

greatly developed during the deposit of these strata in both islands. Hence interbedded lavas and tuffs are frequent, and in the North Island the calcareous deposits are often wholly replaced by widespread trachyte-flows and volcanic breccias.⁵⁶

Section ii. Oligocene

§ 1. General Characters

The term "Oligocene" was proposed in 1854 and again in 1858 by Prof. Beyrich⁵⁶ to include a group of strata distinct from the Eocene formations of France and Belgium, and which Lyell had classed as "Older Miocene." They consist partly of terrestrial, partly of fresh-water and brackish, and partly of marine strata, indicating considerable oscillations of level in the European area. They consequently present none of the massive deep-water characters so conspicuous in some of the Eocene subdivisions. Among other geographical changes of which they preserve the chronicles is the evidence of the gradual conversion of portions of the sea-floor over the heart of Europe into wide lake-basins in which thick lacustrine deposits were accumulated. Some of these lakes did not attain their fullest development until the Miocene period.

The Oligocene flora, according to Heer, is composed mainly of an evergreen vegetation, and has characters linking it with the living tropical floras of India and Australia and with the subtropical flora of America. It includes some ferns, fan-palms, and feather-palms (*Sabal*, *Phœnicites*), a number of conifers (*Sequoia*, Fig. 432, etc.), cinnamon-trees, evergreen oaks, custard-apples, gum-trees,

⁵⁶ Monatsbericht. Akad. Berlin, 1854, pp. 640-666; 1858, p. 51.

⁵⁷ Hector's "Handbook of New Zealand," p. 28.