

OBSERVATIONS ON LYCOPODIUM

BY FRANCIS E. LLOYD

In the summer of 1901, during a visit to Europe, I had the opportunity to observe several species of *Lycopodium* as they grow in parts of the Old World.

Lycopodium complanatum L.—A lot of sterile material of this plant was collected by Dr. Dunzinger of the Botanical Institute, University of München, in the Isarthal near München, on July 25, 1901, and was put at my disposal. Examination showed that the rhizome was blanched as a result of its growth in the mossy mats which clothe the ground in its habitat. The further fact of interest was noted that in this region *Lycopodium complanatum* innovates annually as *L. tristachyum* Pursh is known to do in North America. This behavior is probably a response to the much moister climate of Bavaria. *L. tristachyum* is apparently not to be found in the same locality. I have, however, seen material found growing in the vicinity of Bonn, answering to the North American *L. tristachyum* in every particular.

Lycopodium alpinum L.—This plant was found fairly abundant in the Austrian Tyrol on the flanks of the mountains at the Brenner Pass, and on the mountains behind Steinbach, which stands in the region in which Anton Kerner von Marilaun made his studies of the alpine vegetation. The time—July—was too early for the strobiles to have reached full development. The densely crowded tufts of foliage are often so tightly woven in with the neighboring plants, forming with them the dense carpet of the "alpine pastures," that it is at first quite difficult to recognize.

The striking fact about this plant is that a remarkable amount of dorsiventrality is developed in the branchlets, in spite of their generally vertical position. I have made the statement elsewhere* that this plant is the most strongly dorsiventral of all the plants in the group to which it belongs. Goebel,† however, takes the position that *L. complanatum* has that distinction.

* Lloyd, F. E., and Underwood, L. M. Bull. Torrey Club, 27: 147. 1900.

† Organography (translation), 105.

Regarding the much flattened stem and suppression of the under leaves as indicating the amount of dorsiventrality, it would appear that Professor Goebel is quite right. It was, however, not in this sense that I used the expression, for I referred rather to the remarkable amount of difference in the form of the leaves which are indeed trimorphic, a matter which has been sufficiently elucidated in the paper above alluded to. It would seem, therefore, that *Lycopodium alpinum* occupies a peculiar position, and may more properly be regarded as a parallel species with *L. complanatum*. The two species represent two different kinds of specialization and the peculiar features of the plant *L. alpinum* may perhaps be due to an attempt to revert to a radially symmetrical condition, a suggestion prompted by the fact of the orthotropous position of the branchlets above referred to.

Lycopodium Selago L.—The brood bodies or gemmae of *Lycopodium lucidulum* Michx. are produced on curiously modified branches, which do not, as many suppose, develop in the axils of leaves. It is not very widely known that some, the proximal, leaves of these peculiar branches are so modified as to form a mechanical apparatus for the expulsion of the distal part of the shoot, which constitutes the brood body.

I have been fortunate in extending this observation to *Lycopodium Selago*, which was found growing in the alpine regions of the mountains in the vicinity of Brenner. Observation shows that a very light touch is sufficient to release the mechanism which acts as a pinching catapult, if we may so call it, and may be compared to the somewhat similar mechanical condition seen in the dehiscent fruits in *Viola* and *Hamamelis*. The gemmae are cast to a distance of several centimeters, sometimes ten or more.

Undoubtedly the same will be shown to occur in *Lycopodium porophyllum* Lloyd & Underwood.

TEACHERS COLLEGE, COLUMBIA UNIVERSITY.



Lloyd, Francis E. 1902. "OBSERVATIONS ON LYCOPODIUM." *Torreya* 2(2), 20–21.

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