ON THE OCCLUSION OF THE STOMATA IN TRADESCANTIA PULCHELLA.—Whilst studying the effects of traumatic stimuli on the leaves of *Tradescantia pulchella* an interesting instance of stomatal occlusion was discovered. The wounds were made by incisions and by the removal of portions of the lamina, and it was thought at first that the occlusion was in the nature of a wound response,¹ tending to check excessive transpiration. The examination of a large number of mature uninjured leaves showed, however, that the stomatal occlusion was a constant feature.

In transverse section the leaves show an epidermis composed of very large cells, devoid of chlorophyll, those of the under side, to which the stomata are confined,

FIG. (a) Portion of leaf of *T. pulchella* in transverse section to show distribution of tissues and occluding growths; (b) and (c) show other views of occluded stomata. u.e. upper epidermis; l.e. lower epidermis; me. mesophyll; g.c. guard cells of stoma; a.g.c. auxiliary cells; oc. occluding growths.

being somewhat the smaller. The epidermis encloses, in the young laminae, a perfectly homogeneous mesophyll composed of rounded cells with abundant chlorophyll. In the mature leaves the layer of mesophyll immediately abutting on the lower epidermis enlarges somewhat and seems to lose some of its chloroplasts. It is from this layer that the occluding growths arise, as bladder-like swellings which gradually fill up the cavity below the guard cells in a similar manner to tyloses (Fig., a, b, c). When

¹ Occlusion by parenchymatous ingrowths has been recorded for *Equisetum*, as a traumatic response, by Strasburger (Leitungsbahnen, 1891; Der Bau der Kryptogamen), and I have also observed it in the leaves of *Cycas revoluta*.

mature the walls of the hypertrophied cells become brownish in colour and are slightly thickened, but do not show any trace of lignification. In none of the leaves examined were the outgrowths sufficiently large to prevent the proper working of the guard cells, though they occasionally came into contact with the auxiliary cells of the stomata. To determine the age of the leaf at which this occlusion commenced, leaves of all ages were sectioned, and it was found that, whilst there was no trace of abnormality in the young stages, the outgrowths began to develop as soon as the leaf was fully expanded and were complete in many cases within thirty days. A somewhat parallel case is figured by Haberlandt¹ for *Pilea elegans*, in which, however, the occluding cell is much thickened and touches the guard cells. He also refers to similar cases in *Camellia japonica* and *Prunus Laurocerasus*. Küster² amplifies Haberlandt's statement and cites Molisch³ as recording stomatal occlusion in *Tradescantia guianensis*, *T. pilosa*, and *T. zebrina*. Haberlandt⁴ also records the complete choking of the stomata of *Tradescantia viridis* by the hypertrophy of the auxiliary cells.

The plants of *T. pulchella* upon which the observations here recorded were made, were grown in a greenhouse which was not supplied with artificial heat, and in which, consequently, the temperature was only slightly higher than that obtaining outside. As this species is a native of Mexico it was thought that the low temperature had possibly had the effect of preventing adequate root absorption, and a number of experiments were performed with a view to testing the accuracy of this idea. In the first series an additional supply of water was given to a number of plants, which otherwise were under identical conditions with their fellows, and it was found that this treatment did not result in any noticeable diminution in the development of the swellings. In the second series a number of cuttings from the original plants were allowed to thoroughly establish themselves in a warmer plant-house, in which a constant temperature of 75°–80° F. was maintained. They were liberally watered, and under these conditions very few cases of stomatal occlusion (four out of sixty examined) were found. Further investigation is, of course, necessary before the cause of these outgrowths can be regarded as settled, but the above observations were thought to be of sufficient interest to record.

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¹ Haberlandt: Physiologische Pflanzenanatomie, 1909, p. 423.

² Küster: Pathologische Pflanzenanatomie, 1903, pp. 106–7.

³ Molisch: Ber. Senckenberg. Naturf. Ges., 1887, p. 117.

⁴ Haberlandt: Ueber d. Bezieh. zw. Funktion u. Lage des Zellkerns bei d. Pflanz., 1887.

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