

THE ENCOURAGEMENT AND PROTECTION OF BIRDS.

The importance of a plentiful supply of insectivorous birds is becoming recognised in certain European countries and their encouragement is a necessary adjunct of any system of forest protection, where the abundance of insectivorous bird life is below normal. The method of making the nesting boxes has been described already (p. 23). The distribution of these should be supplemented by the erection of "food houses" in different places. The Hessian "food house," devised by Baron von Berlepsch, is the most convenient form and can be easily erected by any one at very little cost. A number of these "food-houses" (Plate III, Fig. 24) have been erected on the Estate of the Manchester Corporation Waterworks in Cumberland (England) and are proving to be of great value. Their method of construction and other information relating to the encouragement of birds is given by Hiesemann whose valuable book has been translated.¹

REMEDIAL MEASURES.

The measures which may be adopted for the control and eradication of the larch sawfly will vary according to the extent and character of the infestation. Measures practicable for single or small collections of trees whose value is due to their ornamental character are not, in many cases, practicable on a large scale in the plantation or forest, as experiments early in this investigation showed. In fact, remedial measures of an artificial nature are practicable only in the case of small collections of trees or in plantations of a limited area. In the forest the only remedial measures which will offer any hope of success are those of aiding natural means of prevention and control.

Spraying. Where individual or small groups of ornamental trees or plantations of young trees are attacked, the spraying of the trees with an arsenical poison to kill the larvæ is practicable and may be adopted. In one of my previous reports (1907) spraying with a solution of arsenite of copper was recommended for the protection of the plantations of young trees in Cumberland. This was used in the proportion of 1 lb. of copper arsenite to about 130 gallons of water; one pound of flour was added to make the solution more adhesive to the foliage. Paris green in the proportion of one-quarter pound to forty gallons of water or lead arsenate in the proportion of two pounds to forty gallons of water may be used, the lead arsenate being preferable to other arsenical insecticides. In 1909 on the Estate of the Manchester Corporation at Thirlmere, Cumberland, England, about forty acres of young trees reaching a height of about eight feet were sprayed with the copper arsenite and flour at a cost of about \$1.48, or six shillings and one penny, per acre, and by this means the defoliation of the young trees was prevented.

The trees should be sprayed when the larvæ are discovered feeding, which will be approximately from the latter half of May to July.

Destruction of cocoons. The destruction of the cocoons by raking up and collecting the litter and turf around the bases of the trees and burning in heaps with lime has been recommended, but it was found that the cost of the treatment on anything approaching a large scale was prohibitive. In the case of a few ornamental trees the expense might be justified.

Hand picking and crushing. Where plantations of young trees are severely attacked advantage may be taken of the clustering habit of the young larvæ which may be destroying by crushing with the gloved hand as they cluster together on the twigs, or they may be collected in buckets. This method was found effectual in the case of young plantations.

Jarring the trees.—Packard stated that as the larvæ, once shaken off the tree,

¹Hiesemann, M. "How to attract and protect Wild Birds." Translated by E. S. Buckheim: Witherby and Co., London, 1908.