THE HANDLEY PAGE WING

BY P. HANDLEY PAGE

The paper to which everyone interested in aviation has long been looking forward was read by Mr. Handley Page on Thursday of last week (February 17), before the Royal Aeronautical Society. There was a very good attendance at the lecture, which was followed by an interesting and instructive discussion. Giving as it does, for the first time, a full account of the results obtained with the new H.P. wing, we publish Mr. Handley Page’s paper in full, and we feel that we need not make any apology for doing so. The paper is one of most unusual interest, and it may well be that the Handley Page discovery will have the most far-reaching effect upon the future of commercial aviation. The following is the full text of the paper.

The present Paper is a record of experimental work carried out with a view to overcoming the phenomenon of “burbling.” As is well known, the total pressure on an aerofoil is the sum of the positive pressure on the under side and the negative suction on the upper. If this negative suction can be made to increase progressively with increasing angle of incidence on the back of the plane, and the pressure increases continuously as some function of the angle. At angles greater than this critical value the air leaves the back of the plane, a ‘dead’ air region is formed there, and any reduced pressure or suction on the plane back tending to increase the total ‘lift’ is then solely due to the drag of the ‘live’ air stream at the edges of this ‘dead’ air region.

A further reference was made later on in the Paper—

“The critical angle at which the ‘live’ air leaves the plane back is reached earlier in the case of planes of high aspect ratio, and the latter accordingly do not have such high maximum values as the planes of lower aspect ratio. With planes of high aspect ratio there is not the same facility for the ‘feeding in’ of fresh air at the plane sides to act as a link between the plane and ‘live stream,’ and therefore the ‘live stream’ leaves the plane back at an earlier stage than in the case of the plane of lower aspect ratio.”

In Fig. 1 is the set of curves reproduced from the 1911 Paper, showing the pressure on aerofoil as a function of the angle of incidence.

Fig. 1 shows the pressure on aerofoil as a function of the angle of incidence. It will be observed that the square aerofoil marked P. 1 : 1 continues lifting until 40°, whereas the aerofoil of aspect ratio 6.25 : 1 (marked L. 6.25 : 1) “burbles” between 10° and 15°. If, then, it were possible to convert the high aspect ratio aerofoil into a series of square ones and maintain the same conditions as in a square plane, higher maximum lift coefficients should be obtained.

In a Paper which I read before the Royal Aeronautical Society in April, 1911—ten years ago—I attempted an analysis of the somewhat meagre results then available on the pressures on plane and curved surfaces moving through the air. The effect now known as “burbling” was referred to as follows:
