

winds. The effect of this tide is shown by its effect on the Japan Stream, which varies much in position, strength, and temperature, and doubtless also in density, according to the season of the year.

It is thus easy to see how a variety of circumstances conspire to equalise and keep down the density of the waters of the Pacific, and especially of the North Pacific. Its form, that of a huge bay, the length or depth of which is about equal to the width of its mouth where it communicates with the great Southern Ocean, affords no facilities for the localisation of the effects of particular climatic conditions. Again, the large amount of fresh water supplied to the seas around the islands which form its western boundary in equatorial regions has been referred to. For half of the year a violent southwest wind blows through these channels, itself heavily charged with moisture, indeed always supersaturated, and driving before it the diluted waters from its source far into the North Pacific, and it is in the North Pacific that the density of the surface water is found to be lowest and most uniform. Also, unlike the Atlantic, there is no facility for the water to get away, consequently the Arctic regions receive no benefit from the tropical heat of either the Pacific or the Indian Oceans. Again, though the eastern shore of Australia resembles that of South America, the warm water driven by the southeast trade wind is not accumulated so as to form a *head* as in the Gulf of Mexico, but leaks into the Indian Ocean through the numberless channels among the islands. Were there a continuous land connection between Australia and the Malay Peninsula, and it is probable that there has been such a connection, the effect on the climate of the northern parts of Asia and America, and probably also of the Arctic regions, would no doubt be very marked, especially as the heating area available in the Pacific is many times larger than that in the Atlantic. On the other hand, however, the much more marked character of the monsoon on the West Pacific coast than on the corresponding Atlantic one, would to a great extent counteract the effect of the southeast trade wind as a furnisher of heated water.

In the Indian Ocean there are few observations with delicate instruments, but to judge from those of Lenz and the "Gazelle," the concentration area due to the southeast trade is not more pronounced than in the West Pacific, with which ocean its waters have a double communication. To the north of the Equator the local influence of the immense continent, which forms its northern boundary, renders the state of its waters very different from what is found either in the North Pacific or North Atlantic. It appears from the observations available, that the water is comparatively fresh all over this area; and this fact must have an important bearing on the conditions of the Red Sea, where the rainfall is almost *nil* and evaporation takes place with such energy that its waters are the saltiest that occur in any sea in free communication with the ocean.

The following diagrams represent in a graphic form the densities of the surface water as observed in the Atlantic on the voyage home in March and April 1876 from a position