

H. THORADE examines in turn the influence of the wind and of friction, the effect of turbulence, the deflecting force of the earth's rotation, and the different kinds of currents, classified according to their causes — impulse currents, gradient currents, currents at various depths and the influence of the bottom — besides the use of temperature and salinity measurements for obtaining fields of force and fields of pressure; from which recent theories allow the direction and strength of the current at each point to be deduced. These temperature and salinity measurements, much easier to make than direct current measurements, have in certain cases (Newfoundland Banks) produced very interesting results which have been largely confirmed by experience. The author concludes, however, that numerous observations are still necessary definitely to confirm these theories.

Our only criticism of this excellent book is that it is a pity that the absence of an index makes reference somewhat difficult.

P. V.

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## THE DEVELOPMENT OF OUR CONCEPTION OF THE GULF STREAM SYSTEM.

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Mr. C. O'D. ISELIN, of the WOODS HOLE OCEANOGRAPHIC INSTITUTION, Massachusetts, U.S.A., has written a paper entitled *The Development of our Conception of the Gulf Stream System*, which appears in the *Transactions of the American Geophysical Union, Fourteenth Annual Meeting*, April 27, 28, 29, 1933, Washington, D.C., (page 226). In this article he discusses the nature of the problem of the Gulf Stream in physical oceanography. Mr. ISELIN begins by pointing out that the question of terminology is of some importance, for the expression "Gulf Stream" is never quite clearly defined by the various authors who use it, and who apply it indiscriminately to the different parts of the sectors over which this vast current extends. Observing that the historical name should be retained to designate this vast river of warm water which flows out of the Gulf of Mexico, along the Eastern coast of the United States, towards the tail of the Grand Banks and thence to Europe and the Arctic, the author proposes to use the expression "Gulf Stream System" to denote the whole of the current including the branches.

After an historical review of the different conceptions which have given birth to the terms "North Atlantic Drift" and "Atlantic Current", the author states that the atlases have a tendency to exaggerate the breadth of the part that can properly be considered to be a current from an oceanographic point of view. The charts, in fact, usually show the sum of the permanent currents and the prevailing drift. In conclusion the author states that, logically, it is justifiable to split the Gulf Stream System into three parts on the basis of the structure of the current when examined in cross-section, and that historically there is good precedent for calling these the Florida Current, the Gulf Stream and the Atlantic Current. The latter is branched and the courses of all its branches have not yet been worked out, as their flow is masked by the shallow North Atlantic Drift.

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## TIDES AND COASTAL CURRENTS DEVELOPED BY TROPICAL CYCLONES.

by

ISAAC MONROE CLINE

(WEATHER BUREAU OFFICE, NEW ORLEANS, LA., DEC. 1931).

(From an article in the *Monthly Weather Review*, Vol. 61, No. 2, Feb. 1933, pp. 36-38:

U. S. Weather Bureau, Washington, D. C.).

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The greatest damage caused by tropical cyclones is due to the tides developed by them: 45,000 persons were drowned at Calcutta on 5th October 1864 by a storm tide of 16 feet; 100,000 others were drowned in the Ganges delta on 31st October 1876 by a similar tide which brought the water from 10 to nearly 50 feet above normal. Great loss of life from such tides has occurred also in more recent years.