

## Reviews.

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**G. Dietrich.** "Aufbau und Dynamik des südlichen Agulhasstromgebietes."  
Veröff. Inst. f. Meereskunde. N. F., Reihe A, H. 27. Berlin, 1935.

The author has collected all available hydrographic observations from the area 27° S. to 50° S. and 0° E. to 40° E., and has, before starting his analysis, carefully eliminated data which appeared to be in error. Furthermore, he has determined the annual variation of temperature at depths of 100 and 150 m. in order to reduce observations from the upper layers to the same months. His amplitude at 100 m. lies between the amplitudes which have previously been determined by other authors in other regions.

In his further discussion the author assumes conditions to be stationary, and the fact that the greater part of the observations can be combined in a clear and simple picture forms the strongest support for the correctness of this view. The few series which do not fit into the simple picture indicate that disturbances occur, some of which appear to have the character of travelling eddies which are analogous to atmospheric disturbances.

One characteristic feature of the undisturbed system is that the greater part of the water which is carried by the Agulhas Current around the southern part of South Africa bends towards the south and east and returns again to the Indian Ocean in a high latitude. Not more than one quarter of the water carried by the Agulhas Current remains in the Atlantic Ocean.

Another characteristic feature is that the Agulhas Current is caused by the arrangement of light and heavy water masses, and is not a wind-driven current. At the surface it is, of course, modified by the prevailing winds, but on the whole it is a result of the internal field of force in the sea.

These features appear to be well established although the author expresses himself with great caution and admits that very few of his conclusions are free from hypothetical elements, but he hopes that new observations may help to throw light on several of the problems dealt with.

H. U. S.

**H. Thomsen.** "Entstehung und Verbreitung einiger charakteristischen Wassermassen in dem Indischen und südlichen Pazifischen Ozean."  
Ann. d. Hydr., usw. LXIII. Jahrg., H. 8. Berlin, 1935.

Thomsen's discussion is based principally on a study of T-S diagrams from stations in the western and northern Indian Ocean and the south-western Pacific Ocean. In the Indian Ocean Thomsen points out seven different water masses, but he deals extensively with three only: the bottom

water, the Antarctic intermediate water and the Red Sea water. The bottom water is formed by mixing of true Antarctic bottom water with Atlantic deep water; the percentage amount of the latter increases with increasing distance from the bottom. The Antarctic intermediate water can, in the western basin, be traced from about latitude  $47^{\circ}$  S. up to the equator, but the depth of the salinity minimum rises towards the north. The Red Sea water is found below the intermediate water at stations north of Madagascar.

These features have previously been more or less recognized; the essential novelty in Thomsen's conclusions is that he finds no evidence of the existence of a south-going deep water current between 2000 m. and 3000 m., which according to earlier investigations should be analogous to the deep water current in the Atlantic Ocean. The question of this deep current is not yet quite settled. In a recent paper<sup>1)</sup> Clowes and Deacon have published a section from the eastern Indian Ocean, based upon "Discovery II" observation in 1935. They find traces of a rudimentary south-going deep current extending to at least  $35^{\circ}$  S. Their conception of the deep water circulation is a compromise between the views of Thomsen and Lotte Möller.

In the southwestern Pacific Thomsen points out four different water masses and deals especially with the bottom water. He shows that warm deep water of relatively high salinity enters the Pacific Ocean through the opening to the south of New Zealand, and this deep water must come from the Atlantic Ocean, as previously assumed by the present reviewer. Thomsen considers the deep water in the southwestern Pacific as composed of three types of water: Antarctic bottom water, Atlantic deep water, and Antarctic intermediate water. He shows that the percentage amount of these three types varies systematically with depth and locality.

H. U. S.

**V. Cornish.** "Ocean Waves and Kindred Geophysical Phenomena." With additional notes by H. Jeffreys. Camb. Univ. Press, Cambridge, 1934.

Dr. Cornish ist seit langem durch zahlreiche Aufsätze in Fachzeitschriften und vor allem durch sein früheres Werk "Waves of the Sea and other Water Waves" (London, 1912) als Wellenforscher bekannt. In diesem neuen handlichen Buch gibt er Ausschnitte aus seinen in fast vierzigjähriger Liebhaberarbeit gesammelten Beobachtungen zum Thema "Wellen", die dann grösstenteils in den "Additional Notes" durch H. Jeffreys mathematisch-physikalisch erörtert werden. In diesem Anhang, der etwa ein Viertel des Buches umfasst, liegt der wesentliche Unterschied gegenüber den "Waves of the Sea" und eine Ergänzung, auf die der Verfasser selbst, wie er im Vorwort ausführt, seit Jahrzehnten gewartet hat. Die Gruppierung des Stoffes ist im grossen die gleiche wie in dem älteren Buch (Ozeanwellen im Verhältnis zum Wind — Sand- und Schneewellen — Borenartige Erscheinungen in Flüssen); vor allem im zweiten Teil werden neue Beobachtungsergebnisse über Sandwellen (durch Wind wie durch Wasser erzeugte) und Schneewellen, dazu auch eigene Experimente des Verfassers mitgeteilt. Ein besonderer Vorzug des Buches für jeden, der sich Anleitung für eigene Beobachtungen holen will, ist die liebevolle Ausführlichkeit, mit der Dr. Cornish seine Beobachtungsmethoden, die

<sup>1)</sup> *Nature*, Vol. 136 p. 936—938, 1935.