

shoals and banks quite worthy of mention, e.g. Viking Bank, Bressay Shoal, Fladen Ground. The last is, in fact, mentioned later in another connection, but without reference to its position.

2. The properties and movements of the surface waters. The sub-heads of this section are temperature, salinity and alkalinity, air-content (oxygen, nitrogen, carbonic acid), hydrogen-ion concentration, tides, residual (or drift) currents, storm tides ("Sturmfluten").

3. Properties and movements of the deep waters.

The paper contains 25 illustrations and the text is interspersed with a number of useful and interesting tables. A short list of literature which is not claimed to be at all complete is appended to serve as a guide for further reading.

*J. B. Tait.*

**G. Wüst.** Das Bodenwasser und die Gliederung der Atlantischen Tiefsee. Wiss. Ergeb. d. Deutschen Atl. Exped. auf d. Forsch.- u. Vermessungsschiff "Meteor" 1925—1927. Bd. VI, Teil 1, Lief 1. Berlin u. Leipzig, 1933.

In his discussion of the bottom water of the Atlantic Ocean, Wüst has used all available data and has, therefore, been able to give a comprehensive description of the character of the bottom water and to draw a series of important conclusions.

The main part of the Atlantic bottom water is of antarctic origin. In the western Atlantic Ocean the last traces of the antarctic water are found in 40° N., but on the northward course the temperature and the salinity of the water are increased by admixture of warmer and more saline deep water. The percentage of admixture in the different latitudes is determined. In the eastern Atlantic the antarctic bottom water penetrates by a direct route only to the Walvis ridge in 35° to 20° S., but through the Romanche channel in 2° N., which forms a gap in the Atlantic longitudinal ridge, antarctic bottom water flows from the western to the eastern Atlantic and spreads to the north and the south. To the south this bottom water can be traced to the northern boundary of Walvis ridge and to the north to 35° N.

Only small quantities of arctic bottom water enter the Atlantic Ocean and are found in the western Atlantic to the north of 40° N. and in the eastern Atlantic to the north of 35° N.

From the distribution of temperature and salinity Wüst concludes that the bottom of the Atlantic Ocean shows a series of ridges and deeps, some of which are not known from existing soundings. Wüst points out three ridges and four deeps in the western Atlantic and eight ridges and nine deeps in the eastern Atlantic.

The paper is accompanied by excellent charts, including a chart which shows the configuration of the bottom below a depth of 4000 metres as it appears when the character of the bottom water is considered.

*H. U. S.*

**F. S. Russell.** "On the Biology of *Sagitta*. III. A Further Observation on the Growth and Breeding of *Sagitta setosa* in the Plymouth Area; IV. Observations on the Natural History of *Sagitta elegans* Verrill and *Sagitta setosa* J. Müller in the Plymouth Area." Jour. Mar. Biol. Assoc. of the United Kingdom, Vol. XVIII, No. 2, Plymouth, 1933.

Mr. Russell has continued his investigations on the two species of *Sagitta* which are found in the Channel and the results are helpful. The