

quantity of this solution may be prepared in anticipation of the busy season, and drawn upon when necessary. The addition of the resin-solution to the Paris green can be recommended, particularly during the early part of the season, when showers are frequent, as it renders the Paris green more adhesive, and not only so, but by increasing the density of the liquid the Paris green settles less readily, and is, in fact, almost held in suspension, being thus distributed more evenly over each tree. The Paris green and resin solution proved absolutely effective in preventing the attacks of the bronze beetle, which in some localities are almost as much to be dreaded as the codlin-moth.

*Arsenic and Soda No. 1.*—It will be necessary to advise those who prefer this solution to exercise care both in preparation and proportioning. Prepare by adding 1 lbs. white arsenic to 2 gallons of water in which 2 lbs. washing-soda has been dissolved, and boil until arsenic is thoroughly dissolved. As this will produce a liquid almost like clear water, it is advisable to use some simple colouring-matter to prevent mistakes. In bottling for use a graduated glass should be used, so that the number of fluid ounces may be determined in order to be able to proportion the solution evenly through any number of gallons of water, for, as the solution may after boiling be in a highly concentrated form, the addition of a single fluid ounce over and above the proper amount to, say, 18 gallons of water, might have decidedly injurious results. This solution was used in the proportion of 1 lb. arsenic to 700 gallons of saturated solution of lime-water.

*Arsenic and Soda No. 2.*—This preparation was suggested by Mr. Hanlon on his return from a visit to Europe and the United States of America, as being largely used by apple-growers in the Eastern States of America. After careful testing I found that the action upon the foliage of the Cox's Orange apples was rather severe when used in proportion of 1 lb. arsenic to 400 gallons of water. I therefore reduced the proportion to 1 lb. arsenic to 600 gallons of water, which proved effective without injury.

*Arseniate of Lead.*—This preparation, which can be purchased ready-prepared, is convenient to handle, can be used freely (if properly proportioned) without fear of injurious results, and has proved effective, but the cost is so considerable that, for commercial orchards, I fear it is out of the question unless the price can be much reduced.

Season 1902-3: Arsenic and soda—1 lb. arsenic, 2 lbs. washing-soda, to 700 gallons of saturated solution of lime-water. The number of trees of each variety I am unable to give from memory.

3. The dates when the first applications were made in each season, and the number of applications from that date till the apples were harvested?—Season 1901-2: Red Astrachan, last week in October; Ohinemuri, Pride of Australia, Simmonds' Winter, and Cox's Orange, from the 6th November to the 14th November, as the weather permitted. Red Astrachans were sprayed four times; Cox's Orange, six times; and the later varieties—Ohinemuri, Pride of Australia, and Simmonds' Winter—eight times. Season 1902-3: Spraying commenced on the 11th November. Red Astrachans were sprayed four times; Cox's Orange, five times; Ohinemuri, Pride of Australia, and Simmonds' Winter, eight times.

4. Other means taken to trap and destroy grubs which escaped destruction by spraying?—Season 1901-2: Bands of sacking were used; pigs also having the run of the orchard, to save expense of gathering up fallen fruit by hand. Season 1902-3: In deference to the wishes of the committee, and to test their value in assisting to subdue the moth, pigs were kept on one section of the orchard only. No bands were used in any part of the orchard, spraying alone being relied upon.

5. Spraying apparatus used?—The "Pluvial," a powerful force-pump manufactured by Messrs. Burt and Co., of Dunedin. This pump is similar to the well-known Californian "Bean" spray.

6. Ease or otherwise of application of various sprays used?—Arseniate of lead is perhaps the safest and most convenient to use, but, unfortunately, very expensive. Paris green has not proved sufficiently reliable, some brands containing too large a percentage of free arsenious acid. Apart from the trouble of preparing, the arsenic-and-soda spray is convenient and economical, but must be used with care.

7. Cost of spraying-mixtures and their application at per acre containing 100 trees of this age (about eighteen years old)?—Paris green, 1s. 5d. per 200 gallons; arsenic and soda, 2s. 1½d. per 700 gallons; arseniate of lead, 1s. 1½d. per 12 gallons of spray. Cost per acre, Paris green: Labour, 10s.; material, 8½d.; total cost per acre, 10s. 8½d. Cost per acre, arsenic and soda: Labour, 10s.; material, 3½d.; total cost per acre, 10s. 3½d. Cost per acre, arseniate of lead: Labour, 10s.; material, 8s. 4d.; total cost per acre, 18s. 4d. For the coming season arseniate of lead will be imported at about one-fourth of the price noted above. I also propose to test a brand of Paris green, introduced from California, manufactured specially for spraying purposes, giving by analysis a very low percentage of free arsenious acid, which, if present in large quantities, causes injurious effects on the foliage. The above cost for labour might be reduced by using two leads of hose, and still more by using four leads, taking four rows of trees at a time. Moreover, an orchard where the trees had been systematically pruned would take less than one-half the time and liquid that the overgrown trees in the Otahuhu orchard have done, and yet give the same yield of fruit.

8. Has the ground been kept clean under the trees treated?—The orchard has been divided into two sections, one section being cultivated, and the other left in its natural state. The foliage of the trees on the cultivated section presented last season a much more healthy appearance than that of the trees on the uncultivated land.

9. Relative effective values of the spraying-mixtures used, with their degree of injurious effect on the foliage, bark, and buds of the trees they were applied to?—The results of spraying with arseniate of lead and arsenic and soda, in the percentage of sound fruit saved, are much the same. Arseniate of lead is very expensive; but, if properly proportioned in the manufacture, perfectly safe to use, no injurious results being noticeable. Arsenic and soda must be used with care, must be properly proportioned, and mixed with a saturated solution of lime-water from perfectly fresh stone lime. This mixture, at the Otahuhu orchard, season 1901-2, saved 95 per cent. of Simmonds' Winter from the moth. Paris green: Trees sprayed at Otahuhu with Paris green yielded a fraction over 90 per cent. free from the moth. The great drawback to the use of Paris green has been in the different brands showing varying percentages of arsenious acid, so that in some instances the injurious effect is little or nil, in others the scorching of the foliage is very severe. The "Horticultural Brand" introduced by the Department will, I hope, do away with this objection.

10. Cost incurred for treating each variety with mixture used, and for picking, packing, and marketing?—No record of the cost of each variety has been kept, as the orchard is a mixed one, and was taken in hand especially for spraying for codlin-moth, the varieties in some instances being mixed in the rows. As far as I can judge without actual figures the average cost of trees throughout would be about the same, as trees of each variety vary in height and spread. Cost incurred for treating each variety, based on a hundred trees per acre, has already been given.