

The "DEMON" Tractor. Price 7/6  
Length 25½ in., span 23 in. Fitted 10 in. hand-carved and balanced propeller, patent double-bearing and shock-proof chassis, covered yellow proofed silk with identification discs. Weight and wind resistance are reduced to a minimum in this model, giving the utmost duration of flight.  
Weight, 3½ ounces. Distance, 850 feet.  
Speed, 16 m.p.h. Ceiling, 80 feet.  
Rises from the ground.  
Patent No. 296946.

The Warneford "Whippet" Fuselage Model. Price 17/6

Length 20½ in., span 30 in., fitted 11 in. hand-carved and balanced propeller, and covered orange proofed silk. This beautiful Fuselage Model Aeroplane has an excellent performance, is very strong, and has full adjustment of main-plane, tail, and fin. It disassembles and folds so that it fits into a very small box for storage and transport. The finish is in keeping with the usual Warneford high standard.  
Weight, 4½ ounces. Distance, 550 feet.  
Speed, 17 m.p.h. Ceiling, 50 feet.  
Rises from the ground.



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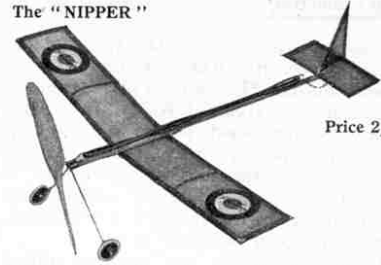
FULL PARTICULARS, WITH FINE ILLUSTRATED FOLDER, POST FREE ON APPLICATION.

MODELS FROM 1/6 TO 35/-

Sole Manufacturer:

F. J. MEE, Warneford Flying Aircraft, GREENWICH, LONDON, S.E.10.

The "NIPPER"



Price 2/6

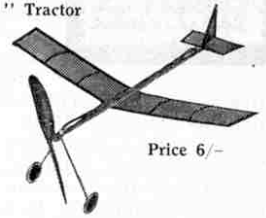
Special Features: A long bearing allowing no movement or wobble on the propeller—therefore a steady flyer. High-tension steel wire tail and rudder—therefore model can be adjusted for stunting. All aluminium wheels, fitted brass bearings, and the model has an amazing performance as the whole aeroplane weighs less than one ounce. The finest machine ever produced at such a price.

Weight, 1 ounce. Distance, 400 feet.  
Speed, 12½ m.p.h. Ceiling, 40 feet.  
Rises from the ground.  
Patent No. 296946.

The Warneford "IMP" Tractor

Length 23 in., span 20½ in., fitted 9 in. hand-carved and balanced propeller. This new model is of all-round increased performance, due to a general reduction in weight. It is fitted with the usual Warneford shock-proof chassis and a 9 in. hand-carved balanced propeller, and also a four-ribbed main-plane. This model having a steel wire tail-plane, is capable of being set for stunting.

Weight, 2½ ounces. Distance, 750 feet.  
Speed, 12½ m.p.h. Ceiling, 60 feet.  
Rises from the ground.  
Patent No. 296946.



Price 6/-

### Famous Inventions—(Continued from page 175)

minutes each night. In the wireless room of this powerful French station he listened intently night after night without any result until the 21st October when, just as he was about to retire, he heard the voice of the speaker at Arlington, and caught the words "and now good night." The experiments were continued for many nights before he again heard any of the transmitted speech, and even then it was only occasional words that he could hear.

At that time the necessary power was obtained by grouping together large numbers of transmitting valves, but as valves of greater power were produced the number necessary for wireless telephony was reduced. It was only after years of painstaking experiment, coupled with the gradual development of more powerful apparatus, that wireless telephony became possible on a commercial scale.

The wireless telephone service between New York and London was inaugurated on 7th January, 1927. At the American end a group of officials of the American Telephone and Telegraph Company were seated round a table in the directors' room on the top floor of 195, Broadway, New York City. With the exception of President Gifford, who was seated at the head of the table, each man wore a headpiece provided with a single earphone. At the London end Sir Evelyn Murray sat in his office in London. At this end also was the same operator who in 1915 had caught the first intentional message ever heard across the Atlantic.

President Gifford picked up the telephone in front of him and, as if making an ordinary telephone call, said to the

operator: "Please connect me with Sir Evelyn Murray in London." Instantly the others seated at the table held their headphones more tightly to their ears, and their intense expressions indicated their keen interest and suppressed excitement.

