

separated from one another by partition walls. In Horse-tails and Calamiteæ the surface is traversed by longitudinal ribs running parallel, as in the case of a fluted column, and the outer skin contains so much silicious earth in the living forms, that it is used for cleansing and polishing. In the Asterophylliteæ, the star-shaped whorls of leaves were more strongly developed than in the two other orders. There exist, at present, of the Calamariæ only the insignificant Horse-tails (*Equisetum*), which grow in marshes and on moors; but during the whole of the primary and secondary periods they were represented by great trees of the genus *Equisetites*. There existed, at the same time, the closely related order of the Giant Reeds (*Calamites*), whose strong trunks grew to a height of about fifty feet. The order of the Asterophyllites, on the other hand, contained smaller and prettier plants, of a very peculiar form, and belongs exclusively to the primary period.

Among all Ferns, the history of the third class, that of the *Root*, or *Aquatic Ferns* (*Rhizocarpeæ*, or *Hydropteridæ*), is least known to us. In their structure these ferns, which live in fresh water, are on the one hand allied to the frond ferns, and on the other to the scaly ferns, but they are more closely related to the latter. Among them are the but little known moss ferns (*Salvinia*), clover ferns (*Marsilea*), and pill ferns (*Pilularia*) of our fresh waters; further, the large *Azolla* which floats in tropical ponds. Most of the aquatic ferns are of a delicate nature, and hence ill-suited for being petrified. This is probably the reason of their fossil remains being so scarce, and of the oldest of those known to us having been found in the Jura system. It is probable, however, that the class is much older, and that it