

average time being from 8 to 10 days. A very peculiar feature, but following also on other causes, occurs in squares just previous to falling, namely, an outward movement of the bracts (flaring). Sometimes, if abscission does not intervene, the bracts will move inwardly again. This movement is of very great theoretical interest, since it indicates that there is no lack of turgor (though it does not prove it), and, if this be true, an undue loss of water, it is probable, is not a factor. It is evident, from the data which are at hand, that there is some relation between the amount of injury and the time which intervenes between the first insect puncture and the final separation, since, by means of other experiments, I have found that it is possible to cause the abscission of 100 per cent. of young bolls by means of suitable injury (a transverse cut across the ovary), within 48 hours, and 90 per cent. have been shed within 24 hours in one series. "Squares" (flower-buds) are not so sensitive, shedding 35 to 55 per cent. in 36 hours; 40 to 75 per cent. in 48 hours, and the rest later.

Larger bolls respond only after a longer period, namely, in from 3 to 6 days, or not at all if too large, though they may die without becoming detached. From this we see that a point of development and induration of the tissues of the peduncle may be reached when abscission is not more possible.

Shedding of the very young bolls may also be caused by cutting off the style before pollination, but this, as Fitting found in *Geranium* and *Erodium*, depends on the absence of pollination. In *E. Manescavi*, the petals fall away much sooner after the style was injured than in the uninjured flower. Hannig also found that cutting off the petals, stamens or stigma, from unpollinated flowers, and still more readily by removing the ovary, before or after pollination, caused abscission of the whole flower. Wounding of the peduncle did not do so if a portion of the tissue was left, indicating, as I have above shown, that a reduced amount of vascular tissue was able to carry on the function of the whole.

Much has been said about the effect of the wounding of leaves by cutting off the blade, and it is generally believed that such injury causes abscission. The results thus obtained are, however, very inconstant and uncertain, as I have found in my own experience. Only a single example. I cut off the petiole (in *Ampelopsis*) from one leaf 10 mm. from the base, and allowed the next lower leaf to remain. The latter separated in 24 hours (in a moist chamber), while the stump of the cut petiole remained attached. I have done similar experiments with other species with like results, and I have observed injured leaves in nature, finding them to adhere just as long and firmly as un-