After a few minutes a voice came distinctly over the telephone, "Hello, is that you, Mr. Gifford?"

The voice was that of Sir Evelyn Murray, and as Mr. Gifford heard him he looked up with a triumphant smile at his fellow directors.

"Yes, this is Mr. Gifford," he replied.

Static interferences were troublesome at first, but afterwards the two men then conversed comfortably for some time. Mr. Gifford concluded by congratulating the British officials and extending to them the good wishes of the American Telephone and Telegraph Company. Sir Evelyn Murray replied in suitable terms and declared the service formally opened. It was then turned over to waiting subscribers and on the first day 31 calls were put through.

From that time the use of wireless telephony increased steadily, and in addition to the service between this country and North America wireless telephone services are now in operation between England and Canada; Capetown; many of the countries of South America; Australia and New Zealand; French Indo-China and French Morocco. Wireless telephone communication is available also to and from the "Majestic" and other large liners on the North Atlantic service. It is also possible to converse by wireless telephone with the pilots of the great air liners employed on the Imperial Airways and other important air services.

### The Story of Meccano—(Continued from page 173)

factory were almost unbelievably better than those in the previous one. For the first time I found it possible to carry out each process in the most economic manner, without being hampered by restrictions of space, or worried as to whether the floor would stand the strain! This reminds me of one very striking change. In my old building the noise of the big presses was terrific. In the new factory, however, all the floors were specially prepared with concrete beds to receive presses and other heavy machines, with the result that when the workshops were in full swing there was no vibration and very little noise.

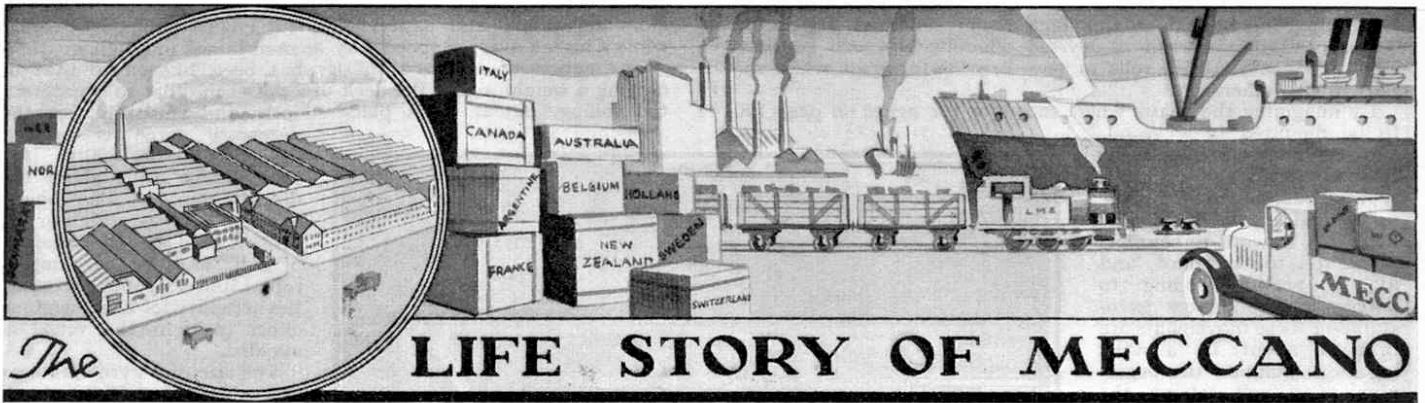
So far I had concentrated entirely on the factory, and my clerical staff still remained in the old building. I now set to work to build ample office accommodation alongside the new factory.

(To be continued)

### Scale Model Aeroplanes

Readers who are aeroplane enthusiasts will be interested in the Aeromodels outfits for home construction. The component parts are printed in correct colours on wood and cartridge board, ready for cutting up and assembling. The outfits include an excellent set of instruction sheets and blue prints that make the task of constructing the models perfectly straightforward for any boy possessing normal skill with his fingers. The present series of models are not constructed to fly, but their accurate presentation makes them of exceptional interest, and in photographs it would be difficult to distinguish between the models and the real machines.

The first model in the Aeromodels series is that of a D.H. Gipsy "Moth." It is designed to a scale of ½ in. to 1 ft., and has a wing span of 15 in. Other outfits will be issued shortly, including one to build the Comper "Swift" machine on which Mr. C. A. Butler made his record-breaking flight to Australia. The price of each outfit is 3/-, or 3/6 post free from Aeromodels, Hooton Road, Willaston, Cheshire.



