knew this, and also did they know that during the past two days they had been persistently tracked. Doubling on their tracks, employing all the stratagems of Mohawk cunning, they had not been able to throw their pursuers off the scent. Red Hawk had made a careful examination of the back trail to discover the number of the party following them.

(To be continued).



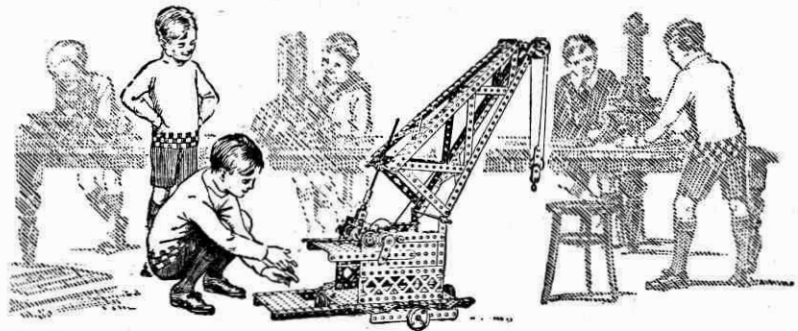
Now boys, I want you to help me to obtain information as to just what subjects appeal to you most. I want every reader of the "M.M." to send me a post-card answering the questions printed below. For the most original reply to question No. 10 I shall award a Hornby Clockwork Train as a prize, and a Zulu Tank Loco as a second prize. There is no necessity for you to write out these questions—simply place the number of the question before your answer. By answering these questions intelligently and thoughtfully you will be helping me to a large extent in my monthly task of trying to please you. Not only this, but a "brain wave" will stand a chance of winning one of the prizes! Just stretch out your arm for the pen and ink and set to work right away, because the answers must be received before 30th April.

Questions.

1. Should we print short stories (similar to "How Jimmy Thornton Made Good" in the December issue) written by Meccano boys?
2. (a) Should we include instead serial stories?
(b) If so, should they be stories of adventure or of school life?
3. (a) Do you like the "Mail Bag" Column?
(b) Should we give it more space?
4. Do you like the new Editorials, or do you prefer the old style of Editorial paragraphs?
5. Do you consider four pages too much to devote to Radio?
6. Do you like reading about Meccano boys and what they are doing?
7. Do you prefer the inclusion of illustrations of new Meccano models such as were published on the front page of the "M.M." last year?
8. Should we publish more articles of a general scientific nature, or should we have fewer of these articles and use the space for articles relating to Meccano?
9. Which kind of Competitions interest you most?
10. Can you suggest a novel feature for improving the "M.M."?

£250 in Prizes BEST MODEL CONTEST

Closing Date: 15th April, 1923



Cash Prizes to the value of £100, Meccano Outfits, Inventors' Accessory Outfits, Hornby Trains and Zulu Trains to the value of £150.

These prizes will be awarded in the big Meccano Competition, which every Meccano boy should enter. As was the case last year, the Competition is divided into three sections (1) for boys under 10 years of age, (2) for boys between 10 and 14 years of age and (3) for boys over 14 years of age.

There are no restrictions and no entrance fees. Full particulars and entry forms will be sent on application. The closing date for the Competition will be 15th April for entries from the United Kingdom, and the 30th May for entries from Overseas.

Ask your dealer, or send to us, for an Entry Form.



RADIO SECTION

"Hearing" a Base-ball Match 1,000 Miles Away

SCIENTISTS are already familiar with "sounds" that cannot be heard and "colours" that cannot be seen. Now Radio makes it possible to "hear" a cricket or a football match! An experiment, recently carried out in America, in connection with a base-ball match, consisted of broadcasting a verbal account of the match as witnessed by an observer. He spoke into a microphone connected to the apparatus at the transmitting station.

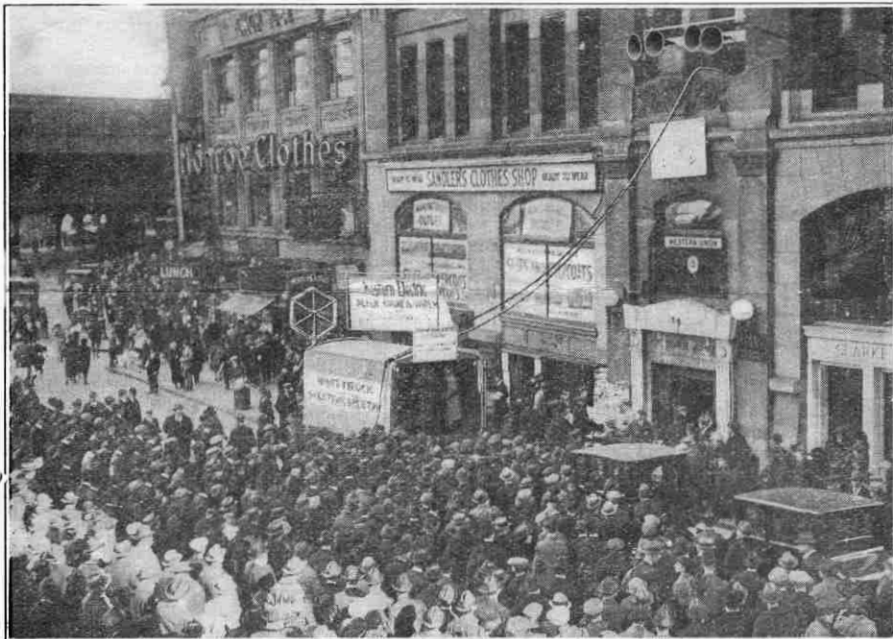
In the particular case referred to, the microphone was installed in a sound-proof compartment on top of the grand-stand on the base-ball ground at Chicago.

This was the starting point of a circuit, which by wire and radio, carried the observer's story of the Chicago *v.* Princeton match into thousands of homes. A well-known sporting writer described every incident of the game, and when the door of the sound-proof compartment was opened the listeners-in were able to hear the shouts and cheers of the spectators. Even the shrill blast of the referee's whistle was audible.

Outside the compartment, valve amplifiers sent the story on its way over the telephone lines to New York. Here it was broadcast by Radio from WEAf, the station of the American Telephone and Telegraph Co.

In one of the main streets of New York was a motor truck, equipped with a frame aerial. This intercepted the radio waves and directed them to a receiving set, connected in turn to five loud-speaking projectors. These were mounted in a window of the New York "Tribune" and made the story of the match clearly audible, above the noise of the street traffic, to a throng of several thousand people in City Hall Park. Over in Newark a similar outfit broadcast the story to another great crowd.

