

the general "scheme" of R.101. As was to be expected in an airship of such an experimental character, there is much in the airship to be proud of and pleased with, and there is a good deal that might have been better, and which unavoidably gives cause for disappointment. The main structure of the airship, due to Boulton and Paul, Ltd., is one of the finest pieces of engineering work which one could wish to see. And although official figures for structure weight are not available, there is good reason to believe that the structure is very "efficient," *i.e.*, of very good strength/weight ratio.

Of the aerodynamic qualities of the airship nothing is known, and these can only be determined when flying tests such as the measurement of drag by deceleration test, the measurement of turning circle, controllability and stability have been made. Results of model tests are, of course, available, and past experience indicates that a fair degree of accuracy may be expected from these.

A good deal has been made in certain quarters of the problems and difficulties encountered in connection with the machinery of R.101. There is no denying the fact that the engines are heavy, nor that the failure of the variable pitch airscrews to materialise in time is a serious drawback by necessitating the reservation of one of the four engines for astern work only. One immediate result of this last is that the performance will be considerably reduced, as but four engines will be available for forward thrust. It is, however, estimated that with four engines running, the top speed will be 70 m.p.h., and cruising speed about 60 m.p.h. This cruising speed probably corresponds to running the four engines somewhat throttled, *i.e.*, at less than their continuous full power speed.

It is a fair assumption that with the four engines throttled to give about 500 b.h.p. each, the cruising speed will be 60 m.p.h. The bench test consumption figure for continuous full-power conditions is 0.385 lbs. per horse-power per hour. Assuming a slightly worse consumption when throttled to 500 b.h.p., say 0.4 lbs./b.h.p./hour, the four engines will consume approximately 800 lbs. of fuel per hour. The normal fuel capacity is 29 tons, or about 65,000 lbs. Thus

the normal endurance, if our estimated figures are approximately correct, should be something like 81 hours. Allowing an average head wind of 15 m.p.h., which is usual for making estimates of range, the ground speed is reduced to 45 m.p.h. This is certainly disappointingly low, but one should not be stampeded into the assumption that such a low speed made good would render the airship valueless. A ground speed of 45 m.p.h. for 81 hours gives a range of about 3,650 miles. The great-circle distance from Cardington to Egypt is approximately 2,300 miles. Allowing for detours, let us call the distance 3,000 miles. At 45 m.p.h. ground speed made good, this would represent a duration of 66.7 hours. Call it in round figures 67 hours. The airship would still have 14 hours' fuel left, or a reserve of 17.3 per cent. This is with normal tankage. Should the tanks on the passenger deck be used for fuel, the reserve would become very much larger.

While 45 m.p.h. ground speed is certainly not impressive, it is worth while pointing out that 67 hours to Egypt still represents a not inconsiderable saving of time, as compared with the present air route, on which passengers leave London at 9 a.m. Saturday morning and arrive at Alexandria at 9.30 a.m. the next Wednesday morning, a lapsed time of about 96 hours. And this is with R.101 as she exists to-day. The fitting of variable pitch reversible airscrews, with attendant release of the fifth engine for going ahead, will result in a material increase in cruising speed, and a consequent shortening of time to 55-60 hours.

The commercial possibilities, as distinct from the technical, cannot be discussed without a knowledge of the tare weight of the airship. We gather that at present, accommodation is provided for some 50 passengers only, but whether this is because it is not desired to carry more, or due to inability to lift more with a good reserve of fuel, we cannot say. At the worst, it only means waiting for lighter engines, which it should be possible to produce now, aided by the experience in producing the "Tornado." This is one of the improvements upon which it is permissible to count. It affects the commercial utility of R.101, but not seriously the technical considerations.



**THE PRINCE'S MOTH:** As previously reported in "Flight," H.R.H. the Prince of Wales has acquired a D.H. "Gipsy Moth" for his personal use. We show above a photo of this machine—G-AALG. ("FLIGHT" Photo.)