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The Cherry Industry in the Lewiston Orchards With Cultural Recommendations

by

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SUMMARY

Lewiston has an average growing season of 200 days. The elevation varies from 1270 feet to 1700 feet in Lewiston Orchards. Blooming of cherries occurs about April 15 and harvesting about June 25.

The soil is classed as a Sagemoor silt loam. It is a dark soil underlaid by a light-colored calcareous hardpan of varying depth.

The three main varieties are Bing, 17,775 trees; Royal Ann, 11,115 trees; and Lambert, 7,367 trees. Approximately 50 per cent of the total, 42,744 trees, are now in bearing. In 1928 about 492 tons of cherries were canned in Lewiston. The total annual cherry production is about 42 cars.

The three main varieties are inter- and self-sterile, making pollinizers necessary. The useful varieties are Centennial, Black Republican, and Black Tartarian. Waterhouse is a good pollinizer but is undesirable for canning. Bees should be kept in the orchard during pollinization and may be rented for $2.50 per hive. Fifty per cent of the cherry trees are planted in square system. The border system is common also. Do not plant sweet cherry trees closer than 36 x 36 square, 40 x 40 hexagonal, or 45 x 45 quincunx. Peaches and apricots as fillers have not proven profitable.

The irrigation water is furnished through a system of pipes. One and one-half acre feet per year costs $12 per acre. An abundance of water is available to the 4,300 acres under irrigation. Unwise use of irrigation water will cause excessive winter injury and reduce the quality of the fruit. Withholding water brings the tree into earlier bearing.

Sweet cherry trees are pruned rather heavily up to four or five years of age. Very little pruning is done after the tree begins to bear. Proper shaping of the tree is the first consideration. Avoid bad crotches and tall narrow trees.

Intercrops are grown and are advisable if handled properly. More cover crops should be found in bearing orchards. Sweet clover is propably the most satisfactory cover crop to use.

Plowing, disking, and harrowing are necessary operations in the cherry orchard. Deep tillage will likely improve the condition of orchards having hardpan near the surface. Lime is not needed on Lewiston soils.

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INTRODUCTION

THE sweet cherry industry in Idaho has made rapid progress during the past few years and is now ranked as one of the leading horticultural industries of the state. Cherries are grown commercially in the Lewiston section, as well as at Moscow, Couer d'Alene, and Emmett. These sections have become famous for their cherries. In the development of this industry, the growers have been confronted with a number of problems. In order to help solve some of these, a study was made of the cherry orchards in the Lewiston district during the summer of 1928.

Fruit growing was started in this district with the development of the irrigation project in 1908. Within a few years the section became widely known. The fruit raised was mostly apples. A few cherry trees were planted at this time and when these began to bear, profits exceeded those from the apples. At present, the annual production of cherries is approximately 42 cars; new plantings and increased yields have necessitated facilities for handling cherries. Other horticultural crops are grown here, including apples, peaches, apricots, English walnuts, strawberries, brambles, early potatoes, and vegetables of all sorts.

In making this survey, personal interviews were had with the growers. Three hundred and thirty farms were visited. It is hoped that the data published in this bulletin along with recommendations will provide a basis for a more successful cherry-growing industry. The information presented should be of special interest to all cherry growers in the state.

Climate and Topography

A study of meteorological data will reveal the essential reasons why Lewiston has become one of the leading cherry-producing districts in the United States. From a summary of data at Lewiston for 28 years (1901-1928) it is found that the annual mean maximum temperature is 64.2, the annual mean

minimum temperature is 42.2, and the annual mean temperature is 53. The annual precipitation is 13.71 inches.

The average date of the last killing frost in the spring is April 7, while the average date of the first killing frost in the fall is October 23. In 1928 the dates were April 8 and October 12 respectively. There is an average growing season of 200 days which permits heavy-bearing trees ample time for growth and preparation for winter. The shortest season recorded was 172 days (1922) while the longest was 266 days (1904).

The elevation ranges from 1270 to 1700 feet. This difference affects blooming dates about four days. The average date of blooming falls between April 1 and April 28. In 1928 cherries were in full bloom about April 12, while in 1929, a late season, the trees did not bloom until April 28. Seasons vary considerably but as a general rule frost is not a limiting factor.

Harvesting dates fall between June 20 and July 10. Picking began June 18 and was practically finished by July 3 in 1928. Harvesting in 1929 was about 10 days later than in 1928.