This was the first time that a long-distance telephone circuit was used for the preliminary transmission of broadcast. Every word was clearly heard by thousands of listeners-in as well as by the two big audiences in the open-air. So successful was the performance that it has been decided to broadcast the most important match every Saturday afternoon during the season.



Photograph]

[Western Electric Co.

Our illustration shows the crowd at New York "listening" to a base-ball match that was being played at the Stadium, Chicago. In the centre is seen the motor-car with frame aerial connected to the loud speakers at the top of the picture.

Cardiff Broadcasts

New Station Opened

THE new Broadcasting Station at Cardiff was officially opened on 13th February, and is now in nightly operation. The first words sent out were spoken by the General Manager of the British Broadcasting Company, Mr. J. C. W. Reith, calling "Hello! 5 W A Cardiff Station calling." After a short greeting Lord Gainford delivered to his unseen audience, a message from Mr. Lloyd George expressing his pleasure at the opening of the first Radio Station in Wales. Lord Gainford informed listeners-in that Cardiff was the fifth station to be erected by the Broadcasting Company, and he congratulated the people of Wales

upon their good fortune in having a station from which so much pleasure and information might be derived, for the Company would do all in their power to give listeners-in programmes of the highest standard. It had been hoped to transmit the King's Speech from the Throne in the House of Lords; but unfortunately the Government's permission was withheld.

Sir William Noble, late Chief Engineer to the G.P.O., then spoke, saying that he looked forward to the day when the great Welsh musical festivals would be broadcast and the wonderful voices of the Welsh singers heard by thousands who would otherwise be denied the pleasure. He was followed by the Lord Mayor of Cardiff, who sent his hearty greetings to each and every listener-in, and mentioned how Radio brings the greatest artists of

the world into the home of the humblest cottager. How the music of such great masters as Paderewski, and the art of such singers as Melba and Tetrazzini, will be within the reach of all, and how all will be able to share the highest artistic and intellectual pleasures with the wealthiest people in the land.

A musical programme then followed, and included classical and popular music, followed by a news bulletin and a weather report. The evening's entertainment was concluded by humorous items.

Cardiff Broadcasting Station operates each evening from 6.30 to 10.0, the call letters being 5 W A and the wave length 395 metres. From 9.0 to 9.30 each evening the station will close down to enable the possessors of valve sets to get in touch with the London Station. Broadcasting will then be resumed from 9.30 until 10.0.

The Men Who Gave Us Radio:

I. GILBERT, GALVANI, VOLTA AND AMPÈRE

THE story of the invention and development of a practical system of communication without wires is one of the most remarkable in the annals of Science. In it we read how the Radio of to-day was only made possible by persistent and thoughtful study. We learn of the conquering of difficulties and the overcoming of obstacles that, when first encountered, were regarded as being insurmountable, and we find that success has been gained only by close attention to detail, perseverance, and sound judgment.

No chance discovery has been made that has enabled scientists to arrive, by a short cut, at such brilliant achievements as radio-telephony or super-regeneration. It has been exactly the same in Radio as in the case of the invention of the steam engine. Here Watt's idea of the separate condenser was not obtained by accident, but was the outcome of close and continuous study. It was the final step in a long journey—a step that could never have been taken had not the road that led to it been carefully and thoughtfully traversed.

The Radio of to-day is not the work of any one man, but is the outcome of the labour of many scientists. These men devoted their lives in endeavouring to develop a practical system of communication without wires, and their researches go back at least one hundred years.

* * * *

Radio is made possible by Magnetism and Electricity, of which fascinating sciences most boys possess some knowledge. Let us first deal with magnetism and magnets. There are two kinds of magnets, (1) the permanent and (2) the electro-magnet. A specimen of the former may be bought at any toy-shop, while the latter has a wide application, being used for many commercial purposes, that range from the ringing of a house-bell to providing great motive power by means of large electric motors.

Dr. Gilbert of Colchester

The permanent magnet was known in olden days, and was regarded as an object of curiosity by the people of many nations. An iron ore, possessing the peculiar property of attracting iron and called the "lodestone," is mentioned in Ancient Chinese records, and is referred to by ancient Greek and Roman writers. In Queen Elizabeth's reign the celebrated Dr. Gilbert of Colchester studied the curious properties of the magnet, and discovered that when freely suspended, a magnet always points north and south, and this principle forms the basis of our magnetic compass.

For some three hundred years no further

progress was made in the study of magnetism, but some advances were made in electricity. Up to the latter part of the 18th century only one kind of electricity was known. This was called "static" electricity, as distinct from "current" electricity. Static electricity is produced by rubbing together two substances such as a glass rod and a piece of flannel. The glass becomes charged and will attract feathers and other light objects.

It is often thought that the invention of wireless telegraphy was due solely to Marconi. Many people are surprised when they find that Radio is the result of researches extending back considerably over 100 years.

In this science, as in history itself, progress may be traced by studying the lives of the men who devoted themselves to the subject. These men overcame difficulties, were unaffected by disappointments, and made possible the achievements of their successors.

In this series of articles we propose to outline the development of the science and to briefly describe the researches of those scientists who, before Marconi's time, laid the foundation of Radio. We hope, by these means, to enable our readers to more fully realise the great physical laws and the vast amount of labour and research, that lie behind even the faintest "click" of the Morse dot or dash heard in the receiver.

Static electricity cannot be used to ring electric bells or to do other similar work, and it is of little or no interest, except for experimental purposes.

Galvani and Volta

The second type of electricity was discovered in 1780 by Luigi Galvani, an Italian. In 1799 another Italian, Alessandro Volta, showed that this new form of electricity could be produced by a column of copper and zinc discs. Placing these discs alternately, and separating them with moist flannel, he found that they produced feeble charges of positive and negative electricity. The electricity thus produced was totally different from static electricity, for the supply was available



André Ampère was one of the many scientific men who have distinguished themselves by applying the highest branches of mathematical analysis to the investigation of the problems of Electricity and Magnetism. Ampère was born at Lyons in 1775 and died at Paris in 1836.

in a continuous current, being renewed as fast as it flowed away. This type of electricity therefore became known as "current electricity."

Volta's discovery was followed by a long and heated controversy as to the origin of the electricity thus produced. It was finally decided that it was produced by chemical action. The "Voltaic pile," as Volta's column of metal discs is called, was later replaced by a vessel containing dilute acid, in which two kinds of metal—

generally copper and zinc—were placed. From these two metals positive and negative currents were obtained. These together compose an electrical circuit.

Subsequently there were introduced several types of "wet cells," such as the "Daniel" cell and the "Leclanché" cell, the latter being largely in use to-day for electric bells and telephones.

