

those engaged in the cultivation of the soil should put the proper value upon the work of economic entomologists, for they year after year see a large amount of their produce destroyed under their very eyes by the ravages of injurious insects, thus rendering much of their labour of no effect, and their incomes proportionately smaller; they, too, have happily learnt by experience that much of this loss may be averted by following the advice of those specialists who devote their time to studying out the life-histories of their enemies.

Until recently there was what I will call a foolish fashion amongst scientific men to scoff and sneer at the labours of those few who endeavoured to develop the economic phase of Entomology. They did not believe, it was alleged, "in wasting time over popularising science. If scientific study was to be valuable it must be technical; there was not time to dish it up in a diluted and palatable form for the masses." As a matter of fact, however, we find that those who are continuously engaged in the practical economic application of Entomology to the daily wants of mankind, have done just as good work scientifically as any others; and to-day we see that these ultra-scientists find it advisable to keep their opinions to themselves, and day by day we find more and more of the best scientific students throwing in their lot with those who only aim at making their investigations useful and for the public good.

That the dangers arising from the increase in numbers of injurious insects are greater now than was formerly the case cannot, I think, be doubted.

In all new countries larger and larger areas of land are continually being brought under cultivation, and by growing large quantities of any one crop the farmer furnishes those insects which feed upon it with a copious supply of food, and their numbers increase correspondingly. A large supply of proper food is the main cause which affects the amount of insect presence. The food of insects varies considerably, and embraces almost all organic substances. Those which come under our consideration now are mainly vegetable feeders. Of these some will feed upon a great many different kinds of plants, belonging to various families or natural orders; others, and these, luckily for us, are by far the most numerous, will only eat a few, and these, too, must be plants of the same or an allied family. Others, again, are so particular that they will actually starve if they cannot obtain a certain species. In Nature we never find, as in our fields of grain or roots, any one plant filling a large space, to the total exclusion of all others; but they are scattered here and there, several kinds growing together, consequently the insects which feed upon any particular one of them have to search far and wide for their food. This limited food supply is one of the checks which keeps their numbers down to the proper limit. It has been estimated that every plant has an average of seven or eight different insects which feed upon it. This number is probably too low, and some of course are known to have many more than this. Dr. A. S. Packard states, in a little work of which I shall speak later on, that the oak affords maintenance to between 500 and 600 species of insects, the hickory to 140, the birch 100, the maple 85, the poplar 72, and the pine over 100. It may be safely stated that at least one-tenth of all the plants grown as crops by farmers is annually destroyed by insects. The amount of loss every year from this cause is so great, as shown by the instances where circumstances permit of an accurate computation being made, that it would be inadvisable for me to dwell upon the subject or to give many of the figures, for I fear you would not believe me. I will, however, give a few instances which can be verified by those who wish to do so.

In 1882 the lowest value which could be placed upon the agricultural produce destroyed by insects in the United States was \$200,000,000. In Canada in one year the wheat midge destroyed 8,000,000 bushels of wheat, and in 1884 the "clover-seed midge" destroyed \$650,000 worth of clover seed. In England in 1882 a single insect (the Hop Aphis), which belongs to one of the ten families which attack the hop, injured the crop to the extent of \$13,000,000.

Now, this enormous, and to a large measure unnecessary, waste can only be prevented by a systematic study of the life-histories of the insects which cause it. The habits or modes of life of insects are very various, and by no means always the same in the different stages. We have some species, as the Blister Beetles, which feed upon

animal food as grass, as the large Silkworm, and some in a perfect state have peculiar habits in all the different points. The one together all possible discovered which it and make it known. Government we have the medium of our the Agriculture and the monthly organ butted amongst the the announcement whatever knowledge to them, and they injurious and bene meeting to issue. January next, at I be prepared especially about the science up entomology as concerning the con

Notwithstanding and the enormous must be classed a life-histories have with reference to of asking for it, of attacks to which attacked, the first enemy. It is at crop pests is made lost by the adoption prevent serious loss which are less active have reached their but which cannot into four well marked widely different.

1. The egg, d
2. The caterp

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3. The chrysa

quiet and takes no

4. The perfec

Some insects: them only in the c I have said, vary; families, and specific ledge necessary, fo results in combat