

chapters of the book deal with the effects of friction on motion, and the illustrations are taken from aeronautical engineering; it was the difficulty of dealing with this problem which seems to have led the authors to consider the use of matrices.

There can be little doubt that the book has put into the hands of computers a collection of processes which will help in the extension of knowledge, and although the number of interested workers may at present be small, it is to be expected that it will increase.
L. B.

OCEANOGRAPHY OF THE EAST INDIES

The Snellius Expedition in the Eastern Part of the Netherlands East-Indies, 1929-1930, under Leadership of P. M. van Riel. Vol. 1: Voyage. Chapters i-iv. Pp. viii+178+31 plates. 20 guilders. Vol. 2: Oceanographic Results. Part 4: Surface Observations, Temperature, Salinity, Density. By S. W. Visser. Pp. viii+62. 5 guilders. (Leiden: E. J. Brill, Ltd., 1938.)

TO the oceanographer the eastern part of the Malay Archipelago is one of the most interesting regions of the world. The *Challenger*, *Gazelle*, *Siboga* and *Planet* showed that it consists of a number of enclosed seas, often of great depth, which are separated from one another or from the surrounding oceans by much shallower sills. They are filled from sill level downwards with the densest water which can gain access to them, the water at the depth of the sill. Thus the Sulu Sea has a temperature of more than 10° C. from 400 m. to the bottom in 4,400 m. The oceanography of such a region must depend to a very large extent on the contours of the bottom, but no detailed survey was possible until the invention of the echo sounding gear.

The *Willebrod Snellius* was built by the Netherlands Navy as a surveying ship for use in the East Indies and was fitted with all the latest apparatus for hydrographic and scientific work; the expedition was her first commission. The leader of the expedition was P. M. van Riel, a retired naval officer and the director of the branch of the Royal Netherlands Meteorological Institute at Amsterdam. In the first chapter of vol. 1 he writes on the general plan of the expedition and the voyage out. In the third chapter he gives a short account of the scientific cruises in the survey area with notes on some of the most interesting observations. A remarkable feat was a wire sounding in Emden Deep with a 54-cm. core of red clay and a temperature and water sample from 10,068 m. In the same volume the commanding officer, Lieut.-Commander F. Pinke, describes the ship and her equipment, and the first officer, J. P. H. Perks, deals with the deep-sea anchoring gear, which was very successful. The surface observations of temperature, salinity, and density are discussed in detail by Dr. S. W. Visser.

The reports are well illustrated by charts and photographs, and the two volumes are a valuable contribution to oceanography.

ATMOSPHERIC TURBULENCE

Atmosphärische Turbulenz. Von Dr. Heinz Lettau. Pp. xi+283. (Leipzig: Akademische Verlagsgesellschaft m.b.H., 1939.) 18 gold marks.

THE appearance of Dr. Lettau's book on atmospheric turbulence is a definite indication of the way in which the scientific study of the atmosphere is progressing. Many books have attempted, with varying success, to cover the whole field of what is known as meteorology, but so far there have been few books which have covered in detail one aspect of the subject. Lettau has done this for atmospheric turbulence. He has done it well,

and this book will probably remain for some time the standard treatment of its subject. It gives all the essential mathematical treatment in a clear and concise form, and offers numerous comparisons with the facts of observation.

The names which recur most frequently are those of G. I. Taylor, W. Schmidt, L. F. Richardson, and of Prandtl and his disciples of the Göttingen school. The vast volume of detailed research in the field of aerodynamics published in recent years is not capable of direct application to the motions of the atmosphere, since these motions are complicated by varying roughness of the ground, and especially by varying degrees of