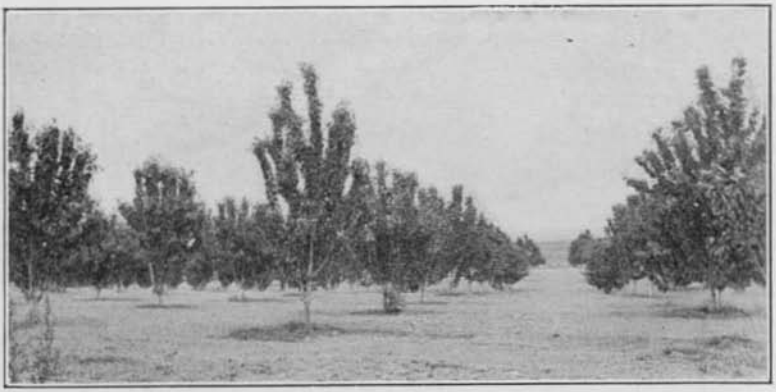

Fig. 1. Thrifty 5-year old cherry orchard. Trees planted 25 feet apart each way.

Soil

The soil found in the Lewiston Orchards is classified by the U. S. Soil Survey as a Sagemoor Silt Loam. In Table I. is shown the mechanical analyses of this type of soil. (1)

(1) Agee, I. H., and Petersen, P. P. — Soil Survey of Nez Perce and Lewis Counties. U. S. D. A., Bureau of Soils in Cooperation with University of Idaho Agricultural Experiment Station, 1920.

TABLE I.

Mechanical Analyses of Sagemoor Silt Loam

Description	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Soil	0.2	0.4	0.4	4.7	32.9	61.2	0.6
Sub-Soil	.0	.2	1.0	5.7	34.4	50.5	8.2
Lower Sub-Soil	.1	.5	.5	5.6	38.1	39.3	15.7

Over much of the area in the orchards this soil is underlaid at depths varying from 10 to 30 inches, by a hard calcarious zone impervious to water. This condition has given rise to abnormal tree growth and at present is one of the chief concerns of some of the growers. It is especially pertinent to the problem of irrigation.

Varieties, Numbers of Trees and Ages

In keeping with the practices of other specialized sections, Lewiston voluntarily planted but few cherry varieties, including only those best adapted for existing conditions.

The Bing is the most important variety grown in Lewiston and fills a peculiar commercial requirement. The fruit is solid and withstands shipping remarkably well, hence it is deserving of first place as a commercial variety.

The Royal Ann (Napoleon) is considered second of importance because of its present place and its probable future in the section. This variety is not grown for shipping but the entire crop is canned in Lewiston. Contracts are let for Royal Ann cherries at a price of seven cents a pound. Since there are no packing charges and lug boxes are furnished by the canning company, this price is more desirable than the uncertainty of selling cherries in distant markets. There is less risk and generally higher returns. These factors and possibly others, among which are the marketing problems, have resulted in increased planting of Royal Anns.

The data in Table II show the extent and importance of the cherry canning industry at Lewiston.

TABLE II.

Cherry Canning Industry at Lewiston

1925	All Sections	50,000 Pounds
1926	All Sections	150.000 "
1927	No Crop	.....
1928	Lewiston	337,888 Pounds
	Clarkston	442,497 "
	Lower Snake River	122,436 "
	Kendrick and Juliaetta	48,920 "
	Moscow	20,435 "
1928	Sour Cherries—All Sections	11,528 "

The figures represent Royal Ann variety mainly except in the case of sour cherries. The data for 1925 to 1927 inclusive are for all sections listed in 1928 since cherries from all the sections are canned at Lewiston. It is highly significant that production has increased so rapidly.

TABLE III.

Estimated Yields of Royal Ann Trees

Year	Age	Pounds Per Tree	Year	Age	Pounds Per Tree
1928	5	5	1937	14	135
1929	6	10	1938	15	150
1930	7	25	1939	16	160
1931	8	40	1940	17	170
1932	9	60	1941	18	180
1933	10	75	1942	19	190
1934	11	90	1943	20 & over	200—300
1935	12	105			
1936	13	120			

Data presented in Table III, showing estimated yields for Royal Ann cherry trees, were given by a representative of the Lewiston Canning Co. It will be found that the Black cherries will bear slightly heavier per tree than the Royal Anns. If there are no further plantings the production of Royal Anns by 1938 will be, on a conservative basis, 1,667,250 pounds from Lewiston alone. This is considering the data in Table IV and estimated yields.

