above quoted, but in this case the branching is very much more extensive. It does not appear that these ramifications are due to any such accident as the trampling on the branch by animals, as there are no signs of rooting at any of the internodes, and indeed the branching is too extensive to render this a probable cause.

The proliferous *Calamus* described and figured in the previous paper from Matang in Borneo, p. 421, Fig. 39, proves to be *Calamus pygmaeus*, Becc.

Daemonorops longipes, Mart. A plant in the Botanic Gardens has emitted a number of the long stems which lie upon the ground, the tips ascending. In one of these, which has probably been bruised or injured somehow, three shoots have been produced below the terminal one. This is somewhat similar to the production of buds on the rattan of *Plectocomia* previously mentioned, and will probably not develop much further. They are quite young as yet. The branching of the rattans of *Daemonorops* has not been observed before.

HENRY N. RIDLEY.

BOTANIC GARDEN, SINGAPORE.

UTRICULARIA EMARGINATA, BENJ.—Although much has been written in recent years upon the structure and development of species of *Utricularia*, there is still much to learn regarding them, and the interpretation of the homologies of the parts in these aquatic heterotrophic plants cannot be said to be yet determined beyond question; indeed, an approach to such determination will only be possible after many more species have been thoroughly studied. As a contribution to our knowledge of the genus I give the following preliminary note upon *Utricularia emarginata*, a Mexican species first described by Benjamin,¹ which is now flourishing in the Royal Botanic Garden, Edinburgh, and which, so far as I know, has not been examined carefully before now. It was introduced to Edinburgh in 1906 by means of seeds obtained from a specimen in Pringle's Mexican collections of 1904. A free-growing plant, as shown in Plate XXII, reproduced from a photograph by Mr. R. Adam, in a moderately warm temperature it flowers and seeds abundantly almost throughout the year, and these characters, along with its ready propagation from seed, make it a peculiarly favourable subject for study in the laboratory of the germination and subsequent history of this type of plant. In fact it may well become a useful plant for teaching purposes.

Mr. Laurence Stewart, foreman in the Glass Department of the Royal Botanic Garden, gives the following account of his experience in the cultivation of the plant:—

‘Seeds should be sown in a shallow pan, having a thin layer of mud at the bottom, with enough water to cover the mud. Germination begins in the sixth week.

‘The plant grows submerged. Experiment has shown that the best method of cultivation is to keep the plant in partial shade in still water. When plants are cultivated thus the water soon becomes alive with micro-crustacea, which when they enter the bladders are absorbed by the plant as food. Once the water is infested with the micro-crustacea, the plant grows quickly and requires room; it will cover an area of a square yard in a short time.

¹ *Linnaea*, xx (1847).

‘Mr. W. Evans, F.R.S.E., has identified the micro-crustacea which were collected in the water in which this plant is growing, as *Pionocypris vidua*—(Ostracoda), *Chydorus sphaericus*—(Cladocera), *Cyclops viridis*—(Copepoda) and *Cyclops serratulus*—(Copepoda).

‘Plants from seed which germinated in 1906 began to show signs of flowering in March, 1907, and the first flower opened on April 27. The inflorescences were from six to seven inches in length, each bearing two to three small yellow flowers.

‘After fertilization the inflorescence bends down to the water, the peduncles of the fertilized flowers twist and enable the ovary to be submerged. Each flower in turn, after being fertilized, bends down in the same way until all the flowers of the inflorescence are submerged. The seed soon ripens and can be seen through the transparent capsule. The placenta then absorbing water begins to swell and becomes mucilaginous; it bursts the capsule and allows the seed to float out into the water, when it is then ready for germination.’

My own study of the germination has shown me that the oval discoid protocorm (which has a pale green colour) of *Utricularia emarginata* produces at one end a couple of subulate outgrowths which rapidly develop and reach a length ultimately of twice that of the body of the protocorm. Between these outgrowths two watershoots are formed in succession; one of them grows more quickly than the other, and becomes the chief watershoot having circinate ptyxis, showing successively forked branchings, and bearing linear lateral appendages (‘leaves’ of authors). The first bladder arises on this shoot in a superaxillary position to the first formed of these appendages. The younger shoot also elongates, though much more slowly, and in its turn branches and produces lateral appendages and bladders. Glück,¹ who has himself made no observations upon the germination, arranges the species of *Utricularia*, of which the features of germination are known, in three groups:—

1. That of *U. vulgaris*, *U. oligosperma*, *U. reniformis*:—With many primary leaves.
2. That of *U. exoleta*:—With two primary leaves.
3. That of *U. bifida*, *U. lateriflora*, *U. montana*:—Without primary leaves.

Whether these are definite types and cover all the forms is a matter for future investigation to decide. *Utricularia emarginata* apparently falls into the second of Glück’s categories.

My paper dealing in detail with the life-history of *Utricularia emarginata* will appear soon, and in it will be given illustrations of the various stages of development, as well as the results of experiments in cultivation. This note may call attention meanwhile to this easily-grown plant as an object for demonstrations. In the laboratory, seedlings grow vigorously in a jar of water stood on top of a jacketted embedding oven.

BERTHA CHANDLER.

EDINBURGH.

¹ Glück, Biologische u. morphologische Untersuchungen über Wasser- und Sumpfgewächse. Teil II, Jena, 1906.

Chandler, Bertha. 1909. "Utricularia emarginata, Benj." *Annals of botany* 23, 339–340. <https://doi.org/10.1093/oxfordjournals.aob.a089222>.

View This Item Online: <https://www.biodiversitylibrary.org/item/236540>

DOI: <https://doi.org/10.1093/oxfordjournals.aob.a089222>

Permalink: <https://www.biodiversitylibrary.org/partpdf/318957>

Holding Institution

Smithsonian Libraries

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: Not in copyright. The BHL knows of no copyright restrictions on this item.

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.