

regard to the structure of the vegetative organs of the mature sporophyte, and finds that in this respect they also show a marked resemblance to one another. Lastly, the organization of the gametophyte and the development of the sporophyte, are discussed in the same connection with a like conclusion.

It is only necessary in considering the results of the present investigation, to examine the latter features. In regard to the structure of the prothalli, the two groups certainly do present marked likenesses; e.g., the gametophyte of *Ophioglossum pedunculatum* to those of *Lycopodium cernuum* and *L. inundatum*, and the gametophytes of *B. Lunaria* and *B. virginianum* to that of *L. annotinum*. It is quite possible, however, that the resemblance in these cases is due to a similarity in environment.

The male organs of the two groups are in some important features quite different. The *antheridium* has a double outer wall in the *Ophioglossaceæ* and the antherozoids are spiral and multiciliate. In the homosporous *Lycopodineæ*, the *antheridium* has a simple outer wall, and the antherozoids have the general configuration and the two cilia of the antherozoids of the Bryophyta.

The *archegonia* of *B. virginianum* at least, resemble those of the *Filicineæ*, (excluding *Isoetes*, which probably does not belong here), in having a basal cell and a single binucleate canal-cell, or at most two neck canal-cells. On the other hand the *Lycopodineæ* and *Equisetaceæ* are without the basal cell and have a decided tendency to increase the number of cervical canal-cells. Too much importance should not, however, be attached to these structural features of the *archegonia*.

The embryo of *B. virginianum* and apparently that also of *O. pedunculatum*, lacks the suspensor and primary sporophytic tubercle which are so characteristic of most of the isosporous *Lycopodineæ*, and in these defects resembles the *Filicineæ*. So far as the facts in the case of *B. virginianum* go, it seems probable that the *Ophioglossaceæ* are much more closely allied to the eusporangiate *Filicineæ* than to the isosporous *Lycopodineæ*, although they may be possibly the nearest of the megaphyllous Pteridophyta to that group. In all probability, the *Ophioglossaceæ* are more primitive than the *Marattiaceæ* which they in some respects resemble.

As a result of the fuller knowledge in recent years of the segmentation of the embryo of the Pteridophyta, it is scarcely possible to retain any longer the conception of octants propounded by Leitgeb and others when the leptosporangiate *Filicineæ* were practically the only ferns in which