

distribution of turbulent flow and is not in accordance with the actual physical conditions. The final chapter on experimental methods contains a brief historical account of the development of wind tunnels and a description of the various modern types. Particular attention is also devoted to the methods of making the flow visible, and there is an interesting series of photographs showing the development of turbulence behind a bluff body and of circulation round an aerofoil.

(2) This volume of the "Handbuch der Experimentalphysik" is devoted to the subject of the lift and drag of a body moving through a fluid, and more particularly to the experimental methods of measuring these forces. All the articles attain a high standard, being comprehensive in character and clear in expression, but it is perhaps to be regretted that experiments in flight, apart from deceleration tests of airships, receive only the briefest attention.

Flachsbart contributes an interesting historical account of the development of hydrodynamics, confined mainly to the determination of drag and the necessary experimental apparatus, and this is followed by an article by Prandtl on the design and operation of modern wind tunnels, in which he expresses a preference for the open jet type in spite of its poorer economy of power. Seiferth and Betz discuss the method of testing aeroplane models in a wind tunnel, describe the principal types of balance used in these tests, and give a few typical experimental results. The problem of wind tunnel interference is discussed in detail, but unfortunately there appears to be some misapprehension on the subject. The authors seem to assume incorrectly that the corrections in open and closed tunnels of any shape are of the same magnitude but opposite sign, and in discussing the interference on the downwash behind an aerofoil they fail to realise that the method of images remains valid for a rectangular tunnel, though it breaks down for a circular tunnel.

Muttray contributes an excellent account of the measurement of the drag of symmetrical bodies, both directly and by measurement of the flow in the wake, and he gives a critical account of the experimental results available. Dropping tests of spheres and discs are discussed very ably by Schiller, who concentrates on the lower range of Reynolds's number, whereas Muttray deals mainly with wind tunnel tests on a larger scale. Schiller also gives a critical discussion of the problem of the sphere, including a summary of the theoretical work on the subject, and shows that the most

reliable experiments confirm the accuracy of Goldstein's extension of Oseen's solution with Faxen's correction for wall interference. The final article is devoted to the problem of lubricated bearings, and Kiesskalt gives a clear account of the subject, including a brief summary of the theory initiated by Reynolds and developed by Duffing.

### Short Reviews

*Introduction des théories de Newton en France au XVIII<sup>e</sup> siècle avant 1738.* Par Prof. Pierre Brunet. Pp. vii + 355. (Paris: Albert Blanchard, 1931.) 55 francs.

THE eighteenth century witnessed the bitter controversies between the Cartesian and the Newtonian conception of the physical world. For decades, the Cartesians tried all the subtleties of logic and science to defend the vortex theory against the views based on universal attraction. But in the end, they had to give way; and the popular defence of Newton's philosophy by Voltaire marked the turning of the tide. It is the epic of these controversies which Prof. Brunet describes for us with a wealth of details giving a scholarly interest to his exposition. The opposition of the Cartesians can be explained by the fact that their master's theory was the first universal explanation of the world, independent of the occult forces which were in favour during previous centuries. The scientific atmosphere of the time was quite at ease with the mechanist conception of Descartes, and loathed any system which had even a vague resemblance to occult qualities. No doubt these controversies help to clear the implications of Newton's system of the dogmatic blemishes which had to be ultimately recognised in Descartes' cosmology. In bringing to light such and other important points, Prof. Brunet has rendered a great service to the history of science.

T. G.

*More Essays of Love and Virtue.* By Havelock Ellis. Pp. xiii + 218. (London: Constable and Co., Ltd., 1931.) 7s. 6d. net.

MR. HAVELOCK ELLIS began writing books more than thirty years ago, and some of his books might be described as milestones on the way to a more scientific and therefore a saner outlook upon certain aspects of human life. He tells us that his earliest book, having first been received with howls of execration, is now called sane and reasonable. Here he writes again, as indeed he has always written, of love and virtue—meaning by these not crude sex and namby-pamby goodness, but something heroic. He writes of the new mother, the renovation of the family, the function of taboos, the "revaluation of obscenity", the control of population, and the future of eugenics. Whether the reader agrees with Mr. Ellis or not, he feels himself in the hands of one who is master of his theme, and master also of a felicitous literary style. Few people, we imagine, could read the preface to these chapters without reading on to the end.