By Frank Hornby

THE output from my first factory was of course small at its best, but nevertheless Meccano began to attract much attention. I received gratifying letters from boys and from parents in every part of the country, and these gave me a great deal of encouragement at a time when I badly needed it. By this time I

had begun to describe Meccano as "Real Engineering for Boys," and in order to make quite certain that I was justified in doing so I submitted outfits to some of the leading engineers and professors of engineering. Their replies surpassed all my expectations. Each expert expressed the utmost interest and pleasure in the invention, and assured me that I was working on correct engineering principles, so that any boy who followed the hobby enthusiastically and intelligently would inevitably acquire a sound knowledge of real engineering. These favourable opinions scattered by the winds my last lingering doubts and filled me with renewed energy.

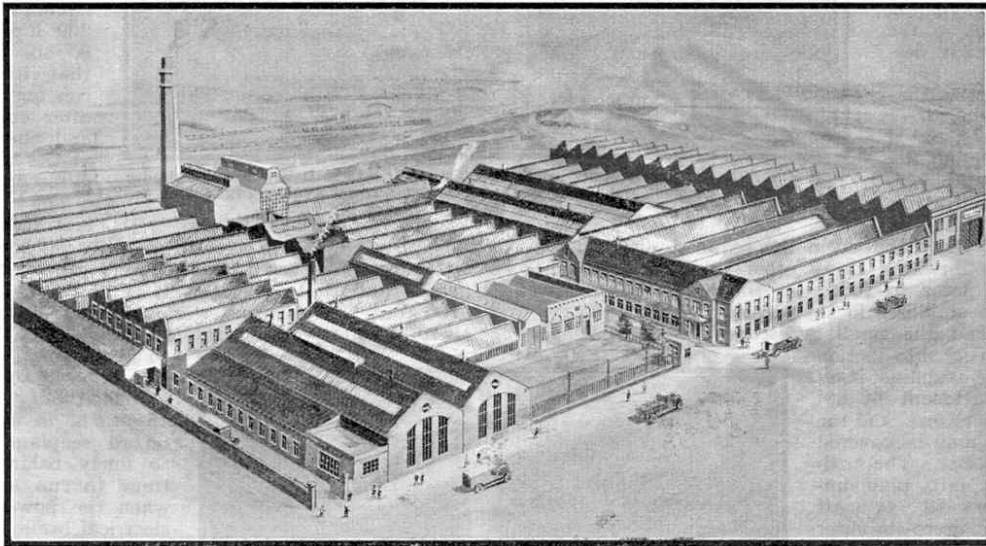
I had supplied a Manual of Instructions with every Outfit from the very beginning. The first edition of this Manual was printed hurriedly and with little thought for appearance, my sole object being to have it ready in time for inclusion in the first outfits.

I now began to feel that this Manual was not good enough for the purpose, and also that it was not distinctive in appearance. I therefore set to work, with the assistance of experts, to design a Manual that should be a standard type of publication that all boys would immediately recognise as coming from my firm. You will have noticed that in all our advertisements, leaflets, etc., the word "Meccano" is printed in a specially designed type-face—the letter "C" is rather unusual in its formation, and the final "O" slopes a little. This and other little peculiarities give the word an artistic and distinctive appearance, and this special design is our exclusive property.

At the top of the cover of the Manual of Instructions there is a drawing of two boys in easy boyish attitudes working away at a Meccano model. The model itself has been changed occasionally, and the boys' clothing has been brought up to date from time to time; but otherwise the drawing has not been altered. I think you will agree that the cover of the Meccano Manual is a most artistic production, and you may be sure that no changes will ever

be made in it without good reason. The same cover is issued for every country in the world, but we make a distinction by changing the colours, using certain colours for certain countries to facilitate identification for storing and packing.