Cells of this type contain liquid, and for that reason they cannot be conveniently handled. To supply the requirement for a portable and unspillable cell, dry batteries were introduced.

They function in a similar manner to the wet cells, but their acids are inserted in a paste, contained in a casing of zinc. The positive current is generally provided by a carbon rod in the centre of the zinc container, and packed around by the acid-charged paste. The whole is sealed with a covering of pitch, or some similar waterproof and insulating medium. (The small batteries used for flash-lamps belong to this type and their construction may be seen in detail if one is pulled into pieces. An old exhausted cell should be chosen for preference, as the cells cannot be re-assembled satisfactorily).

André Ampère

About the time that Volta was experimenting, André Ampère, a French scientist, was also studying electricity. His father had been put to death by the guillotine in 1793, and the tragedy made a deep and melancholy impression on young Ampère. He sought solace in a study of nature and antiquity. He was a distinguished mathematician, and in 1805 went to Paris, where he became an able teacher. In 1824 he was appointed Professor of Physics in the College of France.

We have not space to describe Ampère's work in detail, but must content ourselves by stating that it had a marked effect on scientific progress, especially in electricity and magnetism. What is of even greater importance is the fact that Ampère's researches prepared the way for Faraday's experiments, which we shall consider later.

(To be continued).

NEXT MONTH.
ØRSTED, HENRY and FARADAY



F. R. Marchant (Southampton).—There is no Broadcasting Station in Liverpool at present, although many people would welcome one.

A. V. Hughes (Whitehaven).—Very little is known at present about ether except that it is everywhere, and that if there was no ether there would be no Radio. It has been said that "Ether is the stuff that vacuum is made of."

G. Nelson (Milford Haven).—There is no risk whatever in using a Crystal Receiver, as neither acids nor batteries are used.

T. Morrisey (Tynemouth).—The higher the aerial is placed, the better will be the result. You can fasten one end of the antenna to a pole attached to the chimney, and the other to another chimney about 80 feet distant or to a clothes-post in the garden.

L. Radley (Exeter).—Instructions for the construction of an Electric Buzzer are given on page 9 of the Meccano Electrical Manual (1/8, post free).

H. Atkins (Leatherhead).—I do not think your suggested aerial, composed of metal discs spaced on a piece of wire by washers, would be satisfactory. Although it is true they would present a greater surface, on the other hand their resistance would be very considerably increased. A single wire is the best form of aerial that can be used for reception with a Crystal Set.

B. Mercer (Reading).—We do not recommend you to use a frame aerial with a Crystal Set, as we do not think that you would obtain very good results.

L. Dewhurst (Grimsby).—Telephony may be received from distances up to 50 miles with one valve as a detector. This distance may sometimes be increased, but all depends upon the local conditions.

P. Maitland (Birmingham).—The transmission of Radio-telephony depends upon the variations in the carrier wave.

T. Brinsley (London, S.E.1).—The "dead-end" effect in inductance is caused by the idle portion of any variable inductance coil. The effect on reception is to give rise to loss of energy by discharging into the air.

G. Rendall (Sheffield).—We do not recommend the use of a "ticker" in the manner you suggest for the reception of continuous wave signals.

K. Lunt (Morecambe).—The Meccano No. 2 Receiver, being of the constructional type, may only be used with an Experimental Licence, and is not available for use with the Broadcast Licence. Full instructions for building same will be ready shortly. The Meccano Valve Receiving Set is not yet ready for sale.

H. Greenfield (Tredegar).—There are several very instructive books on the subject of Radio. You might also read the various Radio periodicals that are published weekly.

B. Stokes (Liverpool).—It is not permissible for us to have a transmitting station in London, much as we should like to broadcast to Meccano boys. Certainly you may write as often as you wish and we shall be glad to help you.

N. Corfield (Bristol).—The combined height and length of your aerial must not exceed 100ft. The antennae may consist of any number of wires.

W. Knowles (Newcastle).—A tree situated near your aerial would not make any great difference to the reception of broadcasting. I am very gratified to note your high opinion of the "M.M."

L. Berry (Oxford).—The actual distance from which telephony can be received on a Crystal Set depends largely upon the type and situation of the aerial, and upon the power used at the transmitting station. Broadcast from Manchester has been received perfectly in Cheshire with a Meccano No. 1 Crystal Receiver at distances up to 33 miles from Manchester, using a standard aerial.

G. Montgomery (Blackburn).—Morse signals may be received up to distances of 100 miles or over on a Crystal Receiving Set.

P. Russet (Yarmouth).—An article giving directions for the erection of various types of aerials will shortly appear in the "M.M.". In the meantime I advise you to give up attempting to climb on the roof!

B. Shaw (Musselburgh).—A frame aerial would probably enable you to receive messages from Glasgow on a two Valve Set. Regarding the number of valves necessary for you to receive messages from Manchester or Birmingham, probably three would suffice, but a great deal depends upon the aerial, the skill of the operator, and local conditions.

H. Wilson (Scarborough).—Although the London broadcast has been received at Bridlington on a Crystal Set, this must be regarded as "freak reception." The reception of broadcast on a Crystal Set at Scarborough is not generally possible. As telegraphy may be received at distances up to 100 miles or even over, you could receive code messages from ships at sea.

"LISTEN-IN"



GUARANTEED

THE MECCANO

RADIO RECEIVER NO 1
For Broadcast and Morse Reception

The Meccano Crystal Receiving Set is a piece of scientific apparatus with which anyone may spend hours of delight and enjoyment "listening in" to broadcasting stations and other telephony transmissions.

It has been thoroughly tested and has received with great clearness music and speech in London, Birmingham, Manchester, and elsewhere, up to distances of 33 miles from the broadcasting station.

Low in cost and complete in itself, ready to be connected to any aerial, the Meccano Radio Receiving Set will provide hours of fun and entertainment.

PRICES:

MECCANO No. 1 CRYSTAL RECEIVING SET, complete	55/-
MECCANO AERIAL SET (including antenna, lead-in and aerial wires and insulators)			12/6

A splendid booklet, "The Meccano Crystal Receiving Set," explaining how easy it is to receive broadcasting, will be mailed free on application.

Address: Department R1, MECCANO LTD., BINNS RD., LIVERPOOL.

L. O. Thompson (Portsmouth).—As explained in our Radio booklet, the Radio waves are intercepted by an insulated length of copper wire, known as the "aerial."

I. V. T. Meadows (Wigan).—When listening-in to broadcast you hear full concert programmes, including songs, recitations, violin and cello solos and selections of grand opera. Also special late news items, weather and market reports, bed-time stories and interesting lectures.

