

lished fact, independently of all theoretical explanations, is that the earth has experienced enormous revolutions of climate within comparatively late periods, and since the date of the introduction of many existing species of animals and plants. To this great truth in some of its bearings I have endeavored to direct attention in two previous articles in this REVIEW, in connection more particularly with the origin and succession of plants, and with the antiquity of man. In the present case it will be necessary to consider these vicissitudes in their more general aspects and with some reference to their causes.

The modern or human period of geology, that in which man and his contemporaries are certainly known to have inhabited the earth, was immediately preceded by an age of climatal refrigeration, known as the glacial or ice age. This was further characterized not only by a prevalence of cold, unexampled so far as known either before or since, but by immense changes of the relative levels of sea and land, amounting, in some cases at least, to several thousands of feet. The occurrence of these changes is clearly proved by the undoubted traces of the action of ice, whether land ice or floating ice, on all parts of our continents more than half way to the equator, and by the occurrence of sea terraces and modern marine shells at high levels on mountains and table-lands. Perhaps we scarcely realize as we should the stupendous character of the changes involved in the driftage of heavy ice over our continents as far south as the latitude of 40° , in the deposit of boulders on hills several thousands of feet in height, and in the occurrence of shells of species still living in the sea, in beds raised to more than twelve hundred feet above its present level. Yet such changes must have occurred in the latest geological period immediately preceding that in which we live.

Proceeding farther back in geological time, we find the still more extraordinary fact that in the middle and earlier Tertiary the northern hemisphere enjoyed a climate so much more mild than that which now prevails, that plants at present confined to temperate latitudes could flourish in Greenland and Spitzbergen. Thus the age in which we live is one of mediocrity, attaining neither to the arctic rigor of the later Pleistocene nor to the universal mildness of the preceding Miocene. The cold of the