AIR TRANSPORT

AIRSHIPS AS EMPIRE LINKS

IN view of the forthcoming flights of the British airships R 100 and R 101—the former to Canada and the latter to India—and the amount of discussion of late regarding the use of airships for Empire transport, we think the following article on "Airships as Empire Links," which was contributed by a correspondent to *The Times* for July 7 last, may be of special interest to our readers :—

The first Labour Government undertook, though it did not wholly conceive, the experiment of improving Imperial communications by means of airships. This has now reached a stage where review is possible. In spite of the dogmatic and contradictory utterances of prophets, whom events have already shown to be of the minor variety, no final judgment can be passed until protracted trials have been made and considered. If, in a world of constant technical progress, an absolute adverse judgment can never be justified, it is nevertheless possible that facts may suggest a call for a halt until established difficulties have been surmounted.

A scheme to improve Imperial communications implies, in the first instance, the creation of a more rapid passenger and mail service between this country and Canada, South Africa, India, Australia and New Zealand ; while, at a later stage, direct intercommunication between these several parts of the Empire may become practicable. For the first and more important enterprise a machine is needed capable, for reaching Canada, of continuous flight over some 2,700 land miles ; for the other Dominions the range may be shorter if supplemented by mooring masts equipped with gas-making plant.

Attempting to meet such demands the Air Ministry drew up an outline specification on which two airships, R 100 and R 101, have been designed and constructed in about six years. The first, built by a contractor, is ready to face her task ; the second, built by the State, will be ready before long. In design (as to which there were no restrictions save that certain factors of safety had to be fulfilled to the satisfaction of an independent body, the Airworthiness of Airships Panel) the two vessels differ materially. In structure they represent two distinct types ; in the material of their manufacture the designers have favoured different alloys ; and, in the propelling machinery, engines using different fuels are employed. The privately built ship shows less departure than the other from what was established practice.

The Voyage to Canada

Since definite information is available of R 100, while R 101 is still about to be enlarged, the former ship better lends herself to detailed examination. How far does she meet the requirements of a unit in a possible Imperial Airship Fleet ? The following figures, which appeared in *The Times* last November, give the still air range of the vessel, at different air speeds, when carrying a crew of 40, 100 passengers, and 26 tons of petrol (the maximum in the circumstances cited) :—

5,000	air	miles	at	50	m.p.h.
3,800	,,	,,	,,	60	,,
3,000	,,	,,	,,	70	,,

Under still air conditions it is at once apparent, the range of the ship is adequate for any link in the Imperial chain. But, as flat calms are rare, a mere correlation of ship performance and geographical distance provides no basis of judgment. The daily wind direction and force over the area between termini must be the factor determining whether or not the craft can operate to a time-table.

While there must be some latitude of opinion on the relation of performance to average meteorological conditions, it will probably be generally accepted that R 100 is incapable of operating commercially between this country and Canada, though on many occasions during a year, by selecting her course and the time of her start, she could, and one hopes will, make this voyage with both speed and safety. Parenthetically it may be remarked that on R 34's now historic flight to America in 1919, the distance travelled through the air exceeded that between the termini by well over 1,000 miles. Further evidence of the extraordinary difficulty of the North Atlantic is supplied by the series of aeroplane failures on the west-bound route.

Between England and Egypt (Ismailia), especially if a mooring mast is provided at Malta, an R 100 would appear capable of maintaining some approach to a commercial service. Of the journey from Egypt to India (Karachi), if an additional mooring mast is available at some intermediate point, perhaps Baghdad, the same tentative conclusion is permissible, though qualified by more hesitancy. Beyond India and south of Egypt we need not at present look. The conclusion then is that, so far as the carrying of a commercial load in accordance with a time-table is concerned, the two new airships, while capable of impressive demonstrations to the West, are likely to offer complete justification of their construction only by routine services towards the East. There they may compete with the faster commercial aeroplane by reason of their ability to fly at night and their greater comfort.

Comparisons

It is, of course, impossible to speak with precision of the cost of airships and of airship travel until the experimental stage has been passed, but a comparative estimate can be made. The cost of R 100 has been officially stated at £440,000 ; that is to say, £4,400 per unit of passenger accommodation, an impressive amount which, when compared with a 20,000-ton, 20-knot liner, considered merely as a first-class passenger-carrying machine, show the following proportion :—

Liner, cost per unit of first-class passenger accommodation—1 ;
Airship, cost per unit of passenger accommodation—5.

This disparity is no true indication of the respective sums on which the passenger must pay interest and depreciation, for the difference in speed of the two forms of craft must be taken into account. Since, on the Indian service, the airship will probably prove, after the initial difficulties are surmounted, two and a-half times as fast as the liner, she has the potentiality of earning two and a-half times the revenue in the same period (given equal working capacity), and consequently the better basis of comparison is the relative amount on which the passenger pays interest and depreciation (taken as six times as high in an airship as in a liner, admittedly a guess) :—Liner, 1 ; airship, 2·3.

This difference, which must in some measure be reflected in the fares, will probably prove, after experience, to be subject to modification in favour of the airship.

The weight of R 100, unladen, being between 95 and 100 tons, the cost per ton (if the higher figure be taken) has been £4,400, an amount which none but the most pessimistic can think impossible of material reduction. One of the world's most luxurious motor-cars costs, on a weight basis, but one-quarter of this figure, its mass-production counterpart but one-twentieth, while the 20-knot liner can be built at about 1-180th of the price.

Turning now from the capital cost of an airship considered as a passenger-carrying machine, her operational expenses must be analysed. This is difficult, for there are as yet many unknowns ; but, as fuel and hydrogen are used in definite amounts, they can be contrasted with the oil consumption of the 20-knot liner. Assuming the R 100 to fly 3,000 air miles at 70 m.p.h., and to cover 2,000 land miles, the consumption of petrol will be 26 tons, while that of hydrogen will amount to 856,000 cubic feet. The 20-knot liner, in covering the same number of land miles, will burn 594 tons of oil. Taking current prices for the two fuels, and the hydrogen at the price at which it can be manufactured at a mooring mast station, the relative cost per passenger will be :—Liner, 1 ; airship, 5.

Here, speaking of things as they are, it is but just to point out that, if the airship were so successful as to warrant the