TABLE IV.

Number of Cherry Trees in Lewiston Orchards

	Bearing	% of Var.	% of Total	Non-Bearing	% of Var.	% of Total	Total No.	% Total
Bing (1)	9,781	56.0	22.8	7,686	44.	18.	17,775	41.5
Royal Ann (1)	5,126	47.	12.	5,681	53.	13.3	11,115	25.0
Lambert (1)	3,734	53.	8.7	3,325	47.	7.7	7,367	17.2
Pie	238	49.	.5	250	51.	.6	488	1.1
All other varieties and unknown	2,459	41.	5.8	3,540	59.	8.2	5,999	14.0
Total	21,338		50.	20,482		48.	42,744	100

(1) 308 trees of each of the three main varieties are of unknown age. However, they are included in the total.

It is reasonable to suppose that increase in production will be corresponding in other sections near Lewiston, making improved facilities in canning imperative.

The chief culling factors identified by the cannery in order of importance are:

1. Limb rub, which is a darkening and russeting of the skin, making the fruit unsightly.
2. Stem tears, which result from careless picking.
3. Size. This is an important consideration, since nine sizes are provided in the grades recognized by the cannery.

In connection with canning cherries it is of interest to note the data of 1928 for percentage of sugar found in the three main varieties. Tests were made during the picking season, with a Balling hydrometer:

Bings	19 - 22 per cent
Royal Anns	17 - 20 per cent
Lamberts	15.5 - 19 per cent

Lambert, the third variety at Lewiston, represents a valuable fruit for shipping to distant markets. Plantings have not equaled Bing and propably never will. The Lambert is packed and shipped the same as the Bing.

Varieties found in the district in order of importance are:

1. Bing
2. Royal Ann
3. Lambert
4. Oregon Black
5. Black Republican
6. Black Tartarian
7. Montmorency
8. Centennial
9. May Duke
10. Late Duke
11. Early Richmond
12. Seedlings
13. Waterhouse
14. Oxheart
15. Gov. Wood
16. Eng. Morello
17. Hoskins
18. Olivet
19. Carnation
20. Pease

Due to the influence of the cannery, it appears that Centennial and Montmorency will find a higher place in the list.

In Table IV are presented data of value in arriving at the figures for future cherry production in Lewiston. Bing plantings constitute 41.5 per cent of the total cherry population and but slightly more than half of these are in bearing. But the most significant fact is that of the whole population only 50 per cent of the trees are bearing, 48 per cent non-bearing, 2 per cent unknown.

The basis upon which the trees were divided was the age of eight years. Ordinarily an orchard of this age will yield commercially, and considering the exceptions on both sides, the average seems reasonable. Only half the trees in Lewiston are in production and may of these are under 12 years of age. Thus production should more than double with no further plantings.

Planting Systems

Recently the value of proper planting systems and spacings has been recognized at Lewiston and new orchards are being planted with the essential points considered. Table V shows the per cent of trees in Lewiston planted by the most common methods.

TABLE V.

Planting Systems

System	Per Cent
Square	50
Border	28
Diagonal	14
Quincunx	2.2
Unknown	5.8

In most commercial plantings the square system is used. It permits of easy cultivation, spraying, and other field operations. But in the Lewiston district, conditions are such that border planting is very common, miles and miles of streets being bordered by single rows of cherry trees. Often a single row will be planted entirely around a 2.5 or 5-acre plot.

Possibly the greatest mistake in orchard planting in Lewiston is too close spacing of the trees. Many are planted 30 x 30 and closer. One orchard of 5,000 trees is laid out 25 x 25 on the diagonal or hexagonal plan. In 15 years the trees will be crowded, become ill-shaped and air circulation will be poor. Even in orchards 40 x 40 quincunx at 20 years the trees are

too thick, the lower and center branches dying from light and food starvation. Such a condition materially lowers the bearing surface of trees. Too close planting will result in misshapen, "long-legged" trees that grow tall instead of spreading. Each year dead limbs are far too numerous and early death of the tree results.

