

ENTOMOLOGY

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WHAT WE LOSE.

The losses occasioned by insects exceed the entire expenditure of the National Government, and in this total is included the pension roll and the cost of the army and navy. The annual loss to agricultural products will vary from ten per cent as a minimum, to fifty, seventy-five, or even a greater percentage, in years of occasional serious operation. This may not appear to us high in value until we realize that our farm products at the present time in the United States, have an annual value of about \$7,000,000,000. Then notice what 10 per cent only will mean,—\$700,000,000 a year caused by such insignificant members of the animal kingdom; insignificant individually, but collectively, gigantic in their ability to cause injury. The loss of one apple by one codling moth will appear slight when compared with the products of the tree on which the apple grew, but the loss of fifty to sixty apples out of every hundred borne by that tree, would cause consternation to the owner. A great many insects, while successful from their own view point, most seriously interfere with the products developed by man.

No small amount of the damage afflicted by insects is compensated for by the more valuable or beneficial insects. For instance, the honey bee furnishes every year many thousands of dollars worth of products that aid in off-setting the losses by depredation of other insects. On the other hand, the Phylloxera when introduced in France from this country became a source of national calamity for nearly forty years, and nearly threatened with complete extermination the great wine industry of France.

Several years ago a number of experts looked into this situation quite thoroughly, and most of the figures given below are those given by these men as the absolute minimum amount of loss caused by the various insects. For instance, the grass and grain feeding insects, such as the chinch bug, the Hessian fly, the jointworm and the armyworm, were estimated at that

time to cause a loss of over \$200,000,000 annually. Add to this the outbreak of the so-called "green bug" which is one of the aphids, and whose injury in the last few years would reach easily \$100,000,000, and you have to this one group of crops, a greater total than the actual cost of the running and other expenses for all the schools and colleges of the United States, and this estimate to the grass and grain crops does not include the corn crop, which alone has some fifty seriously injurious and one hundred and fifty minor species of insects attacking it. The direct loss by the codling moth easily figures \$8,000,000 a year, and this is estimating only a loss of 5c for each bearing tree, manifestly much too small. The loss to the fruit crops by the woolly-aphis and the green-aphis, will each year amount to four or five per cent of the total for which these crops would sell.

In the South the cotton-boll weevil for several years was robbing the cotton planter of from thirty to fifty millions a year, the boll worm in some districts of at least twelve millions. The cotton-worm which formerly caused an average annual loss of twelve to fifteen millions, has now been so successfully handled that its ravages are reduced to a minimum by proper field work and spraying. The same is beginning to be true of the cotton-boll weevil, since in the districts most seriously ravaged in 1904 the Department of Agriculture has been able to successfully grow almost banner crops in the last two years. This has been accomplished by the Bureau of Entomology through certain cultural methods which they have worked out.

When it comes to forest products, it is hard to estimate, but several years ago the timber of the Black Hills district was being injured at the rate of \$100,000,000 a year in this one district. Since that time simple and effective means devised by Entomologists have been able to practically control the loss.

Stored products in the United States, milling products, and items that would come under practically either of these are damaged at the rate of at least \$100,000,000 a year,

and more than half of this loss could be prevented by the direct application of remedies now well known.

When it comes to live stock, it is again hard to ascertain the actual damage, but on the Chicago market several years ago, an estimate was made that the loss to hides alone from the work of the ox warble, would amount to \$3,000,000 a year. The loss to the actual growth and life of cattle, horses and other live stock by the irritation and other injurious action of horse-flies, bot-flies and insects of this character will easily amount to \$175,000,000.

When we come to discuss the loss caused by insects which carry diseases such as malaria, yellow fever, and typhoid fever to man, and Texas fever to cattle, we are in a position where it is absolutely impossible to make any estimate. One has no right to estimate the loss to a community, of a leading citizen whose life was taken by typhoid fever through the failure of the city government to properly care for the water supply. Neither can we estimate the actual loss to the city of New Orleans by the outbreak of yellow fever which occurred there a few years ago.

Another source of loss caused by insects in addition to the actual loss to the product, is that caused by the inter-action upon labor and manufacturing. Supposing a serious loss to the cotton crop in that year, or probably the next, the effect will be felt in the cotton milling centers throughout not only this country, but the whole world, and instances are known where the actual failure of large concerns has occurred. This has not only caused a financial loss to those having capital invested, but even greater loss to those who labor for the concern and are thrown out of work for long periods.

Dr. Forbes has said, "It is the especial object of the economic Entomologist to investigate the conditions under which this enormous loss to food and labor occurs and to determine; first, whether any of them are in any degree preventable; second, if so, how they are to be prevented with the least possible cost of labor and money; and third, to estimate as exactly as possible the expense of such prevention or to furnish the date for such a remedy, in order that each may determine for himself what is for his interest in every case arising."

The life history of insects lies at the foundation of this whole work. By thoroughly knowing the history of the insect, we may in some measure get at the exact inter-relation which occurs between the insect, its food plants, and general farming operations involved. Each species must be followed accurately, not only through seasons when it is excessively abundant, but through those years in which it is relatively scarce. No part of the work requires more care than this.

The insect's own life periods, the climatic conditions, the insect's insect enemies, the diseases which may affect it, its bird and other animal enemies, the soil conditions, the natural food plants and their relation to other food plants, the relation of other insects feeding on the same food plants, are but a few of the points which must be investigated.

Some people will have to get right with their neighbors before they can get right with God, while there are many who will have to get right with God before they can act right with their neighbors.

Some of you good church members who never darken the church door had better be hunting some good place to hold your funeral. The theatre or the dance hall, for instance, as you are more acquainted at those places.



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