

Hammer.

The only disease of importance at present in the Hammer Plantations is the birch green-fly (*Aphis betuli*), which has done a considerable amount of damage to the foliage of the birch-trees that were originally planted as shelter-belts for the slower-growing trees. As, however, these trees will soon have outlived their usefulness, the appearance of the insect, which restricts its attacks to the birch, need not be viewed with any apprehension.

The pine white-aphis is also fairly abundant, being chiefly found on the Austrian pine. I noted with regret that the trees of certain species of *Abies* in the sanatorium grounds are badly affected with the spruce red-spider. This insect is evidently one which will in future be the cause of damage to any *Abies* plantations that are made in the Hammer district.

From the above, it will be seen that the present conditions of the Department's plantations are in a highly satisfactory condition so far as plant-diseases are concerned.

FUTURE PROSPECTS.

From the fact that the plantations are in a perfectly satisfactory condition from the disease point of view, it must not be inferred that they will always remain so. The liability to infection will yearly become more intensified, and the problem of control which is at present almost non-existent will, without doubt, become a serious factor. The large amount of pure planting that is taking place, which is necessary if the forests are to be brought to the highest pitch of efficiency, will in itself cause the disease-control problem to be an acute one. That serious diseases will appear sooner or later is incontestable, and the Department must on no account lose sight of this fact. To be forewarned is to be forearmed, and the successful control of forest diseases must largely depend on methods of suppression being taken in hand before they have assumed a grave character. With regard to our planted forests, it is probable that the efforts will have to be directed almost entirely against introduced fungi and insects. It is unlikely that any of our native diseases will ever become of any serious menace. This is of great importance, as with a knowledge of the work that has been accomplished against these diseases in other countries, the position will be simpler in certain respects than if new and unknown diseases had to be contended with.

CONTROL-MEASURES.

It is not proposed to deal in this article with the various methods that have been adopted to cope with the insect and fungoid diseases of forests in other countries. In the control of any particular disease, although the main features may be similar in different countries, a knowledge of the local conditions correlated with the habits or life-history of the organism or insect under discussion must of necessity figure largely in its successful control.

So far, in New Zealand, the problems of plant-hygiene have not been sufficiently studied in their relation to local conditions, but in most cases the adoption *in extenso* of the methods advocated in other countries has been followed. Certainly in many cases this has probably been the most rational procedure to adopt, but where the life-history of any particular disease follows a different course to that in those countries where the disease has been studied, it follows that the ordinary control-methods may not be at all applicable. This is well shown in the case of woolly aphis of fruit-trees (*Schizoneura lanigera*), the control of which will not be properly worked out for New Zealand until we are in possession of careful studies on the life-history of the insect.

In the control of forest diseases in New Zealand it is obvious that the first requisite will be a thorough understanding of the causal influences that render them especially injurious. The elimination of these causative factors will naturally form the basis of successful disease-control.

THE LINE OF ACTION TO ADOPT.

At the present time the most important work that should be done is a periodical inspection of all the planted areas to ascertain the exact position with regard to the presence of disease. These inspections could for some time to come take place not oftener than once a year, but when any special diseases are discovered it will be advantageous to visit all affected areas fairly frequently, to ascertain if the disease is one that, under the local conditions, shows any signs of becoming dangerous. At the first signs of serious injury strenuous efforts at control will have to be made, and the methods adopted in other countries will have to be applied, modified or supplemented as the case may be by a study of the local conditions. Any sickness or mortality of the trees that may occur must at all times be fully investigated, and the causes ascertained, for until the exact cause is known it will, of course, be impossible to formulate any line of action that should be taken.

All responsible officers in the employ of the Forestry Branch should make themselves conversant with the broad principles that underlie the problems of forest-disease control. This can be and is being done by a study of the literature that is rapidly growing up, and which is easily obtainable.

With the increase of the areas planted, in time the work of the individual will become more and more specialized, and it is probable that finally there will be some who devote all their time to forest pathological matters. There will be open two channels from which to recruit the *personnel* for this work—either by the employment of trained foreign specialists, or, as seems preferable, the training of certain of the New Zealand young men entering the forestry service as cadets, and who show some special aptitude for this class of work. This latter method would appear to be the more rational one, for a knowledge of the local conditions must in all cases have an important bearing on the effectiveness of the individual. There is, too, plenty of time in which these officers could be made efficient, for these services will not be urgently required for some years yet.