

I. Die Lage der Meeresoberfläche im Druckfeld von Ozean und Atmosphäre.

II. Über Bewegung und Herkunft des Golfstromwassers.

by

GÜNTER DIETRICH.

I. THE POSITION OF THE SURFACE OF THE OCEAN IN THE PRESSURE FIELD OF OCEAN AND ATMOSPHERE.

II ON THE MOVEMENT AND ORIGIN OF THE GULF STREAM.

(MITTLER & SOHN, Berlin, S. W. 68).

I. In order that the sea level should be a level surface and consequently a portion of the geoid, it is essential that it should be in complete repose. But if, taking into consideration its mean position, we free it from all temporary displacements, of a periodic nature or otherwise, there may subsist a permanent displacement due to the pressure field of the ocean, of the atmosphere, or a heaping up of waters due to the prevailing winds.

We are thus led to plot an actual topography of the sea level, the results of which may be verified along the coasts by means of accurate levellings. The author gives an historical summary of some of these levellings, which have only rather recently attained sufficient accuracy to permit of comparison with the *oceanic levelling*. The latter term is used to designate the combination of the *oceanographic levelling*, which takes into consideration only the internal pressure field of the ocean, and the *meteorological levelling*, which takes into consideration only the external field of atmospheric pressure. It will be recalled that BOUQUET DE LA GRYE appears to have been the first to attempt a topographic survey of the sea level in 1882. After him various authors of studies of this nature have adopted a standard reference (the "zero-level") plane for the entire region under observation; but in 1918 R. WITTING, in a study of the tectonic movements of the shores of the Baltic and the North Sea has shown that at the depth of the density discontinuity layer, the isobaric surfaces of equal pressure correspond to the level surfaces; this depth varying with the locality and the season of the year. Günter DIETRICH has applied this method to the oceanic levelling of the Gulf of Mexico and the North-western part of the Atlantic Ocean for which he employs primarily the sections established by the *Atlantis* and the *Dana*. From this he concludes that the level at Havana is from 40 to 50 cm. higher than that at Key West, a result which cannot be verified by geodetic levelling; whereas along the shore of the Gulf of Mexico the comparison between the two levellings shows a sufficiently close agreement. It is not the same along the East coast of the United States of America where the oceanic levelling does not reveal the very clear gradual rise in the mean sea-level in going from South to North, a rise which is proven by geodetic levelling. The author believes that this difference may be due in part to the lack of homogeneity in the times of the data used for oceanic levelling; whereas the geodetic levelling is based upon mean values corresponding to a period of many years. He shows also that one must take into consideration the current fields, which are rather variable, and the effects of friction and mixing.

II. In the second part the author attempts by means of these same sections of the *Atlantis* and the *Dana* to investigate the flow of the Gulf Stream and the origin of its waters. With regard to the terminology to be adopted in designating this current, he is led to believe that this will necessarily depend upon the point of view from which it is regarded. The great current which flows along the East coast of the United States will be called the Florida Current or the Antilles Current if based upon dynamic concepts; whereas the designation Gulf Stream will only hold provided one considers the Gulf of Mexico in its totality as an immense reservoir. From the point of view of analysis of the waters, the current to the South of Cape Hatteras is a South Atlantic tropical current, and to the North, a North Atlantic subtropic current, or a Sargasso current. All of these denominations are well founded.

P. V.