Some growers plant the trees close, planning to remove some when they become crowded. The trees are never taken out until they die for the grower is waiting for that "one more crop." The numerous examples of tree crowding should impress upon the growers the importance of proper spacing.

Fig. 2. A three-year old cherry orchard intercropped with strawberries. Note severe topping of trees.

As a recommendation, cherry trees in the Lewiston district should not be planted closer than 36 x 36 square, 40 x 40 or 36 x 36 hexagonal, and 45 x 45 quincunx. These plantings will permit 32 to 39 trees per acre. Some growers prefer 40 x 40 square, giving 27 trees per acre. 40 x 40 hexagonal is probably the best spacing.

Where trees are planted so far apart it is permissible, in fact desirable, to intercrop with an early maturing crop, or plant with peach or apricot fillers, taking them out after 10 or 12 years. This is practiced quite generally in Lewiston. Brambles and bush fruits and strawberries make desirable intercrops.

Pollination

It is only in relatively recent years that pollination of cherries has been given much attention, although this subject is one of the most important in successful cherry production. One may be able to grow wellshaped trees and bring them into heavy bloom but if the blossoms are unfertilized there will be no crop. It is a subject, too, that must be worked out for almost every district and requires accurate experimentation. Many other conditions enter in and tend to mask condition. Most of the growers expressed the belief that pollinators are needed.

Table VI shows that the Bing, Royal Ann, and Lambert may all be pollinated by Black Tartarian, Black Republican, Centennial, and Long Stemmed Waterhouse, but are both inter- and self-stirile. Many of the growers, when first establishing an orchard, were advised to plant Long Stemmed Waterhouse as a pollinator. Since the fruit makes a poor canned product because the pulp and seeds separate. the practice has been discontinued. Within the last two years steps have been taken to top-work the Waterhouse trees to other varieties. One orchard has 500 such trees.

TABLE VI.

Sweet Cherry Pollinators (1)

Female	Bing	Black Republican	Black Tartarian	Centennial	Lambert	Royal Ann	Long Stemmed Waterhouse
Bing	O	X	X	X	O	O	X
Lambert	O	X	X	X	O	O	X
Royal Ann	O	X	X	X	O	O	X

X—Successful Cross.
O—Unsuccessful Cross.

The Centennial variety, a seedling of Royal Ann, has come into prominence both as a commercial cherry and as a valuable pollinator. The fruit is very similar to the Royal Ann.

Black Republican and Black Tartarian are both effective pollinators and may be handled in shipping although inferior to the Bing and Lambert. Lewiston Orchards contain several hundred seedling cherries and unknown varieties scattered promiscuously about the tract. No doubt these account for a great deal of pollination that less observing growers do not recognize. Quite often specific examples are given of trees

(1) Table VI is a summary of Table II. Lagasse, F. S. — Proper Pollination of Fruit Blossoms. Bulletin No. 15, 1928, University of Deleware.

close to pollinators which yearly set heavy crops while those farther in the solid block fail to set properly.

For old established orchards which require additional pollinators it is recommended that the trees be top-worked to desirable varieties. For border plantings and for replants it is well to plant effective pollinators. Several of the better informed growers are specifically arranging for pollinators by planting, on an average, a ratio of about one to nine or ten. Recognizing the value of bees as an aid to pollination most of the larger growers rent bees and place in their orchards during the critical period. The rental is $2.50 per hive, with one hive to approximately 1 acre.

A few growers pollinate small areas by using branches of certain varieties usually Black Tartarian or Black Republican and brushing them over the limbs to be fertilized. Others tie bunches of limbs in the top of the trees to be pollinated. These methods are slow, uncertain, and costly.

Another factor, perhaps the limiting factor in pollination, is the character of the weather during the critical period. Windy, cloudy days prevent bees from working; besides cold weather will reduce the vitality of the pollen. Bees fly against the wind when leaving the hive in search of honey and return with the wind. The prevailing direction of the wind, then, will be a factor in placing the hives.

Irrigation

Irrigation in the district usually starts about the middle of April, with the regular season May 1, when the meters are connected. In most years irrigation is finished the early part of October. For cherries in solid blocks and not intercropped, three to six irrigations of 24 hours each are given. Often two before and two after picking fill out the season. The water is applied by the furrow system, usually two to three furrows three or four inches deep on each side of the tree row. A great variation was found in the length of run in different orchards. In long runs the upper portion becomes heavily soaked while the trees in the lower end barely get enough. It is advisable to limit the rows to 300 feet. Another point to consider is that a small stream in the furrow will be more efficient than a larger stream carrying sediment and washing the soil. Fig. 4 shows a view of common irrigation practices.

