JRFFREY : GAMETOPHYTE OF BOTRYCHIUM VIRGINIANUM.

the superior margin being raised so as to produce a depression in the centre. The antheridia occupied ridges in the bottom of this basin. No archegonia were present, nor did the plants show a definite apical meristem. The same observer remarked that the inferior cells of the prothallus were occupied by an apparently symbiotic fungus, the mycelium of which communicated with the outside by means of the root-hairs with which the plants was provided. He referred the symbiont to the genus Pythium. More recently Treub⁶ has published a description of the prothallium of Lycopodium cernunm. Here the gametophyte, as in Ophioglossum pedunculosum, starts from a primary tubercule, and divides subsequently into green lobes. The sexual organs have no definite arrangement and are moncecious. The archegonia possess a single uninucleate canal-cell. The large antheridia have a single-layered outer wall and produce biciliate moss-like antherozoids. The embryo is peculiar in the possession of a rudimentary suspensor. The stem in the young sporophyte is at first represented by a parenchymatous mass which has been designated the primary tubercule. The first division in the embryo is transverse and gives rise to the epibasal and hypobasal cells. The latter originates first the cotyledon; the stem-apex apparently not developing till after several leaves have grown out. The first root also is derived from this segment, but only after a number of foliar organs have unfolded. The prothallus in this case was likewise occupied by a symbiotic fungus, which was considered by the author to be a species of *Pythium*.

Goebel⁷ about the same time described the sexual phase of another species, Lycopodium inundatum. It closely resembled Lycopodium cernuum in structure, and also harboured a fungus resembling Pythium. Treub⁸ has also published an account of another form, viz : Lycopodium phlegmaria which is slender, much branched, and entirely subterranean. It is especially interesting on account of the occurrence of a number of canal-cells in the archegonium and from the presence of paraphysis-like growths among the antheridia.

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In 1895, the writer came upon a large number of prothallia of *Botrychium virginianum* in a Sphagnum-swamp behind the village of Little Metis, in the Province of Quebec. The presence of these plants was revealed by the greenish-yellow cotyledons appearing above the surface

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^{6.} Etudes sur les Lycopodiacées. Annales du Jardin botanique de Buitenzorg. Tome iv., v., vii. viii, viii, 1884-1890.

^{7.} Bot. Zeitung, 1887, No. 11-12.

^{8.} Op. Cit.