

"THE CONQUEST OF THE AIR"

SIRS,—Apart from personal privilege, a reply to a review is only justified when new facts are brought out for the benefit of readers. This is the author's excuse for replying to the review of "The Conquest of the Air," on pages 40 to 42 of the January *Journal*.

In the first place, the writer must express his satisfaction that the only portion of the book which is based on his own work, namely, the chapter dealing with the "Ocean of Air," is regarded so favourably. The greater portion of the book is, as the review states, a compilation from various sources, which, however, are believed to be reliable. Incidentally, it may be said that the nomenclature of the Zeppelin balloon, to which exception is taken, is correct, for it was not until the destruction of No. 4 that the new numbering was begun. Mention of the compartments in the rigid system was not omitted since on page 103, in speaking of the Zeppelin balloon, it is said: "It will be noticed that some of the ideas, which have been used to secure safety at sea, namely, the division into compartments and the duplication of the engines, were applied to this balloon." The most serious criticism, however, is the following: "Towards the end of this chapter (p. 122) the author springs upon us this axiom 'that the motive force increases as the cube of the speed for balloons of similar design and the weight per horse-power diminishes in the same ratio.' We should have liked to see how this was arrived at, especially, in view of the fact that in the example given the speed is doubled when the horse-power is squared." The importance of this subject seems to require a full explanation of the author's statement, taken from a recent book, "L'Aéronautique," by Comte Paul Renard, than whom no one writes more accurately and clearly. He says: "The general law is that the motive force is proportional, not, like the traction, to the square, but to the cube of the proper velocity. To double the velocity of an aerial vehicle, other things being equal, the motor must be eight times as powerful, to triple it the power of the motor must be multiplied by 27, etc." The lightness of the motor is expressed by the quotient of the weight of the motor divided by the horse-power. Now, 30 years ago steam-motors weighed about 100 kg. per horse-power and consequently dirigible balloons were impossible. In 1884 Capt. Renard constructed an electric-motor of 44 kg. which was exceptionally light and gave a velocity of 6.5 metres per second. To double this speed and bring it up to 13 metres it was necessary to have the motor eight times lighter, or not much more than five kg. per horse-power. This is about what exists to-day, and consequently we see dirigibles attaining a speed of 12 to 15 metres per second. The same explanation is given by A. Berget in his "Route de l'Air," which has been translated in England under the same title as the author's work (and was reviewed in the October *Journal*). In the example criticised, if a velocity of 13.5 miles per hour requires 8.64 horse-power, with a maximum weight of 178 pounds, a speed of 27 miles per hour, or twice as much, will require 69 horse-power, or eight times more, and the weight per horse-power can only be 22 pounds, or about one-eighth of the original weight, for the same balloon.

The following sentence appears ambiguous to the reviewer: "In a balloon the carrying capacity is proportional to the volume, which increases as the cube of the surface and weight." A comparison of the advantage for transportation of the large balloon over the large flying machine was intended, and it was expected that the reader would remember this more ample statement in a previous chapter: "Since the lift of a balloon increases as the cube of the linear dimensions, but the surface, and consequently the resistance of the air, only as the square of these dimensions, it follows that the larger balloon with an equal speed will carry more weight, exclusive of its motors, than the smaller one."

As regards the omission of any discussion of lift and drift, aspect-ratio, stability, and the resistance of the air, etc., the author would say that his "Primer" is intended for the man in the street, and the publishers required its contents to be confined within 200 pages.

A. LAWRENCE ROTCH

Blue Hill Meteorological Observatory, U.S.A.

March 14, 1909.

THE DAGENHAM GROUND

SIRS,—As Chairman of the Experimental Ground Committee, I take strong exception to the remarks of Mr. Turner at the Annual General Meeting. He might have taken the trouble to ascertain the real facts before making such sweeping assertions.

He asks who chose the ground at Dagenham, and whether it was chosen by all the members of Council "in a body" or the Committee. The Council, of course, had nothing to do with it. It was chosen by the "properly constituted" Committee, all the members of which visited the ground—most of them two or three times—before it was definitely decided upon. The ground was regularly used by only four or five members (not "one or two"), and it is a very great pity that more did not avail themselves of it. Mr. Turner states that this