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Fruit Thinning In Missouri



Duchess apples picked from thinned and not thinned halves of the same tree. Note difference in size and color.

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Fruit Thinning in Missouri

A. E. MURNEEK

ABSTRACT.—Fruit thinning of apples and peaches is a desirable orchard operation in Missouri. In years of heavy yields it appears to be a very profitable undertaking. Few, if any, practices will so directly increase the size, grade and quality of fruit as thinning. By reducing the number of defective specimens, it will decrease the cost of handling a crop. Systematic fruit thinning will prevent the breakage of limbs and preserve the vigor of a tree. It may not obviate biennial bearing, however. The time, methods and cost of thinning apples and peaches is discussed. An outline of procedure of apple thinning for beginners is appended.

Fruit thinning is a recognized orchard practice in almost all fruit growing regions west of the Rockies. Lately it has gained in popularity also in midwestern and eastern states. With many successful fruit growers, therefore, thinning has become as indispensable an operation as spraying, pruning and soil fertilization. The reasons are rather self-evident. Supplementary to the major orchard operations, it would be difficult to mention any other practice that will do as much in increasing the size and quality of fruit as systematic thinning.

In years of heavy crops fruit thinning will likewise prevent the loss of branches from breakage. Moreover, it will preserve the vigor of a tree. Fruit bearing is a devitalizing process. As a rule only vigorous trees are likely to bear profitable crops consistently. Certainly it is a short sighted policy to permit trees to carry too great an overload of fruit and thus become exhausted, since under such circumstances the fruit is usually of a small size, of poor color, and, therefore, often unprofitable. This is particularly true in years of a heavy supply, when a substantial premium is offered for the better grades and larger sizes. Thinning is one of the best means of securing this desired perfection.

Fruit thinning in the midwestern states is restricted to the peach and the apple. While thinning of peaches is rather well known in Missouri, apple thinning is much less understood and hence little appreciated. Recently, however, a number of growers in this State have shown a keen interest in apple thinning, particularly in years of high yields. After a careful investigation of the value of this practice in a number of commercial orchards, it has been found that under certain conditions it may prove advisable to thin apples in Missouri; under others it may be highly profitable. The aim of this publication is to present in a concise way some practical suggestions for carrying out the work. Special emphasis is placed on apple thinning.

THE PURPOSE OF THINNING APPLES

Thinning is the removal of a part of the crop in order to improve the size and quality of the remaining fruit and lessen the strain on overloaded trees. Consequently the work is done with a definite object in mind. It has the following distinct advantages in the scheme of orchard management:

1. Increase in size and grade of fruit.
2. Improvement in color and quality.
3. Reduction in number of defective specimens.
4. Decrease in labor of harvesting the crop.
5. Prevention of breakage of limbs.
6. Preservation of vigor of the tree.
7. Securing of more regular bearing.

THINNING INCREASES SIZE AND GRADE OF FRUIT

Probably the most conspicuous advantage resulting from thinning is increase in the size of fruit. With favorable conditions of fruit bud formation, pollination and setting, most varieties of peaches and many sorts of apples are likely to overbear, in some years at least. The usual result will be fruit of small size and of poor grade. To nourish and develop a large apple thirty to fifty leaves are needed. With heavy yields the average number of leaves per fruit runs very much short of this requirement. Hence the fruit will be small and of poor quality. There is no better way of adjusting the crop to the ability of the tree to support it than by thinning. A careful consideration of this relationship between foliage and fruit and a necessary adjustment in the right direction by thinning has certainly been highly profitable to the growers of the Western States.

The approximate differences in size and grade of apples that may be expected from thinned and not thinned trees may be seen from Table 1. The figures are averages from ten carefully conducted experiments in eastern and central states, as summarized by Gourley of the Ohio Agricultural Experiment Station.

TABLE 1.—APPLE THINNING—AVERAGE OF TEN EXPERIMENTS IN EASTERN AND CENTRAL STATES

Percentage No. 1		Percentage No. 2		Percentage culls	
Not thinned	Thinned	Not thinned	Thinned	Not thinned	Thinned
43	71	45	23	6	3

One can see from this table that the usual results of thinning are a marked increase in No. 1 fruit and a corresponding decrease in No. 2 and culls.

Such differences in grade may be and commonly are of considerable profit to the grower, as the following table of results secured in Missouri will show:

TABLE 2.—APPLE THINNING—INGRAMS
Paul H. Shepard's orchard, Independence, Mo.

