

refuge to plants in times of submergence, and means of escape to the south in times of refrigeration. Hence, the greater continuity of American vegetation and the survival of genera like *Sequoia* and *Liriodendron*, which have perished in the Old World. Still, there are some exceptions to this, for the ginkgo-tree is a case of survival in Asia of a type once plentiful in America, but now extinct there. Eastern Asia has had, however, some considerable share of the same advantage possessed by America, with the addition, referred to by Gray, of a better and more insular climate.

But our survey of these physical conditions can not be considered complete till we shall have considered the great Glacial age of the Pleistocene. It is certain that throughout the later Miocene and Pliocene the area of land in the northern hemisphere was increasing, and the large and varied continents were tenanted by the noblest vegetation and the grandest forms of mammalian life that the earth has ever witnessed. As the Pliocene drew to a close, a gradual diminution of warmth came on, and more especially a less equable climate, and this was accompanied with a subsidence of the land in the temperate regions and with changes of the warm ocean-currents. Thus gradually the summers became cooler and the winters longer and more severe, the hill-tops became covered with permanent snows, glaciers ploughed their way downward into the plains, and masses and fields of floating ice cooled the seas. In these circumstances the richer and more delicate forms of vegetation must have been chilled to death or obliged to remove farther south, and in many extensive regions, hemmed in by the advance of the sea on the one hand and land-ice on the other, they must have altogether perished.

Yet even in this time vegetation was not altogether extinct. Along the Gulf of Mexico in America, and in the Mediterranean basin in Europe, there were still some