INTRODUCTION
Melanose control is one of the most important operations on the spray schedule. Much work has been done by the State and Federal Stations and by commercial organizations in the development of proper materials and proper timing.

OBJECT
Much of the work which has been done has been on experimental plots which were intensively studied as a ground work for commercial practice. The men in charge of production are interested therefore in taking these data and applying them to their specific needs. In the present paper the writer proposes to show the effect of varying practices on the control of melanose with their commercial values when applied to extensive grove operations.

The work reported was not set up as experimental but was accomplished in the regular routine of the production department of the Haines City Citrus Growers Association. Not until the pool sheets were studied was it realized that varying practices had such profound significance. The writer feels that these data taken from actual records would be most interesting to all citrus men.

METHODS
The groves under discussion can be placed in four distinct groups:

Group A (3 groves) groves were pruned and had a minimum of dead wood and received a thorough spray application.

Group B (2 groves) groves were sprayed but carried a heavy proportion of dead wood.

Group C (2 groves) groves were not sprayed but were thoroughly pruned prior to the period of heavy melanose infection on the fruit.

Group D (2 groves) groves were not sprayed and had an excess of dead wood.

The spraying was done by the regular spray crews which have been trained to apply a thorough inside and outside coverage without excessive drip. The gallonage for these groves, which averaged twenty years of age, was approximately 16 gallons per tree. The mixture consisted of two pounds of neutral copper, two pounds of zinc sulphate, one pound of hydrated lime and ten pounds of wettable sulphur containing 90 per cent sulphur and a good wetting agent. While the neutral copper used in all of these groves reported contained 53% metallic, in other test work comparable results were obtained with coppers of lesser metallic content. The spray was applied between March 15 and April 15. Zinc sulphate was used for its nutritional value but it also added greatly to the sticking properties of the mixture.

Neutral copper was used instead of bordeaux mixture for the following reasons: First, the increased safety factor; second, the lessening effect on scale build-up; third, the convenience of handling.

The safety factor and the convenience of handling of the neutral coppers are properties which are well recognized.

The direct relationship of increased spray residue to increased scale build-up has been definitely proven by the work of W. L. Thompson (two references), Osborn and Spencer (one reference), L. W. Zeigler (unpublished data) and others. In our commercial practice this has proven of great commercial value.

None of the groves herein reported have received an oil spray since the spray application and the scale population is at a minimum.

DISCUSSION
All fruit reported was marketed in the pool period of September 15 to October 1. It was picked without regard to grade.
Table 1 shows the packout from each grove and the average return per box.

Table 2 summarizes the packout of the fruit from the groves in each group and shows the weighted return per box.

Group A: A total of 2,894 boxes were packed from these groves in Group A. These groves had been pruned and sprayed. Eighty-four percent of the fruit went in U. S. No. 1 grade and no fruit graded low enough for canning. The average return was 61.7 cents per box.

Group B: The two groves in Group B which had been sprayed but not pruned packed 2,290 boxes of which 53% were U. S. No. 1. No fruit graded into cannery class. The average net return was 50.7 cents per box.

Group C: The two groves in Group C received a thorough pruning but received no spray application. Of the 881 boxes 40% packed U. S. No. 1 and 5.4% went into cannery grade. The average return was 44.7 cents per box.

Group D: These two groves received no control measures against melanose infection. Twenty-one percent of the 1,440 boxes packed U. S. No. 1 while 8.4% fell into cannery grade. The average was 39.4 cents per box.

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### Table 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Grove</th>
<th>Total Boxes</th>
<th>U. S. No. 1</th>
<th>U. S. No. 2</th>
<th>U. S. No. 3</th>
<th>Cannery</th>
<th>Ret. per Box at Pk. Hse.</th>
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<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>1,087</td>
<td>956</td>
<td>92</td>
<td>39</td>
<td>62.4c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1,249</td>
<td>1,088</td>
<td>122</td>
<td>59</td>
<td>60.9c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>558</td>
<td>410</td>
<td>128</td>
<td>20</td>
<td>56.3c</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>432</td>
<td>239</td>
<td>172</td>
<td>21</td>
<td>52.0c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1,858</td>
<td>969</td>
<td>736</td>
<td>153</td>
<td>50.4c</td>
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</tr>
<tr>
<td>C</td>
<td>1</td>
<td>372</td>
<td>183</td>
<td>148</td>
<td>41</td>
<td>49.4c</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>509</td>
<td>167</td>
<td>294</td>
<td>48</td>
<td>41.4c</td>
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</tr>
<tr>
<td>D</td>
<td>1</td>
<td>380</td>
<td>57</td>
<td>256</td>
<td>67</td>
<td>41.4c</td>
<td></td>
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<td></td>
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<td>1,060</td>
<td>247</td>
<td>616</td>
<td>75</td>
<td>38.8c</td>
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### Table 2

