little too much emergence, even if only a few hundred feet, there would have been no marshes in North America; for the land would have been drained. And with a little too much submergence, limestones or barren sediments of sand or gravel would have covered the region. North America was admirably arranged and poised for the grand result. South America probably lay a little too low, and vast plains, although situated just like those of North America, were left barren. Europe was not so well off as North America, because of the less extent of the level land surface, and the consequently less equable system of oscillations. Moreover, the lands of North America were on the wet border of the Atlantic, the western; and those of Europe, as at the present time, on the dry border, the two differing now a fourth in amount of precipitation.

METEOROLOGICAL CONDITIONS OF THE CARBONIC ERA.

1. *Temperature of the air and waters.* — Using the facts from the relations of existing plants to climate, — that Ferns and Lycopods thrive best in tropical and temperate latitudes, and Equiseta in temperate, — it is inferred from the occurrence of coal-plants of each of these groups in all latitudes to the Arctic regions that the climate of the globe in the Carbonic era was nowhere colder than the modern temperate zone, or below a mean temperature of 60° F. Similarly, the occurrence in Spitzbergen of Corals of the genera *Lithostrotion*, *Cyathophyllum*, and *Syringopora*, and of some species of Brachiopods of twice the size they have in Europe, seems to show that the waters of the ocean were equally temperate throughout. As to excessive heat in the tropics, we have no evidence, since the common Carboniferous Brachiopods, *Productus semireticulatus*, *P. longispinus*, *Athyris subtilita*, and a Bellerophon near *B. Urii* are found in the Bolivian Andes.

2. *Hygrometric conditions.* — With the atmosphere so genial and the ocean so warm, evaporation would have been excessive, rains abundant, and mists almost perpetual. Over the land on the favored side of the ocean, from the tropics to the higher temperate latitudes, atmospheric moisture would have reached its maximum. The great tropical Atlantic current — a part of the world's machinery from the beginning of oceans and continents — would have given moisture freely to the British Isles, more so than to Europe, and more to Spitzbergen than to Greenland and the western Arctic lands. Moreover, Lycopods, Equiseta and most Ferns like shady as well as moist places.

3. *Influence of the carbonic acid and moisture of the atmosphere.* — If the amount of carbonic acid used up in the making of Subcarboniferous and later limestones, and of coal and other carbonaceous products stored in the rocks of the Carbonic era, could be ascertained, the amount of carbonic acid abstracted from the atmosphere by the rock-making and coal-making of the era would be known. In view of the facts it is safe to say that the amount of carbonic acid in the atmosphere at the beginning of the era was at the least 3 in 1000 parts instead of 3 in 10,000, as it is now. (See page 485.)