

### BEEES AND HORTICULTURE

The following valuable paper was read by Prof. H. A. Surface, M. Sc., Economic Zoologist in the Department of Agriculture for the State of Pennsylvania, at the recent Ontario Convention in Toronto:

In attempting to discuss this subject, we realize that it is one of the most time-honored among bee-keepers and fruit growers, and that it has been threshed over and over again in journals and meetings devoted to the interests of persons engaged in such pursuits. However, there is sometimes justification in revolving old subjects under a new light to see if perhaps an additional point concerning it can be gained. The very antiquity of the subject indicates its importance, and if anything whatever new can be added; or anything in doubt can be cleared up, and the truth emphasized, we shall be justified in again turning discussion toward the old topic. If something really new be desired, we should be glad to discuss such subjects as "The Bee Sting Cure for Rheumatism," which must no longer be regarded as a joke, but in the line of recent developments becomes a reality, or it might be possible to take up the subject of some unsolved problems, such as "The Effects upon the Human System of Continued Stinging by Bees," "The Results of Rearing Bees in Cells of Different Sizes or Shapes," "The Probability of Spontaneous Production of Wax Flakes and Consequent Loss of Honey by this Transformation when Drawn Comb is Used for Storage and the Wax Flakes Can Not be Utilized," "Multiple Queens," and other topics that may be of more or less practical or scientific interest to bee-keepers.

In discussing the subject of "Bees and Their Relation to Horticulture," we shall refrain from touching the now well-established fact of the definite relationship between the bee toward the flower, the necessity of the bee to obtain both nectar and pollen from the blossom, its wonderful adaptation of structure as shown in the nectar sack and pollen baskets, especially fitted for their purposes, or on the other hand the dependency of the blossom upon the bee for the carrying of the pollen grains from stamens to pistil, particularly in going from one

flower to another, so essential in cross fertilization and the setting of roots. However, concerning the last point, we may pause long enough to say that this year we have evidence that the general shortage of the plum crop was due to the very cold weather of the spring time, when the plum trees were in blossom, but the bees did not fly. It is possible that the reduced pear crop over the country may be due to a similar cause, but this can not be true of the apple crop, and we know where there was a magnificent yield of apples, in some regions of Pennsylvania, from blossoms that were expended when it was too cool for bees to fly, and from our own observations we believe that many of the apple trees laden with fruit in the fall of this year were not visited by a bee or other pollenizing insect during the time of their blossoming in the unusually cool spring. We must acknowledge that while in Nature there are most beautiful structures and adaptations, such as the color, form and products of the blossom to attract and sustain the bee, and pollen sacks, and numerous hairs for the carrying of pollen, as well as nectar sacks for carrying liquids by the bees, yet the full relationship of insects and flowers has not been demonstrated by practical test of trees and plants of different kinds definitely covered with gauze or very thin netting in such a way as to permit the natural vital functions of the plants to take place, with the possibility of wind fertilization, but excluding pollenizing insects entirely from the trees or plants of different kinds. Such studies could well be made by our Experiment Stations, and would no doubt reveal the fact that some kinds, like plums, are more dependent upon the bees than are others, like the apples. The student of Nature constantly meets so many beautiful and wonderful facts and conditions that he may possibly fail to appreciate their full significance, but occasionally in the contemplation of such things he is forced to pause and exclaim with the poet Young,

'No more the misty Vale of Doubt I tread,  
My reason saw, my Soul confessed a God.'

In the following discussion I wish to place emphasis upon the three following points: (1) Bees will not be killed by proper spraying methods; (2) bees do not and can not puncture fruits, and (3) bees are

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