From the data secured in the survey it is seen that about one-third of the growers watered heavily and about one-third lightly with one-third giving no conclusive data.

Fig. 3 General View of Irrigation Practices in an 11-year old orchard. The Weirs, however, are for Experimental Purposes.

Irrigation should be considered relative to the following four points:

Winter Injury In rapidly growing young trees, late irrigation is dangerous. That is, if a tree goes into the winter with tender, succulent growth it will be very apt to winter-kill. Trees entering the winter in a very dry condition are as liable to winter-kill as those too heavily watered. One of the larger successful growers firmly believes in late dormant irrigation in dry seasons. For both young and old trees winter injury is no doubt the most important factor with which the Lewiston cherry orchardist has to contend. Since irrigation has such a direct influence the points discussed should be carefully considered.

Sloughing A great many of the growers feel that irrigation before or while the trees are in blossom will result in excessive sloughing. They withhold water until the set is determined. In a trial during the 1929 season no apparent difference was noticed in two test plots. The writer feels that the pre-blooming irrigation, if the soil is below normal in moisture, is really desirable and should be practiced. Sloughing as noticed by some men is probably due to other factors than the irrigation.

Quality of Crop In vegetable gardening, excessive irrigation will prove detrimental to the quality of the crop. It will cause growth cracks and too high water content. Growers and packers have traced low quality cherries to orchards that have been too heavily irrigated. Such fruit is watery, spongy, and will not stand shipping. They sacrifice quality for size and yield. It is, however, generally conceded that a small amount of irrigation will result in fruit of higher sugar content. But here size is reduced. Considering the ap-

parent effects of differing amounts of irrigation on the quality of the fruit this factor is one of importance to Lewiston growers.

Age of Bearing To a certain degree, irrigation will determine the age of bearing in cherry trees. One outstanding example of this effect was shown in 1928. A five-year old orchard of large trees was given no irrigation until very late in the growing season. The dry season and lack of water forced the trees into heavy fruit bud formation showing up in a heavy set in 1929. After a tree has reached a desirable size withholding irrigation water will tend to bring it into profitable bearing. This is a factor that may well be used if caution is taken not to overwork the young trees.

Pruning Sweet Cherries

There is perhaps no other orchard operation in which growers differ so much as that of pruning. Data on this point was very difficult to get and did not prove very conclusive.

Fig. 4. 11-year old cherry orchard in full bloom. This five-acre orchard yielded 18 tons of cherries in 1928. These trees are almost the ideal shape due to careful pruning.

What data were secured indicated that there are two distinct systems of pruning: (1) The trees are pruned up to four to five years and then let entirely alone. (2) Trees are pruned heavily up to bearing and then thinned and topped each year. Of course there are modifications and variations.

Following is a description of the best method of pruning cherries under Lewiston conditions; information secured from

the growers, observations and studies of experiments in Lewiston.

Shaping the tree is the first and most important factor. When the nursery tree is first set out it is merely a switch with numerous buds placed along its length. The first thing is to cut the switch to 24 to 30 inches. As the buds and shoots develop, several desirable ones should be left for scaffold limbs. This may be done during the summer or at pruning time the following spring. Each spring the undesirable shoots are removed and the terminals cut back, the amount depending on the growth. Some orchards four to five years old have been headed so severely that at least two years have been lost. Besides the trees are forced to vegetative growth and the shape is not so desirable. Low headed trees are a rule bear earlier than high headed trees. Fig. 4 illustrates well-shaped trees with branches arising at good spacing distances. The trees are spreading and carry immense bearing surfaces for 11-year old trees.

