

Distance in Feet.	No. of Plants per Acre.
7	889
8	680
9	537
10	435
12	302
15	193
18	134
20	108
24	75
25	69
28	55
30	48
40	27

To obtain records to the acre from this table, the number of insects found infesting a tree or a hill would be multiplied by the number of plants to fill out the acre, coinciding with the width of the rows.

To the working field inspector some sort of system as mentioned would be of value. The tables might be typewritten and pasted in the front of the pocket note-book for ready reference.

The type of note-book of most use, to my mind, is a fling-cover loose-leaf kind, about 7 x 4½ inches to the cover, with pages about 6 x 4½ inches. Each page may be already printed in form somewhat as follows:—

Orchard of

Address

Name of insect present

Prevalence

Degree of injury

Condition of crop

Remarks

Inspected by

Date

Each form is preferably reserved for one insect, and each one, when filled out at the end of the week, is filed away for future reference and report.

However, all these details are merely incidental and subject to individual preference; the main principles, however, are accuracy of report based on a continuous and satisfactory system.

I wish, in conclusion, to say that these various methods of obtaining insect records in the field are far from scientific. The facts obtained are too general in nature and the possibility of error is too great. However, to the working field inspector these may prove of use in his work.

The Chairman: I am sure the schemes suggested will be of use in a general way. I will now ask Mr. Cunningham to give his paper.

THE WORK OF THE INSPECTOR OF FRUIT PESTS.

BY THOS. CUNNINGHAM, INSPECTOR OF FRUIT PESTS.

I have been requested to prepare a paper for this meeting on the work of the Government Entomologist. The title was chosen without my knowledge, and I have therefore taking the liberty of making a slight change which I believe will more fully describe the duties of the Inspector of Fruit Pests. This title is comprehensive and unique; it was chosen in the early pioneer days when the few fruit-growers then in the Province were feeling their way cautiously toward the development of an industry which has since attained such proportions, and now plays such an important part in the settlement and commerce of this country.

Some twenty-five years ago the fruit-growers of British Columbia formed themselves into a society known as the "Provincial Fruit-growers' Association," the object being mutual assistance in selection of lands best adapted for horticulture, and the varieties of fruit that gave promise of success in a new and practically undeveloped and untried country. The Government of the day, from the very first, took a kindly interest in our affairs, assured us of their readiness to assist us financially, and by such legislation as would receive the approval of the Association. As earnest of the Government's good intentions the sum of \$1,000 was placed on the estimates for the use of the Association. I may state that in those days this was considered a very liberal grant. But the financial assistance, though very helpful, was not by any means as valuable and important as the protection which the Government subsequently, and at the request of the Association, placed in the Statutes of British Columbia.

Taking advantage of the assurances given, the Association drew up a Bill entitled the "Horticultural Board Act," by which a Board of Horticulture was created, and the Province divided into three horticultural districts. The members of the Board were chosen by the Government, the term of service being four years; they were eligible for reappointment at the will of the Government.

The "Horticultural Board Act" empowered the Board to make such regulations for the promotion and protection of the fruit industry as the Board thought necessary and expedient, subject, however, to review by the Attorney-General. After having the approval of that officer, the regulation, or regulations, were published in the Government Gazette, after which they had all the force of a statute law. This valuable provision is the key to the success of British Columbia in protecting the Province from any of the destructive pests which afflict the horticulturist in other countries. It is, I believe, greatly to the credit of all the Governments that have been in power during all these years, and also to the prudence of the Board of Horticulture, that not one regulation or decision of the Board on any matter affecting the fruit industry has been vetoed or disallowed during the entire history of the Board, nor has the Federal Government refused its consent to the enforcement of our regulations even when such enforcement bordered on interference with trade and commerce.

I trust that I will be pardoned for venturing the opinion that the good fortune which has attended the operations of the Board and its officers is mainly due to firm, just, and impartial administrations of the horticultural regulations. Not once in the history of the Board has it been shown that even-handed justice was not administered alike to small and great. Not once has the Government been compelled to interfere or reverse the decision of the officer having charge of the enforcement of the laws. Considering the cosmopolitan character of the settlers of this Province, such as importers, consignees, and canning companies, and the varying interests involved, this record is something of which all good citizens may well be proud.

Immediately after the Board had agreed on a code of regulations it was found necessary to appoint an executive officer whose duty it is to enforce such regulations, and as his duties involved inspection of all nursery stock, whether imported or home grown, and all imported fruit, it was agreed that the title of Inspector of Fruit Pests would be most appropriate. All destructive insects, fungous and bacteriological diseases may be included in the term "pests," so that the title, though very uncommon, was, perhaps, as consistent and satisfactory as any that could have been chosen.

During the first few years of the operations of the Board there were only three varieties of fruit subject to inspection—viz., apples, pears, and quinces. Not until the appointment of the present incumbent were peaches, apricots, plums, cherries, oranges, lemons, grape-fruit, and pine-apples subject to inspection. As trade with the Orient, Australasia, Sandwich and Fiji Islands began to develop, it was found that we were exposed to the introduction of many destructive pests not commonly distributed in the neighbouring States; this has led up to the inclusion of all vegeta-

tion arriving from those countries being subject to close inspection. The discovery of the larva of the tuber-moth in Californian potatoes, worms in cabbages, carrots, and turnips during the present year has resulted in all those vegetables being made subject to inspection, and are now very carefully inspected.

There are some twenty ports of entry in this Province where fruits, vegetables, and grain may be entered. The Board of Horticulture maintains an officer at each port whose duty it is to inspect all such importations before the goods can be delivered to the owners or consignees. Goods coming from other Provinces of the Dominion and British possessions throughout the world are subject to the same system of inspection as those coming from foreign States and Territories.