<table>
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<tr>
<th>GROUP</th>
<th>Total Boxes</th>
<th>U. S. No. 1</th>
<th>U. S. No. 2</th>
<th>U. S. No. 3</th>
<th>Cannery</th>
<th>At Packing Hse., Ret. Per Box</th>
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</thead>
<tbody>
<tr>
<td>A Pruned</td>
<td>2,894</td>
<td>84.1</td>
<td>11.8</td>
<td>4.1</td>
<td>0.0</td>
<td>61.7c</td>
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<tr>
<td>A Sprayed</td>
<td>2,390</td>
<td>52.7</td>
<td>39.7</td>
<td>7.6</td>
<td>0.0</td>
<td>50.7c</td>
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<tr>
<td>C Pruned</td>
<td>881</td>
<td>39.7</td>
<td>50.2</td>
<td>4.7</td>
<td>5.4</td>
<td>44.7c</td>
</tr>
<tr>
<td>D No Control</td>
<td>1,440</td>
<td>21.1</td>
<td>60.6</td>
<td>9.9</td>
<td>8.4</td>
<td>39.4c</td>
</tr>
</tbody>
</table>
CONCLUSION

These figures are considered to be highly significant. Group A which received the two control measures showed an increased average per box of .223 cents over Group D, or an increase of over 50%. The average expenditure for the pruning and spraying was 4 cents per box, which showed a net return of almost 500% on these operations. It must be considered that on the group receiving no control for melanose, a spray application was necessary for rust mites. Therefore it is readily realized that while a very appreciable return was made on these operations in actual money, the groves received at no cost the sulphur and zinc treatment.

Group B, which received only the spraying at a cost of 1.6 cents per box, showed an increased return per box of 11.3 cents. This was an actual return of 600% on the expenditure and the grove received the zinc and sulphur application at no cost.

In considering the cost of melanose control with copper there remains the question of oil spraying which in the minds of many must be charged against the melanose control because of the increment of scale with the increased residue. It has been noted above that none of these groves received nor required an oil treatment. It is nevertheless well to figure the returns of Groups A and B, had an oil treatment been necessary. Using a 1.3% concentration of oil derived from one of the standard emulsions and considering that these trees would require 20 gallons for thorough coverage, a cost of 2.2 cents per box would thereby be incurred. In the Group A groves, this would increase the cost to 6.2 cents per box but would still show a return of about 300% on the operations. In the Group B groves the cost would be increased to 3.8 cents per box and these groves would then show a return of 200% on the spray investment.

In considering the Groups C and D, however, since no melanose spray was applied, no oil control for scale can be charged.

From the experience of the writer over a period of years, it would appear that many scale infestations are charged against a specific spray application while in actual fact much of the scale had been developing for some time prior to the spraying.

The Group C groves received a thorough pruning at an average cost of 2.5 cents per box, but showed an average increased return of 5.3 cents. This increased revenue showed better than 100% profit on the pruning operations.

While Group D received no spraying or pruning, the grower was forced to pay for the zinc and sulphur applications, without benefit of the increased revenue which melanose control returned.

These figures show very decidedly that the spray operations returned the greatest dividend, but that even above this, the thorough pruning was a most profitable operation.

SUMMARY

The return from groups of groves which had received varying treatments directed toward control of melanose were studied. It was found that a copper spray application gave the highest percentage returns based on expenditure, but that pruning sprayed groves increased the monetary returns. Pruning without spraying showed a definite value but not as profitable as one spray application.

The groves included in these studies are only a small percentage of the total number which might be included without varying the data. It should be noted that the spray dates will be dependent upon weather conditions, cultural practices and blooming periods.

Production men must consider these factors of vast significance in the proper timing of the melanose sprays for greatest returns.

Valuable assistance has been given by L. W. Ziegler in the preparation of this manuscript.

REFERENCES

