GARDEN & ORCHARD.

Orchard Treatment in Summer.

No longer does the successful orchardist allow his fruit area to lie in grass from year to year, or even for three years out of four. Experience on individual farms, as well as at college and experiment stations, has shown that cultivation, for at least part of the season, is advisable.

In a bulletin recently prepared by Wm. Stuart, Horticulturist at Vermont Experiment Station, the various cultural systems in orchards are discussed. Figures are given to show the returns from an orchard in sod mulch, and one under the tillage and cover-crop system.

Seven methods of handling orchards are dealt with, as follows :

TILLAGE.

The tillage system, pure and simple, involves clean culture, and the maintenance of a dust mulch throughout the growing season. This method is advocated where the rainfall during the growing season is comparatively light, necessitating the conservation of all possible soil moisture, in order to insure a reasonably good tree-growth. In such localities, the humus content of the soil is maintained by applications of manure or straw.

TILLAGE WITH COVER CROPS.

The only difference between this system and the preceding one is that the dust mulch is maintained until about July 15th, and then seeded down with some cover crop, such as clover, vetch, oats, rye, buckwheat, etc. Several objects are thus accomplished. It serves to check too late growth of trees; the cover crop furnishes humus to the soil; and, if either clover or vetch is used, serves to increase its nitrogen content. The choice of cover crops should be determined by the appearance of the trees. If the leaves are light green, and the wood-growth is scant, a deficiency of nitrogen is indicated, and leguminous or nitrogen-gathering crops should be used. If the leaves are dark green, the foliage luxuriant, and the wood-growth ample, non-leguminous plants should be grown. To secure a maximum benefit, these crops should not be removed, but should remain as a winter protection, and be turned under early in the spring to supply humus.

TILLAGE WITH INTERCROPPING.

The system of tillage and intercropping is generally practiced in the orchard before the trees arrive at a profitable bearing age, and, after it has served its purpose, is usually succeeded by tillage and cover crops. The growing of companion crops or intercrops in the young orchard affords the orchardist an opportunity, by careful management, to make such crops pay for the care and management of the orchard during the period elapsing between the time of setting the trees and the age of their profitable bearing. The kinds of crops which may be grown in the young orchard are limited only by the climatic and soil conditions. Generally speaking, however, they should be restricted to hoed crops. Vegetables and small fruits are the most desirable. The writer prefers vegetables, because the orchardist can choose such crops as may be planted rather late and still mature a crop, thus permitting early and unrestricted cultivation of the soil for a short time before planting, thereby furnishing moisture and plant food to the tree when it is making its most vigorous leaf and wood growth. Such crops as late cabbage, squash, cucumbers, beans, tomatoes, etc., may be used to good advantage. Corn and potatoes may be grown, if not planted too close to the tree rows. Strawberries are preferred among fruits, followed by the bush fruits—currants, gooseberries, raspberries and blackberries. The objection to these crops is that their season of growth is practically identical with that of the apple tree, and that, unless, as has been said, they are planted at some distance from the rows, they are apt to deprive the young trees of needed moisture and plant food. The successful practice of the intercropping system is wholly dependent upon the intelligence displayed by the orchardist in furnishing a sufficient amount of plant food to meet the extra demand made upon the soil by both tree and companion crop, as well as upon the intelligent selection of intercrops, and the thorough cultivation of the soil to conserve moisture. For the past four seasons the writer has grown Hubbard squash upon certain portions of the young Station orchard. The squash is usually planted about June 17th to 20th, and, as yet, has not failed to mature a crop. This late planting permits of unrestricted cultivation of the orchard practically up to July 15th, or later, as desired, as the vines do not begin to run much before that date.

GRASS MULCH.

