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UNIVERSITY OF ILLINOIS.
Agricultural Experiment Station.

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BULLETIN NO. 30.

Blackberries and Raspberries, Variety Tests, and Management.

Experiment No. 43. Blackberries, Test of Varieties.

The first of the blackberries—Snyder, Erie, Early king, Missouri mammoth, Wilson's early, Wilson Jr., and Minnewaska—were planted in the spring of 1889. Of the others described in this bulletin—Wachusett thornless, Early cluster, and Freed, were planted in 1891, and the rest in 1892. The varieties are each in a single row, and, where enough plants were obtained, the row is four rods long, 25 plants being set in the four rods. Those planted in 1892 have not been out long enough to form an accurate estimate of them.

Part of the land is low and apparently of a character not suited to the blackberry. The test on that account is not so reliable as it would otherwise be. The land is well drained with tile, so that the lowest ground is the first that is fit for cultivation in spring. The surface, on exposure to the weather during winter, becomes finely pulverized and looks almost like ashes. If this land is turned up to a depth of eight inches, a gummy soil is thrown on top that breaks into larger or smaller angular lumps that become very hard on drying and will rattle almost like gravel when struck with a hoe, and it retains that character all summer. By the next spring it is in the condition that the previous surface soil was, and what was surface soil has again taken on the gummy and semi-crystalline nature of the subsoil. The plants on this lower ground have not grown so well as on higher land of a different character, and the fruit has dried up much worse during the drouths of summer. The Snyders during the severe drouth of last summer were not near so

large, juicy; or so good in quality on this low land as they were on higher ground not more than twenty rods away. Under otherwise the same conditions 78 of the berries grown on the higher ground weighed as much as 100 of those grown on the low ground. The Snyders are on the lowest ground and seem to have been most affected. All those planted the first season would undoubtedly be better if on a different soil.

There is no record of the land having been manured. It had been in meadow and pasture for several years previous to 1888. It was broken up in the spring of that year and allowed to lie idle until planted to blackberries and raspberries in 1889.

The blackberries have never had any mulch, manure, or winter protection. They have had thorough level cultivation from early spring until the latter part of summer. The plants have been kept closely confined to the rows, but have not been thinned much in the row, probably not so much as would have been best for the production of good fruit. The new shoots have been pinched back when about $2\frac{1}{2}$ feet high and have had no further pinching or pruning until the following spring, when the branches or laterals thrown out after pinching have been cut back to from one to two feet in length. This is a method of thinning the fruit on plants that are liable to overbear. Some varieties, as the Snyder and Minnewaska, will frequently bear more fruit, with even that amount of cutting back, than they can ripen well, while some of the other varieties could ripen more fruit than they would set, even if they were not cut back at all.

There is a natural difference in the hardiness of the varieties of blackberry. In those tested, Snyder and Minnewaska have seemed most hardy, and Early harvest and Crystal white least. The condition of health of the plant will, without doubt, make a difference in its ability to withstand cold as well as other unfavorable conditions. The Wilson's early, Wilson Jr., and Erie have so far been most subject to disease.

DESCRIPTIONS OF VARIETIES.

SNYDER.—Plant, a very strong, upright grower, not branching unless tipped, stiff; spines, straight, stiff, not numerous; very hardy. Leaf and stem comparatively free from disease. The young shoot usually comes from the side of the old cane, and so is very liable to break down with the load of fruit, unless the row is somewhat ridged. Berry, large, oblong, glossy; grain, large; seed, very large and firm. The berry colors two or three days before it is at its best for use, and is usually picked about as soon as well colored. It is then sour, has a hard core, and has not attained nearly its full size. When fully grown and ripe the berry is sweet, rich, and has entirely lost the hard core which it had only two days before. Cluster, large and rather open.

The Snyder is grown more largely than any other variety, and is deservedly popular as a market variety in the same sense that the Ben Davis apple is popular. It is a regular and very heavy bearer. The fruit has seemed more liable to dry up on the bush than that of other varieties, perhaps because of the heavy bearing.

The Snyder is a variable variety, but whether from bud variation or from seedling plants that come up along the rows, it is impossible to say. For the past two years we have allowed all seedlings that appeared in the rows to live as long as they would, but both years all were dead before the middle of the summer. This, however, does not prove that numerous seedlings have not grown. Some difference has been found in the appearance of the fruit, but little or none in the quality; and there has been frequently a difference of two or three days, in one instance as much as a week's difference, in the time of ripening.