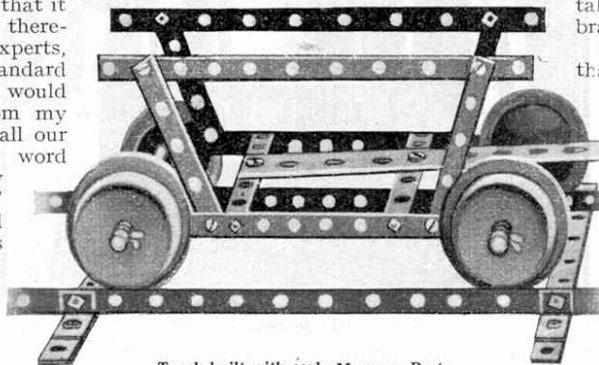
You will have noticed that in all the Meccano Manuals the instructions for building the various models are written in technical language; that is to say correct engineering terms are used in every case. When you are talking with an engineer or a mechanic you may use with confidence any word or phrase employed in the Meccano Manuals of Instructions. Your meaning will be understood perfectly, because you will be speaking the language of engineering. I have no hesitation in saying that any boy who has built a series of



An aerial view of the Meccano factory, which now covers an area of nearly five acres.

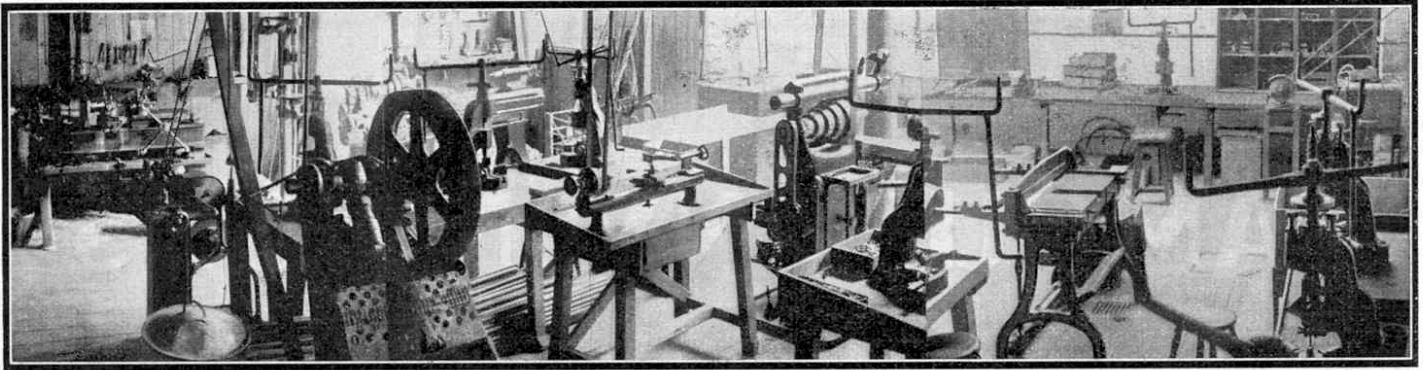
Meccano models from the instructions provided in our Manuals will be able to read intelligently and understand any book on engineering, or a description of any engineering feat that he may come across. I attach the greatest importance to this matter of correct technical description of models, not only because I like everything connected with Meccano to be accurate, but also because technical accuracy is of such great importance to the thoughtful boy who intends later on to take up a career in one of the many branches of engineering.

By this time it had become quite obvious that our tiny factory in Duke Street, Liverpool, was utterly inadequate for dealing with the demand for outfits. Many parts were still made by various manufacturers, but even with this assistance we could not turn out parts in sufficient quantity. We did our best, and worked long hours every day, but the resources of the little factory had reached their limit, and the output could not be increased. There was therefore nothing for it but to move into larger premises and install more machinery.



Truck built with early Meccano Parts.

I spent a good deal of time in searching for a suitable place, and ultimately I decided upon a building that previously had been used as a motor car works, in West Derby Road, Tuebrook. I well remember how impressed I was with the size of the building. It seemed to me more suitable for constructing railway locomotives than Meccano parts, and even after all our machinery and benches were installed the uncovered floor space



that remained gave me a fright!

Before we moved into the new premises at West Derby Road I carefully planned a layout for the various machines and benches, based upon the experience gained in the existing factory; and I was now able to carry out many improvements that previously had been impossible on account of lack of space. First of all I moved in the old machinery and got it working, and then gradually I added one new machine after another. Eventually I had an equipment that, I felt sure, would not only enable me to manufacture practically the whole of the parts myself, but also to produce them in sufficient quantity to meet all possible demands in the future. Never had I made a bigger miscalculation! The popularity of Meccano increased at a rate that I had never contemplated in my wildest imaginings. Dealers who previously had ordered a few outfits, almost in fear and trembling, now began to order on a continually increasing scale and to clamour for immediate delivery. In the effort to grapple with the situation I added machine after machine until the vacant floor space that had worried me earlier on was completely covered; and still the output was not large enough.

