winds drive the surface water of the Atlantic bodily to the westward, thus drawing the water away from the eastern side of the ocean, it is evident that while it pushes the water westward it must drag water from some other direction to supply its place. No doubt much of it is supplied by surface drift from the southward and eastward, but if the temperature curves of the water off the coast of Guinea be studied, it will be seen that much of the water which is brought into the eastern part of the Atlantic to supply that drained away by the Equatorial Current and other westerly streams is supplied from the deeper, colder, and less dense strata of southern seas. On the 11th August 1873, in the Guinea Current the surface temperature was 78°·7, and at 50 fathoms it was only 54°·2, the decrease being at the average rate of 0°·5 F. per fathom. The latitude of this Station was 12° 5′ N. If this be accepted as an indication of the deep water of the southern hemisphere penetrating to the northward of the Equator, it follows necessarily that as it goes farther north it will experience a thrust to the eastward, and will therefore be thrown up against the western shores of Africa, and the observed cold current coming from the south and entering the Strait of Gibraltar would be satisfactorily explained. It must be remembered that to produce and sustain the observed temperature gradient of 7° F. in less than 20 miles, and a difference of 5° F. between the temperature of the surface water and that of the air above it, a considerable and active supply of cold water is absolutely necessary, and it is observed to have a motion from the southward.

It is difficult to make an accurate estimate either of the mean depth or the mean salinity of the ocean, but taking the one at 2000 fathoms (3660 metres) and the other at 35·5 grammes per litre, there would be an average of 1300 kilogrammes of salt dissolved per square decimetre of sea surface. Taking the specific gravity of sea salt at 2·5, this would give the amount of salt dissolved as equivalent to a layer of it 52 metres, or 170 feet thick over the whole area of the ocean.

It may be pointed out that organisms which secrete silica are much more abundant in the Pacific, where the specific gravity of the water is relatively low; and, on the other hand, organisms which secrete carbonate of lime are relatively more abundant where the specific gravity of the water is high, as, for instance, in the tropical regions of the Atlantic.

The ratio of total salts to water has been discussed when treating of the density of the water at constant temperature. During the cruise samples of sea water from very various depths and localities were collected and preserved in glass-stoppered bottles, and from time to time sent home. After the return of the Expedition a large number of these were handed over to Professor Dittmar for analysis. On his analyses of a portion of these, and his work in connection with the subject, Professor Dittmar has furnished an exceedingly valuable Report,[1]

[1] Report on the Composition of Ocean-Water, Phys. Chem. Chall. Exp., part i., 1884.