

brush in the woodlands which were adjacent on three sides of the most heavily infested areas.

Another control measure of considerable value is the practice of frequent close cutting of the grass and removal of the math. This is of greatest value where it occurs at a time when the insect is present either in the egg stage or in an immature stage so small that it can not migrate widely or readily. Mowing in this way not only removes such eggs as may be included in the leaves or stems, but also exposes the young leafhoppers to a shortage of food and to the direct rays of the sun.

The capture of leafhoppers by means of hopperdozers or tar pans also has been found of considerable practical value in some cases. Such apparatus commonly consists of a long shallow sheet-iron pan, coated with coal tar and mounted on small wheels. When this is drawn over the grasses, the insects, rising at its approach, fall upon the surface of the tar in the pan and are killed. It has been found by repeated experiments that in infested pasture lands the insects could be captured by this method at a rate of approximately one-half to one million per acre—a very appreciable reduction in the number which occurred in the treated areas. It has been estimated that two treatments of this character would capture about three-fourths of the leafhoppers present. This treatment is applied to best advantage during the latter part of the afternoon on sunny days, when the insects are most active and jump about with greatest facility. The expense involved is not great, as it amounted, under pre-war economic conditions, to about seven cents per acre.

Upon areas where the growth of the grass will permit of penetration through it to the insect, it seems possible, in view of the recent development of spraying apparatus, that broadcast sprays of insecticides such as a kerosene mixture or emulsion would likewise secure very effective results.

Additional information concerning various species of leafhoppers, life-histories and control, may be obtained from U. S. Bureau of Entomology Bulletin No. 108, entitled, "Leafhoppers Affecting Cereal, Grass and Forage Crops," by Herbert Osborn, issued in 1912. This is obtainable by purchase from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 20 cents per copy. Acknowledgment is gladly rendered to that publication for a considerable portion of the matter included in this article.

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**Pebble blisters on greens.**—On one northern Michigan course with sandy gravelly soil there was trouble each spring from the little irregularities caused by the frost over winter having lifted pebbles to or near to the surface of the greens. This trouble was obviated by probing the greens with a tool made of stiff wire smaller in diameter than a lead pencil, set into an awl handle. The pebbles within two or three inches of the surface were thus found and were removed by a similar tool with a short flattened hook upon the end. This work was done early in the spring growing season, and the wounds in the green were filled by raking in sandy loam with the back of an ordinary iron garden rake and rolling. The trouble has not returned during the five years since the pebbles were removed.—*Dr. Maynard M. Metcalf, The Orchard Laboratory, Oberlin, Ohio*