

A FAMOUS PIONEER CHATS WITH "M.M." READERS

The Young Engineer and Aviation

By A. V. Roe

"THOSE who wish to take up machine drawing hold up their hands. Mr. Holden, take down their names!"

These were the words I heard soon after I became the proud possessor of a Pauline cap. The very words "machine drawing" thrilled me, and so up went my hand. It came as a slight shock when I discovered it was a supplementary class to be attended after school hours—but I was too keen to think further of that!

Then came a craving to see the world, and when 14½ years of age I went out to a Civil Engineer in British Columbia to learn surveying. It turned out to be a very unsettled period. I did all sorts of things and, after an adventurous year, came back to England to learn a profession.

My father was a doctor, and he wanted me to follow in his footsteps, but engineering was the only thing I could think of. "It is a hard life, you know—six o'clock in the morning!" he warned me. Again my keenness came to the front, and I thought little of getting up at that time, as I was often up at four o'clock in the morning and cycled to Guildford and back (about 50 miles) before breakfast on one of the first pneumatic-tyred cycles! This was 35 years ago, when we lived at Earl's Court, London.

After five years at the Lancashire and Yorkshire Railway Locomotive Works, Manchester, and a year on the engineering side of King's College, Strand, I went to sea as a marine engineer. Many things at sea interested me, but most of all I was fascinated by the albatross, gliding so majestically on the air with seemingly motionless wings. This made me think seriously of tackling the problem of flight.

Then in 1906 the "Daily Mail" offered £250 in three prizes for the best flying models. To my great surprise there were over 200 entries. I fortunately secured the highest awarded prize, my machine flying the fullest possible length indoors and the longest distance out of doors. Thus started my aviation career.

To-day aircraft design is undergoing rapid development and there is more design and research work carried out in a modern aircraft factory during a normal day than was carried out in 50 years by many old-established firms. Nowadays quite a battalion of engineers of various qualifications are required in the drawing

office alone, apart from the works.

No doubt some of you have seen Dunlop's latest advertisement in which it is announced that after years of research and experiment they have discovered and designed a new tread for their tyres. That is only one item. In an aeroplane there are literally thousands of items! Sometimes a draughtsman has to spend weeks, or even months, over a quite small but complicated detail. The reduction of weight, head resistance, and cost of manufacture are often diametrically opposed to each other.

Metals are entering more and more into aircraft construction. Steel is undoubtedly the most difficult material to use, as it has to be so thin. Much of it is only .012 in. (or 12/1000-ths of an inch) thick, which is no thicker than ordinary paper. One can readily understand the difficulty of avoiding local stresses in a spar built up of such thin material when it has to carry attachments that are subjected to very great loads, running into tons.

Flat surfaces have to be avoided. No doubt most people are under the impression that there are no flat surfaces on an ordinary sheet of corrugated iron, but there are! There is a flat portion as one curve joins the other, and the material crumples or fails at this portion when under compression. This can be avoided to a great extent by joining the series of corrugations alternately with corrugations of a much smaller radius. A three-foot length of tube of

very thin duralumin, thus corrugated, weighing only an ounce, can be made to support a ton in compression!

Few people realise the number of parts that are required to build up an aeroplane. The Standard Avro Training Machine of the 504 series is simple constructionally as an aeroplane, yet it contains about 15,000 parts, without counting the engine! Most of the parts are illustrated and numbered in a spare parts schedule.

As readers of the "M.M." know, there are various kinds of aeroplanes, and of these the tractor biplane seems to be the most popular at present. The monoplane is coming forward, however, and offers distinct advantages in simplicity and in stream-lining, which can more readily be carried out, both in commercial and fighting aircraft. In the latter case, guns may be mounted in such a position that there are practically no obstructions to the field of fire in any direction even when two gunners are in action.



A Pioneer of Flight: Mr. A. V. Roe