

caused by a 'modified case' of the general oceanic circulation, and neither by the Gulf-stream nor by the anti-trade drift.

Although there are, up to the present time, very few trustworthy observations of deep-sea temperatures, the surface temperature of the North Atlantic has been investigated with considerable care. The general character of the isothermal lines with their singular loop-like northern deflections, has long been familiar through the temperature charts of the geographers already quoted, and of late years a prodigious amount of data have been accumulated both abroad and by our own Admiralty and Meteorological Department.

In 1870, Dr. Petermann, of Gotha, published<sup>1</sup> an extremely valuable series of temperature charts, embodying the results of the reduction of upwards of 100,000 observations, derived chiefly from the following sources:—

1. From the wind and current charts of Lieutenant Maury, embodying about 30,000 distinct temperature observations.

2. From 50,000 observations made by Dutch sea-captains, and published by the Government of the Netherlands.

3. From the journal of the Cunard steamers between Liverpool and New York, and of the steamers of the Montreal Company between Glasgow and Belleisle.

4. From the data collected by the secretary of the

<sup>1</sup> *Der Golf-Strom und Standpunkt der thermometrischen Kenntniss des Nord-Atlantischen Oceans und Landgebietes im Jahre 1870.* Justus Perthe's 'Geographische Mittheilungen,' Band 16. Gotha, 1870.