

if equalled in modern times, and which may have enabled plants so constructed to exist even on the land.

From these beginnings in the early Palæozoic, the progress of the vegetable kingdom went on, until, in the later parts of that great period, the Devonian and Carboniferous eras, it culminated in those magnificent forests which have left so many interesting remains, and which accumulated the materials of our great beds of coal. In these the families of the Club mosses, the Ferns and the Mare's-tails attained to a perfection in structure and size altogether unexampled in the modern world, and may be said to have overspread the earth almost to the exclusion of other trees. Here, however, two new families come in of higher grade, and leading the way to the flowering plants. These are the Pines and their allies and the Cycads, and certain intermediate forms, neither Pines nor Cycads, but allied to both.¹ This wonderful flora, which we have now the materials to reproduce in imagination almost in its entirety, decays and passes away in the Permian system, the last portion of the Palæozoic, and in entering into the third great period of the earth's history—the Mesozoic, we again find an almost entire change of vegetation. Here, however, we are able to understand something of the reasons of this. The Palæozoic floras seem to have originated in the North, and propagated themselves southward till they replenished the earth, and they were favoured by the existence at that time of vast swampy flats extending over great areas of the yet imperfectly elaborated continents. The Mesozoic floras, on the other hand, seem to have been of Southern or equatorial origin, and to have followed up the older vegetation as it decayed and disappeared,

¹ *Cordaites*, etc. As I have elsewhere shown, these are distinct sub-floras in the Lower, Middle and Upper Devonian, and in the Lower, Middle and Upper Carboniferous and Permian, sufficiently different to allow these periods to be determined by the evidence of these fossil plants. Reports prepared for Geological Survey of Canada.