

Lecturer thought could certainly be inferred, and that was, as these experiments had taken place some time ago, they would not have been allowed by either France or Germany—who wanted navigable balloons for military purposes—to be discontinued had they been as successful as the Chairman thought they were.

After the meeting Mr. Briant sent the following letter to Mr. Brearey, who asked Mr. Middleton to reply to it.

17th May, 1890.

DEAR SIR,

I don't know whether you intend printing the discussion on Mr. Middleton's paper, but if so, could you find room for the enclosed note to the remarks I made last night? I did not care to walk up to the blackboard and give these figures as I was a stranger.

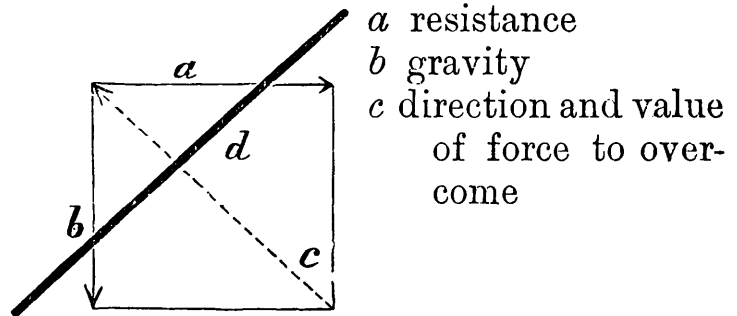
Yours truly,

(Signed) TRAVERS J. BRIANT.

Note.

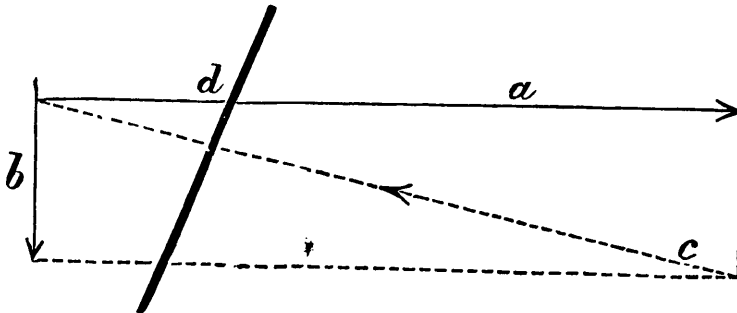
The forces to be overcome in flight are (*a*) resistance of the air, [and] (*b*) gravity. These forces act normally at right angles, and may be represented diagrammatically. Mr. Middleton's small models shewed that when wings are moved vertically the motion is horizontal, *i.e.*, at right angles.

When a bird is flying slowly, as at starting or stopping [or the case of a slowly flying bird], the resistance to be overcome is less in proportion to gravity than when the flight is rapid. Assume for simplicity that these forces of resistance and gravity are equal. We have this figure—



The direction [of the wing stroke must be d , *i.e.*, at right angles to c .

In the case of a quick flying bird the figure, because of the increase of resistance (gravity remaining the same), is this—



A study of instantaneous photographs of birds proves this theory. To get at this exact inclination, however, allowance must be made for the downstroke being more effective than the upstroke, and for other details unnecessary to refer to, but the above is, I conceive, the fundamental principle of flight.

Mr. Middleton replied as follows :—

3, Wellesley Villas,

Wellington Street,

Slough,

4th June, 1890.

MY DEAR SIR,

I safely received your letter of the 23rd May, with the enclosed remarks of Mr. Travers J. Briant.

I did not earlier answer your letter from *want of time*. Now you write under date of June 4th—this morning—that you sent me “some remarks upon your [my] lecture in the way of discussion,” and seem surprised I don’t discuss them. But what is there to *discuss* in them? Briant says—asserts rather—that “the direction of the wing stroke must be . . . at right angles to c , [c being the resultant obtained by compounding the *acceleration* of gravity—or the weight of the bird, perhaps, he means, with the *force* of resistance of the air to the bird’s motion!] Now whether this assertion be true or not, there is no valid *reason* given for it being true. His pretended reason or argument being *as ridiculous* as if he wrote, that because a bushel of wheat cost x shillings and a pound of sugar 7 pence, the distance of the sums is thereby proved to be 91,000,000 miles! I fear Mr. T. J. Briant *is ignorant of the very elements* of mathematics. For he is evidently “compounding” [*confounding*, shall we say?] two quantities of different “dimensions” to wit, *force* and *acceleration*, in order to get from their resultant a quantity whose dimensions is to be . . . what? force? or acceleration? I know not, and I don’t think Briant knows either. And then he tells us that the direction of the