

the theoretical views that have been started regarding the simplicity of primitive forms of organic life, or that vegetable preceded animal life, and that the former was necessarily dependent upon the latter. The existence of races of men inhabiting the icy regions of the North Polar lands, and whose nutriment is solely derived from fish and cetaceans, shows the possibility of maintaining life independently of vegetable substances. After the devonian system and the mountain limestone, we come to a formation, the botanical analysis of which has made such brilliant advances in modern times.* The coal measures contain not only fern-like cryptogamic plants and phanerogamic monocotyledons (grasses, yucca-like Liliaceæ, and palms), but also gymnospermic dicotyledons (Coniferæ and Cycadeæ), amounting in all to nearly 400 species, as characteristic of the coal formations. Of these we will only enumerate arborescent Calamites and Lycopodiaceæ, scaly Lepidodendra, Sigillariæ, which attain a height of sixty feet, and are sometimes found standing upright, being distinguished by a double system of vascular bundles, cactus-like Stigmariæ, a great number of ferns, in some cases the stems, and in others the fronds alone being found, indicating by their abundance the insular form of the dry land,† Cycadeæ,‡ especially palms, although fewer in number,§ Asterophyllites, having whorl-like leaves, and allied to the Naiades, with araucaria-like Coniferæ,|| which exhibit faint traces of annual rings. This difference of character from our present vegetation, manifested in the vegetative forms which were so luxuriously developed on the drier

* By the important labors of Count Sternberg, Adolphe Brongniart, Göppert, and Lindley.

† See Robert Brown's *Botany of Congo*, p. 42, and the Memoir of the unfortunate D'Urville, *De la Distribution des Fougères sur la Surface du Globe Terrestre*.

‡ Such are the Cycadeæ discovered by Count Sternberg in the old carboniferous formation at Radnitz, in Bohemia, and described by Corda (two species of Cycatides and Zamites Cordai. See Göppert, *Fossile Cycadeen in den Arbeiten der Schles. Gesellschaft, für vaterl. Cultur im Jahr 1843*, s. 33, 37, 40, and 50). A Cycadea (*Pterophyllum gonorrhachis*, Göpp.) has also been found in the carboniferous formations in Upper Silesia, at Königshütte.

§ Lindley, *Fossil Flora*, No. xv., p. 163.

|| *Fossil Conifera*, in Buckland's *Geology*, p. 483-490. Witham has the great merit of having first recognized the existence of Coniferæ in the early vegetation of the old carboniferous formation. Almost all the trunks of trees found in this formation were previously regarded as palms. The species of the genus *Araucaria* are, however, not peculiar to the coal formations of the British Islands; they likewise occur in Upper Silesia.