<i>Yield of 100 Ingram Trees—Thinned</i>	
97 barrels No. 1 at \$4.00.....	\$388.00
12 barrels No. 2 at \$3.00.....	36.00
3.5 barrels culls at \$.60.....	2.10
Total 112.5 barrels.....	\$426.10
<i>Yield of 100 Ingram Trees—Not Thinned</i>	
51 barrels No. 1 at \$4.00.....	\$204.00
40 barrels No. 2 at \$3.00.....	120.00
18 barrels culls at \$.60.....	10.80
Total 109 barrels.....	\$334.80
Difference in favor of thinning.....	\$ 91.30
Cost of thinning, 22 cents per tree.....	22.00
Net gain.....	\$ 69.30

Two points are brought out by this comparison of the value of apple thinning. In the first place, the crop of the one hundred thinned trees was actually larger than from an equal number of not thinned trees. Secondly, as a result of thinning, the amount of No. 1 fruit was almost twice that in the non-thinned group, and the income was correspondingly greater. It must be emphasized here that the whole expense of thinning should not be placed against these trees, since most of the apples removed during thinning would have to be picked anyway and at a cost either equalling or exceeding that of thinning.

An erroneous idea seems to be prevalent among some growers that though the quality of the fruit may be improved by thinning, it is at the expense of the total yield. Consequently the net results might not be profitable, particularly with varieties that are sold under one grade or else in bulk. There is much evidence on record that in most instances this is not true. Still to test this consideration under Missouri conditions a block of 26 large Gano trees was thinned and compared with a large number of adjoining non-thinned trees. The results are found in Table 3.

TABLE 3.—APPLE THINNING—GANOS
Riverview Orchard, McBaine, Mo.

<i>26 Trees—Thinned</i>	
Yield, bushels per tree.....	15.8
No. 1, bushels per tree.....	9.0
<i>87 Trees—Not Thinned</i>	
Yield, bushels per tree.....	14.6
No. 1, bushels per tree.....	8.0
<i>Difference in Favor of Thinning</i>	
Per tree, orchard run.....	1.2 bushels
Per tree, No. 1.....	1.0 bushels

Even when the cost of thinning is deducted, it was estimated by the manager of this orchard, that the net gain in this case was 50 to 75

cents per tree. The fruit was orchard graded and sold as No. 1 and as culls.

While the economical side of apple thinning under the marketing practices existing in Missouri is being determined further, the above two examples may be considered as quite typical of results that may be expected. Naturally it will be found more remunerative to thin the better varieties of apples than the poorer sorts, which often are sold in bulk.

That an increased value usually results from thinning of peaches is so well understood by Missouri growers that it is unnecessary to furnish specific figures.

THINNING IMPROVES COLOR AND QUALITY OF FRUIT



Fig. 2.—King David Apples. Fruit on the left picked from the inside, fruit on the right from the outside of the same tree. Thinning will make the inside fruit of larger size and better color.

Color of apples and peaches is largely a variety characteristic. The amount of color that each individual specimen will acquire, however, depends largely on exposure to sunlight particularly at the time when the fruit ripens.

When trees bear a large crop, most of the branches are weighted down. This causes a shading of many fruits, especially those on the inside of the tree. Moreover, fruit on drooping limbs, even those on the outside, will be so exposed to light that only the stem end will be colored. It is, of course, more desirable to have a blush on the cheek. But in order to obtain a good price for so-called "red" apples, it is rather

necessary that they be well colored all over. This is secured only by proper and full exposure to light.

The interior of heavily loaded trees may be so shaded that the fruit will not only lack color, but also will be small in size. This is strikingly illustrated by Fig. 2. Under continuous shading the leaves will remain small and will not function properly. Thus not enough food will be available to the developing fruit.

The "opening up" of the apple tree by proper pruning, largely thinning out of branches, will in a measure overcome this difficulty. Heavy pruning of this nature is, however, somewhat dangerous in the midwestern states, where exposed limbs are frequently injured by sunscald. And the removing of small branches by the so-called "detailed pruning" is expensive.

The peach, bearing its fruit on the newer wood, can be more conveniently treated by judicious pruning and at less expense than the apple. But due to adverse climatic conditions a good crop of peaches may be expected in this state only every third or fourth year. Therefore, the adopted system of pruning calls for a heavy heading back in the non-bearing year, while in the bearing year, when pruning would be most valuable, often none is given, the grower wishing to harvest, while the harvesting is good, as large a crop as possible. The results of such a practice would be highly disappointing, were it not for a more or less systematic fruit thinning—the best method of securing fruit of high grade.

