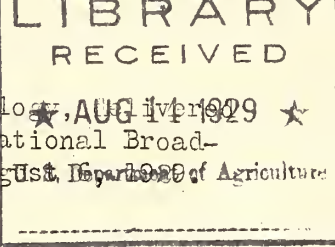


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THE INSECT WAR.



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A radio talk by Dr. C. L. Marlatt, Chief, Bureau of Entomology, through Station WRC and 30 other stations associated with the National Broadcasting Company, at 2 p. m., Eastern Standard Time, Tuesday, August 12, 1929.

The man view is that he is the dominant ruling type in the world.

The insect view, if expressed, doubtless would be much to the same effect.

At any rate, we can say with assurance that the insect world is unaware of, and ignores, the man view, and unconcernedly fills its ordered role in the economy of nature. In so doing insects in many of their activities challenge man's boasted dominance.

The picture of the antagonism between man and insects has often been painted. Credit must be given, however, to the fact that perhaps 50% of the insect life of the world plays a useful role. As cross-fertilizers of most plants; they insure the perpetuation of a vigorous growth--action essential to the production of important field and orchard crops. They produce also important articles of food such as honey, and articles useful in manufacture and the arts, and for human clothing and adornment, as wax, silk, shellac, dyes, etc. They are useful also in maintaining the balance of nature by preventing undue increase of particular plants or animals.

The great disturber of this balance of nature is man himself in his effort to produce unit crops over vast areas and it is largely here that the conflict lies between man and insects. The natural reaction of insects to those artificial conditions is to seize the favorable opportunity thus created, to multiply enormously with the result of setting the stage for a war to determine whether it shall be man or insects which shall benefit most from the labors of the former. Here, again, there is another balance in nature, and man is greatly aided by other insects which are parasitic or predacious on the predators in his fields and orchards.

This conflict to protect his crops from destruction by hordes of insects, and also to protect himself and his domestic animals from parasitic, and from disease-carrying types, is fortunately one-sided. Insects in all their relations follow blindly their inherited instinct with no appreciation of any conflict. On the other hand, with man, the conflict is intentional and is what we now refer to as applied or economic entomology. This field of work has been enormously developed in the last fifty years but goes back to the dawn of history.

In the relation of insects to man it is a very fortunate thing that this most abundant type of life in the world acts solely by instinct and not by reasoning. It is terrifying even to contemplate the typhoid fly, or the yellow fever or the malarial types of mosquitoes spreading these diseases with malicious purpose. The existing balance of nature might be quickly broken down so far as man and the higher animals are concerned and the insects would then be really the masters of the world.

Applied entomology has had its largest development in the United States. Our crops are grown on a larger scale and our climate in general is more favorable to insect life than in most/other countries of the world with the result that insect damage reaches here enormous importance and this has compelled us to develop, also on a large scale, means of control of such crop and animal pests.

Confining myself to the United States and to the present, the Department of Agriculture in its Bureau of Entomology has developed during the last fifty years a force of entomologists doing work throughout the United States independently or in cooperation with State institutions and agencies. The work of this bureau is distributed in some ten divisions, each of which deserves a story of its own. These divisions are charged with the study of:

1. Deciduous fruit insects.
2. Cereal and forage insects.
3. Truck crop insects.
4. Cotton insects.
5. Insects affecting tropical and subtropical and ornamental plants.
6. Insects affecting forest and shade trees.
7. Insects affecting stored products.
8. Insects affecting man and animals.
9. Bee culture investigations, and
10. Museum work, namely, technical or scientific study of insects from the standpoint of determination and classification.

This work is being conducted at some 103 different field stations located in 37 States. There are additional stations in Alaska, Hawaii, Canal Zone, and in some seven foreign countries. All but one of these foreign stations are concerned with the collection of parasitic and beneficial insects to be imported into the United States to aid in the insect war. The conduct of this work in the United States and around the world involves some 360 technically trained men.

The appropriations have grown from a lump sum of about \$20,000 in 1890 to upwards of \$2,000,000 in 1929, not counting the \$10,000,000 appropriation of 1927 for a demonstration of the possibility of controlling the corn borer over half a dozen States--largely an educational effort.

Every State also has many trained entomologists--State entomologists, experiment station entomologists, research entomologists, and teachers of entomology. Similar development in economic entomology has taken place throughout the world.

The pertinent question will be asked, "What benefit has resulted from the work of this increasing force of technical men and this increasing expenditure?" An estimate of such saving and benefit recently was prepared for Dr. Woods, Director of Research Work of the Department, for presentation to Congress and was reduced to the last limit of modesty! The details of this statement would be very interesting if time permitted it to be analyzed.

It covers some seventy-five different important work projects, and indicates annual savings to the farmer and others ranging from a million dollars to fifty million dollars per project, or a total annual savings upwards of \$330,000,000 and this does not include some twenty or more subjects for which savings could not easily be estimated. The \$330,000,000 of annual savings from work in applied entomology are well worth while, certainly, on the basis of an expenditure for research in this field of less than two-thirds of one percent of that amount. This estimate has been referred to as modest. In fact, savings of that amount can be made on single crops with the cooperation of farmers. The top loss in the worst year of the boll weevil damage was estimated at approximately \$600,000,000. Under the controls now generally practiced, the loss of one-third or one-fourth of that amount would be unusual and yet for the whole group of cotton insects, and they are numerous, an annual saving of only \$50,000,000 is indicated in the estimates referred to.

