TRANS-ATLANTIC AIR SERVICES*

THE problem of trans-Atlantic flight has been viewed so often from a false angle as "so much nonsense has been talked and written" about it, that the technical aspects of the case were seldom appreciated.

With regard to the merits of the alternative routes, it must be remembered that the one offering the shortest stages, that is, technically the easiest, is not the most suitable commercially, as it would not be operable in winter. Also it is necessary to remember that bases in Canada for Empire air communications, and in the United States for the traffic between New York and Europe, must be used even though they do not lend themselves for the most suitable subdivision of the flight into stages. Further, the conditions at these and the English ends of route may impose a limitation upon the choice of type of machine, landplane or seaplane, that again may not be technically the most suitable for the flight itself. The route with the shortest stages, the most economical to operate, would be Southampton–Horta (Azores)–Botwood–Montreal or New York, but this is difficult because of lack of landing facilities at the Azores. The difficulties on each of the alternative routes suggest that the ultimate aim will have to be a direct flight from England (at present Southampton) to New York or Montreal. This presents many formidable technical difficulties to the aircraft designer, particularly with regard to strong winds and icing conditions during the winter. What would appear to be the easiest solution, by dividing the flight into stages of most suitable length by floating islands or seadromes, is considered to be impracticable.

With regard to the nature of the services provided, Major Mayo is of opinion that, owing to the short duration of the passage, there is no need to offer comfort comparable with a modern liner. A fast and frequent service of comparatively small aircraft would appear to be ideal. It should be possible to attain a daily overnight mail service between London and Montreal or New York. The difference between the conveyance of passengers and mail is very real, and points to the necessity of separating the two types of traffic. A passenger with reasonable luggage and the necessary equipment and furnishing for his comfort demands about 500 lb. weight. Mail, with a limit of half an ounce per letter, would give an equivalent of 20,000 letters, which would occupy much less space. Therefore a mail plane, being small, can be built in quantities to operate at high speed and high frequency, while the passenger machine must be larger, slower, and less frequent.

The time to be taken for the journey is affected by the prevailing wind of an average forty miles an hour against the west-going crossing, but the gain in time in travelling west is in favour of it. Surprisingly, the latter more than balances the former. The optimum transport conditions, to avoid bunching up of machines at one end, and the consequent uneconomical return of some of them, would be equal scheduled times for either way of crossing; but this would occur at a cruising speed of 156 miles an hour, which Major Mayo suggests is much too low for other aspects of the problem. He considers a speed of 300 miles an hour to be practicable, which would allow a letter posted in New York at 5 p.m. to be delivered in London at 12.30 p.m. the next day, and one posted in London at 8 p.m. to be in New York by 8 a.m. the following morning. The slower passenger machine could have a speed of 200 miles an hour, making the time of the average journey 21·3 hours, a not unreasonable figure for a passenger to endure physically, and a considerable gain on any other forms of transport.

The speed of the aircraft is governed, among other things, by the wing loading, and while the maximum for this type of craft is about 33 lb. per sq. foot at present, the author considers that a figure of 50 lb. should be possible with present-day refinements in design. Forecasts point to the ideal machine to this specification being a land plane of 60,000–70,000 lb. total weight. It is not considered to be any further risk to fly a land plane over water, as even the largest flying boat would not keep afloat for any considerable time in average Atlantic conditions in the event of a forced landing. The greatest difficulty with high wing loading is that of 'taking off' with maximum load, and Major Mayo then discusses the methods of dealing with this problem. There are three of these in use to-day, catapulting, refuelling in the air after taking off more lightly loaded, and a composite aircraft in which the long-distance craft is in effect taken up into the air on the top of another one and launched at a higher speed than that at which it could have left the ground with safety. He considers that the latter method is the most promising.

With regard to stratosphere flying, so far as can be foreseen, cruising speed can be increased by about 1·5 miles an hour per 1,000 feet of altitude. Meteorologists estimate that the prevailing westerly winds over the Atlantic increase at about 2 miles an hour per 1,000 feet of altitude, so that for the east to west crossing stratosphere flying would actually reduce the net speed.

* Abstract of a paper read before Section G (Engineering) of the British Association at Dundee on September 1 by Major R. H. Mayo.

PUBLIC HEALTH IN GREAT BRITAIN

THE twentieth annual report of the Ministry of Health dealing with the year 1938–39, published on September 14*, covers the whole range of the Ministry's work, including finance, public health, public assistance, housing, national health insurance, pensions, and—for the first time—certain aspects of civil defence. A report on the Welsh Board of Health is included.

In presenting his report, the Minister of Health, Mr. Walter Elliot, remarks that in spite of the strain of the present emergency, it has been possible to

* Cmd. 6039. H.M. Stationery Office. 5s. net.

© 1939 Nature Publishing Group

maintain and develop the normal work of the Ministry, and that the main indexes of progress in health and public welfare during 1938 show no faltering in the upward tendency of every recent year.