H. Fleming (Brighton).—It is necessary to obtain a licence before installing a Receiving Set. If you wish to install the Meccano No. 2 Receiver (Constructional type) you will require an Experimental Licence. The No. 1 Meccano Receiver may be used with a Broadcast Licence. Either of these Licences costs 10/-.

W. B. V. Hanson (St. Helens).—A knowledge of Morse is necessary if you wish to receive telegraphy, but this is not difficult to acquire. If you wish to join the Meccano Guild, write to the Guild Secretary for an application form.

H. Clements (Glasgow). If you intend attaching an aerial to your house, it will first be necessary to obtain the consent of your landlord.

L. Brown (Watford).—You should be able to receive broadcast from Marconi House satisfactorily at Watford with a Meccano Crystal Set.

H. Forshaw (Birmingham).—Only one person can "listen-in" with a Crystal Set, unless more than one 'phone is used. I hope that you will be able to pay a visit to the Meccano factory while in Liverpool.

G. M. Goodwin (Ripley).—I am afraid that you are too far away from Birmingham to receive broadcast with a Crystal Set, to receive which a valve set would be necessary.

D. Inglis (Oldham).—There is no charge made for broadcast concerts other than the contribution you pay when buying your receiver.

M. Burton (Newbury).—I am very pleased to learn that you are studying Radio. The science is as yet only in its early stages, and, as Professor Fleming recently pointed out in our columns, many of the valuable discoveries in Wireless Telegraphy have come from amateurs.

T. F. Sinclair (Ulverston).—A short paragraph on the new American invention, a Radio Slot-machine, appeared in the January issue of the "M.M."

L. F. Conway (Newcastle).—We shall continue to deal with Radio in the "M.M." so your wish will be granted.

C. Edwin (Ashton).—A good illustration of an aerial is given on page 7 of the Meccano Radio Booklet.

N. J. Leonard (Leeds).—A world radio combine with a capital of £34,000,000 has been formed. It will include British, French and German Stations.



The Secretary's Notes

Every day the scope of the Guild increases and new members are enrolled from all parts of the world. The small enamelled badge of membership is becoming universally known, and Guild members everywhere are pleased to recognise other Guild members by this token, and to accept them as friends. I often hear of members in strange towns meeting and claiming fellowship with other members whom they see in the streets, recognising them by the triangular Guild badge.

The handsome membership certificate, which shows that a boy has been enrolled as a member of the Guild, is one that draws many tributes from new members. Many thousands of members' bedrooms contain this certificate, framed and hanging at the head of the bed, reminding its owner of the objects of the Guild. For the benefit of boys who are not members, it may be mentioned that the three objects of Meccano Guild Fellowship are:—

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.

Every boy who possesses a Meccano Outfit should join the Guild without delay. The Meccano Guild stands for Happiness, Instruction and Progress. It helps a boy to live straight by bringing out all that is best in his nature. A member of the Guild is associated with tens of thousands of other members, who also are interested in the most instructive toy in the world. To join the Guild it is necessary for a boy to fill up the official form of application and to post it to me, together with 7d. in stamps. The Guild badge and certificate of membership are then forwarded, and the boy enrolled as a member of the Guild. If you are not already a member, send a postcard to-day for an application form.

Having joined the Guild the member should attach himself to an existing Meccano Club. If he is not already acquainted with a Club he should write to me for particulars of the nearest Club to him, or a list of the Clubs, if there are more than

CLUB NOTES

West View (Nottingham) M.C.—Second Winter Session proved even more enjoyable than those held hitherto. A very successful exhibition was held last month. **Leader:** Mr. H. W. R. Cousens, 494, Mansfield Road, Sherwood, Nottingham.

Leamington M.C.—This enthusiastic Club recently organised an entertainment in the Urquhart Hall. The Meccano Minstrels, under the direction of Mr. Frank Reade, were the principal attractions. The audience of about 500 included the Mayor of Leamington (Councillor G. W. Hawkins), and the Club President, Lieut.-General Sir John L. Keir, K.C.B. The items were splendidly rendered, and included the well-known song entitled "The Roast Beef of Old England," and a trio "The Pom and the Pug and the Pekinese" given with great effect. A musical tragedy entitled "The Body in the Bag," and a burlesque on the new medical theories, under the heading of "I'm getting better every day," provoked much laughter. During the interval the Mayor presented two Special Merit Medallions to Master J. L. Hills and F. C. Miles, and read a letter of congratulation to these boys from Mr. Hornby, President of the Guild. Mr. F. W. Bull, the Club Leader, then gave a brief outline of the general Club routine and said that he would be pleased to welcome new members, and the proceedings terminated. After all expenses were paid there was £5 profit, which was added to the Club funds. The Leamington Meccano Club have good cause to be proud of their troupe of Meccano Minstrels. **Secretary:** Mr. G. Hare, 36, Willes Road, Leamington.

Malvern (South Africa) M.C.—An excellent Session has resulted in the members being keener than ever, and the attendance has been very good. Before the close of the First Winter Session an enjoyable picnic was arranged to the Zoo Lake. Sports are held every Saturday afternoon, and a very successful sale of work was organised during last month. **Leader:** Mr. E. Sykes, c/o T. Henderson, P.O., Cleveland, Transvaal, S. Africa.

1st Belfast M.C.—The Club continues to make good progress and the members turn up in full force for each meeting. Local gentlemen are evincing great interest in the Club, and one gentleman kindly gave a Lecture on "Radio," and allowed the boys to listen-in. It is hoped in the near future to instal a Radio Set for the use of the members. **Secretary:** Master J. Sinclair, 33, Oakland Avenue, Bloomfield, Belfast.

Butt Lane Council School (Talke) M.C.—Continues to make progress. A very successful Competition, held recently, proved a welcome addition to the programme. **Secretary:** Master Percy A. Ray, 147, Congleton Road, Talke, Staffs.

one. On this list are given the names and addresses of the Club Leader and Secretary, either of whom will be pleased to give details as to the place and time of meetings.

If there is no Club near enough for him to join, the new member should endeavour to form a Club in his district. A useful booklet "Suggestions for Club Secretaries" tells him how to do this, and will be sent (post free) to applicants. If there is no existing Club and one cannot be formed, the boy becomes a "lone member" of the Guild. If he desires it he may be placed in touch with other lone members in almost any part of the world, through the Guild Correspondence Section.

The activity of the second Winter Session of Meccano Clubs all over the world is now in full swing. From all quarters I hear how enjoyable

Club Football and successful Teams

Session is proving. Many Clubs have recently introduced gymnastics and indoor games into their programmes, but up to the present Football seems to have been the most popular development of physical exercise. I should like to extend my congratulations to Clubs on their initiative in establishing Football Teams, and to express my pleasure at the number of matches that have been won by Meccano Clubs. It is quite evident that the majority of Guild members are keen sportsmen, and that they are as much at home on a football field as in the Club-room.

