## "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 Comt. 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 comparision 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.

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## 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

ground was not suited to its purpose. The Committee, who were in a better position to judge of this, were of opinion that, though it had its faults, it had all the makings of a really first-class ground—indeed, it is by nature quite the best to be found near London. But it would involve an expenditure of fully £300 to £400 to develop it into a good flying ground, which the Committee could not get. If a dozen members had come there and had given £50 each for the use of it, matters would have been different. Nevertheless, anyone who witnessed the trials with Mr. Moreing's Voisin machine there would agree that though the area was restricted, in experienced hands the machine could have been made to fly. A space of about 300 by 400 yards was available with perfectly open ground round it, but this was bounded by ditches. If these ditches could have been filled in a run could be made in any direction of fully 600 yards across the flat. As regards the upper part of the ground, which was covered with scrub, the scheme on hand, estimates for which had been gone into, was to clear a circular patch 300 yards across, to be rolled and cindered, and this would have made a perfect starting place. This was actually commenced by the construction of a good cindered track 400 yards long, and on this many trials were actually made with two different machines.

It must also be remembered that this ground was chosen not merely for practice with aeroplanes, but also for all other kinds of experiments in aeronautics, such as gliding, kite-flying, etc. There are other considerations, too, to be taken into account. Privacy, proximity to London, facilities for repair shops, lodging and feeding accommodation, etc., and it is not easy to find all these combined.

If only members would rally together and co-operate, instead of paying high prices for the use of grounds in various places, a good ground could be provided by the Society. But if they hold aloof and only grumble at what is provided by those who have taken a great deal of trouble to do their best, then no satisfactory results can be expected.

B. BADEN-POWELL

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SIRS,—The question of the Experimental Ground is a very small part of the case for the appointment of the elected General Purposes Committee which was decided upon at the annual meeting; but since a great deal has been made of it, and the subject is likely to be referred to again in the *Journal*, I should like to make one or two remarks.

It seems idle, at this date, to defend the choice of the ground at Dagenham. In the annual report of the Society it was admitted to be a failure. Mr. Balston, during the discussion at the annual meeting, admitted that it was a failure. Mr. Reid used the words "you cannot blame anybody for being a little wrongin their estimate of the requirements of such a ground." Finally, we have the bill to pay.

The ground was chosen for flying experiments. It is admitted that it is not suited for that purpose. As to not blaming anybody, I think we are entitled to question the judgment of those who were responsible. After all, to an expert, or to experts, the choice of a ground for flying experiments should be quite a straightforward business. What is needed is perfectly well known, and should, I venture to say, have been known at the time this ground was chosen. The slightest element of doubt as to the suitability of the ground ought to have occasioned a pause in the negotiations for it. No doubt there were considerations which made it desirable that the ground should be selected quickly; and perhaps there is no need to criticise harshly those who were entrusted with this matter.

I only raised the subject because it illustrated the growth of the business of the Society and the need that we have of the help and advice of a Committee that can control business affairs, leaving the Council undistracted by them, and with more time, therefore, for the scientific objects of the Society.

CHARLES C. TURNER

Press Club, Wine Office Court,
Fleet Street, E.C., April 14, 1910.

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## THE FIRST AEROPLANE FLIGHTS

SIRS,—I have had my attention called to your issue of January. On page 40 you give the first aeroplane flights throughout the world. This is of particular interest to me, for my brother, Mr. A. V. Roe, was the very first to leave the ground on a free aeroplane in England. It was on June 28, 1908, that he made his best flight. This was about two feet off the ground for about 60 yards. Of course, it was not a long flight, but sufficiently long to be recorded as the first. He was then using a 24 h.p. Antoinette. This will place Great Britain fourth on the list instead of ninth.

In June, 1909, as you will, of course, know, he made the first flight ever made on an all-British aeroplane.

I am sorry I did not call your attention to this sooner, as it is only fair to my brother that he should have the credit of it.

H. V. ROE.