

South America; but these few exceptions can by no means invalidate the rule which has been thus expressed by Professor Owen, "that in the highest organized class of animals the same forms were restricted to the same great provinces at the Pliocene periods as they are at the present day."

However modern, in a geological point of view, we may consider the Pleistocene epoch, it is evident that causes more general and powerful than the intervention of man have occasioned the disappearance of the ancient fauna from so many extensive regions. Not a few of the species had a wide range; the same *Megatherium*, for instance, extended from Patagonia and the river Plata in South America, between latitudes 31° and 39° south, to corresponding latitudes in North America, the same animal being also an inhabitant of the intermediate country of Brazil, where its fossil remains have been met with in caves. The extinct elephant, likewise, of Georgia (*Elephas primigenius*) has been traced in a fossil state northward from the river Alatomaha, in lat. $33^{\circ} 50' N.$ to the polar regions, and then again in the eastern hemisphere from Siberia to the south of Europe. If it be objected that, notwithstanding the adaptation of such quadrupeds to a variety of climates and geographical conditions, their great size exposed them to extermination by the first hunter tribes, we may observe that the investigations of Lund and Clausen in the ossiferous limestone caves of Brazil have demonstrated that these large mammalia were associated with a great many smaller quadrupeds, some of them as diminutive as field mice, which have all died out together, while the land shells formerly their contemporaries still continue to exist in the same countries. As we may feel assured that these minute quadrupeds could never have been extirpated by man, especially in a country so thinly peopled as Brazil, so we may conclude that all the species, small and great, have been annihilated one after the other, in the course of indefinite ages, by those changes of circumstances in the organic and inorganic world which are always in progress, and are capable in the course of time of greatly modifying the physical geography, climate, and all other conditions on which the continuance upon the earth of any living being must depend.*

The law of geographical relationship above alluded to, between the living vertebrata of every great zoological province and the fossils of the period immediately antecedent, even where the fossil species are extinct, is by no means confined to the mammalia. New Zealand, when first examined by Europeans, was found to contain no indigenous land quadrupeds, no kangaroos, or opossums, like Australia; but a wingless bird abounded there, the smallest living representative of the ostrich family, called Kivi, by the natives (*Apteryx*). In the fossils of the Post-Pliocene and Pleistocene period in this same island, there is the like absence of kangaroos, opossums, wombats, and the rest; but in their place a prodigious number of well-preserved specimens of gigantic birds of the struthious order, called by Owen *Dinornis* and *Palapteryx*, which are en-

* See Principles of Geology, chaps. xli. to xliv.