Perhaps the most important phase of applied entomology in recent years has been the effort of various countries of the world to prevent the entry from other regions of new pest hazards--insect and plant disease. The United States was laggard in this field in spite of the general realization of the fact that our more important pests are of foreign origin. A stream of such plant and animal hazards had been coming into North America beginning with Colonial settlement. The latch string was out and these undesirable immigrants took full advantage of the situation. We have thus received many, but fortunately not all, of the numerous crop, household, and animal enemies which have developed in older civilizations. At least 100 of these are major pests. It is conservatively estimated that such imported farm pests now cause crop losses of upwards of a billion dollars a year.

There is no time to discuss in detail the entry of these pests, many of which must be known to you by personal experiences. Most of the older importations have become so thoroughly established and so commonplace that they are not now matters of great public interest, except for the farmer or other person directly concerned. Among such are the Hessian fly of wheat which entered this country in Colonial days with straw brought in by Hessian troops; the San Jose scale, an important enemy of all deciduous fruits coming to us about fifty years ago with imported ornamentals from China; and a hundred others which could be mentioned, all of which are continuing charges on our agriculture.

The more recent importations which have now the greatest news value include the European corn borer; the Japanese beetle, which has now spread as far west as the District of Columbia and to the border of Virginia and, therefore, has a modest local interest to the capital of the United States; and the Oriental fruit worm, rapidly becoming one of the most serious of deciduous fruit pests, imported with the flowering Japanese cherry less than twenty years ago. These and some four other similarly important pests gained entry during the short period of four years when the last and ultimately successful effort was made to get National legislation to check such entry. This is mentioned to stress merely the rapidity of entry of such important pests into the United States just prior to the passage of the Plant Quarantine Act of August 20, 1912.

The enforcement of this Act for some fifteen years under the Federal Horticultural Board is now directed by a new office of the Department, entitled the Plant Quarantine and Control Administration. It has become one of the big regulatory activities of the Department, but the story of this phase of warfare against insect pests and plant diseases is much too big to be the subject of more than incidental reference at this time.

You will naturally inquire "How effective has been the enforcement of this Act in the exclusion of pests?" Up to April of this year, it was possible to say that the effort to exclude important pests had been in large measure successful. In only two instances had pests of the importance of those mentioned secured entry into the United States and these entries had been such as could not well have been prevented, namely, the entry from Mexico of the pink boll-worm of cotton, due to contiguity with the United States, and the similar entry of the Mexican fruit-worm into the lower Rio Grande Valley of Texas. There is no time to tell you how thoroughly and well these two pests have been controlled and held in check and in large part eradicated.

This story of successful enforcement of the Act was the record up to April of this year. In that month the information came of the discovery in Florida of the Mediterranean fruit fly, perhaps the worst fruit pest of the world. That invasion attracted immediate and tremendous interest throughout the United States, particularly in the important fruit-growing sections of the South and the Pacific coast. The realization of the necessity for eradication of this pest, if eradication were possible, was widely appreciated. The Congress of the United States, upon the recommendation of the Secretary of Agriculture, approved by the President, made \$4,250,000 available for eradication work. The story of this work is too large to be covered in any detail in this discussion. The Federal Government and Florida have mobilized all possible agencies for this eradication effort. The destruction of citrus fruit has been on a tremendous scale amounting, perhaps, to a total of fruit on the trees, ground and culls of some 600,000 crates. Forces of between five and six thousand men have been employed. The cleanup of cultivated host fruits and vegetables is now nearly 100% perfect over the known infested areas. This cleanup involves not only planted orchards and vegetable areas, but also the penetration of the wild lands and the swamps and hammocks of the State to destroy wild host fruits of all types. To continue and complete this work for this year alone will involve enormous costs of which the present appropriation and expenditures will represent only a beginning. Such expenditures can be justified only by a reasonable assurance that eradication of this pest is possible. If such eradication can be accomplished it will be worth the cost, even if that cost runs to millions and even hundreds of millions. In fact, the importance of this pest to much of our fruit industry is such that we would be tremendously well off if we could by the expenditure even of a billion dollars be absolutely sure of its complete and permanent elimination.

The best judgment of the United States has been called in by the Secretary of Agriculture to determine possibilities in this direction and the opinion has been rendered by this body that the eradication effort should

proceed with full financial support. This program is now under way and plans are being made to continue it with the hope and intention of accomplishing the elimination of this pest if this is humanly possible. This effort represents the most important insect control operation which has ever been undertaken. The expenditure of \$10,000,000 in the corn borer campaign had no thought of eradication back of it, but was simply an educational effort carried out over invaded farm areas of parts of five States to demonstrate to some 3,000,000 farmers that such control was a reasonable possibility. But with the fruit fly, we are looking to the eradication of a pest with the object of eliminating future losses to our fruit and vegetable crops which might well amount annually to more than any expenditure which is being contemplated in the campaign now under way.

The man-insect war is on, the stake is large, and a great body of earnest men are enlisted. The enemy cannot be entirely eliminated but can be, and is being, effectively controlled.

