

PLANTS.

The line of succession for Paleozoic terrestrial plants has been made apparently clear by the observation that the Rhizocarps, the simple and small, mud-growing Acrogens, few in existing species, of which *Salvinia* and *Marsilea* are two of the four modern genera, were the probable source of the spores that so greatly abound in Devonian shales (Dawson). Through the Protosalvinia, according to this author, the line leads up to the Equiseta, that is, to the *Calamites* and *Annulariæ* of the earliest terrestrial flora. Another simple type of Cryptogam, related to the former in fructification, that of *Selaginella*, which is represented now by only one single genus and thus shows that it is a type of the past now dwindled, is regarded as the probable source of the Lepidodendrids, and through them of the Sigillarids, or semi-exogenous Acrogens, and of the Yews and other true Gymnosperms.

The special type among these simpler Cryptogams that was precursor to the Ferns has not been ascertained. Since circinate vernation characterizes both Cycads and Ferns, and since a genus of Cycads, *Stangeria*, now exists in which the foliage is Fern-like, it is probable that the line to the Ferns led beyond to the Cycads, the other grand division of the Gymnosperms, and, therefore, that the Gymnosperms had a double source.

In the Lepidodendrids, Sigillarids, and related species, Cryptogams reached their culmination, or their greatest expansion in number of species, and their highest perfection in type of structure. The Lepidodendrids have no species in the Permian period, and the Sigillarids none after it. Further, the Equiseta passed, through the Calamodendra, their time of maximum development during the Carboniferous period. The genus *Calamites* had later species, but they were smaller, and the associated Equiseta were of the inferior modern type.

The Cycads culminated in later time; and the same is true also of the more typical Gymnosperms — the Conifers.

INVERTEBRATES.

1. **Hydrozoans ; Actinozoans.** — The Graptolites, Cambrian in their beginning and Lower Silurian in culmination, disappear with the Lower Devonian. The *Cyathophylloid Corals*, or *Tetracoralla*, also dating from the Cambrian, increase in number of genera and species in the Silurian; with other Corals make coral reefs in the Upper Silurian; are in much greater numbers, and of larger size, and make still more extensive reefs, but undergo little increase in genera, in the Lower Devonian; then in the Lower Carboniferous they almost disappear. Three of the species observed pertain to the three older genera, *Cyathophyllum*, *Zaphrentis*, and *Phillipsastrea*, and three are new genera, *Lithostrotion*, *Cyathaxonia*, and *Lonsdalia*. The recent discoveries of the "Challenger" Expedition report a living species of a Cyathophylloid Coral from the bottom of the ocean.