

be seen that there is some necessity for placing the time of effective thinning. Naturally, we would not want to begin thinning before the June drop. On the other hand, our studies show that no treatment or combination of treatments will enable the tree to size up an excessive overload beyond certain fairly definite limits.

*Things to be Reckoned With in Thinning.*—With this much of an introduction then, we may consider briefly some of the things to be done in the cultural program which will have a bearing upon the size of fruit. One of the first things to be reckoned with is the age of the tree. Young trees are inclined to size up most of the fruit they set because they generally produce an abundance of vigorous leaves. After the first few heavy crops, however, and as the tree begins to reach the larger size of the mid-year, some attention has to be given to regulating growth. This brings both nitrogen and pruning into the picture as supplementing the growth stimulus coming from cultivation. From the measurements we have made, it appears that fertilizer applications and pruning have a comparable stimulus upon the length of growth induced in the top shoots. The growth induced by heavy nitrate applications, combined with heavy pruning, results in a thick top which always matures the fruit late. Wherever the set is heavy, however, the experiments show that the tree cannot size up an excessive load without limiting it, in part at least, by pruning or thinning. Under no conditions is it possible to size up a thickly clustered set.

A number of very interesting things have come out of the thinning investigations. For instance, in the growth studies of the fruit, it was found that the cells ceased

to divide after the fruit reached one-half to five-eighths of an inch in diameter, and that enlargement from then on took place as a result of the stretching and enlarging of cells, rather than an increase in their number. With the period of cell division over so early, it is apparent that some increase in size might be expected to follow a reduction in the crop quite late in the season. This point was tested out under the conditions of heavy cropping by leaving the larger fruits on the tree and pulling off the smaller ones, paying less attention to size. It was found that, during the second growth period, it was easy to find some fruits more than twice the volume of others and that, by taking full advantage of the larger fruits on the tree and making the reductions primarily from the smaller ones, yield was not cut materially. In this way thinning can be made effective well up toward the final swell. This kind of thinning seemed to be especially effective with Gage.

*The Critical Period.*—Things come to a head then at picking time in a rather critical form, and we have some rather difficult things to reckon with which seem to point in opposite directions. For instance, as maturity is approached, quality increases as long as the fruit hangs on the tree. On the other hand, the carrying ability of the fruit drops vary materially as ripening comes on. Growers are tempted to take into consideration a large number of factors at harvest time, and hindsight, unfortunately, is always better than foresight. It is a temptation to pick early while the price may be good and the carrying quality highly satisfactory; at the same time, the fruit is enlarging as long as it hangs on the tree. And we must always reckon with the pos-