

During the year much information has been gleaned about the life-history of this beetle, which has been fully described in the *Journal of Agriculture* of March, 1913, by Mr. A. H. Cockayne, Government Biologist, under the name of *Odontria puncticollis*. Several methods of control have been adopted, and from the knowledge thus acquired there appears no reason to fear any serious losses in the future. Spraying the trees with arsenate of lead and other insecticides at the period when the beetles were on the wing was not productive of any appreciable good results, and fires at night were similarly ineffective. There seems reason to believe that the wind has an influence upon the direction taken by the beetles on the wing in search of a suitable feeding and breeding ground, and in view of this the present year's crop of larch was sown as far as possible from the last year's crop, and in a direction at a right angle to the prevailing winds. This crop of larch has been protected, too, with a covering of thin hessian, and so far only one beetle has been found amongst the trees. The results of these precautionary measures are being eagerly awaited, and it is confidently expected that they will reduce the destruction of trees to a minimum. The losses amongst the two-year-old seedling larch amounted to about 400,000—the result of the damage by grubs combined with an unusually dry season. This insect seems to prefer larch before any other tree, but it has been got in considerable numbers in white-pine (*Pinus strobus*) and Douglas' fir. Beds of Corsican pine and *Pinus ponderosa* growing alongside of infected larch-beds seem to be perfectly immune from attack.

PROTECTING THE PLANTATIONS AGAINST FIRE.

The dry period of the year, which usually commences about the beginning of November and continues to the end of April, necessitates definite measures being taken to protect the plantations from fire, and as it is desirable that the present system of protection should be extended, it is proposed to discuss at some length this important branch of forest-management. Hitherto the protective measures which have been adopted have consisted in the upkeep of fire-breaks, and in having at all times, during the dry season, an officer on duty to watch for outbreaks. Fortunately the damage done by fire to the plantations in the Rotorua district has been slight, but on several occasions this has been averted by only a hair's breadth, and it is upon such occasions that the shortcomings of the present system are realized. It must, however, be borne in mind that in the early stages of the work here it would have been unprofitable to have inaugurated an elaborate system of protection. The fire-breaks and the system of watching were then sufficient, but the area under plantation has gradually increased, until at the present time 5,748 acres are planted at Whakarewarewa, and 6,747 acres at Waiotapu, thus making it justifiable to increase the protective measures to some extent. It has been the rule to have all the internal fire-breaks $1\frac{1}{2}$ chains wide, and in laying them off a ploughable course has been followed as far as was possible or desirable. On the boundaries, half a chain has mostly been left unplanted inside the fence; but where the line passes over heavy bracken country, or on the slopes of a hill, the width has been increased to three-quarters of a chain and sometimes to 1 chain. Owing to the broken nature of the country it has not been possible to adopt any regular size for each block, but it is now the rule to try and make 300 acres the minimum and 600 acres the maximum area. Road reserves and tracks are also left through the large blocks, and these would probably be of assistance in stopping the spread of fire. The outside boundary fire-breaks are kept cultivated, and never allowed to have sufficient growth upon them to carry a fire from outside into the plantations. Where these adjoin a public road they are made more effective by periodically burning off the growth upon the roadside. All fire-breaks which, owing to the rough or steep nature of the land, are unploughable are kept bare by burning. The continuous expense of ploughing an increasing area of fire-breaks led to an experiment being made three years ago of sowing them in grass and grazing them. This system is satisfactory, provided the grass is regularly eaten off, but neglect to do so might prove disastrous in case of a ground fire. It can be recommended only for the internal fire-breaks, because the danger from fire from without makes it expedient to keep the boundary ones cultivated. There are many sources from which fires may originate, but the most frequent one is the burning-off by occupiers of land adjacent to the plantation reserves. Very few settlers will go to the trouble to take measures to prevent the fire extending beyond their own boundary, and they usually regard the burning-off of the bracken country as a desirable thing, forgetting that a fire once started in such country may travel miles, and probably do considerable damage before it is extinguished. The fire which caused so much concern for the safety of the Whakarewarewa Plantation last December was, as far as can be ascertained, caused by a passenger on one of the coaches coming from Wairoa to Rotorua throwing down a burning match, cigar end, or something of a similar nature. Extensive areas of land covered with bracken and dwarf scrub growth adjoin all of the plantations. During the summer this growth is highly inflammable, and if once a fire is started it may last for a long time and burn over thousands of acres. Much depends upon the state of the wind as to how wide a fire-break a fire will carry over. Sparks will often carry fire for a distance of 10 or more chains. Hot cinders may be blown across a much-used road, and unless they are arrested by a bank of earth, by fresh plough furrows, or a non-flammable hedge they will extend the fire in an inconceivably short time. At Puhipuhi Plantation the land throughout the reserve and adjoining country carries a heavy growth of bracken, and in addition is strewn with decaying logs and dead standing trees. Once a fire starts it is not long before a dead stump or log becomes ignited, and the sparks from this, assisted by the wind, will carry destruction forward by stages, igniting other logs, and these in turn carrying the fire still further forward.

The present system of fire-breaks is, on the whole, satisfactory, but as it entails an annual expenditure of 10d. for every acre planted it appears desirable to sow them in grass and graze them with sheep in order to reduce this annual charge. Placing the grazing-value at £1 per acre per annum, the cost of sowing down at £3 per acre, and the permanency of the pasture at eight years, profit at the rate of about $7\frac{1}{2}$ per cent. on the outlay would be reaped. Supposing, however, the grazing returned no profit, but simply paid expenses, it would still be a paying proposition, because the cost of ploughing, &c., at 10d. per acre per annum is, when reckoned at