

into the cellar and kept them until some time between the 1st and 10th of June, and they came out in good shape.

The President: I will call attention to the fact that the Northwestern Greening sells on its appearance rather than reputation. I think we rank red apples too highly; the Northwestern Greening will sell on sight better than any red, so will the White McMahan.

SPRAYING

ARSENATE OF LEAD.

The President: We will now be glad to hear from Mr. Tuck, who will give us a ten minute talk concerning arsenate of lead.

Mr. Tuck: I might add a word about the Greening apples. I have been at every exposition of apples pretty nearly at horticultural meetings from the New England show to the National show at Spokane, and I have not seen any better Greenings than right out here on those tables, all the way around. Some of the red apples at Spokane were a little bit larger and better looking, but even so, I do not believe they tasted much better.

What I did want to talk to you about this morning is arsenate of lead; I talked to you last summer on lime and sulphur. I am going on the supposition that you use arsenate of lead. Any farmer who is not spraying with arsenate of lead for codling moth or curculio is running desperate chances of soon losing his orchard. There are two kinds of arsenate of lead and only two, two definite chemical formulae. I have here a solution of sodium arsenate and here a solution of lead acetate. I will precipitate these to what is known as a concentrated solution. In so doing I am able to press the water out of my solution easily and give you a high percentage of arsenic oxide, but I want to show you that is not the proper way to make arsenate of lead. (The speaker here illustrated methods of mixing.) On examination you will see that is exceedingly coarse in structure, in that way it loses its spreading power, it will not spread over the leaves. When a man goes around and guarantees you high percentage oxide arsenate of lead, he is either giving you an acid arsenate of lead, or he is giving you a solution more concentrated which lessens its covering qualities. There are only two kinds of

arsenate of lead, there is the acid kind and the neutral; the difference is that one contains an acid atom in its molecule and it will surely break up if it is not combined or neutralized by the lead, it also contains a lower percentage of lead. The neutral kind is absolutely neutralized by twice as much lead present, so that there can be no breaking of the molecule whatsoever and there is no danger of injury to your trees after it falls onto the ground. That has been the strongest point that has ever been put out in the states of Washington and Oregon where the alkalinity of the soil has the tendency to break up any chemical of any kind. The proper arsenate of lead for a man to buy is that which guarantees you 12½ per cent arsenate oxide. A man that guarantees you higher than 12½ per cent arsenate oxide in a test must be doing one of two things, either he is giving you an acid arsenate that will burn your foliage and injure your trees in time or he is giving you an arsenate which has made the concentrate solution and you are not getting full value, it is not the properly made stuff. In time that will get down in your settling tank and pack hard, and the next morning, if you let it stand over Sunday, you will have hard work with your agitator in the tank. The other will settle in time, but it will never settle hard, the slightest agitation will throw it immediately into solution in your barrel. This has been a matter of experiment for years. In fact, I am given to understand that arsenate of lead made in this way, containing 12½ per cent arsenic was used on the Wausau orchard last year and everybody has heard of the wonderful results there, less than one per cent wormy fruit. The whole thing is, if you are going to spray, go out and buy the best materials, if you buy arsenate of lead, buy from a reputable firm, no matter if it does cost a half a cent more, because what is \$5.00 a year to a man that is getting \$600 an acre for his fruit?

Mr. Foley: Is there any one who can tell how often this arsenate of lead was used in the Wausau orchard, how many applications this year?

The Secretary: Three applications this year. In regard to arsenate of lead in the Wausau orchard, we have used a new brand each year. We used Disparine the first year, Swift's the next, Graselli's the next year, Sherwin-Williams this year and next year we will use Vreelands. We are going to be impartial, and I want to say that after studying the matter closely, I can-

not see any difference between one compound and the other in regard to its effects on the codling moth in the Wausau orchard; one has been as efficient as the other and none of them has ever injured the foliage as far as I can see. It is fair to say that the material used has always been contributed by the manufacturers, for which of course we are duly thankful, we appreciate that compliment; they have contributed very generously indeed.

In regard to the quantities used, I have never used as much as the manufacturers recommend, or as much as is commonly recommended in bulletins. The amount that we have used is about two pounds to 50 gallons, sometimes two and a half pounds, and we never have any wormy apples.

Mr. Crawford: Is Paris green used very much for spraying?

The Secretary: It is not used so much now as arsenate of lead. We have never had any check in the Wausau orchard; by that you will understand, we have not reserved any trees that were not sprayed, so it is barely possible that there would not have been any codling moth, any wormy apples anyway, but we have never had any there. I doubt if there was one per cent of wormy apples in the Wausau orchard this year, and the effects with spraying with Bordeaux have been very marked indeed, the crop is practically free from scab.

Mr. M. S. Kellogg: Are you sure you catch the curculio with the arsenate of lead?

The Secretary: I cannot say positively, but I think we have reduced the injury.

Mr. Kellogg: In my opinion it is practically impossible to eliminate the curculio with the poison, although I may be mistaken.

The President: I would like to say that after two years experience I am well satisfied that spraying with either Paris green or Arsenate of lead reduces the number of curculio and gougers very materially.

Mr. Palmer: I have sprayed this year and last year on the Duchess trees where the curculio work the worst, putting the poison on before the leaves start, and I think it has had a pretty good effect, at least I did not have any curculio.

Mr. Tuck: Mr. Quaintance of the U. S. Bureau of Entomology has recently written a bulletin on Deciduous Fruit insects which will answer all those questions. He states that arsenate of lead is an absolute control for the curculio and gives

the evidence from the farm where he made his experiments, and also codling moth.

The Secretary: Should we mix the arsenate with the milk lime?

Mr. Tuck: Yes.

The Secretary: Is it not sufficient to pour it into the Bordeaux?

Mr. Tuck: You can put it into the Bordeaux afterwards, only, if you put it into your lime before putting it into the Bordeaux mixture, your arsenate of lead will remain longer in suspension.

A Member: Can you give us some recommendations in regard to Bordeaux mixture?

Mr. Tuck: For a 4-4-50 Bordeaux mixture, the first recommendation I can give you is to slake the lime carefully, that is an important point, do not brown your lime, get it carefully slaked, then dilute it to 25 gallons, dissolve your blue stone and dilute it to 25 gallons, then pour the two solutions together, pour the solutions simultaneously together.

Mr. Bryant: May I say a word in regard to the application of arsenate of lead for the plum curculio? Our Illinois entomologist tells us that the plum curculio early in the season, before the apples are of any size, feeds upon the leaves, that the effect of the application then is to poison them when they feed upon the leaves, not by spraying the fruit.

Mr. Tuck: The first spray of arsenate of lead is the most effective spray, most important, just before the blossoms fall, just before the cup of the calyx closes, to get some of the poison into the cups of the calyx will do away with probably 95 per cent of wormy fruit.

LIME SULPHUR AS A SUMMER SPRAY.

PROF. ERRET WALLACE, Cornell Univ.

Before beginning my paper I would like to say a few words concerning the reason why a certain Wealthy tree had been injured by the Bordeaux mixture while the adjoining trees had not.

There are three or four principal factors that are likely to control Bordeaux injury either to fruit to foliage, one is weather