

(3) It is assumed since Frank's researches that the host derives part of its food from the carbon compounds which the mycorrhiza draws from the humus in the soil.

CONCLUSIONS.

The example of *Arbutus* supports Rayner in the belief that symbiosis with endophytes is a general rule, at least, for Orchidaceæ and Ericaceæ.

It shows again that *the so-called symbiosis is a form of parasitism in which an equilibrium exists between the invading power of the fungus and the resisting power of the host*; also, that it is a *reversible* phenomenon—profitable to both symbionts so long as the equilibrium remains balanced; but each is ever ready to assume the character of parasite and bring about the death of the other.

STATION BIOLOGIQUE, ARCACHON, FRANCE.

May, 1917.

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NOTE ON *TARGIONIA HYPOPHYLLA*.

IN 1914 the writer published some of his observations on a form of *Targionia hypophylla* which he had collected at Mussooree (*NEW PHYTOLOGIST*, Vol. XIII, Nos. 6 and 7). Since then the writer has found that the plant is pretty common throughout the whole of Garhwal. The form from Mussooree was described as a distinct variety as it presented several differences from the

type, the chief among which as stated were: (1) the occurrence of antheridia on ordinary shoots and the usual disc-like male shoots; and (2) the absence of tooth-like interlocking processes from the involucre valves.

In a paper by O'Keeffe in 1915 (NEW PHYTOLOGIST, Vol XIV, Nos. 4 and 5) it has been shown that the peculiar male shoots described in the Himalayan form by the writer also occur in British specimens, so that the character can no longer be said to be peculiar to the former. In the light of the details and figures given in the above mentioned paper it was thought desirable to examine some more Himalayan material of this species as regards the second peculiar character, *i.e.*, the entire margin of the involucre valves, especially because at the time when the writer published his observations he was under the impression that the teeth on the involucre valves in the typical specimens were large enough to be visible to the naked eye. A thorough re-examination of material from Mussooree has brought out the following points:—

1. As seen by the naked eye or with a lens the margin of the involucre valves as a whole is usually quite entire, though sometimes a few small irregular obtuse teeth are present.

2. As seen in microtome sections often the greater part of the valve-margin shows no interlocking processes as figured by O'Keeffe, or the marginal cells are only more or less irregular or disorganised, but a small part of the valves near the dorsal surface shows well developed interlocking processes.

3. In other specimens distinct teeth were present on the whole of the margin.

It appears, therefore, that since the two important characters on which the variety *integerrima* was based are not constant features of the Himalayan form, there is no need of the form being put in a separate variety.

It may also be mentioned that according to the view put forward by the writer as regards the derivation of *Targionia*-like forms from *Marchantia*-like forms by reduction (NEW PHYTOLOGIST, Vol. XIV, No. 1) the interlocking teeth on the involucre valves of *Targionia* would be the last remnants of the long processes of the fimbriated valves of the involucre of *Marchantia*, and even these teeth are in process of being eliminated.

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