With the apple, likewise, fruit thinning is the most certain and the most effective means of obtaining a crop of good color and high quality. Properly thinned branches will not weigh down and shade each other. More light will reach fruit well within the tree. The average amount of foliage supporting each apple will be greater, and the leaves will perform their function of food manufacture more efficiently. The result will be fruit having better color and finish and as a consequence higher value.

It should be remembered that more culls in the Missouri orchards are due to small size than any other defect.

THINNING REDUCES THE NUMBER OF DEFECTIVE SPECIMENS

A large amount of injuries on apples and peaches are caused either directly or indirectly by parasitic insects and diseases. Most of these pests may be put under control by proper and timely spraying. Later in the season, however, trees loaded with fruit cannot be sprayed properly, because of the fruit hanging in clusters. Then, too, branches drooping to the ground will often cover others so completely that many

specimens on the inside will remain practically unsprayed. Thus the ravages of a host of pests will continue unchecked. Unless carefully examined, the damage will not be apparent till the fruit goes over the grading table and the income is registered in the ledger.

When fruit is thinned properly, only infrequently two specimens will touch each other. Hence with usual care they may be covered completely with spray material. Furthermore, branches that are properly thinned will be more nearly in their normal position, thus permitting the interior of the tree to be sprayed far more efficiently.

THINNING DECREASES COST OF HANDLING THE CROP



Fig. 3.—Cull piles like this one may be avoided by proper thinning of fruit.

A properly thinned tree will have most of its defective specimens removed early in the season. And fruit that is left will be better protected from injury. Certainly it will reduce materially the expense of harvesting, grading, and disposal of culls. This is particularly true of fruit that is graded more closely, like some of the late peaches and the better varieties of apples.

The saving in expense of handling the crop is often large enough to cover the cost of thinning. So much so that in almost all sections where fruit thinning has become a common practice the cost of this work is not laid against the income from the crop. It is supposed to pay for itself.

THINNING PREVENTS BREAKAGE OF LIMBS

In years of a heavy crop a rather common sight in Missouri orchards is a large number of broken limbs. Often enough these are of such size that the tree may be permanently ruined. A nasty wound caused by the severing of a branch usually does not heal over well. Wood rotting fungi gain a secure foothold through such openings. Soon the center of the tree has decayed, thus weakening its main structure and subjecting the tree to further breakage. Hence, it is little wonder that some trees of an advanced age will break down in a windstorm even from the weight of a moderate crop.

Luckily enough, many fruit growers of the Ozarks with their comparatively low investment and overhead expense are able to endure some loss. Still such losses are not necessary and can be easily avoided by proper distribution of the crop as a result of thinning early in the season. In many cases a certain amount of corrective pruning, wire bracing, and timely propping of some of the limbs will be of material aid also.

THINNING PRESERVES VIGOR OF THE TREE

While the greatest emphasis has been placed on the immediate influence of thinning on the fruit, the effects on the tree are equally important. It should be clearly understood, however, that fruit thinning cannot increase the vigor of a tree, it can merely preserve it. Vigorous trees are secured largely by proper attention to all the necessary cultural practices—soil management and fertilization, spraying, pruning. Fruit bearing, however, is a devitalizing process; so much so that even the most robust apple or peach trees may become weakened by a series of heavy crops. Naturally the degree to which a tree can withstand the exhaustion due to a heavy yield of fruit in each case will be in proportion to the vitality of the individual tree. Very strong trees may carry safely a large crop of fruit; those in a weakened state will suffer even from moderate bearing.

The usual consequences of overbearing are a decreased vegetative growth, smaller leaves, and reduced fruit bud formation. Not only the tree is exhausted of its reserves by the maturing of a large number of fruits, but the very machinery for future fruit bud formation and food manufacture is reduced.

If a short crop follows one of great abundance, the tree may and often does recover. A series of such alternating years, however, will soon become a fixed habit. Thus biennial bearing is initiated.

Furthermore a tree weakened from overproduction is more easily subject to winter injury. It has been frequently observed, for instance, that following a heavy yield, fruit buds of the peach are more likely to be



Fig. 4.—An overloaded Jonathan tree. Much fruit on the inside branches is shaded and many limbs have broken.

killed by low temperatures. An actual demonstration* in Missouri has shown that more peach buds will come through an average winter uninjured on thinned than unthinned branches. Similarly late spring frosts seem to play the greatest havoc with fruit buds and flowers of devitalized apple trees—those that have yielded heavily during the previous season.

