

injured, in many cases. We must therefore say, as Hannig has, that wounding as such does not induce abscission, but works in a round-about way.

THE EFFECT OF TEMPERATURE UPON ABSCISSION.

The occurrence of abscission at the time of the year when the cold is increasing, and the dropping of leaves in great numbers on frosty mornings, must not be thought to indicate that low temperatures cause abscission. Fitting found that *Geranium pyrenaicum* sheds its petals in a much shorter time (2.5 minutes) only when the temperature is raised to over 40° C. Lower temperatures, but yet as high as 33° to 34° were necessary, for certain other species, and in all cases the rapidity was greatest in a saturated atmosphere. Some species have their reaction time reduced from 25 seconds to 60 seconds (*Linum*, *Verbascum*, etc.). Hannig also found that temperatures higher than the normal laboratory ones caused a more abundant shedding of flowers and that sudden change was more effective than gradual. On the other hand, a lowering of temperatures inhibited it. That the higher, more effective temperatures increased the rate of abscission, and even cause them, as Wiesner (35) has suggested in the case of inner leaves, which may become over-heated does not militate against his explanation of abscission in consequence of frost, which may be procured, according to him, by the macerating (hydrolysing) effect of organic acids escaping from the frozen cells of the abscission layer or by the differences of tension produced at the limits of the dead leaf-stalk tissues and the still living and turgescient cells of the leaf-base. Entire killing of both leaf and abscission layer may be followed by the rotting away of the tissues, and thus ending in separation. High osmotic pressures, held by Wiesner and his pupils to be important in the case of ordinary abscission, have no place in frost defoliation.

THE EFFECT OF CHEMICAL AGENTS.

The air and soil of cities and in the neighbourhood of certain kinds of mills and factories is usually more or less contaminated, and, as a result, there is much detriment to the health of vegetation. Among the first symptoms to be noticed is the shedding of leaves, and this is doubtless a sensitive, and perhaps a very sensitive, indication of an abnormal condition. Harvey (36) found, for example, that one part of ethelene in 1,000,000 of air was sufficient to cause abscission of the cotyledons of the castor-oil plant (*Ricinus*), which is perhaps a more delicate reaction than would be observed in trees. It is significant, however, and we may expect to find similar behaviours in many plants. Even the small amount of illuminating gas found in the ordinary air