

turgor changes the more important factor. They believe, indeed, that in some instances chemical change is absent.

The study of about 30 odd species leads me to the conclusion that chemical change is always present to some extent whether growth and turgor changes intervene or not. I found that under the influence of a hydrolysing agent (5% KOH) the walls of the abscission cells break down more readily than those of the neighbouring tissues above and below (*Cheiranthus*), and may be so treated as to stimulate advanced autolysis, both in the swollen condition of their walls and in their behaviour toward stains.

Concerning turgor effects it may be said that in such forms as *Ampelopsis* and *Impatiens*, which present ideal material for study, the abscission cells show a no higher osmotic equivalent at the time of abscission (of floral parts, peduncles, leaves) than others. In the case of the axis, the cells of the cortex and epidermis are pulled apart, apparently by elongation of the central tissues, since in partially wilted peduncles the faces of the abscission-wound remain juxtaposed, although abscission actually takes place.

Before, during or after abscission, secondary changes in neighbouring tissues take place. They consist of suberization, sclerification and lignification in various degrees, and all are either extensions of periderm or are of the nature of wound responses. This phase of the subject, beyond this very general statement, lies beyond the present purpose. Numerous details have been worked out by Tison and by Lee. It is, however, pertinent to indicate that, on the abscission of decurrent peduncles in *Gossypium* there may follow an extensive sacrifice of tissues, including all the living element of the stem, resulting in the formation of a wound-cavity of sometimes large extent, and not unlike gum pockets in appearance. Some of these phenomena recall the abnormal behaviours seen by Loewi, which, however, may readily occur in other species\* (Ash, Poplar, etc.) under special conditions.

#### CITATIONS.

1. Correns, C. Vermehrung der Laubmoose. Jena. 1899.
2. Tison, A. Recherches sur la chute des feuilles chez les Dicotylédones. Mém. soc. Linn. Normandie. 20: 125. 1900.

\* At going to press, a paper by Gortner and Harris (Am. Jour. Bot. 1: 48-50, Jan., 1914) on "An Axial Abscission of *Impatiens* Sultani as a result of traumatic stimuli" comes to hand. They leave undecided the question of the method of abscission.