CORRESPONDENCE

To the Editor of the JOURNAL OF THE ROYAL AERONAUTICAL SOCIETY.

Dear Sir,—Mr. W. O. Manning, in his letter in the JOURNAL OF THE ROYAL AERONAUTICAL SOCIETY for July, 1933, voices a popular but erroneous belief that it was the coming of light power that gave to the Wrights the opportunity to fly that had been denied to their predecessors.

Although, as Mr. Manning very rightly says, the Wright aeroplane engine was not available in 1848 for Stringfellow, I would remind him that other engines of lighter weight per horse-power had been built previous to the Wright engine by Maxim and by Manly. Both Maxim and Langley, who used these engines when they built their power-driven machines in 1891 and 1903, had the knowledge of the earlier work of Sir George Cayley and of Stringfellow, but the possession of this knowledge and adequate power did not enable them to fly. There seems to be no ground for supposing that they would have succeeded had they possessed the Wright aeroplane engine instead of the lighter engines which they did possess.

It was in the decade preceding the Wrights' invention of their aeroplane that at least two Governments, encouraged by the fact that adequate power was then available, subsidised the building of flying machines and the attempts to fly them. They failed, not for lack of power, but because of their lack of knowledge of how to apply and control that power. In order to fly it was necessary to make efficient wings, produce efficient propellers, direct the thrust in the right direction, and manipulate the machine in such a way as to enable the man not only to rise in the air, but to remain in sustained flight and subsequently to land so as to fly another day.

Perhaps Colonel Lahm might not have drawn Mr. Manning's criticism had he referred to the Wright Brothers as the inventors of the first successful airplane, but the word " successful," to my mind, is included in the term " airplane " in the same way that " flight " is now recognised, since the Gorell Committee, as being confined to actual flight and is not applicable to unsustained hops or to flights assisted by towing from a car.

I would therefore submit, with all respect to Mr. Manning's long experience, that Colonel Lahm, in referring to the Wright Brothers as the inventors of the airplane, is justified in this expression without requiring the qualification " successful " or " capable of flight " to be added after the word " airplane."

Yours faithfully,

GRIFFITH BREWER.

THE BEHAVIOUR OF FLUIDS IN TURBULENT MOTION

To the Editor of the JOURNAL OF THE ROYAL AERONAUTICAL SOCIETY.

Sir,—I read with great interest the lecture of December, 1st, 1932, on " The Behaviour of Fluids in Turbulent Motion," by Mr. Fage, as I have followed for many years his very valuable contributions to the modern experimental hydrodynamics. I especially appreciated in his last paper the statement that the fully developed turbulence is essentially three-dimensional even if the mean motion is two-dimensional. I came to the same conclusion by some theoretical statistical investigations on turbulence which I recently carried out where the assumption of a two-dimensional turbulence failed.

I am sorry that I cannot completely agree with another statement in the paper. The lecturer writes the following:—" Some attempts have been made to determine the state of flow in the neighbourhood of flat plates and circular cylinders, but the solutions obtained have failed to indicate the commencement of eddying motion."

I cannot say as to whether he is referring in this sentence to my investigations of the stability of the laminar flow along a flat plate lying in the direction of the stream (" Nachrichten d. Ges. d. Wissenschaften z. Göttingen," p. 21, 1929), and the later application of my method to the flow inside a rotating cylinder by Dr. Schlichting (" Nachrichten d. Ges. d. Wissenschaften z. Göttingen," p. 160, 1932). In any case, I cannot approve of the criticism.

In the above mentioned paper of mine, it has been shown that certain oscillations or, as Mr. Fage may say, periodical eddies, may be superposed on the basic flow at the proper Reynolds numbers without dying out and even with increasing strength. Thus, the instability of the mentioned laminar flow under certain circumstances agreeing in a satisfactory manner with the experiments has been proved. On the other hand, also the wave length of these oscillations or the spacing of the eddies and the travelling velocity of the latter have been given. It would also be possible to calculate the velocity distribution in the mentioned eddies. Therefore, I cannot see why the theoretical investigations have failed to indicate the commencement of eddying motion.

W. TOLLMIEN,

California Institute of Technology.

Sir,—I wish to thank Dr. Tollmien for his written contribution to the discussion, which was inadvertently omitted in the general reply in last month's Journal. The criticism there made was justifiable, and mention should have been made in the paper of Dr. Tollmien's theoretical prediction of the breakdown of laminar flow.

Yours faithfully,

A. FAGE.

REVIEWS

The Measurement of Air Flow

By E. Ower, B.Sc., F.R.Ae.S. Published by Messrs. Chapman and Hall. Price 15/-. 2nd Edition.

This book deals with various methods of measuring air flow, and the principles of the pressure tube anemometer, plate orifice, Venturi tube, the vane and hot wire anemometer, etc., are discussed with the aid of much mathematics. There is also a chapter on manometers and another on examples from practice.

The effect of the author's experience as assistant in the Aerodynamics Department of the National Physical Laboratory can be seen in the way the subject matter is dealt with, and the book will appeal more to the research department of the firm concerned rather than to the engineer, who does not usually require such detailed knowledge of the instruments he uses. The theory of the watch is usually only vaguely understood even by those who use the instrument constantly for scientific research purposes.

The book is useful as it contains a complete description of modern methods of measuring air flow, written by an author who is an authority on the subject, and those who are interested in this subject scientifically will find the work a valuable addition to their library.