

There can be no doubt, furthermore, that the age of an organ has some influence. In the small cotton boll (8 mm. diam.) no evidence of separation (following injury) can be seen at the end of 16 hours, but at 20 hours the process is practically complete, as shown by the ease of removal of the peduncle. In larger ones cell-divisions in the separation layer can be seen for a day previous. However, the act of cell-division is not necessarily a precursor of separation, since in the young bolls above mentioned no cell divisions are to be seen at the moment of separation of the cells concerned, there being only a slight elongation of them, accompanied by a chemical alteration of the cell walls, causing the loosening. The essential phase of the process of abscission may, even in older as well as younger cotton bolls, be of much shorter duration than above indicated, less, namely, than four hours.

With reference to petals, Fitting found that in the dark, at temperatures of 31° - 32° , they are shed earlier than normally, and the older the more quickly. On the other hand, petals of younger flowers were found by Fitting to be less sensitive than older, an apparent reversal of things which may be regarded as a "phenomenon of interference," between increasing adaptability and shortening of reaction time.¹² In petals, however, there is no development of mechanical elements, such as quickly appear in many leaves, to increase the amount of preparation before separation may become effective. Early in the season I have observed that abscission (in a moist chamber) will overtake older leaves frequently more rapidly than younger. The slowness of separation in indurated organs may simply mean interference by tissues or mechanical elements in which separation takes place only passively or not at all, as, e.g., in the non-living or moribund pith in older cotton peduncles.

THE MECHANISMS OF ABSCISSION.

By "mechanism" is meant that histological behaviour resulting in the separation of one organ, or a part of it, from another organ or part. To the best of our present understanding it may be purely mechanical, either by a break (a) passing directly across the tissue irrespective of the position of the cell wall (rhexolysis, according to Correns 1, 372, e.g., *Dicranum scoparium*), or (b) passing along the middle lamella, causing separation of entire cells (schizolysis, Correns). In the latter alternative the separation is believed by some to result from a marked increase in turgor, the pressures causing the cells to

¹²The character of the behaviour of petals under various stimulants has led Fitting to insist on a conception of abscission as an active separation of an entirely living organ in response to stimulation, quite analogous to movements, etc. He proposes the term "chorism" for this phenomenon.