The grass-mulch system of apple orchard management consists in the maintenance of an ample mulch of grass, straw or other coarse material beneath, and extending out beyond the heads of the young trees. This mulch, as advocated by Messrs. Vergon, of Ohio, and Grant Hitchings, of New York, two of its foremost champions, should be of sufficient depth to prevent the growth of grass or weeds beneath it. The claims made for it are that it obviates the labor and expense of plowing and fitting the soil for the reception of the trees, and all the subsequent cost of these operations. The trees are simply set in holes in the sod, and are thereafter kept liberally mulched. The grass growing on the orchard area is at first quite ample for this purpose, being cut once or twice during the season, raked up and piled beneath the trees. Other adavntages claimed for this system are a slower, firmer wood growth, earlier formation of fruit spurs, and a more highly-colored, firmer-textured, better-flavored and longer-keeping fruitage. The main objection to the grass mulch is that the time finally arrives when the amount of mulch material produced in the orchard becomes insufficient, and when it becomes necessary to secure it elsewhere. In other words, as the trees increase in size, their demand for mulch increases, while the supply is continually decreasing. Eventually, therefore, the time arrives when the source of mulch supply must be located almost entirely outside the orchard. The question which will then confront the orchardist on land which can be tilled is as to whether mulch can be produced at less expense than a tillage and cover-crop system of management will cost.

Where the grass-mulch system, as thus outlined, is literally practiced from the time of planting, and where the orchard is located on a deep, rich, loam soil of a retentive character, good results may doubtless be secured. On rough, stony or hillside lands, where tillage is difficult or impossible the grass-mulch system may be recommended.

SOD MULCH.

The sod-mulch system differs from the grass-mulch system in degree and method of mulch. At present there seems to be more or less confusion in the interpretation of the two systems, some writers using the term sod mulch to designate what others term grass mulch. The writer conceives the term sod mulch to be properly applied to the practice of cutting the grass growing upon the orchard land once or twice during the season, and allowing it to remain where it falls. Such a system does not contemplate the bringing in of mulch material from other sources for the purpose of providing a more ample mulching of the ground beneath the trees. The two systems are quite different, and should give distinctly reverse results in orchard practice.

A ten-years' comparison of the merits of the sod-mulch and the tillage and cover-crop systems of orchard management was begun in Western New York in 1904, by the New York Station. No attempt was made to compare the grass-mulch system, and the results obtained have no bearing upon the merits or demerits thereof ; a statement which the comparison of terms just alluded to makes pertinent at this point.

The results obtained with two lots of mature trees favor tillage.

APPLE PRODUCTION : SOD MULCH VS. TILLAGE AND COVER CROP.

	118 Trees. Sod Mulch.	121 Trees. Tillage and Cover Crop.
1904	615.1 barrels	591.9 barrels
1905	233. barrels	278.9 barrels
1906	210.3 barrels	531.1 barrels
1907	275.3 barrels	424.3 barrels
1908	325.3 barrels	722.5 barrels
Total for 5 years	1659. barrels	2548.7 barrels
Acre av.	72.9 barrels	109.2 barrels

The tilled acre averaged 36.3 barrels more than did the sod-mulch area, a gain of 50 per cent. It took 131 apples grown on sod mulch to fill a barrel, while only 309 grown on the tilled area were needed. The one averaged 5.01 ounces in weight, the other 7.04 ounces. The tilled areas grew 9 per cent. more apples, in number, and they averaged to weigh 40 per cent. more.

It cost, on the average, for the five years, to handle the two plots : Sod mulch, $17.92 per acre ; tillage and cover crop, $21.47. This $6.55 extra cost, however, shrinks into nothingness in comparison with 36.3 barrels more fruit, and the better grade of the entire 109 barrels. The cost of orchard management was 27 cents per barrel on sod mulch, 24 cents on tilled and cover crop; in other words, it cost less per barrel to grow the better grade of fruit than it did to produce the poorer product.

The average growth of the branches were : Sod mulch, 3.1 inches; tillage and cover crop, 6.7 inches. The color and volume of the foliage notably favored the tillage and cover-crop system. The trend of the yields from 1904 to 1908 is downwards on the sod mulch, and upwards on the tilled areas.

