part of the foliage of the host plant. The analysis is interesting, but incomplete. The lengthy and well selected bibliography will be valuable for workers in biochemistry.

A paper by HOUARD[16] is subdivided into five parts as follows: (1) table of galls previously described, in which are listed 26 species with bibliography of each and grouped with reference to the host plants; (2) new observations upon the new galls of Tunis, in which the author gives brief discussions of 93 cecidia, some of which are assigned to genera only; these cecidia are also grouped with reference to the host plants; most of them are attributed to insects, one on *Moriandia cinerea* Cosson is caused by *Cystopus candidus*, one on *Olea europaea* L. is caused by *Bacillus olea* (Arc.) Trev., and a third is referred to as a fasciation without comment as to cause; (3) a very valuable bibliography on the zoocecidia of Tunis from 1894 to date; (4) a table of galls arranged with reference to host plants; (5) a table arranged with reference to the organisms causing the galls.

COSTERUS and SMITH[17] have represented a very interesting paper on tropical teratology. Malformations of 18 species (7 of which belong to the family Orchidaceae) are carefully described. These descriptions are far better than those frequently given in papers on teratology in that the relationships of the parts have been carefully worked out. No explanation is offered as to the cause of these peculiar structures.—MEL T. COOK.

Gas movements in plants.—It is a question of some interest whether static diffusion accounts for essentially all the gas exchanges of foliar intercellular systems or whether molar movement is also considerably involved. OHNO[18] has already shown how "hygro-diffusion" leads to such a molar extrusion of gas in the leaf of *Nelumbo nucifera*, and has explained the physics of the action. Now URSPRUNG[19] shows that the same process plays an important part in the gas movements in the leaves of *Nymphaea* and *Nuphar*. The first half of the article is devoted to a critical historical review of the work on *Nelumbo*. The conclusions reached agree with OHNO in all essential points, although that author has given the earlier literature a less critical consideration than is desirable. As URSPRUNG states, it has generally been believed that the observed gas exchanges and positive and negative pressures in the intercellular systems of *Nymphaea* and *Nuphar* are entirely determined by photosynthetic and respiratory activities. A mention of two of his experiments will show clearly that "hygro-diffusion" plays an important rôle in these forms.

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[16] HOUARD, C., Les Zoocédicies de la Tunisie. Marcellia **10**:160–184. 1912.

[17] COSTERUS, J. C., and SMITH, J. H., Studies in tropical teratology. Ann. Jard. Bot. Buitenzorg II. **9**:98–116. *pls. 5.* 1911.

[18] BOT. GAZ. **51**:310. 1911.

[19] URSPRUNG, A., Zur Kenntnis der Gasdiffusion in Pflanzen. Flora **104**:129–156. 1912.

If the cut end of a petiole of a leaf of *Nymphaea* is placed just beneath the water surface while the upper face of the leaf blade is in the air, gas of about the composition of the air continuously extrudes from the cut end of the petiole with pressures varying from 0 to 17 cm. of water, and in volumes amounting to several times that of the leaf in course of an hour. Both the pressure and rate of extrusion increase with a rise of the temperature of the leaf and with dryness of the air in contact with the upper surface of the blade, and ceases when the air over the blade is saturated or when the blade is immersed. By piercing the upper surface of the blade of *Nymphaea* just over the petiole repeatedly with a needle, turning up the margin of the blade, and supporting a little water over the punctures, a great extrusion of air can be demonstrated, increasing with the temperature of the leaf and with dryness of the air over the marginal region of the blade. This is almost identical with the main observations on *Nelumbo*, and is explained by the same physical principle. URSPRUNG believes that a considerable part of the gas exchange in leaves of water plants floating or borne above the water is brought about by "hygro-diffusion," but that it plays no considerable rôle in the gas exchange of land plants with their narrow intercellular systems, and of course no part in submerged leaves. The studies of OHNO and URSPRUNG now make possible a much more lucid statement of gas movements and pressures in the intercellular systems of plants than was formerly[20] the case.—WILLIAM CROCKER.

Cytology of rusts.—Investigations of the cytology of *Puccinia Falcariae* by DITTSCHLAG[21] and of *Endophyllum Sempervivi* by HOFFMANN[22] show that the sequence of nuclear phenomena in these forms agrees in its essential details with that of other rusts. Among the facts presented the following are of special interest. In *Puccinia Falcariae*, which is an autoecious form of the *Puccinopsis* type, the binucleate phase arises by the lateral fusion of the cells of a palisade-like layer differentiated near the lower middle of the young aecidium. Unlike the mode of origin of binucleate basal cells in the true aecidia of *Puccinia Poae* as described by BLACKMAN and FRASER, the mode of origin of these cells in *Puccinia Falcariae* resembles more nearly that usually observed in aecidia of the *Caeoma* type, in which the fertile cells are not overlaid with a mass of sterile tissue. Occasionally three cells fuse and thus trinucleate basal cells arise. Occasionally the basal cells branch and form more than one row of spores. Regarding the trichogyne-like cells observed by some investigators, the author states that the so-called sterile cells are not always present, but when they are they occur on both sexual cells.

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[20] PFEFFER, W., Plant physiology. Eng. ed. Vol. **1**. pp. 199. 1899.

[21] DITTSCHLAG, E., Zur Kenntnis der Kernverhältnisse von *Puccinia Falcariae*. Centralbl. Bakt. II. **28**:473–492. *pls. 3. figs. 6.* 1910.

[22] HOFFMANN, H., Zur Entwicklungsgeschichte von *Endophyllum Sempervivi*. Centralbl. Bakt. **32**:137–158. *pls. 2. figs. 14.* 1911.