The first two post-war expeditions were made in the "Dana" I, a four masted auxiliary schooner, which had been placed at the disposal of the Committee by the Danish East Asiatic Company of Copenhagen. The first, under the leadership of Dr. SCHMIDT, began from Gibraltar and finished at Copenhagen, covering the period March to September 1920. In the following year (1921), between February and May, Captain HANSEN, the commander of the vessel, directed a cruise in the Sargasso Sea, starting from, and returning to, the West Indies. On these two voyages the work was largely restricted to the study of pelagic and bathy-pelagic organisms, mainly owing to the unsuitability of the ship for other kinds of work.

In the meantime, the Danish Government had acquired a steam-trawler of the Lord Mersey class, which was adapted for marine research. In this ship, the Royal Danish Research Ship "Dana", Dr. SCHMIDT undertook the third and most extensive cruise, which started from Copenhagen in August 1921 and ended at the same place nearly a year later (July 1922). The penetration of the Mediterranean and Pacific on that occasion foreshadowed the even more ambitious voyage from which, news comes, the little vessel is now returning.

The details of the ship and the equipment are fully described and illustrated. The chief difference, Dr. SCHMIDT remarks, between the earlier methods and those employed in "Dana" II, is the use of nets and water-bottles in series on the one wire, which not only saves time, but tends to greater accuracy, especially in hydrographic observations. The work done is briefly outlined, and one may mention, *inter alia*, the hydrographic sections across the Equatorial Current and the Gulf Stream, the demonstration of a seasonal periodicity in the biological phenomena of the Sargasso and Caribbean Seas, and the further progress made in the study of the development of the European eel and other muraenoids, of which a number of eggs and the youngest larval stages were obtained. Various opportunities, namely, in the Gatun Lake and while sheltering from bad weather off Beata Island, were taken for botanical work ashore, under Professor OSTENFELD.

The paper is completed with a detailed list of stations of the three expeditions, a table of the hydrographic observations made on the third voyage ("Dana" II), and a number of charts shewing the itineraries and stations. J. R. L.

GEORG WÜST. Der Golfstrom. Zeitschrift der Gesellschaft für Erdkunde zu Berlin, 1930, No. 1/2, pp. 42—59.

This paper presents in concise form a review of the latest knowledge of the oceanographic features of the Gulf Stream proper, that is, of the current as far as the Great Bank of Newfoundland. Making use of the most recent observations, the author amplifies his previous study (Florida- und Antillenstrom. Veröff. Inst. für Meereskunde, 1924) in which dynamical methods were successfully employed in correlating and interpreting the observations made at various times in the Gulf Stream.

After a brief historical notice, in which the importance of HUMBOLDT's

contribution is stressed, the author considers first the surface features of the Gulf Stream and then the subsurface features. For the surface of the Gulf Stream there is a relatively large mass of observational material; for the subsurface, however, there are but few observations. This makes the application of dynamical considerations of the very first importance; for it is only by such means that the scattered observations can be combined to give a correct understanding of the characteristics of the waters embraced in this great ocean current.

The questions more specially discussed by WÜST relate to the distribution of temperature, salinity and velocity, and to the transport of water and heat. Five sections across the Gulf Stream, drawn to the same scale and covering the region from Yucatan to the Great Bank of Newfoundland, bring out in graphic form the temperature and salinity conditions prevailing. Instead of the still-popular notion of the Gulf Stream as an unusually warm body of highly saline and homogeneous water — a river in the sea — these diagrams bring out clearly the very decided stratification of the water comprising the Gulf Stream, the temperature in the Straits of Florida, for example, ranging from 25° C. at the surface to 10° at a depth of 400 meters. They also bring out the fact that the neighboring water of the Sargasso in the same latitude is warmer and of higher salinity.

The most saline water in the Gulf Stream has a salinity of a little more than $36\frac{1}{2}$, and is found, not at the surface, but at a depth of from 100 to 200 meters. This more highly saline layer of water is a characteristic feature in the vertical distribution of salinity in the Gulf Stream and is explained by WÜST as coming from the Sargasso Sea, from which it is carried as a subsurface current into the North Equatorial Current and thence through the Carribean into the Gulf of Mexico.

The vertical velocity distribution is figured for three sections, two based on observations and the third based on computation. By means of these the transport of heat and water on the part of the two components of the Gulf Stream, namely the Florida Current and the Antilles Current, may be computed. WÜST here gives the results as found in his earlier paper in which he showed that, contrary to what had been accepted, the Florida Current was the principal contributor, both in regard to the heat and water. The amount of water discharged by the Florida current is about 24 million cubic meters per second, or as WÜST puts it in striking fashion, about 22 times the total amount of water discharged by all the rivers of the world in a like period of time. In conclusion he directs attention to the fact that the conditions within the Gulf Stream are subject to variations both periodic and nonperiodic, and that one of the most important future problems is the determination of these variations.

H. A. M.

A. DEFANT. Die Theorie der Meeresströmungen und die ozeanische Zirkulation. Geografiska Annaler, Vol. XI (1929) pp. 268—293.

The problems involved in oceanic circulation are so complex that they do not lend themselves readily to formulation in a general dynamical theory. To cope with this difficulty, it has been necessary to introduce