After about four years of age the trees should be thinned and only a small amount cut back. By six and seven years of age the trees will begin bearing. After this time, only dead and diseased wood should be removed. Limbs that rub and interfere with cultural operations should also be taken out. Large limbs should not be cut unless absolutely necessary due to the shock to the tree and the very slow healing. When the trees are about 10 or 12 years old the very tall-growing trees should be topped. This is done generally during picking. The long-arm system employed in California is not adapted to the Lewiston conditions. Care must be used to keep as much bearing surface as possible and by thinning out prevent the inside limbs from dying, due to light and food starvation. A wide-spreading tree is far more desirable than the tall long-legged type. In fact, one cent a pound bonus is often necessary to get the tall trees picked. Pruning is directly correlated with fruit setting since fruit is borne on old wood mostly with a large cluster near the end of the

Fig. 5. An 11-year old tree showing poor crotch formation coupled with winter injury. Note the dead wood in the center surrounded by only a band of live wood.

two-year old growth. Thinning out will also increase the size and color of the fruit. Fig. 5 shows the effect of poor crotch formation coupled with winter injury. These trees may be saved, before splitting occurs, by crotch-bracing with wires and lag screens or wooden plates. The best method, however, is to eliminate the danger by careful shaping of the tree from planting time. Planting systems and spacing combine with pruning in determining the shape of the trees.

Tillage

Cherry orchards should be cultivated. During their early period the tillage given the inter-crops will also aid the young trees. Some growers consider it a mistake to plow in a cherry orchard, but with reasonable depth to the soil the trees will normally develop deep root systems. Of course this in turn depends upon irrigation. Cherry orchards should be plowed deeply every one to three years, a practice which will tend to keep the roots down in the sub-soil, and will also conserve water. In an orchard with trees planted 40 x 40 quincunx numerous roots can be found wherever a digging is made, most being found between the second and third feet in depth.

Tools used most commonly are the disc, the harrow, horse cultivator, and plow. In practically all orchards the disc is the usual tool for cultivation. Ordinarily the first tillage is given in the early spring and in clean cultivation at intervals throughout the summer. A great deal of the cultivation is done by custom. Tractor owners charge about $1.50 per acre for double discing or plowing. Most of the tools are power-drawn as few growers keep horses.

Cherry orchards should be tilled, including plowing and discing but these operation will be determined considerably by cover crops and irrigation.

Cover Crops—Inter-Crops—Fertilizers

In reports from 293 farms, 71 per cent grew either cover crops or inter-crops and 28 per cent practiced clean cultivation. The greater proportion had their orchards planted to strawberries, lettuce, cabbage, brambles, potatoes, spinach, asparagus, tomatoes, or other garden truck. Although the per cent growing strictly cover crops was not compiled, it would approximate 25 per cent of the total—a figure far too small for that district. As mentioned before, inter-crops that do not require late heavy irrigation may well be grown in order to cut the overhead in growing the cherry orchard. If

properly handled, intercropping is advisable up to bearing age of the orchard, but no longer. In no case should a bearing orchard be intercropped; but cover crops should be grown. When a piece of ground is left bare during the hottest months of the year this organic matter will actually be burned out, reducing the plant food available, moisture-holding capacity, and placing the soil in poor tilth. Nature provides a covering for the ground and we should make no exception of the cherry orchard. A great many growers utilize the weeds and brome grass that grow naturally. This is plowed or disked under in the fall or spring and is far better than clean cultivation since all that is lost is the water.

In most sections of the district, however, it is desirable to grow a deep-rooted cover crop such as alfalfa, discing the growth under each fall. Red clover should be used more than it is. Some growers object to alfalfa because it protects gophers which injure and kill some of the trees. This, however, need not limit its use.

For all purposes a light stand of white or yellow sweet clover will be most satisfactory. A medium growth will cover the ground the first summer and the second year it may be cut at two feet and left on the ground. Late in the fall this is disked or plowed under. Peas, vetch, or even grain crops are better than nothing. On bearing cherry orchards in Lewiston, cover crops in a definite rotation should be grown more extensively.

From about 1920 to 1927 nearly every piece of ground now in orchard was planted to head lettuce. This required very heavy fertilization consisting of great quantities of barnyard manure and commercial fertilizer. Market conditions since 1927 have reduced the lettuce acreage to practically nothing. The point, however, is that during 1920 to 1928 nearly half the cherries in the district were planted on this highly fertilized soil. The trees have made wonderful growth.

In the survey it was found that few growers were fertilizing their orchards directly. Some were using large quantities on the intercrops. Forty-two per cent of the growers fertilized their orchards with barnyard manure.

Diseases

Lewiston is remarkably free from cherry diseases. California peach blight is found in the Lewiston section but only occasionally does it cause much damage to cherries. Reports of American brown-rot on cherries have been received from

fruit shipped east. Since no indications of the disease have been found in Lewiston it is supposed that the fruit became contaminated during shipment.