MINNEWASKA.—This variety has been obtained from two sources under the name of "Ancient Britton." The plant is a good grower, erect, branching, strong; stems, stiff, sharply angled, and very thickly covered with long, straight spines. It has so far seemed perfectly hardy; leaf and stem, free from disease. The cluster of fruit is long, compact, and very full; 25 to 30 berries in each. Berry, large, long, dull in color, with the pistils adhering and giving the fruit a hairy appearance; somewhat sour, and of inferior quality; core, rather firm; seed, large. Its season is two or three days later than Snyder. This has been the most productive variety grown so far. The weight of the fruit frequently makes the plant hang down to the ground. It does not suffer so much from drouth as the Snyder, and would seem to be a valuable variety for market, as it would carry well, and but little attention is usually paid to anything more than the fact that it is a blackberry in good shape.

ERIE.—The plant is one of the most vigorous growers; cane, upright until it reaches a height of two or three feet, then growing over sideways, not very strong; spine, large and stiff. More subject to disease than the Snyder. Cane somewhat subject to anthracnose, and the lower leaves liable to be attacked by a brown rust (*Septoria rubi*), commonly called spot disease, that causes them to fall early in the season. Cluster, of medium size, 8 to 10 berries. Berry, large to very large, smooth, glossy, of good quality; grain, very large; seed, large and firm; core, soft when fully ripe. A large part of the blossoms fail to set any fruit, and many of the berries are very imperfect. The variety is not so hardy as Snyder; its season is 3 to 4 days later, and it is a comparatively shy bearer as grown here, yielding but about one-third as much as the Snyder or Minnewaska.

WILSON JR., AND WILSON'S EARLY.—As grown here there has not been enough difference in these two varieties to separate them.

The plant has been a good grower, with drooping stem and numerous small, recurved spines. The stem is very subject to anthracnose; and the leaves to the spot disease, which takes them off below before the fruit has begun to ripen. The plants winter-kill and would need protection here during cold winters. Most of the fruit is borne on shoots which come from the ground the same year. Not more than one-half the blossoms set any fruit, and most of that is very imperfect. The perfect berries on shoots from the ground are of largest size; the others, only medium. From our experience this variety is entirely unworthy of further attention here, though very flattering reports are heard from it in other places. Plants bought for "Stone's hardy," have proved to be the same as these.

MISSOURI MAMMOTH.—Plant, a moderate grower, nearly free from disease, upright; spine, medium size, recurved. Fruit, cluster of medium size, with 8 to 10 berries. Blossoms do not all set fruit, and some of the berries are imperfect. Berry, large, oval, fair in quality; grain and seed, large; core, soft when fully ripe. Its season is three to four days after Snyder, and it is a comparatively shy bearer. It has not proved entirely hardy and could not be recommended.

WACHUSETT THORNLESS.—The plant is a slow grower; stem grows upright at first but soon becomes drooping; spines, few and small. The stem is very subject to anthracnose, and is somewhat liable to winter-kill. The leaf is subject to the brown rust. The clusters of fruit are few and small, six to ten berries in each. Berry, small, round, not well filled, of very good quality; seed, large. Season, about

one week later than Snyder. This is the poorest bearer among the blackberries and not worthy of a place anywhere.

LOVETT'S.—The cane is strong, upright, but slightly angled, dark purple, very free from disease; spines, few and small; leaf, comparatively healthy. The fruit cluster is small, 8 to 10 berries, compact. Berry, rather small, round, well filled, with little core; quality, very good to best. The seed is large and very firm. It seems to be a very shy bearer, but has borne one crop of fruit only and may improve with age as some varieties seem to do. From present experience it could not be recommended.

KITTATINNY.—Plant, an upright, rather strong grower; stem somewhat subject to anthracnose, has the reputation also of not being entirely hardy, and of being subject to the red rust, though it has not shown the latter disease here. The fruit cluster is large and open. Berry, large, oblong, glossy; no core when fully ripe; quality, very good. Its season is the same as Snyder. It is not so apt to be injured by the drouth as the Snyder, and is better in quality, with smaller seeds. It is a moderate bearer. It could not be recommended for general planting.

