

BRITISH AIR TRANSPORT

What is Likely and Possible in future Development

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ALTHOUGH THE airlines of the future are among the chief topics of public interest, most people are extremely ignorant, and often positively misled, about the potentialities of air transport and aircraft design. To serve as introduction to this article, a few popular illusions may be dispelled.

During the last year or two many papers and magazines have published detailed drawings, by "our own artists," of the airliner of the future. A few knowledgeable people may have amused themselves by trying to work out the probable wing area and loading of some of these monsters; and no doubt many readers accept these speculations credulously enough. Actually, although extremely large aeroplanes, by present standards, can be foreseen in the fairly near future, the "Queen Mary of the skies," and the giant cargo carrier which will replace merchant shipping, are not at present within the realm of the practical. For the distant future no one can answer; this present article tries to provide some idea of what is likely and possible in the years immediately following the war.

Aircraft Design

All aircraft design is compromise. Designers are faced with demands for characteristics which are generally incompatible. Very fast planes tend to be less manoeuvrable; heavily loaded planes cannot fly at great heights; a plane with a low landing-speed tends to fly slowly as well. Great speed is incompatible with economy, and great load with long range. The fitting of more powerful engines is often the start of a vicious circle; for the most powerful engine designed to give greater speed means greater weight, which leads to higher wing-loading, necessitating larger wings or tricycle undercarriage, which again increase the weight and reduce the speed. In the end no advantage is gained, and it is the

engine with the better power-weight, or even power-size ratio, which improves performance.

The successful designer is the man who can best adjust and balance against each other the various advantages desired. For examples, the N.A. Mustang with the Rolls Royce Packard Merlin engine has upset the whole theory and practice of air strategy by combining speed and manoeuvrability with great range: three qualities to a certain extent incompatible have been incorporated in a single machine which is changing the course of the air war as surely as the Hurricane did in 1940.

Let us then consider the various trends of design, which the great manufacturers' drawing offices and research departments are now trying to combine to produce the post-war airliner.

The Use of Air for Speed

The principles of jet propulsion have been understood for many years, but only recently has the practical application of them been possible. In this country, in America, and Italy experiments went on for many years and Italy produced a jet-propulsion plane which excited much interest a year or two ago. Now it is claimed that Britain has solved the many problems involved sufficiently to be producing a jet-propelled fighter plane. Its post-war use is indicated by the fact that one of the seven types projected by the Air Ministry for civil aviation employs the principles of jet propulsion. The application of jet propulsion to large passenger planes will present many difficulties. It seems, for instance, that the jet units will probably have to be in the wings.

Boundary layer control is another refinement of aircraft design which has immense possibilities, and which we are only beginning to apply. The "boundary layer" is the air immediately surrounding the aircraft which is accelerated by the