139

in the early months of the season and then by smothering it in the fall by the use of a cover crop such as rape or hairy vetch, which makes a rank, dense growth during the fall months.

## CULTIVATION THE BEST

In regard to sod versus cultivated orchards the advantages that the cultivatea orchard has are pretty well understood. The great majority of profitable orchards are cultivated. The best advice to follow if one has a good, profitable, bearing orchard in sod is to leave it as it is, for there would be no good reason in changing to cultivation, and in changing from sod to cultivation one might easily lose one or two seasons' crops. If the sou orchard is unprofitable and not in a good, thrifty condition, change to cultivation, and by the use of manure and cover crops it can soon be brought into a profitable condition. It is safe to say that in future

plantings that are properly handled, the method followed will be cultivation right through the life of the orchard. Were cultivation systematically followed from the beginning of the orchard we would have a much larger number of annual bearing orchards. It has been amply demonstrated in the west by many growers, and also in the east, particularly in the orchards of Mr. B. J. Case, of New York State, that orchards should bear annually profitable crops, and these crops are secured chiefly by the methods of good cultivation adopted.

Some growers are often discouraged, for after giving one season's good management in this respect they do not get the results they anticipate the following year; but this is not to be expected, for it usually takes from two to three or more years of good cultivation to get the orchard into good bearing.

## The Value of Bees in the Orchard Morley Pettit, Provincial Apiarist, Guelph, Ont.

T HOSE who have driven a horse and cultivator close to the hives in the orchard may say their value is negative. Nervous fruit pickers wish them on the other side of the fence; but the observant grower considers bees a necessity in the orchard during the blooming period, even if the hives are placed elsewhere.

By persons of a poetic turn, bees have been called the "Marriage Priests of the Flowers," because they bring together those opposing elements which produce fruit and do it more effectively than any other agency.

There are three media by which pollen is carried from flower to flower. Water operates in the case of certain aquatic plants . Wind does duty for such trees as pines. Animal life, principally insects, do this work for the flowers which produce the orchard fruits. Take a simple illustration: At the Maryland Experiment Station, a Grimm's Golden apple tree of medium size and very symmetrical was taken just before the blooming period and divided into three equal portions. One-third of the tree was cover-



Comet Red Currant—Fig. 1 Note absence of fruit.

ed with muslin to exclude all insects and wind; one-third was covered with mosquito netting to keep out insects and ad-



## An Unprotected Bush-Fig. 2

This bush produced an excellent crop of fruit. mit wind; the remaining one-third was left open to admit both wind and insects. The tree was kept covered in this manner during the entire blooming period. The part covered with netting set one apple. The part left open set nine apples. The observer did not report on the part covered with muslin; but from our own and other experiments, we should judge that it was barren.

Each fruit blossom offers a double invitation to the insect. Showy petals attract the eye, and aromatic nectar invites the appetite. Honey bees accept most readily and are most welcome. They are more valuable than others for several reasons:

First, nature compels them to seek food in the hearts of flowers, because they cannot secure it elsewhere. Besides water and a little salt they eat nothing but honey and pollen. Even when other sweets are offered them they only eat it when no nectar is to be found in the flowers.



Cox's Pomona-Fig. 3 Insects were excluded from the branch to the right and it bore no fruit.

Second, their bodies and legs are comparatively large, and thickly covered with branched hairs, making it impossible for them to reach the nectar of the blossoms, without carrying away on their persons the pollen which will be distributed on the next blossom they visit.

Third, their numbers in the orchard can be controlled. Wild bees and other insects may or may not visit the orchard, depending on the season and the weather. Bees can be protected through a severe winter and they can be hived in sufficient numbers where they will do their work. In catchy weather wild insects seldom visit the orchard, but one hour of sunshine brings out the bees and sets them buzzing thickly on the nearest flowers.

## WHAT INSECTS DO

To show the value in the orchard of insects, of which I have shown that hive bees are chief, I cannot do better than tell the story of the accompanying illustrations, taken from the British Journal of the Board of Agriculture, March, 1911. Professor W. B. Little, instructor in horticulture, Armstrong College, Newcastle-on-Tyne, tried the experiment on two Comet red currant bushes, which were alike in every respect, except that he covered number one with netting during the blooming period to exclude insects; and left number two exposed. Insects worked freely on the blossoms of



Early Victoria-Fig. 4

The middle branch was not protected from insects until after pollination had taken place, and this branch produced well-developed apples.