

All we can say, therefore, is that contact with the bottom can never be a source of depression of temperature. As a general result the Gulf-stream water is nearly uniform in temperature throughout the greater part of its depth; there is a marked zone of intermixture at the junction between the warm water and the cold, and the water of the cold indraught is regularly stratified by gravitation; so that in deep water the contour lines of the sea-bottom are, speaking generally, lines of equal temperature. Keeping in view the enormous influence which ocean currents exercise in the distribution of climates at the present time, I think it is scarcely going too far to suppose that such currents—movements communicated to the water by constant winds—existed at all geological periods as the great means, I had almost said the sole means, of producing a general oceanic circulation, and thus distributing heat in the ocean. They must have existed, in fact, wherever equatorial land interrupted the path of the drift of the trade-winds. Wherever a warm current was deflected to north or south from the equatorial belt a polar indraught crept in beneath to supply its place; and the ocean consequently consisted, as in the Atlantic and doubtless in the Pacific at the present day, of an upper warm stratum, and a lower layer of cold water becoming gradually colder with increasing depth.

I fear, then, that in opposition to the views of my distinguished colleague, I must repeat that I have seen as yet no reason to modify the opinion which I have consistently held from the first, that