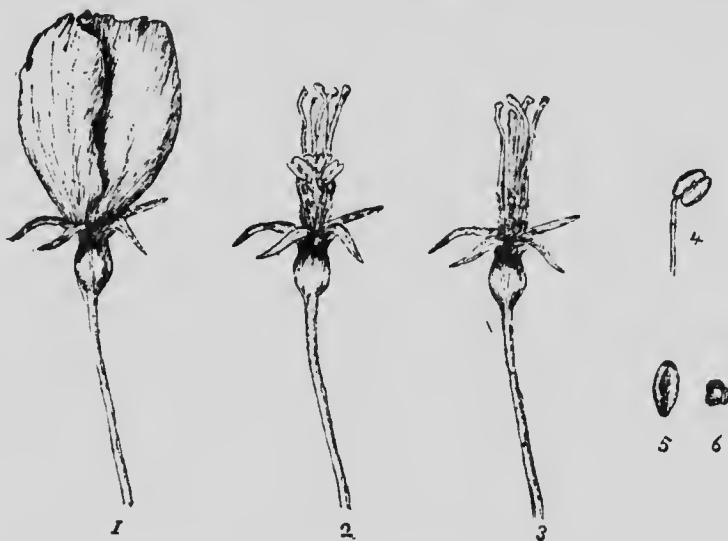


CROSS-BRED AND HYBRID VARIETIES.

Those varieties which are originated by artificial cross-fertilization and hybridization are called cross-bred and hybrid, respectively. A hybrid is a cross between two species: as for instance, between *Pyrus Malus*, the apple, or a variety of it, and *Pyrus baccata* the Siberian crab. A cross-bred is a cross between two varieties of the same species, as, for instance, between the Northern Spy and McIntosh Red apples.

Although nearly all our best apples have been originated as seedlings, the reason is, not that good varieties cannot be produced by artificial cross-fertilization, but that comparatively little systematic work had been done in this direction in America until recent years. When one considers that a very large number of chance seedlings have been the result of natural cross-fertilization of the flowers of different varieties (for it is now an established fact that many varieties of apples are self-sterile) it seems reasonable to suppose that a much larger percentage of good apples will be obtained if the flowers are pollinated artificially, as then only the varieties which have the characteristics desired in the seedlings will be used as the parents, and although it has been already said that apples have been so intercrossed in nature for hundreds of years that there is no certainty what the seedlings of any variety will be like, yet the



Flower of apple prepared for cross-pollination.

1. Flower just before opening. 2. The petals removed. 3. The anthers removed.
4. One of the anthers. 5 6. Views of pollen highly magnified.

characteristics of the parents will be more likely to predominate than those of varieties whose blood has intermingled at a more remote period. Before beginning any work of this kind, it is important, then, to decide what kind of an apple is most desired, and to select as parents those varieties which have as many of the qualities sought for as possible. As there is yet not sufficient information available to know with certainty what will result by using certain varieties of apples as both the male and female parent it is wise to do some crossing with one variety as the female parent, and some with the same variety as the male parent. The results obtained with cross-bred apples at the Central Experimental Farm between cultivated varieties show that the male and female parents may influence the character of the fruit almost equally, though some varieties appear dominant in certain characteristics as female parents. A hybrid, however, is almost certain to have more characteristics of the female parent if the species differ widely. Such, for instance, as the hybrids between *Pyrus baccata* and the apples which are described further on.