

B. *The amelioration of the cold, and the retreat of the ice-sheet.* — Setting aside Croll's theory, for the reasons already stated, the disappearance of the cold and wet climate that was the occasion of the ice period is naturally attributed to a reversal of the conditions that produced it—that is, to a subsidence of the land over the higher latitudes, and a deepening again of the sea over the submarine plateau between Scandinavia and Greenland, thereby restoring the Gulf Stream to its circuit in the Arctic regions.

But there appears to be good evidence that the melting had made great progress before there had been much subsidence of glacial regions. The facts stated on page 969 bear strongly in this direction; for they show that, however great the loss from melting and subsidence may have been, the southward slope of the ice-surface continued, and the Mississippi drained a large part of British America, even when the ice was making its last moraine on the northern borders of Minnesota.

These facts from the Continental Interior are sustained by others from the eastern border. It has been shown by N. L. Britton (1872), that the Pine Barren flora of the New Jersey coast region formerly occupied Staten Island and Long Island; and others have added to the range of its distribution the southern shores of Rhode Island and Massachusetts, with the adjoining islands. A. Hollick has reviewed the facts (1893) and referred the northward distribution of this southern flora to the period of Glacial emergence, which made New Jersey, Staten Island, Long Island, with the islands east of it and southern New England, continuous dry land.

The migration northward of the Pine Barren flora must have been during the later part of the time of high latitude elevation. The flora was first driven south by the ice, and long kept there. But finally, after the ice had retreated from New Jersey it was again restored; and when the retreat had made so great progress that the climate of southern New England was right for the flora, it completed its northward migration. It is thus proved that southern New England had a climate warmer than now, long before the alleged subsidence had completed its work in southern New England.

These facts do not prove, however, that no subsidence had taken place in higher latitudes. That of the submarine plateau between Europe and Greenland may have been so far completed as to have caused a great modification in climate. Each stage in the retreat was a contraction of the area of perpetual frost, and a widening of the range of tropical winds, ensuring further encroachment. In view of all the facts, it is probable that before the subsidence had made large progress, the ice-sheet had retreated to Canadian territory, excepting the portions left about the higher mountains of eastern and western America.

It seems also to be true that the conclusion of Becker, deduced from his discussion of the question of Glacial climate, on page 979, suggests the right explanation of the initiation of the warmer climate and retreat.