

shoot proceeds. Indeed, the much more restricted secondary thickening of the vascular tissues to the boll strengthened my belief. But experimental evidence is all against it. I removed large sectors of tissue from the axis below leaves and below bolls, in twenty cases¹¹ on August 19th. On the 21st one boll was shed, but the injury had been made beneath the corresponding leaf. On the 22nd one, and on the 23rd two bolls were shed, the injury having been made beneath them. After this there was no shedding till the 28th, when two more bolls fell, beneath which the operation had been done. In no case was the leaf affected, and the shedding of bolls later than August 23rd must in any event be excluded. The bolls were all small when shed, as the operations were done when the flowers were open. It can be shown that the number of losses is accountable for in other ways, and we must conclude that disturbance due to wounding is absent.

On the other hand, Balls (33), working in Egypt, was able to cause practically complete shedding of leaves, flower-buds and bolls within four days by pruning the roots, and so limiting the ability of the plant to take up water. I have repeated the experiment with positive, but less striking and perhaps not unequivocal results, in North Carolina. Cultivation, which unavoidably causes some damage to the shallower lateral roots, is believed by planters to be responsible in part for shedding. Such treatment as root-pruning is certain, if at all extensive, to cause visible wilting in an unusual amount, and too great a loss in this manner may interfere with the mechanism of abscission. It would seem that, if a reduction of water activates the process it must be when only in a small measure, such as we may suppose happens in cut branches when kept in a moist chamber, a method which was used even by von Mohl (34) in his studies. The relation is, at the present moment, a puzzling one. In the case of flowers, Hannig was unable to find any effect on the rate of abscission beyond that of ordinary laboratory air, buds, open flowers and young fruits falling away equally rapidly in both. Fitting arrived at the same conclusion, from which we may argue that the greater loss of water by evaporation, supposedly attributable to drier air, has no effect on the abscission of the corolla. This organ is, however, especially resistant, as is shown by the fact that a cotton flower-bud, removed on the evening before opening, will open and remain turgid on a laboratory table for an entire day, even though the bracts and calyx wilt and even wither. And I have observed that the petals of desert plants (e.g., *Sidalcea*) remain turgid while the whole plant shows marked wilting during the hottest period of the day. The fact

¹¹Exp. 11, West Raleigh, N.C., Aug. 19th, 1913.