

nearly alike on the two halves, and corresponds to that of *E. crassum* rather than of *humerosum*. Another difference, which is not represented in a front view, is that the lower is decidedly thicker than the upper half, but I was not able to obtain any exact measurements.

That hybridity should occur among the Desmidiaceae is not in itself surprising, several well-authenticated instances being on record in the allied Zygnemaceae. Professor Vines has pointed out to me that if this is a true instance of hybridity, it must be temporary in its character; since, if the individual were to reproduce itself in the ordinary way by fission, each half-cell would probably reproduce a half-cell like unto itself.

ALFRED W. BENNETT, London.

VAUCHERIA-GALLS.—The literature of the so-called ‘galls’ on various species of *Vaucheria* is not very extensive. Benkö gives a list of those who have observed them up to the date of his paper; but as this paper, which appeared in the ‘Magy. Nov. Lapok.’ vol. vi, 1882, p. 146, is probably not accessible to the readers of the ANNALS, I transcribe the list from the notice in the ‘Botanisches Centralblatt,’ vol. xiv, 1883, p. 1:—Vaucher 1803, Lyngbye 1819, Unger 1827 and 1834, Wimmer and Valentin 1833, Fürstin Friderike 1836, Morren 1839, Hofmeister and Cohn 1853, Kützing 1856, Magnus 1876, Wollny 1877 and 1878, Cornu and Balbiani 1874 and 1878, Benkö 1882. From this list are omitted the only two descriptions with which I am acquainted by English observers before that time, viz.:—by Sir J. E. Smith in ‘English Botany,’ 1st ed., vol. xxv, t. 1765, and Hassall, ‘Freshwater Algae of Great Britain,’ 1845, p. 56. The only description I have met with since Benkö’s paper is by Lister, in the ‘Proceedings of the Essex Field Club,’ vol. iii, 1884. The earliest figures are those by Vaucher, ‘Conferves d’eau douce,’ 1803, t. iii, f. 8, and Smith, ‘English Botany,’ 1st ed., 1805, t. 1765; and these, though rough, are fairly accurate. I know of no figures later than these, except the very admirable ones in Balbiani’s exhaustive account of the parasite in the ‘Annales des Sciences Naturelles,’ Zoologie, vol. vii, 1878, t. iv¹; and the woodcuts in Lister’s paper referred to above.

The species infested by the ‘galls’ is stated by Smith to be *Vaucheria sessilis*, by Hassall *V. racemosa*. Benkö gives the

¹ An abridgment, with the illustrations of Balbiani’s paper, appears in the Journal of the Royal Microscopical Society for 1879.

following list of species on which they have been observed:—*V. racemosa*, *dichotoma*, *clavata*, *caespitosa*, *geminata*, *uncinata*, *terrestris*. Lister has also observed them on *V. aversa*, Hass. and *V. Dillwyni*, Ag. The animal (rotifer) which gives rise to them is described in the earlier papers as *Cyclops lupula*, Mull.; but Balbiani and others have identified it, in all the species examined, with *Notomata Werneckii*, Ehrb.

I append a figure (Fig. 5, $\times 200$) of one of these 'galls' found on a *Vaucheria* growing on the surface of a wet rock at Buckfastleigh, Devon, in August 1889. Having no organs of fructification, the species could not be determined with certainty, but is probably *V. sessilis*, Vauch. The 'gall' is a vesicular appendage attached to the filament nearly at right angles; its length from five to six times, and its greatest breadth about twice that of the filament, from which it springs by an open neck about as wide as the filament. The protoplasmic contents of the filament and of the vesicle are in complete communication; and the latter is rich in chlorophyll, which however has retreated from the cell-wall, leaving a parietal space filled with granular colourless protoplasm. Within the chlorophyllous portion is seen the living animal, which feeds upon the protoplasm of the vesicle, but, according to Balbiani, not on the chlorophyll.

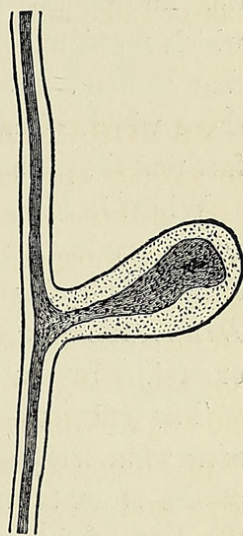


Fig. 5.

The 'galls' are described by several observers as frequently present in large numbers on the same filament; but they are certainly sometimes solitary. From the fact that the filaments attacked are never fertile, it has been suggested that they weaken the plant, and prevent its forming sexual organs; but Balbiani has clearly shown that the 'gall' is a lateral fertile branch which the parasite has entered at an early stage, prevented it from forming oogones and antherids, and cause it to swell to from four to five times its original size by hypertrophy, brought about probably by the action of a stimulating secretion, as in true galls. This is further confirmed by the horn-like protuberances with which they are frequently furnished; but these were not present in those observed by me. If this view of their formation is correct, they are not accurately described as galls—a term which should be

confined to special structures brought into existence entirely by the stimulation of the parasite. Their history may be compared, in its general features, to that of the 'bladder-plums' produced by the attacks of *Exoascus*.

ALFRED W. BENNETT, London.

ON THE STOMATA IN THE FRUIT OF IRIS PSEUDACORUS, LIN.—So many papers have been written on the development and structure of the stomata of plants that it might seem almost superfluous to contribute any further details to a subject on which our knowledge appears to be so complete. But the conditions which regulate the process of cell-division in a leaf (and it is in leaves that stomata have chiefly been studied) are not precisely similar to those which obtain in a growing fruit, and it is probably upon this fact that the peculiarities now to be described in some measure depend.

Whilst in leaves the division of the epidermal cells, so far at least as the production of stomata is concerned, ceases at a comparatively early stage, this is frequently not the case in growing fruits, and *Iris pseudacorus* presents a striking example of stomatal formation extending over a considerable period of time.

The epidermis of the ovary in a young bud consists of small, somewhat irregularly elongated cells from which the mother-cells of the stomata are cut off in the way described by Strasburger¹ for the leaf of this plant. The ovary does not however reach its full size until the bud is almost ready to expand, and if the epidermis be examined at this stage its cells clearly exhibit the properties of tissues still in a merismatic condition.

If the flower be fertilized the ovary swells, and rapidly increases in size, and this process is accompanied, not merely by growth and extension on the part of the epidermal cells, but also by a very considerable increase in their number. As this takes place, certain cells become clearly marked off from those which surround them, both on account of their much smaller size, and also by their richness in protoplasmic contents. These small cells are the potential mother-cells of a fresh series of stomata, and their development may be traced in all stages (Figs. 6–13). Not all, however, of these cells appear actually to give rise to stomata, for in fruits of an advanced age they may be detected in various stages of arrested development. When

¹ Ein Beitr. zur Entwicklungsgesch. d. Spaltöffnungen, Pringsh. Jahrb. Bd. V.



Bennett, Alfred W. 1889. "Vaucheria-galls." *Annals of botany* 4, 172–174.
<https://doi.org/10.1093/oxfordjournals.aob.a090556>.

View This Item Online: <https://www.biodiversitylibrary.org/item/234873>

DOI: <https://doi.org/10.1093/oxfordjournals.aob.a090556>

Permalink: <https://www.biodiversitylibrary.org/partpdf/316788>

Holding Institution

Smithsonian Libraries and Archives

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>.