

it was not until the great mind of Humboldt, with its wonderful power to grasp the cosmic relations of material things, devoted itself to the task, that anything like a philosophy of distribution was offered to the scientific world.

The materials had been brought piece-meal to the feet of this great man, whose work it was to build out of them the splendid fabric of a great generalization. But even he has as yet been only able to lay the broad foundation upon which the scientist of the future must rear the superstructure of a complete science.

It was natural in the beginnings of botanical science that the description of every new plant, whether new to the world in general, or only in the particular locality, should be accompanied with a mention of the place where it was found, although no reference whatever was had to the deduction of a general law. Thus it was found that a certain class of plants were chiefly confined to a definite zone, or still narrower range, sometimes even limited to a small circumscribed locality, never being found elsewhere or susceptible of easy cultivation in any other part of the world, however like the place of its habitat. For instance, of the numerous species which grow in New Holland, very few are found in other parts of the world; while of the sixty-three or four peculiar to St. Helena, only two have been discovered elsewhere. So also, it sometimes occurs that upon the two sides of a given range of mountains totally different varieties of plants are found; from all of which facts it will appear that the vegetable world is really much less independent of circumstances than the animal—it seeming to have been the intention that animals being gifted with powers of locomotion should seek such localities as furnish the food to which they are partial. True, we have the power of manufacturing a given climate to order, on a small scale, but the uses of such artificial climate can never be more than very partial and imperfect; the exactions of nature are rigid, her claims imperative.

The nature of the relations which subsist between the vegetable and the animal kingdoms, and the joint relation of both to the climate where they are native is one of the most interesting studies in the whole range of natural science, and might with propriety be noted in this connection; we are not willing, however, to embarrass our present subject with any discussion not strictly essential to its completeness, and shall hence defer it to the general department of Uses of Plants.

The important discovery of Humboldt that the parallels of latitude do not demark either zones or more specific climates was the first great contribution to the science of climate, and gave rise to what are now known as *isothermal* lines, (lines of equal annual temperature,) *isothermal* lines, (lines of equal summer heat,) and *isochimenal* lines, or such as pass through places on the earth whose mean winter temperature is the same.

To any one accustomed to associate a definite climate with a particular degree of latitude, the tortuosity of these several classes of lines will be an occasion of no little surprise. Sometimes in their windings they cross several parallels and then suddenly and by an almost due north or south course return to the parallel of departure, or, even crossing it, deviate as far in the opposite direction.

Now so far as these lines are concerned, they are quite satisfactorily explained upon the ground of the physical configuration of the surface—and the astronomical lines which govern the earth—mountain ranges, lakes, rivers, plains, &c., &c., all have a modifying influence, and to the man of science determine what must be the nature of the vegetation of any given locality.

To illustrate briefly:—Every one familiar with the mass of the world and the general botany of the old and new continent must have been struck with the fact that fruits and grains belonging to the temperate zone grow much further north on the western coast of Europe than any on the eastern coast of America. Indeed so almost identical with the fruits of New England are those of Great Britain, that many, who have not reviewed their geography for some time, find it difficult to believe that the parallel of latitude which just touches the southern coast of England is the same which passes through British America, some two degrees above the extreme northern limit of Lake Superior. A proper understanding of Physical Geography, however, renders the explanation quite simple, as follows: Owing to the spheroidal form of the earth, its revolution on its axes and the peculiar relative position of land and water there exists what is known as the Gulf Stream, whose warm waters moving in a north-easterly direction from the Gulf of Mexico wash the western coast of England and thus raise its temperature above what it would otherwise be; while on the other hand the eastern coast of America is washed by the cold waters and influenced by the cold winds from the regions of Iceland and Spitzbergen; thereby reducing the temperature considerably