Compared with the previous year, the standardized death-rate fell by 0·8 to 8·5 per 1,000 population. This is the lowest figure on record, and compares with a rate of about 12 twenty years ago. Infantile mortality fell by five points from the 1937 figure to a new low record of 53 per 1,000 live births. That most regrettable form of death, maternal mortality, fell for the first time below 3 (2·97) per 1,000 total births. The slight upward trend in the birth-rate, which first became apparent after the low record of 14·4 in 1933, carried the figure for 1938 to 15·1 per 1,000 population, though the latter figure is still below that of every year before 1933. Deaths from tuberculosis, numbering 26,176, were actually fewer by 2,353 than in 1937, the biggest fall in one year since 1934. The anti-tuberculosis service of local authorities, together with better general hygiene and housing, sanitary environment and protection of the milk supply, appear to be exerting a continuous and satisfactory effect in the reduction of this disease.

On the other hand, cancer mortality still gives cause for anxiety, for the total number of deaths attributable to cancer in 1938 is estimated provisionally at 68,600 as compared with 66,991 in the previous year. Cancer deaths, in fact, have been steadily increasing in every year, from 27,487 in 1901 to the present time. Cancer is, however, a disease to which young persons are less susceptible than the middle-aged or old, and it is common knowledge that the young are becoming proportionately less numerous in the population, and the increase in cancer mortality in recent years may, therefore, be more apparent than real. A disturbing factor is that investigations pursued by the Ministry show that, in spite of recent developments in cancer treatment, a large proportion of sufferers who could benefit from treatment, if it were given sufficiently early, either do not receive treatment at all, or receive it under unsatisfactory conditions or at so late a stage in the disease that cure, or even temporary relief, is impracticable. There is, moreover, a deficiency of accommodation at hospitals possessing adequate facilities for all forms of treatment. It is to be hoped that a new Cancer Act, passed in March last, may remedy this unfortunate position.

Of the infectious diseases, the number of notified cases of the enteric fevers decreased from 2,149 in 1937 to 1,322 in 1938, and the deaths from 206 to 163, the lowest ever recorded, except for 1934. Notified cases of pneumonia were considerably less than in the previous year, but an exceptionally large number of cases of acute poliomyelitis (infantile paralysis) occurred, namely, 1,489 compared with 768 in 1937, and still fewer in the previous three years. There were 65,000 notifications of diphtheria, 4,000 more than in 1937, though the deaths (nearly 3,000) remained practically the same. An efficient method of artificial immunization for the prevention of diphtheria is now available, by means of which this disease has been almost stamped out in certain American and Canadian cities. It is regrettable that immunization is not more widely practised in Great Britain, particularly as welfare authorities have, and local authorities can obtain, powers to adopt it. Eighteen cases of smallpox were notified in 1938, with three deaths, the first deaths from this disease to have occurred since 1934. Here again it is disturbing to find that infantile vaccination has been steadily declining, so that in 1937 only 34 per cent of that year's infants were vaccinated.

Much information is given in the report upon housing and town planning. Slum clearance and rehousing has been proceeding and continues to grow, together with abatement of overcrowding. The total number of houses completed by local authorities during the year was 101,744, the highest number in any year since 1927–28. The Housing (Financial Provisions) Act, 1938, which has come into operation, contains provisions for the encouragement of the building of new houses for the agricultural population, and should improve the conditions of agricultural workers and benefit agriculture, for "the lack of cottages supplied with modern amenities is one of the main factors which accounts for the desertion of the land, especially by the younger generation".

Other developments recorded during the year include the passing of the Food and Drugs Act, which brings together for the first time the statute law relating to the purity and soundness of food and drugs, and the receipt of 652,899 initial applications for admission to the new pensions scheme for 'black-coated' workers.

For the first time, a chapter on civil defence is included. This contains two sections, one on evacuation, providing for the movement of some 3,000,000 people in an emergency, which has been successfully carried out since the report went to press, and another on the Emergency Medical Services for the treatment of air raid casualties, which will provide 290,000 emergency beds in England and Wales.

PROGRESS IN SEISMOLOGY

THAT the study of earthquakes has been actively pursued in Great Britain during the year September 1938–September 1939 is indicated in the report of the Committee for Seismological Investigations to the British Association meeting at Dundee, which for the first time since 1912 is without the name of Sir Frank Dyson. His death has been a severe loss to the committee, as his wise counsel was always greatly appreciated by his colleagues.

This forty-fourth report of the committee has been edited by the chairman, Dr. F. J. W. Whipple, who states that another Milne-Shaw seismograph has recently been made for the British Association and sent, together with a high-precision clock, on loan to the Fiji Government at Suva. The need for this to replace the old Milne instrument was brought to the notice of the British Association by the newly formed Seismological Investigations Committee of the Australian and New Zealand Association for the Advancement of Science; and brings the number of such instruments owned by the British Association up to seven.

The records from the Suva station are particularly important for the study of deep-focus earthquakes,

© 1939 Nature Publishing Group