St. Luke's M.C. (London, W.10).—This is a new Club, and at present the members are all Boy Scouts. The programme includes a number of table games in addition to the usual model building, and the Club is rapidly increasing the scope of its usefulness. **Leader:** Mr. P. J. Betts, 178, Wornington Road, North Kensington, London, W.10.

Airdrie M.C.—An Exhibition which was held recently lasted for almost three weeks, and was an unqualified success. There was a fine show of models, including Cranes, Bridges, Ships, and an Electric Railway and Electric Tramway with overhead wire. The Wireless Section of the Club were busy also, and concerts were heard from Manchester, Birmingham and London, almost every evening. **Secretary:** Master W. B. Gardner Henderson, "Rosehall," Airdrie.

Luton M.C.—The members are very keen on model building, and the programme for the last Session proved very enjoyable. Master W. Humby was awarded a Special Merit Medallion. **Secretary:** Master W. Humby, 34, Adelaide Street, Luton.

Victoria (Glasgow) M.C.—The Club membership now stands at over 40, and the Club-room is always well filled. A Model Building Competition was held recently, which proved very popular indeed. **Secretary:** Master Ian Kerr, 57, Victoria Park Drive South, Whiteinch, Glasgow, W.

Bromsgrove M.C.—The Club Leader informs me that the Club is at present more successful than it has ever been, and that owing to the increase in membership further accommodation has become necessary. The Meccano Lecture entitled "The Story of our Ships" has been given and met with a good reception. Master Dennis Tilt has been awarded a Special Merit Medallion. **Secretary:** Master L. Edwards, 148, Worcester Street, Bromsgrove.

St. Cedds (London, E.16) M.C.—Just before the close of the First Winter Session a very successful Dance, Social and Exhibition was held. The Club in general continues to make good progress. **Secretary:** Master S. Elliott, 142, Beckton Road, Canning Town, London, E.16.

Holy Trinity (London) M.C.—The Fourth Annual Exhibition of this Club was held in conjunction with the "St. Mary with St. Gabriel M.C." towards the close of last Winter Session. The Exhibition was the most successful yet held and representatives were present from several London Clubs. In addition to a display of Meccano models, a Radio Demonstration was included in the programme. This was conducted by G. F. Auckland, Esq., and telephony was received every hour from his firm. It is hoped that another Exhibition will be held this year on an even larger scale, and that more of the London Clubs will co-operate. The Club continues to make excellent progress. **Leader:** Mr. S. H. Wilson, 29, Thornhill Road, Barnsbury, London, N.1.

Woodville (Thornton Heath) M.C.—During the last Session two interesting Lectures were given: "Japan" by the Secretary, and "Temperance" by the Leader, Mr. J. F. Preskett. Further progress has been made during the present Session and the Club is steadily advancing. **Secretary:** Master B. Morley, 12, Liverpool Road, Thornton Heath, Surrey.

South Kirkby M.C.—The Meccano Lecture "The Story of our Ships" was read to the members recently and was greatly enjoyed. The boys are hoping to produce the Meccano play "Nonsense Nana" at an early date. A novel Competition consisted of each member studying a certain model from the Manual of Instructions for a few minutes. The books were then put away and the model had to be constructed from memory in a given time. Mr. Hawkesworth has kindly undertaken the Leadership of the Club. **Secretary:** Master J. Williamson, School House, South Kirkby, nr. Wakefield.

Clubs Recently Affiliated.

Adderbury M.C.—This Club, which was referred to in the last issue of the "M.M.," has now become affiliated with the Guild and shows every sign of becoming a keen and energetic branch of the Guild. **Secretary:** Master T. Thacker, The Green, Adderbury, Banbury.

Den Haag (Holland) M.C.—This Club is the first Club in Holland to become affiliated with the Guild, it having been established mainly through the energetic Secretary, Mr. van der Sluis was formerly the Secretary of the "Weltevreden Meccano Club" in the Dutch East Indies, and is one of the most enthusiastic of our Guild members. **Secretary:** Mr. H. G. van der Sluis, 54, Ant. Duijck Straat, Den Haag, Holland.

Change of Address

Subscribers should immediately notify the Editor of any change of address. Send a Postcard giving the old and new address, so that records may be kept up-to-date.



BRIGHT IDEAS

These columns are reserved for dealing with suggestions sent in by Meccano users for new parts, new models and new ways of making Meccano model-

building attractive. We are always pleased to hear from any Meccano boy who has an idea which he considers will be useful in the Meccano system.

Louis Bodinso (Arras).—Although we quite see the value of your suggested short crank handle, the coupling makes a more ready and cheaper connection than the screw method you mention.

C. A. Mason (Northampton).—We shall go carefully into your suggestion for a square shoulder on the threaded pins.

J. Semple (Falmouth).—Your idea for a front axle necessitates the introduction of complicated and costly parts. It would be detracting from the adaptability of Meccano if special parts were introduced to serve the same purpose of existing parts.

Victor Isard (Brighton).—We are introducing a $3\frac{1}{2}$ " gear wheel this year. We shall explore the possibilities of the $2\frac{1}{2}$ " gear wheel you suggest.

J. M. Myers (Nairobi).—Although we have utilised a contact block on our display models, for the transmission of electric current to the moving part, we do not consider the demand would justify our introducing it as an accessory part.

Cedric Pearson (Eastbourne).—It is not possible to make electric motors and accumulators of the vest pocket size. There is a minimum bulk which precludes their incorporation in small size locos.

A. W. Hammonds (Bristol).—It is possible that we may shortly introduce miniature barrels as an accessory to Hornby Trains.

R. C. Terry (Ealing).—(1) Our present coupling is adaptable to a corner connection. (2) The face plate (No. 109) is $2\frac{1}{2}$ " diameter, and is quite suitable for boiler ends.

W. C. Howles (Winstow).—The disadvantage to the fly-wheel type of motor is the lack of reserve power. The slightest load quickly brings it to a standstill.

Master MacFarlane (Plymouth).—Such a part as you suggest has only an ornamental use. Unless a new part has a general use we cannot consider its introduction to the Meccano system.

F. Jarvis (Bethersden).—We are introducing a large size circular flanged plate this year.

M. C. S. Gaitskell (Lymington).—The narrow angle bracket is impracticable, because of the impossibility of effecting a secure point on account of the shanks of the bolts fouling on the inside. The wider angle bracket may easily be made from the present bracket.