So far as is known there is no bacterial gummosis of cherry in Lewiston.

The most serious non-parasitic disease of cherries in Lewiston is winter-killing or winter injury. During the fall of 1924 unseasonably high temperatures prevailed until into November. Within a few hours the temperature dropped far below normal, causing a great amount of winter injury, even killing the peach trees. Fig. 6 shows a tree that blew down in 1928. Careful examination reveals about an inch of live, healthy wood near the outer portion of the tree while the center is dead and pulpy. Nearly all the old trees show the effects of this freeze and another which occurred in 1919. During the winter of 1928 a temperature of 15° below was recorded. Many of the trees split from the crotch clear to the ground and some branch killing occurred. Buds are rarely killed outright during the winter. Partial prevention of winter injury is effected by proper irrigation and cultural methods.

Limb rub has been mentioned in regard to cannery grades. It is one of the greatest culling factors and should be reduced if possible.

During some years serious losses, from 10 to 75 per cent, occur from the cracking of the fruit. Indications are that rain during the critical period of ripening is the chief factor. This is probably the second important factor tending towards limiting cherry production at Lewiston.

Insect Pests

The cherry orchardists in Lewiston so far have had relatively little difficulty with insect pests. The following are the most important:

San Jose Scale This pest causes some damage in connection with winter injury. That is, the insect reduces the vitality of the infested limb and during the winter it is killed. Ordinarily the insect attacks only the tree parts, not the fruit.

Black Cherry Aphid This insect curls terminal foliage and prevents growth of the young shoots. It is of most danger on young trees.

Cherry Maggot or Cherry Fruit Fly The larvae of the fly feeds inside the ripe, or ripening fruit.

Pear Slug It is a sticky dark-green larvae causing the leaves to become skeletonized, brown and crisp.

Red Spiders These creatures feed on leaves causing them to turn yellow and fall.

Control measures for these diseases and insect pests are found in Idaho Recommendation Chart for Plant Diseases and Insect Control, University of Idaho Agricultural Experiment Station Bulletin 159, 1928.

Harvesting, Packing and Shipping

The harvesting season in Lewiston cherry orchards varies from the middle of June to the middle of July. Picking is all done by hand, mostly with transient labor. Often there are cases in which the same pickers will return year after year to pick for the same grower. Children, women, and elderly people can be found picking cherries throughout the season. Usually, however, experienced men pickers are preferred.

Growers should discourage pickers from climbing the trees since the spurs are broken off and never replaced. This important factor is eliminated if fruit is picked only from ladders.

The Royal Anns are usually harvested first. They are handled in 40-pound lug boxes and trucked to the cannery at Lewiston. Bings are handled in 40-pound regular apple boxes with handles for convenience. They are trucked immediately to the packing houses, sorted and loaded as soon as possible. Lamberts are picked after the Bings and are handled in the same manner.

Fig. 6. Branch from 20-year old Lambert Tree. 217 Cherries in 1 foot, wt. 3 pounds.

During the 1928 season picking prices were 1½c per pound, with 2½c for very tall, difficult trees. Probably the average daily work would amount to 250 to 350 pounds, with a few pickers up to 500, and occasionally 600 to 750 pounds a day under good conditions.

Young trees about nine to ten years old will often yield 150 to 250 pounds per tree while some of the older trees will often yield 500 to 800 pounds. One can easily see the importance of large spreading well-shaped trees to carry such loads as these. In 1928 a well-kept 10-year old orchard of 5 acres, trees 40 x 40 quincunx, yielded 18 tons of cherries.

Cherries for shipment are picked and hauled directly to the packing house where they are run over belt conveyors and graded by girls who pick out the culls. Small flat boxes holding 15 pounds net are used as shipping containers. Inspection service is furnished at the packing houses and also after the cars are loaded. Fruit picked in the Orchards is trucked to Lewiston and loaded in refrigerator cars. It takes 8 to 12 days for shipments to reach the eastern markets. A new cold storage plant began operation in 1929 which provides for precooling and packing cherries at 40° F.

The Lewiston Orchards' Cherry Growers' Association has done a great deal to promote efficient handling and marketing of the cherries. Prices received through the Association have been above those paid by cash buyers while quality of fruit shipped has been rigidly maintained.