

Charlotte Islands,* and still earlier in Virginia.† The presumption is, therefore, that it came from the south. It has, indeed, the facies of a southern hemisphere and insular flora, and probably spread itself northward as far as Greenland, at a time when our northern continents were groups of islands, and when the ocean currents were carrying warm water far toward the arctic regions. The flora which succeeds this in the sections at Atané has no special affinities with the southern hemisphere, and is of a more temperate and continental character.‡ It is not necessarily Upper Cretaceous, since it is similar to that of the Dakota group farther south, and this is at least Middle Cretaceous. This flora must have originated either somewhere in temperate America or within the Arctic circle, and it must have replaced the older one by virtue of increasing coolness and continental character of climate. It must, therefore, have been connected with that elevation of the land which took place at the beginning of the Cretaceous. During this elevation it spread over all western America at one time or another, and, as the land again subsided under the sea of the Niobrara chalk, it assumed an aspect more suited to a warm climate, but still held its place on such islands as remained above water along the Pacific coast and in the north, and it continued to exist on these islands till the colder seas

* "Reports of the Geological Survey of Canada."

† Fontaine has well described the Mesozoic flora of Virginia, "American Journal of Science," January, 1879, and "Report on Early Mesozoic Floras."

‡ In the "Proceedings of the Royal Society of Tasmania," 1887, Mr. R. M. Johnston, F. L. S., states that in the Miocene beds of Tasmania trees of European genera abound. The Mesozoic flora of that island is of the usual conifero-cycadean type. Ettingshausen makes a similar statement in the "Geological Magazine" respecting the Tertiary flora of Australia and New Zealand, stating that, like the Tertiary floras of Europe, they have a mixed character, being partly of types now belonging to the northern hemisphere.