Harry Williams (Ayr).—We should have to make the loco wheels of harder metal to take a set screw, which would increase the cost somewhat. The same remarks apply to the bolt connection on the pistons.

Eric Smith (Willoughby).—We illustrate a built-up spring in our Chassis Leaflet, and suggest you send for a copy of this leaflet (post free 4d.)

Jean Lafitte (Blagnac).—Your suggested double bent strip may be made from existing parts, i.e., reversed angle brackets and ordinary strips.

Wm. Scott (Kings Cross).—The cost of the double hinge you suggest would very nearly equal two simple hinges, so there would scarcely be much saving in it.

R. Marker (Honiton).—We are engaged at the moment on a slide action.

Donald M. Rankin (Pelaw-on-Tyne).—(1) An angled coupling of 300 would be much more expensive to make than our present coupling, and unless it had a general use, we could not consider its introduction. (2) We should be very interested to have particulars of the standard you have in mind for carrying overhead wires.

Horace Astley (Skelmersdale).—We are at the moment engaged on the manufacture of a slack wagon, supplies of which will be ready very shortly.

Gordon Phillips (Croydon).—A clock escapement may be made from a face plate with eight $\frac{1}{8}$ " reversed brackets firmly secured to the rim. This particular escapement is working very satisfactorily in a model of a grandfather's clock we have here.

Roger Debenes (Dunkirk).—A very good cantilever spring may be constructed from existing parts. See illustration in our Chassis Leaflet (post free 4d.)

E. Lindsay Thompson (Lindfield).—The internally-toothed gear wheel has been suggested to us from time to time, but we have not yet found for it any application.

Brian Crispin (Tiverton).—A flange for the $3\frac{1}{2}$ " side of the $3\frac{1}{2}$ " x $2\frac{1}{2}$ " flanged plate may be obtained by means of the $3\frac{1}{2}$ " angle girder. We now list angle girders in the same sizes as the strips.

J. R. Cottrill (St. Annes).—We are interested in your suggested slotted curved strips and would appreciate any further uses to which you consider they could be applied.

S. J. Walker (Leigh-on-Sea).—(1) We are afraid that a clockwork mechanism embodying such nicety of

FROM OUR RECENT PHOTOGRAPHIC COMPETITION

We have pleasure in publishing two photographs recently submitted in the Overseas Section of our Photographic Competition. These photographs won the third and fourth prizes, respectively. We hope to announce the results of the Third Photographic Competition, now closed, in our next issue.



Photograph by Master R. Bandiera, Florence, Italy. Master Bandiera is fortunate in living in the midst of beautiful Italian scenery of which the above is a good example.



This well-taken photograph shows three Zulu Warriors in native war-dress and was taken by Master G. Adamson, Eshowe, Zululand, S.A.

control and length of run is quite impractical in the space available in our locos. We agree it would be most desirable. (2) We shall be making modifications to our rails very shortly amongst which the requisite amount of camber will be assured.

Ronald Taylor (Brigg).—(1) We have helical gears already under consideration. (2) We list a fly wheel (No. 132) in our accessories. (3, 5, 6) We should be interested to hear of any general uses you have found for these three items. (4) What precisely do you mean by an "L section girder"?

A. E. Sargent (Shrewsbury).—The question of the filling-in material for Meccano models has been occupying our attention for a considerable time. The standardisation of the sections is the great problem.

Walter Arnold (Blackheath).—Your suggested steering gear is not true to motor car practice. If you have not already seen an illustration of our model chassis, we suggest you send for a copy of the special leaflet (Price 4d. post free).

E. M. van Peborgh (Buenos Aires).—As we do not at present contemplate embarking into higher reaches of Radio, we could not consider the introduction of large-capacity accumulators. We already list a 4-volt accumulator for use with the electric motor. Any firm specialising in electrical accessories can supply you with any size and capacity accumulator.

A. Ormandy (Liverpool).—Rheostat for the 4-volt circuit is illustrated in our electrical manual.

C. Cowes (London, N.W.).—(1) We already list a flat plate $4\frac{1}{2}$ " x $2\frac{1}{2}$ " (No. 53a) also $4\frac{1}{2}$ " strips (No. 2a). (2) The governor of the Meccano Clockwork Motor is placed immediately adjacent to the brake lever.

W. Blakey (Pleistow, E.).—See our reply to A. Ormandy, Liverpool, regarding an electric controller.

J. A. Pope (Liskeard).—(1) We illustrate an electric loco constructed from Meccano parts on page 19 of the electrical manual. (2) For what do you consider an $18\frac{1}{2}$ " curved strip and the larger flanged plate would be useful?

R. Peters (Liverpool).—There may be possibilities in your suggested split-coupling for a big-end bearing and we shall consider it carefully.

Walter Andrews (Cullercoats).—The early type of Hornby Loco is now obsolete, and we have ceased manufacturing this model. Many thanks, however, for your criticisms.

André Billard (Oullins).—Miniature tools such as you suggest would only serve an ornamental purpose, and their inclusion in the Meccano system would not be justified.

Eric Jenkins (Nr. Openshaw).—Our 2" pulley wheel makes an admirable reproduction of an auto steering wheel. It is almost identical in shape to that shown in your sketch.

Douglas Ruffles (Cirencester).—We have in mind a large base plate.

E. J. Curtis (Penge, S.E.).—What is the object of the split in the centre of the large rectangular plate? You do not mention any uses.

Dick Shelton (Swansea).—Two double brackets joined together with a set screw and nut will certainly give your suggested bent strip.

Jean Billant (Paris).—The matter of curved girders is already receiving consideration. It is necessary to prevent the buffers coming together otherwise they lock and derail the train. The type of coupling we at present employ prevents this. (3) We are engaged in a new design of grab made from Meccano parts, and this will probably appear in the revised manual next year.

Kelvin Heagney (Sydney, N.S.W.).—Your idea for the fitting of a cock in the steam pipe on the vertical boiler is sound, and we shall make a note of it.

Roger C. Bennett (Oldham).—The nuts and bolts are packed and assembled exactly as they come through from the testing department. As each unit is handled individually, the cost of the extra handling for disassembling would be prohibitive.

F. H. Staub (Paris).—(1) We have decided to increase the number of perforations in the sector plate. (2) Angle girders are issued in the same sizes as the strips. See our latest price list.

F. A. Hill (Beckham S.E.).—We appreciate your criticisms regarding the tank loco, and we shall give them careful consideration.

Howard D. Jennings (Croydon).—When mounted on a face plate the rack segments give a 3" diameter gear wheel. As this dimension does not mesh with our half-inch standard we do not advocate their use in this form. We are contemplating issuing a $3\frac{1}{2}$ " gear wheel shortly.

