

thallus, also called Protonema, still remains in that lower stage of elaboration manifested throughout life by all Thallus plants; that is to say, stem and leaf-organs have as yet not differentiated, and the entire cell-mass of the Fore-growth corresponds to a simple thallus. The second and more perfect generation of mosses and ferns—the Stem, or Cormus—develops a much more highly elaborate body, which has differentiated into stalk and leaf (as in the case of flowering plants), except in the lowest mosses, where this generation also remains in the lower stage of the thallus.

With the exception of these latter forms the first generation of Mosses and Ferns (the thallus-shaped Fore-growth) always produces a second generation with stem and leaves; the latter in its turn produces the thallus of the first generation, and so on. Thus, in this case, as in the ordinary cases of alternation of generation in animals, the first generation is like the third, fifth, etc., the second like the fourth, sixth, etc. (Compare vol. i. p. 206.)

Of the two main classes of Prothallus plants, the Mosses in general are at a much lower stage of development than the Ferns, and their lowest forms (especially in an anatomical respect) form the transition from the Thallus plants through the Algæ to Ferns. The genealogical connection of Mosses and Ferns which is indicated by this fact can, however, be inferred only from the case of the most imperfect forms of the two classes; for the more perfect and higher groups of mosses and ferns do not stand in any close relation to one another, and develop in completely opposite directions. In any case Mosses have arisen directly out of Thallus plants, and probably out of Green Algæ.

Ferns, on the other hand, are probably derived from