GRASS REMOVAL.

This system is commonly called the " sod " or " sod-grass " method. The writer deems " grass removal " a more descriptive term, for it contemplates the entire removal of the hay crop. The owner hays the orchard, and if, perchance, the trees appropriate enough plant food to grow a crop of apples, it is so much gain. Such a procedure does not tend to grow vigorous, healthy, productive trees, and should be discarded. It has less merit than any system now in vogue, save, perhaps, that of intercropping with cereals for harvest.

SOD PASTURE.

The practice of pasturing the orchard, while not to be recommended, if one expects to secure maximum returns of fruit, may, under certain conditions, serve a useful purpose. In sections where the apple maggot or curculio is abundant, pasturing the orchard with hogs or sheep tends materially to lessen their ravages. Hogs and sheep injure the orchard less than do cattle or horses, as they do little browsing upon the tree and unfallen fruit, whereas the depredations of cows and horses are quite serious. As a general rule, however, orchard pasturing should be discouraged.

Profits from Spraying Potatoes.

The potato-spraying experiments of the New York State Experiment Station (Geneva) for 1907 and 1908 are summarized in a single " popular bulletin," No. 307-311, which is now being distributed. These two years were dry seasons, so that blight was almost wholly absent one year, and little in evidence the other, yet spraying was profitable both years in the experiments at the Station, in business experiments in which farmers co-operated with the Station, and in volunteer experiments reported by other potato-growers. The Station tests have been continued seven years, with an average gain, at Geneva, of 110 bushels to the acre from spraying every two weeks, and of 84 bushels from spraying three times during the season. On Long Island, the gains were 54 and 29½ bushels, respectively. Six years of farmers' business experiments, covering almost a thousand acres, have given an average gain of 43.8 bushels to the acre, and an average net profit of $17.94 an acre. On 1,700 acres sprayed during five years by farmers who have reported their results to the Station, the average gain has been 50½ bushels to the acre. Such results certainly prove spraying potatoes a most profitable practice. Those unfamiliar with the details of such work should send to Geneva for a free copy of the bulletin. Presumably, a limited number of copies would be available for Canadian applicants.

Essex Fruit Outlook—Other Crops.

Judged by the beautiful profusion of bloom and general condition in the famous South Essex fruit country, the prospects could not well be surpassed. This is especially true of the peach and cherry orchards, plums and pears not being so generally grown. If a fair proportion of the blossoms set and develop into fruit, it is expected by some peach-growers that severe thinning will have to be resorted to, if the standard of size and quality is to be maintained and excessive drain on the resources of the trees lessened. Since the killing frosts of two winters some years ago, which swept away tens of thousands of peach trees, confidence has been gradually restored. Replanting has steadily increased, and this is very noticeable the present season, not only in the districts adjacent to Lake Erie, but back through the county. The number and size of bales of nursery stock distributed at different railway points have been surprising. No doubt the returns obtainable from a good peach crop are handsome and tempting, but it is well to bear in mind, as leading growers point out, that the problem of distribution in limited time, with its attendant expenses and risks of glutted markets, is so serious as to suggest the wisdom of not overdoing the business, and of improving the means whereby such luscious fruit can safely reach the increasing numbers of people who want it. The apple orchards have blossomed magnificently. The returns from apple-growing have not been encouraging, but men of wide observation and experience, like Joseph L. Hilborn, of Leamington, forecast a brighter day ahead for this staple fruit, with improved orchard methods and a better system of marketing, in order that growers will receive better returns from their crops. In too many cases the tendency has been to let the orchard go by default, and not a few trees and portions of orchards have been cut away entirely. Where the trees are decayed or of undesirable varieties, this is regarded by many as the wisest course to pursue, but it should not mean the abandonment of orcharding where the apple can be so well grown and is so largely used. There is no fruit more wholesome, none that can be put to so many domestic uses, and none so readily kept in storage. But any one who has taken the trouble to observe carefully the scrawny and ill-assorted