

Bees and Pollination of Blossoms.

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(Continued.)

In some plants called dichogamous, the pollen is ripe, and discharged either before or after the stigma is ripe, or ready to receive it. This is seen in some of our pears, and is a common peculiarity among plants. Other hermaphrodites, known as heterogonous, have two kinds of Stamens and two kinds of pistils, one long and the other short. One set of flowers have long pistils and short stamens, and the others short pistils and long stamens. In these cases insects transfer the pollen, and cross-pollination is insured.

In all these cases, we see that nature has fenced against close pollination, or as some one has suggested, nature seems to abhor close pollination. The flowers have so developed in the process of evolution, that cross-pollination is enforced and in the last case we see that insects have controlled in giving trend to the development. The other argument comes from direct experimentation, and proves that many perfect flowers require cross-pollination. Flowers were emasculated just as they were opening, before the pollen was ripe. That is, the stamens were all removed. When the stigmas were ripe for the pollen, they were dusted with pollen from other blossoms on the same tree, from those of other trees of the same variety, and from those of trees of other varieties. Other blossoms were covered, and the stigmas dusted exclusively with pollen from their own stamens.

These experiments gave different results with different fruits, and with dif-

ferent varieties of the same fruits. Some varieties are perfectly sterile, and others perfectly pollinated with their own pollen, or that of the same variety of trees, while others were imperfect in form and size, and seedless if not pollinated with pollen of another variety. Many varieties, especially of plums and pears, will bear no fruit, or very imperfect fruit, if not cross-pollinated.

EXPERIMENTS IN MICHIGAN.

While in Michigan, I tried at the State Agricultural College, numerous experiments, as did my friend and colleague, Dr. W. J. Beal, that we might determine just how necessary this cross-pollination might be. Dr. Beal experimented with red clover, and I with red and Alsike clover, and with several cultivated fruits, as cherries, plums, apples, pears, strawberries, raspberries and blackberries. Sets of blossoms of the same number were marked on contiguous plants or twigs, and one or two of the sets just prior to the opening of the flowers, were closely covered with cheese-cloth, while the other set was left uncovered.

In several cases it was noted just when the stigmas were ripe, and bees were caught and enclosed in one of the cheese-cloth bags surrounding the flowers. The bees were watched and seen to work on the flowers in several of the experiments. The results published in the Report of the State Board of Agriculture were surprising. The covered flowers, where bees were excluded gave from no fruit to very little, except in the case of strawberries and blackberries. where there seemed very little difference, while the uncovered and covered, while bees were enclosed in the bags with the blossoms, bore well.

In some of the cases, as with cherries and plums, the contrast was remarkable. In several of the experiments where bees were admitted under the