A timely removal of the overload of fruit by systematic thinning will certainly help very much in preserving the vigor of a tree and in securing the necessary vegetative development. This will become quite clear if it is remembered that it takes almost as much energy to grow a cull as to develop a marketable fruit. Most of the concentrated forms of food, are to be found within the core of the apple and the stone of the peach, especially in the seed. A defective specimen usually has just as large a core, with as many seeds as a good one. When such culls are permitted to come to maturity, then are harvested and discarded or sold with practically no profit to the grower, the vitality of the tree has been uselessly scattered or exhausted. Thus a heavy mortgage is put on the future crops of an orchard.

*W. H. Chandler. The Killing of Plant Tissue by Low Temperature. Missouri Agricultural Experiment Station Research Bulletin 8. Pages 277-278.

DOES THINNING SECURE MORE REGULAR BEARING?

Experimental evidence and the experience of fruit growers do not yet warrant a definite answer to this question. In general, the consensus of opinion seems to be that fruit thinning does not help very materially in altering the fruit bearing habit of a particular variety of apples or peaches. As will be explained further on in detail, the best time for thinning is after the last natural drop, the so-called "June drop," has occurred. But flower buds for next year's crop have already been initiated by this time. Hence no marked influence on flower bud formation can result from thinning and, therefore, it does not seem to have any direct effect on the future crop. It may be expected, however, that in the long run an orchard, the trees of which are thinned consistently, will be a more regular bearer. In fact, the consistent cropping of most deciduous fruits in the western states may be due in a large measure to systematic thinning. The biennial bearing habit of many varieties of fruits is far more pronounced east than west of the Rockies.

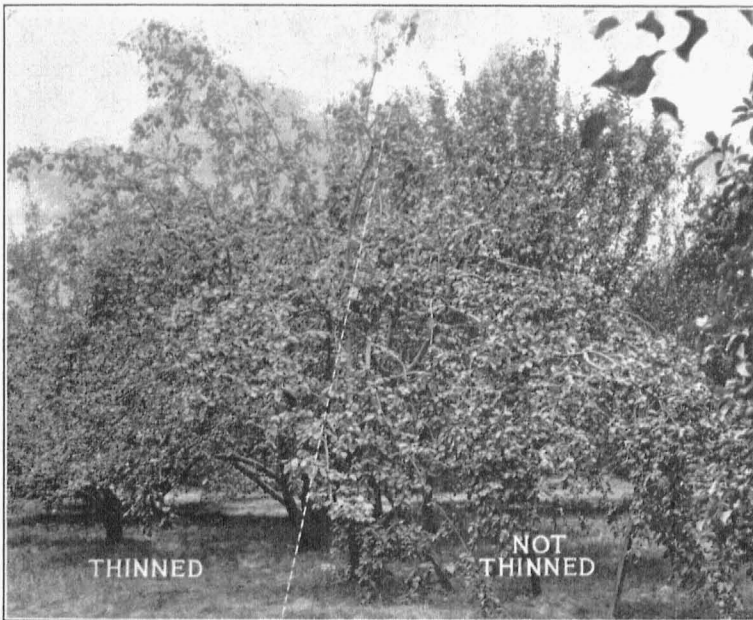


Fig. 5.—The left half of this Duchess tree was thinned, the right half was not thinned. Note drooping and breaking of branches on the unthinned side, in spite of propping.

TIME OF THINNING APPLES AND PEACHES

As a rule apples should be thinned as soon after the June drop as possible. The more promptly the work is done the better will be the results, since most of the elaborated food is transferred to the fruit rather early in the season. The June drop is the last natural thinning by the plant itself. Thereafter it is possible to tell how many fruit will stick and how much artificial thinning will be required. At the time when the work should be done, apples are usually about one inch in diameter—the size of walnuts.

Some early varieties such as Duchess, Wealthy, Yellow Transparent and others, may sometimes attain this size in May. Hence thinning of summer apples is done correspondingly earlier. In all instances one should be guided by size and the natural drop of the fruit.

Peaches, of course, must be thinned immediately after the late "May drop", or early June drop when the fruit is still small and the pits have not yet hardened. The hardening of the stones is a heavy drain on the vitality of the tree.