During my occupation of this factory I improved my outfits in many important respects. For instance, I abandoned the old tin containers, and the Meccano outfits were now displayed in strong cartons with all the parts looking smart, neat and orderly in their separate compartments. Another far-reaching change was made in regard to the strips. Up to that time these had been made of tin with turned-over edges; but now I began to make them of rolled steel, heavily nickel-plated. This change, as will easily be realised, marked a great step forward in the style and quality of the outfits. I also recognised that the key with which the wheels were fastened on the rods, although satisfactory in most respects, was not sufficiently strong and rigid for use in large working models in which considerable stresses existed. I therefore introduced the more effective set screw which, as will be remembered, I had turned down earlier as being too costly for the purpose. Thus it came about that the key that I formerly manufactured by the million was superseded and gradually disappeared.

In less than two years the position in this factory became similar to that in the old one. I had not sufficient machinery to cope with the demand for parts, and at the same time it was impossible to cram another machine into any part of the building. Thus another move became necessary. At first I thought of looking round for a larger building that might be vacant, but after considering the matter carefully from every point of view I decided against this step. The popularity of Meccano had already increased far beyond my expectations, and I realised that if this growth were to continue on a similar scale it would be foolish to move into a larger building that could only serve the purpose for a comparatively short time, and then have all the trouble and worry of a further change. Finally I decided that the only satisfactory method of meeting the needs of the business was to buy a plot of

land and erect a factory for myself. It was essential that this land should be in a suitable position, and large enough to accommodate not only a factory adequate for present needs, but also any extensions that might become necessary in the future. Finally I purchased a piece of land at Old Swan, a district away from, but within easy reach of the centre of the city, convenient for the principal railway stations and, as far as possibly could be foreseen, large enough to provide for all future requirements.

The designing and planning of the new factory was a long process, demanding the most serious thought. The experience I had already gained was of the utmost value to me at this time in enabling me to decide upon the most effective and economic arrangements, and to avoid features that had proved to be unsatisfactory. Beyond this there was the health and convenience of the workers to be considered, and in this respect I determined to produce an ideal factory. As soon as the plans were completed building was commenced and was pushed forward with the utmost rapidity; and presently there came into being the great Meccano Factory in Binns Road, the name of which is familiar to hundreds of

thousands of boys all over the world. It covers an area of nearly 5 acres of land, with every workshop on the ground floor, glass-roofed and, to a certain extent, glass-sided. Its perfect efficiency is proved beyond doubt by the enormous output that continues steadily week in and week out, and I am confident that there are few factories in which the working conditions are so pleasant.

I take great pride in my factory, and I welcome the thousands of Meccano boys who visit it every year. They are conducted by special guides from shop to shop, every process being thoroughly explained to them; and they leave with eyes shining with excitement and enthusiasm. They have realised a long-cherished ambition—they have seen the home of Meccano!

I wish every boy could see the Meccano Factory, but unfortunately this is impossible. For the benefit of those who, on account of distance or other circumstances, are unable to pay it a visit, I propose in a later article to describe the factory as well as I can, and to explain the many and wonderful processes by which the raw material is converted into the perfectly-finished parts that you all know so well.

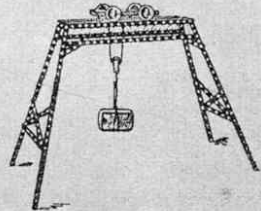
As a rule the transferring of plant and machinery from one factory to another involves an almost complete stoppage of work for a period, and great dislocation of business generally. In this case, however, the machinery was transferred from the old factory to the new one without a stoppage of even a day. Two large new gas engines were first installed, and completely new shafting and belting was set up throughout the works. Then each lathe, press or other machine was carried over separately, fixed in the position that had been prepared for it, and set to work immediately. This involved an immense amount of careful organisation, but the labour was amply repaid, for the whole removal was conducted from start to finish without a hitch.

The working conditions in the new

(Continued on page 238)

## MECHANICS MADE EASY.

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and STOKE-ON-TRENT.**

MANUFACTURERS—

**FRANK HORNBY, 18, James Street, LIVERPOOL.**

One of the earliest advertisements issued by Mr. Hornby for "Mechanics Made Easy," under which name Meccano first appeared.

The upper photograph shows the interior of the first Meccano factory.