It is the duty of the Inspector of Fruit Pests to see that this system of inspection is firmly enforced. Each officer is required to make monthly returns of all inspections, so that the Government is kept informed regarding any threatened danger, and the Board advised of such additions and amendments to the horticultural regulations as may be found necessary to meet new conditions.

All nursery stock, trees, and plants of every description are subject to rigid inspection; all plants and trees carrying visible infection of destructive insects, fungous or bacteriological diseases are promptly condemned, and either cremated or reshipped to the country from whence they were exported. During recent years a very small proportion of condemned stock has been reshipped; nearly all has been cremated. It has been our policy at the inspecting and fumigating station to discourage the return of nursery stock. We believe that the only safe place for infected nursery stock is the furnace.

As a further precaution all nursery stock, including ornamental shrubs and plants, except those grown under glass, are fumigated with hydrocyanic-acid gas, United States formula.

All Indian corn, brown rice, or other grain showing infection are fumigated with carbon-bisulphide. This treatment has been found to be exceedingly effective; all animal life is destroyed without the slightest injury to the grain.

It often happens that hides and pelts in transit from Australia to the United States must be fumigated at Vancouver. We are glad to undertake all such service on behalf of our cousins, who have from the earliest history of the Province of British Columbia rendered willing and most valuable service in the interest of horticulture. I take this opportunity of testifying that not once in my experience of a quarter of a century have I been refused the very best technical information and assistance from our cousins south of the International Boundary, despite the fact that I have often been obliged to inflict severe financial loss on some of their people by the destruction of diseased and infected vegetation. Not in a single instance have any of their experts or officials who are in any way connected with the great fruit industry, or their educational system, suggested that we were too severe in the administration of our defensive system. On the contrary, I have ever received encouragement from their Entomologists and Plant Pathologists to enforce our horticultural regulations with firmness and justice.

I desire publicly to thank the representatives of that great and noble nation who are present with us to-day for the generous assistance and encouragement that they have given, with unstinted measure, during the whole of my experience.

The duties of the Inspector of Fruit Pests are often, indeed they are mostly, unpleasant; but considering the importance of protecting this beautiful and promising young Province, which is teeming with undeveloped wealth, and is being rapidly settled with a superior class of people, unpleasant duties must not be considered.

The regulations of the Board of Horticulture have been devised and promulgated in the interest and for the protection of the fruit-grower, the farmer, the capitalist, the canning companies, the consumer—in fact, for every resident in this Province. It is the duty of the executive officer of the Board to see that these wholesome and necessary regulations are enforced. It is no less the duty of every man who profits

by this valuable system of protection to aid by all lawful means those who are appointed from time to time to enforce the horticultural laws of British Columbia.

The reorganization of this Society is bound to have an important and beneficial effect on the agricultural and horticultural development of this Province. The presence of trained experts here to-day, to give us the benefit of their research and experiments, is a sure guarantee of a great forward and benevolent movement for the good of all concerned.

May our deliberations result in stimulating our people to greater efforts and deeper research in all matters that pertain to insect-life and plant pathology is the earnest desire of the Inspector of Fruit Pests.

THE IMPORTANCE OF ECONOMIC ENTOMOLOGY AS A SUBJECT OF EDUCATION.

BY M. H. RUHMAN, GRAND FORKS, B.C.

In this vast country with its wonderful agricultural and horticultural future the study of economic entomology is of vital importance to the general welfare of the country. The business-man in town is as much concerned as the farmer, fruit-grower, and lumberman; the success of our agricultural communities and forestry-work will always, in a great measure, affect the business of our cities and towns and the general finances of the country.

With the rapid development of the land, the insect pests are not yet very noticeable, except in the more settled districts, but such pests as are native to this country, and such introduced pests as have become established, are slowly but surely spreading and increasing throughout the country, and consequently increasing the already great annual loss of crops, which, in cash value to the individual grower, would be the equivalent of a high rate of interest on his legitimate profits, which, if he only realized the extent of this tax, he would surely try to avoid.

It is stated that 50 per cent. of the insect pests of the United States of America are introduced species. Introduced insect pests are generally the most serious and the more difficult to control, as frequently the parasites of these pests do not exist in the country into which they have been introduced, and as the parasites are by far the best, and in some cases the only means of keeping insect pests in control, it therefore becomes essential that the life-histories of insect pests be studied, both in this country and in the country or countries from which they have been introduced (where they may not be considered serious on account of parasitic control), that the parasites may also be introduced when found necessary.

The very rigid inspection of nursery stock, plants, and fruit enforced in Canada makes it almost impossible for insect pests to be introduced through these channels, but there are minor channels through which insect pests could and probably are being introduced which it would be impossible for the Government to entirely control. I might mention such possibilities as migration from the United States of America, introduction with general effects of immigrants and in material in which merchandise is packed and shipped from foreign countries; these minor channels are a real danger which cannot be entirely avoided. The business-man in town may leave the packing material of imported products lying about, or uses it again for packing things for shipment to home points instead of destroying it; also the farmers and fruit-growers are apt to leave packing material about for some considerable time before destroying it, thereby giving insect-eggs which it may contain an opportunity to hatch and the minute larvæ to get to some food-plant which may be near, or imagos may emerge from pupæ which the packing may contain.

The most destructive pests are generally very small and would, on that account alone, escape notice; even the larger species if seen would not attract attention unless the observer were a live entomologist. In the event of the introduction of a few insect pests in this way they could escape notice for some considerable time, perhaps