

Ordinary Level of the General Certificate of Education; such courses will not only enable these teachers to take Advanced Level work, they also include some study of modern concepts of mathematics and encourage the introduction of such concepts into the school course, often at a surprisingly early stage. The industry and enthusiasm of teachers taking these diploma courses are heartening; to them in particular the reading of this report is recommended, for in it they will find much to help them directly in their efforts to raise the standard of their teaching, and some brief but illuminating indications of ways in which Britain's industry is dependent on a bigger and better output of mathematicians from the schools.

T. A. A. BROADBENT

## ANTHONY VAN LEEUWENHOEK'S SCIENTIFIC CORRESPONDENCE

The Collected Letters of Antoni van Leeuwenhoek Vol. 6. Edited, illustrated and annotated by a Commission of Dutch Scientists. Pp. ix + 425 + 32 plates. (Amsterdam: Swets and Zeitlinger, 1961.) 175s.

CLIFFORD DOBELL, writing in 1932 his pleasant author's epistle to the reader of his book, *Antony van Leeuwenhoek and his 'Little Animals'*, referred constantly to the great difficulty he had experienced in discovering either an authentic account of the man or any adequate version of his work other than his original letters handwritten in Dutch of a somewhat archaic character. With typical meticulousness he therefore set himself the task of learning Dutch with the object of translating those letters which referred to Leeuwenhoek's discoveries relating to Protozoa, bacteria and the like; in fact, the 'little animals'. How much his task would have been lightened were he engaged in his search now, for this is Volume 6 of a definitive edition of all Leeuwenhoek's letters in course of preparation by Dr. H. W. Julius and his group of Dutch collaborators! How much also, incidentally, the world might have lost had Dobell's book not been written! In this present edition the provenance of each letter, and full references to its publication elsewhere, precedes the full text, side by side, in the original Dutch and in English translation. Knowing no Dutch, I find it impossible to offer an opinion on the quality of the translation; the English text, however, conveys an even quality of excellence through which the simplicity and lively curiosity of the man is made lamently clear.

This volume includes letters 90-101 (or 49-56 of Leeuwenhoek's own numbering) written between April 1686 and July 1687. There are also included two short notes by Dr. A. Schierbeek, one putting into its proper perspective letter No. 92 written to the Royal Society and concerned with the origin of oak gall-nuts; the second establishing the interesting fact that Leeuwenhoek was officially appointed wine-gauger to the City of Delft in August 1679, and giving some account of his functions and duties in this capacity. It may be that this engagement throws some light on his predilection for calculations of the sizes and relationships of so many of the objects which he writes about.

The letters, for the most part communicated to the Royal Society, report Leeuwenhoek's observations on a wide variety of natural phenomena, and one is

filled with a renewed admiration for the meticulousness of his work and the acuteness of his mind. That he was often mistaken, and clung tenaciously to his views none the less, is not to be wondered at; he was exploring mostly new ground with equipment which, by modern standards, was ludicrously inadequate and from a background of knowledge still woefully insecure. Moreover, he had no language other than his native Dutch, and he was therefore unable to read the work of most of his contemporaries and in consequence was precluded from that full interchange of ideas which is now such a commonplace of scientific life and thought that we cannot conceive of working in its absence. A notable, and well-known, example of this is apparent in his misconception of the ovum as a nest within which the spermatozoon develops and grows into a new organism. Whether he is recording his observations on the structure of seeds, oak galls and the like or discussing the development of the eggs of crustaceans and silkworms, it is apparent how strongly his views and interpretations of observations are coloured by this mistaken idea.

It is regrettable that the price of this edition (175s. for this volume alone) is prohibitive not only to most individuals but also to far too many libraries; not only is Leeuwenhoek's work of very great historic interest, but also his minute exactitude in observation, his simple clarity of expression, and his humbleness set standards deserving of wider attention than they may receive should this work remain, as seems likely, relatively inaccessible.

L. A. HARVEY

## ADVANCES IN GEOPHYSICS

### Advances in Geophysics

Vol. 7. Edited by H. E. Landsberg and J. Van Miegheem. Pp. x + 333. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1961.) 88s.

IT is inevitable in a volume of this type, containing six articles most of which are only distantly related one to the other, that the way the authors treat their subjects will show considerable differences. It is unlikely that this will inconvenience many readers since few will have an equal interest in all the articles.

More than half the present volume is divided between a report by D. Fultz on "Development in Controlled Experiments on Larger Scale Geophysical Problems" and an article on "Atmospheric Tides" by M. Siebert. The former demonstrates that controlled laboratory experiments in such matters as atmospheric circulation, movements in the core and in the crust of the Earth, waves in lakes and a variety of other problems can provide useful, quantitative information. The paper is plentifully illustrated with photographs, and throughout the author stresses the need to establish dynamical similarity between the experimental system and the full-scale phenomena. There is a bibliography of about 350 references, most of which are dated in the last decade. The paper by Siebert includes first a history of present ideas about atmospheric tides and a description of the outstanding problems. This is followed by an outline of the mathematical theory in which free oscillation, Laplace's tidal equation and gravitational and thermal excitation of atmospheric tides are covered. There is a bibliography of 108 references, two of which are noted as containing further references.

The remainder of the book is divided between four papers. J. Van Isacker uses recent advances in