

meter, it may be asked whether such large tracts of ancient land as are implied by this fact are not inconsistent with the hypothesis of the general prevalence of islands at the period under consideration. In reply, I may observe, that the American coal fields are all comprised within the 30th and 50th degrees of north latitude, and they may have been produced at a time when no land of great height or extent was present in the arctic regions to generate cold. In the southern hemisphere, where the predominance of sea over land is now the distinguishing geographical feature, we nevertheless find a large part of the continent of Australia as well as New Zealand placed between the 30th and 50th degrees of S. latitude. The two islands of New Zealand taken together, are between 800 and 900 miles in length, with a breadth in some parts of ninety miles, and they stretch as far south as the 46th degree of latitude. They afford therefore, a wide area for the growth of a terrestrial vegetation, and the botany of this region is characterised by abundance of ferns, one hundred and forty species of which are already known, some of them attaining the size of trees. In this respect the southern shores of New Zealand in the 46th degree of latitude almost vie with tropical islands. Another point of resemblance between the Flora of New Zealand and that of the ancient carboniferous period is the prevalence of the fir tribe or of coniferous wood.

An argument of some weight in corroboration of the theory above explained respecting the geographical condition of the temperate and arctic latitudes of the northern hemisphere in the carboniferous period may also be derived from an examination of those groups of strata which immediately preceded the coal. The fossils of the Devonian and Silurian strata in Europe and North America have led to the conclusion, that they were formed for the most part in deep seas, *far from land*.\* In those older strata land plants are as unknown, or at least as rare, as they are abundant or universal in the coal measures. Those ancient deposits, therefore, may be supposed to have belonged to an epoch when dry land had only just begun to be upraised from the deep, in the latitudes where the coal strata were deposited; a theory which would imply the existence at the commencement of the Carboniferous epoch of a great many islands or detached areas of land slightly elevated.

The various characters then of the carboniferous strata which have been enumerated—the continuity of the marine mountain limestone over vast spaces—the apparent derivation of the fragmentary rocks from the waste of islands—the submarine aspect of the volcanic products, and the insular character of the flora—all concur to establish the fact of the northern hemisphere having been pervaded by a great ocean, interspersed, as the Southern ocean is now, with lands of moderate dimensions, and with insular or submarine volcanos. It has already been shown that such a combination of geographical circumstances, if not neutralized by others of a contrary tendency,

\* See Travels in North America, by the Author, 1845, chap. 16.