

period in Geological history onward, the same kind of influence on the temperature of the North Atlantic Ocean which it now has.

The existence of a coral reef made out of corals of the *Astræa* tribe and others, during part of the Oölitic era (middle Jurassic), in England, as far north as the parallel of  $52^{\circ}$  to  $55^{\circ}$  is strong evidence that the isocryme of  $68^{\circ}$  F., the coral-reef boundary, extended then even to that high latitude ; for species of the *Astræa* tribe are now confined to coral-reef seas (p. 84). This isocryme now reaches along the course of the Gulf Stream to a point just north of the Bermudas, near  $33^{\circ}$  N. ; and  $55^{\circ}$  is  $22^{\circ}$  beyond this.

There are no marine fossils in any rocks of that period on the American side of the Atlantic, so that facts fail for definitely locating the *western* terminus of this oölitic isocryme of  $68^{\circ}$  F. But it is highly improbable that the whole ocean across, on, or near the parallel of  $55^{\circ}$  N., should have had, as the mean temperature for the coldest month of the year, one so high as  $68^{\circ}$  F.; the present average position of the isocryme of  $68^{\circ}$  F., through the middle of the two oceans, the Pacific and Atlantic, is near the parallel of  $27^{\circ}$  or  $28^{\circ}$ , or one-half nearer the equator than the parallel of  $55^{\circ}$ . It is difficult to account for an oceanic temperature high enough to give England's seas  $68^{\circ}$  F. as the average for the coldest winter month, even supposing the Gulf Stream to have aided ; but it is vastly more difficult if no such north-eastward current existed and the high temperature extended equably so far from the equator. The probability is therefore strong that the existence of coral reefs in the Oölitic era in England was owing to the extension, by the aid of the Gulf Stream, of the isocryme of  $68^{\circ}$  more than  $30^{\circ}$  in latitude (and over 3,000 miles in distance) beyond its present most extra-tropical position, just outside of the Bermudas ; in other words, that the whole ocean was just enough warmer to allow this oceanic current (part of the great water-circulation of the globe) to bear the heat required for corals as far north as northern England.

The present isocryme of  $44^{\circ}$  F., as drawn on the chart of