Ernest Richer (Ilford).—The question of curved girders has already been raised, and we are going carefully into the matter.

André Broc (Arras).—We are interested in your suggested rail, but we fear it may not prove practical to manufacture.

Eric Ponken (Copenhagen).—Your suggested tube rod is applied in sleeve actions, but the difficulty of this method is that the diameter of our present holes would be too small to accommodate both the rod and the sleeve pieces.

J. C. Spackman (Newbury).—We are interested in your suggestion for an internally-toothed ring, but you do not mention the purposes to which it may be applied.

Wynn Arthur (Lichfield).—The model of level-crossing gates illustrated in our No. 3 Manual will make an excellent addition to your Hornby Train system.



MECCANO



ACCESSORY OUTFITS

Each Meccano Outfit from No. 0 to 6 may be converted into the one next higher by the addition of an Accessory Outfit. Thus, if a No. 2 is the first Outfit bought, it may be converted into a No. 3 by adding to it a No. 2a. A No. 3a would then convert it into a No. 4 and so on up to No. 7. In this way, no matter with what Outfit you commence, you may build it up by degrees to a No. 7 and so be able to make all the many hundreds of models shown in the Books of Instructions. Our illustration shows one of the Meccano Accessory Outfits.

PRICES OF ACCESSORY OUTFITS

No. 0a	converting No. 0 into No. 1	4/-
" 1a	" " 1 " " 2	7/6
" 2a	" " 2 " " 3	8/6
" 3a	" " 3 " " 4	18/6
" 4a	" " 4 " " 5	15/-
" 5a*	" " 5 " " 6	50/-
" 5a†	" " 5 " " 6	80/-
" 6a	" " 6 " " 7	210/-

* Carton. † Wood.



ELECTRICAL OUTFITS



X2 ELECTRICAL OUTFIT.

The application of Electricity to the Meccano system adds a further and wonderful charm. The joys of model-building are now increased by the fascinating pastime of carrying out delightful electrical experiments. THE MECCANO ELECTRICAL OUTFITS contain a number of specially designed electrical accessory parts, and, used in conjunction with any of the regular Outfits, enable the user to construct models for making interesting and instructive experiments. These include the Electric Railway, Morse Key, Tapper Key, Buzzer, Electric Lamps, Electric Crane, Induction Coil, Electric Iron, Motor-Starter, etc.

PRICES.

X1 (containing electrical parts, without motor or accumulator)	...	12/6
X2 (containing Meccano motor, 4-volt accumulator and electrical parts)		42/-

Wonderful Radio Results

We have pleasure in printing below a letter received from Messrs. Shrimpton & Cooke, of Market Place Post Office, Bromsgrove, near Birmingham. We feel sure that our readers will be interested to hear of the wonderful results that this firm are obtaining on their Meccano Crystal Receiving Set.

"We were demonstrating your No. 1 Wireless Receiver last night, and after getting Birmingham very loudly and clearly (we could hear every word spoken), we continued on this until about 8.30, when the Birmingham station closed down for an interval of half-an-hour. We then thought we would see if by any chance we could get London or Manchester. We did not expect to, but there is nothing like trying, so we moved the slide down until it was about a third of the length from the beginning of the coil, when much to our surprise we heard a buzzing in the 'phones. After moving the slide a bit we distinctly heard an orchestra playing with a piccolo or clarionette predominating. After that we heard a man speaking, also a lady singing, and afterwards a gentleman singing.

The whole thing was very faint and we could not

But this dismal chap didn't get one.



Sketched by

[Francis Jeffrey.

This lucky chap got a "MECCANO OUTFIT" for his Birthday,

distinguish any words that were spoken. Manchester is about 90 miles from here, and London about 110 miles, which do you think it was. I think we were most likely on the Manchester wave length, but cannot be sure. We were using two 'phones, one to each ear."

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.

Good Things Coming

The following articles will appear in future numbers of the "M.M." Every Meccano boy should place a regular order with his dealer or direct with this office.

- THE MEN WHO GAVE US RADIO.
- Meccano Boys' Hobbies:—
- An Adventure in the Tree Tops.
- 144 miles an hour in a Giant Bomber:—
- The Most Powerful Aero-Engine in the World.
- A Monster Dredger.
- A Unique Coaling Plant.
- New York's New Bridge.
- A Renowned Cable Ship.
- A Message from Dr. de Forest.
- 1,000 k.w. Radio Valve.

The Meccano Manuals



There are three Manuals, the 0 Manual for simple models built with the 0 Outfit, the 0-3 Manual comprising models built with any of the Outfits from 0-3 and the Complete Manual, which comprises a selection of models that may be built with every Outfit from 0-7. This latter Manual is a very fine publication and should be in the hands of every Meccano boy. It includes instructions for building most of the models shown in the present No. 3 Manual. A limited supply of the No. 3 Manual is still available.

PRICES OF MANUALS:		s. d.
0 Manual post free	0 6
0-3	1 2
Complete Manual	2 10
No. 3 Manual	1 4½

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.

M. G. S. Sewell (Weymouth).—In response to innumerable requests we hope shortly to introduce a stamp collector's column in the "M.M."

H. Wilson (Musselburgh).—We are not all duke's sons, as you say Harry, but we should be surprised if even a duke's son is as keen and happy as you evidently are. We are glad to hear from you again, and we hope you found our suggestions were useful.

G. O. Smith (Whitehaven).—Thanks for your friendly criticisms of the "M.M." You would be surprised if you knew the number of boys who ask for more Radio pages. We shall commence a Stamp Collector's corner shortly, and we can assure you it will be unusually helpful to boys interested in this hobby.

J. Balmer (Belfast).—You lead a full life and that is the happiest life of all. Your four hobbies are well chosen and they all fit in nicely together. We may publish illustrated instructions for making a Meccano Storage Cabinet soon.

T. B. Wood (Bournemouth).—As you will see we have now introduced a "sale and exchange" column.

R. Tanner (Aberdeen).

"There was a young fisher named Fisher
Who was fishing for fish in a fissure.
One day with a grin, a fish pulled him in
Now they're fishing the fissure for Fisher."

With the aid of a siphon of soda-water we can say this riddle through with hardly a pause! Now we are ready for the adventures of the young tanner named Tanner.

H. Beer (Riverton, New Zealand).—Many thanks for the paper telling us about the southern portion of New Zealand. The scenery is gorgeous and we wish we could borrow your climate. We congratulate you on your school successes, and shall be very glad to hear of your further progress.

A. Twist (Blaby).—We have in mind a variety of subjects of general interest for publication in the "M.M." If you are not yet a subscriber we suggest you become one.