A word of caution should be added here. Not infrequently the last drop of peaches may be rather protracted. As a result the grower may think that the trees have an unusually heavy set of fruit and an extensive thinning will be required. But by the time the June drop is over the crop after all may be comparatively light. The trees should be examined and watched carefully.

HOW TO THIN—METHODS AND DISTANCE

Thinning of the apple, like that of the peach, is done much more conveniently by hand than by the use of any particular tool. The young apples can be easily broken off by pressing dexterously against the fruit stem and toward the spur. A little practice will guide one in adopting the best procedure. It is advisable to shake the branches beforehand. This will save labor, for many specimens that should have dropped naturally may still be hanging on.

In general the smaller the fruit a tree produces the more it should be thinned. The size of the fruit is a good index of the ability of the tree to carry a certain crop.

Naturally, in years of light crops and with some varieties, or trees which are inherently light bearers, very little or no thinning at all will be required. This is equally true of some branches on practically any variety that for one reason or another may have set sparsely. Such parts of a tree may not need any attention beyond the breaking up of occasional "doubles". Many summer apples, on the other hand, especially those bearing biennially, quite often set so heavily that thinning by necessity

must be very severe. If not thinned, some summer apples remain so small that they are almost worthless even for local trade.

As a rule not more than one apple should be left per spur and these fruits thinned 4 to 8 inches apart on the branches. Naturally all small and defective individuals are removed first. Figure 7 illustrates the proper spacing of fruit on a moderately thinned twig. If the tree is in a

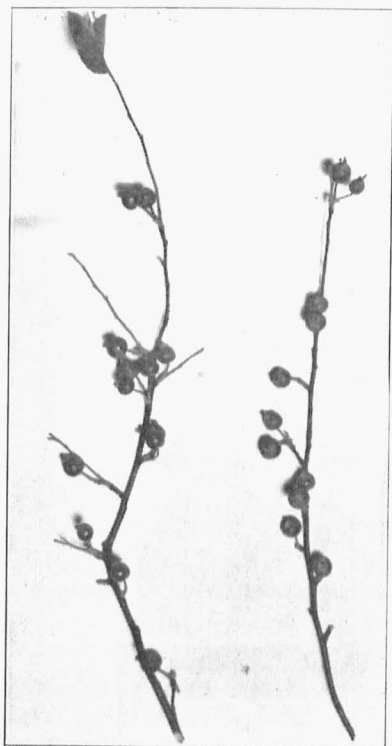


Fig. 6.—Typical branches of apples before thinning. The leaves have been removed. Compare with Fig. 7.

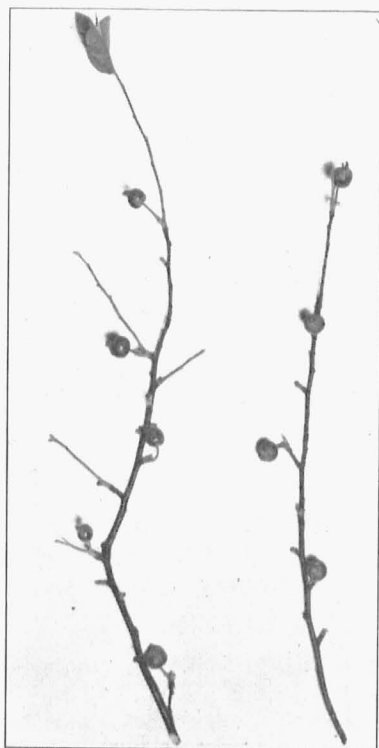


Fig. 7.—The same branches as in Fig. 6, after thinning.

vigorous condition, the crop comparatively light, and the set uneven, then, of course, it is permissible to leave some of the fruit closer together, even two specimens to the spur. Judgment must be used in this work, as in any other procedure.

In thinning peaches care should be exercised that all undersized, inferior and insect-injured specimens are removed. Those left should be thinned about 4 to 6 inches apart, depending on the condition of the twig or the tree. Many experienced peach growers of this state believe

that under no circumstances should more than two fruits per linear foot of branch be permitted to develop.

COST OF THINNING

Quite contrary to the opinion of many growers who have not practiced thinning of fruit, the undertaking is relatively inexpensive. When one deals with a considerable acreage, the work may appear formidable, but in practically all instances, it is a paying proposition. Records kept by the writer and others show that trees yielding 10 to 15 bushels of apples can be thinned properly at the cost of 30 to 45 cents per tree, or approximately 3 cents per harvested bushel. With the present scale of wages around 25 cents an hour, low-headed trees may be thinned for as little as 2 cents a bushel. Those of greater height will raise the cost to 4 cents. Light thinning, naturally, is less expensive.

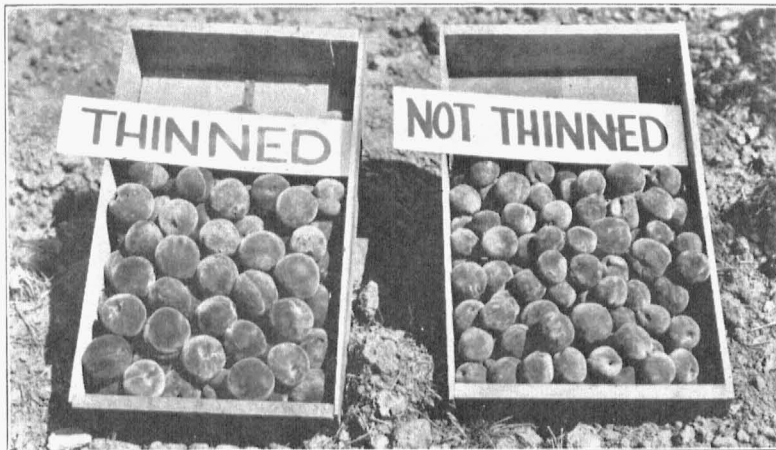


Fig. 8.—Peaches from thinned and not thinned trees of the same variety. Thinned fruit are larger and of more uniform size and color.

The cost of thinning peaches when the trees are young or headed low will be about the same as for apples. It will cost somewhat more to thin older trees. But unquestionably it pays to thin all overloaded trees at practically any reasonable expense. Of this one may be easily convinced by a single season's practice.

Though stated before, it must be emphasized once more here that it is not quite fair to charge all of the expense, if any, against the thinned tree. The fruit that is removed at time of thinning would have to be harvested anyway. Moreover, the cost of sorting and grading of a

crop from an unthinned orchard is far greater than from one that has been properly thinned.

SOME GENERAL REMARKS

It must be realized that fruit thinning is not a cure-all. The crop must be carefully grown before it is worth thinning. In fact it may not pay at all to thin neglected, unsprayed and devitalized trees, on which almost all of the fruit may be defective. Hence thinning will be remunerative in proportion to the grower's ability to raise high quality fruit and grading it properly before marketing. The conscientious orchardist, one who has attended carefully to all the essential orchard operations, cannot afford to neglect thinning, an undertaking that will put the finishing touches on his crop and insure a margin of profit.

Furthermore, the work must be done with reasonable care. Rough or slovenly practices will not produce the desired results. Quite to the contrary, much injury can be done to the trees by pulling off large numbers of spurs or by the breaking of branches. In this respect, however, the dangers are not nearly so great as equally careless work at the time of harvesting, particularly when pickers are paid by the bushel.

Acknowledgments are due to Mr. Patterson Bain, Jr., Manager of Riverview Orchards, McBaine, Missouri, and to Mr. Paul H. Shepard, Independence, Missouri, for cooperation in experimental work and for records.

OUTLINE OF PROCEDURE FOR THINNING APPLES

1. Use one or two varieties that are bearing heavily this year.
2. Select two rows or two blocks of trees of at least a dozen in each for thinning and an equal number of similar trees as a check. Tag all trees.
3. By hand remove the fruit, leaving only one apple per spur and these fruits 4 to 8 inches apart on the branches. Of course, the smaller, the injured and misformed specimens should be removed; the best ones left.

The fruit can be easily broken off by pressing dexterously against the fruit stem and toward the spur. A little practice will guide you to adopt the best procedure. It is advisable to shake the branches beforehand. This will save labor, for many specimens that should have dropped may still be hanging on.

4. The cost of labor for thinning should be kept separately for each variety and calculated on the basis of the average cost per tree.
5. At harvesting time the thinned and check lots must be picked separately. Expense of harvesting and grading and the comparative yield and quality (grade) of the fruit of the two lots will determine the value of thinning apples.
6. The following spring and summer the effects of thinning on the general vigor of the trees, the rate of shoot growth, flowering, etc. should be carefully noted.

In most instances thinning of apples has been found to increase not only the size and quality of the remaining fruit, but also to preserve the vitality of the tree. Fruiting is an exhaustive process.