R. Peace (Huddersfield).—We are glad you approve of our taking small advertisements, for we consider this column will be a boon to our readers. You are right in your surmise that any boy with something to sell should be able to dispose of it through the columns of the "M.M."

D. Cawley (Hale).—

My first is in furze but not in grass,
My second in tumbler but not in glass,
My third is in bowl and also in bull,
And as for my fourth you'll find it in skull,
My fifth is in bat but not in ball,
My sixth is in dash and also in crawl,
My seventh you will see is in the word snack,
My eighth is my last and you'll find it in knack,
My whole as you will see is a beautiful toy,
That will last for ever and give great joy.

If we receive many riddles as good as this from our readers we shall certainly be compelled to devote a special corner to them.

R. H. Jobson (Prestatyn).—Your praise of the Radio articles in the "M.M." gratifies us. They are written by an expert who possesses the wonderful gift of explaining a complex matter in a clear and lucid manner. They are proving of great assistance to the beginner in this fascinating hobby.

W. Summarsell (Brighton).—Many thanks for your offer to assist in the stamp column of the "M.M." We shall commence this column shortly, and in the meantime if you care to send contributions we will consider them.

Leon Goodman (Stepney, E.).—We shall endeavour to include a drawing competition in our future programme.

Sale and Exchange

Small advertisements are inserted in this column at 1/- per line (average seven words to the line), or 10/- per inch (average 12 lines to the inch). Cash with order. Rates for larger space quoted on application. Address your letter to Advertisement Manager, "Meccano Magazine," Binns Road, Liverpool.

FREE. 30 different stamps to applicants for approval.
100 different 6d. 100 Hungary 9d.
R. W. Edmondson, 35, Queen Street, Morecambe.]

1,000 STAMPS, well assorted, 1/- Post Free.
North Brothers, Stamp Dealers, 37, Bostock Avenue,
Abingdon.

FREE SETS FREE

10 HUNGARY (Pictorials), 10 GERMANY (including 2 Mark), Set 4 unused surcharged "Koztarsasag," and a SPLENDID COLLECTION of unused stamps from Litwa, POLAND, Russia, BULGARIA, Austria, etc., etc. Sent only to applicants for BARGAIN APPROVALS, POST CARD ONLY (Abroad 6d.) N. M. PATERSON, 19, DORSET AVENUE, RUSHOLME, MANCHESTER.

STAMPS FREE. 20 Unused "Neurope" 2d.
50 1/-, 100 unused mixed 1/-, G. H. Barnett,
Limington, Som.

SIXTY DIFFERENT Stamps free to applicants for approvals. All ½d. each. Send postage. Cox, 135, Cambridge Road, Seven Kings.

SET OF 12 UNUSED Batoum 1—50 roubles cat, nearly 40/- for 2/6. This marvellous offer is made to introduce my bargain approvals. State whether beginner, medium or advanced collector.

F. Allan Went, 8, Irston Road, Colchester.

SIXPENCE-POST FREE

Packet F23, containing 80 different Foreign Stamps, including Montserrat (new), Volkstaat Bayern, Fiji, Kenya and Uganda (new), Barbados (Victory), Angola, Hungary, (Koztarsasag), Germany (2½ marks), etc., etc. Buyers of this packet who ask to see Approval Sheet receive an Extra Packet of 15 Unused Free.

Approval Sheets for all Classes of Collectors. Write for a selection TO DAY, and state countries you collect. Exchange desired with collectors and dealers abroad. Collections and duplicates bought or exchanged.—F. G. ROWE, 86, Alma Rd., Bournemouth.

SPLENDIFEROSUSH! But you must wait until the next issue of the "M.M." I have something that you want. G. Hare, 36, Willis Road, Leamington.

Bargains in Bicycles

8 Guinea Models reduced to

£4 19s. 6d.

Carriage Paid and Fully Guaranteed.

Best Value in Great Britain.

Write for List.

JANES & ADAMS, The North London
Cycle Stores,
Palmers Green, N.13.

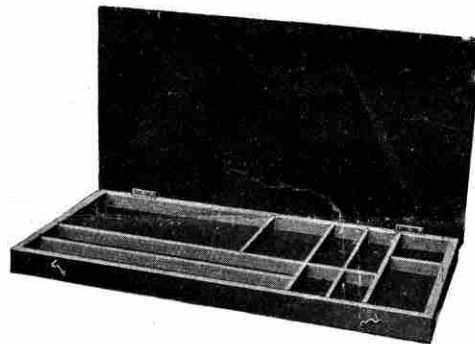
STAMPS FREE to applicants for approval sheets—10 unused, including St. Kitts (1923 view), Egypt (surcharged crown), Malta (Britannia). Without approvals, 4½d. Glass, 72, Birch Road, Southville, Bristol.

FOR SALE. New Meccano, No. 4a, 12/6; Electric Motor (reverse), 10/-. Slightly soiled: No. 4, 30/-; No. 1, 5/6; Inventor's Outfit, 5/6. Also write for list of spares. Box No. 101, Meccano Magazine, Liverpool

FREE! TEN SUPERB BOSNIA to purchasers of one of the following sets. Every stamp different. 100 Austria, 9d.; 100 Hungary, 1/-; 32 Finland, 9d.; *25 Feldpost, 1/-; 30 Turkey, 1/-; *62 Austria (1922), 1/-; 30 Jugo-Slavia, 1/-; 50 Roumania, 1/3; 50 Bulgaria and Thrace, 1/9; 50 Danzig, 1/-; 50 Czechoslovakia, 1/-; 25 Luxemburg, 1/-; *19 Carinthia, 2/6; *35 Baranya, 5/6; *25 Fiume, 2/-; 70 Greece, 5/-; *16 Armenia, 2/6; *10 Azerbaidjan, 3/-; *12 Montenegro (1907), 1/-; *Denotes Mint. Postage extra. Overseas Orders welcomed. H. Llewellyn, 41, Dereham Road, Norwich (Member J.P.S.).

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. 20½" x 10½", depth 1¼".
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" x 15", depth 9¼".
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.

Sale and Exchange (cont.)

LOOK! 250 Good Stamps. 4½d. (Post Free).
Lewis, 362, Wavertree Nook Road, Liverpool.

STAMPS. Sixty different used and unused Colonial and Foreign, 6d.; Ten different Mint British Colonials, 6d.; Twenty different ditto, 1/-; St. Kitts Commemorative ½d. and 1d., mint pair, 2½d.; Gibraltar 1½d. script, mint, 2d.; St. Helena, 1884/94, ½d. Queen, mint 3½d. Postage extra. Alec Kristich, 92, Marchmont Street, London, W.C.1.