EARLY KING.—The plant is a rather small grower, erect, stiff, with several small canes making a thick clump from each stool, and with large spines; nearly free from disease but subject to winter-killing. The cluster of fruit is of medium size. Berry, medium size, oval, not regular in shape, not promising in appearance, but one of the best in quality; core, soft. It attains its full size and perfect quality as soon as colored. Its season is fully a week earlier than Snyder. It yields fairly well, is not so hardy as Snyder, about one-half the wood being killed by the cold of 1892-3, when the lowest temperature was $-21\frac{1}{2}^{\circ}$ F. It would be recommended for an early variety for this latitude.

EARLY HARVEST.—The plant is a moderate grower, upright, with some tendency to branch without tipping; wood, light colored; has so far been nearly free from disease, but is one of the most tender varieties tested. About nine-tenths of the wood was killed during the winter of 1892-3. Spines, few and small. Fruit cluster, medium size, 12 to 15 berries. Berry, small to medium size, oblong, glossy, smooth; quality, very good to best; grain, very small; seed, small, not hard. It has a soft core when fully ripe. Its season is about ten days earlier than the Snyder. It promises to be very productive, if it can have winter protection, and its season and quality would make it valuable for home use or market.

LINCOLN.—The plant is a good grower, upright, strong; spine, long and stout. It has so far been entirely free from disease. The fruit cluster is large and rather open. Berry, large, oblong, glossy, juicy, of good quality; grain and seed, large. Its season is 3 or 4 days later than Snyder. It seems to be perfectly hardy here. It has not been planted long enough to come into full bearing. It has been condemned in some places where tried and highly praised in others.

CRYSTAL WHITE.—A moderate, upright grower, branching readily without being tipped. It is very thorny, and the canes are more subject than in most varieties to anthracnose. This is a very tender variety, killing back worse than Early harvest. The fruit cluster is small. Berry, small, oblong, white; core, soft; taste, pleasant, sweetish; not of high quality. Its season is somewhat later than Snyder. It has so far been a very shy bearer, and would be of no value except as a curiosity.

FREED.—The plant is a rank, upright grower, has few spines, is very hardy, and has been free from disease. The fruit cluster is rather small. Berry, small to medium size, oblong, juicy; quality, very good. Its season is nearly the same as Snyder. It has been a very shy bearer and is not recommended for any purpose.

EARLY CLUSTER.—The plant is a medium grower, very upright, rather slender, very thorny. The stem shows some anthracnose, and the plant is not entirely hardy. The fruit cluster is small. Berry, small to medium, nearly round, of very good quality; core, soft. Its season is nearly the same as Snyder. The fruit does not set well and it has proved to be a very shy bearer. It is not worthy of recommendation.

JEWETT.—The plant is a moderate, upright grower, with a few small spines. Cane, not entirely hardy and more subject to anthracnose than in most varieties. Fruit cluster, small. Berry, small, round, juicy, sour, with a hard core and large seeds. The season is 2 to 3 days later than Snyder. It is a very shy bearer, and could not be recommended.

LUCRETIA.—This is a dewberry and does not grow upright, but trails on the ground. Stem, small and slender; spines, few, small, recurved. The plant is somewhat subject to anthracnose, and the leaf to the spot disease. Fruit cluster, large, open, with 6 to 8 berries. Berry, very large, not well filled, oblong, sour, and poor in quality as grown on our soil; core, rather firm. Its season is 6 to 8 days earlier than the Snyder. From our experience it would seem almost worthless, but it has done better with others in the vicinity, though not a profuse bearer with any. In other localities it is highly recommended both for quality and productiveness. It seems to be of more value in the southern than in the central or northern part of the state.

Experiment 44. Raspberries, Test of Varieties.

The raspberries were planted along with the blackberries, though none of them in the low ground described on page 321. The plats, as described under blackberries, consist each of a single row four rods long, where enough plants were obtained to fill out so much. In 1889 the following varieties were planted; Cuthbert, Turner, Brandywine, Golden queen, Rancocos, Early pride, Hansell, Philadelphia, Marlboro, Naomi, Carman, Springfield, Gregg, Mammoth cluster, Johnson's sweet, Hilborn, Shaffer's and Nemaha. In 1890, Hornet, Hudson River Antwerp, Reliance, Herstine, Clarke, American black, Palmer, Muskingum, and Lovett's black were planted; and in 1892, Stayman's No. 5, Kansas, Caroline, and Crimson beauty.

The cultivation has been the same as described for blackberries. The new shoots of the black raspberries are tipped when from 2 to 2½ feet high and are then allowed to grow without further pruning until the spring following, when they are cut back, leaving the laterals from 12 to 15 inches long. This gives a compact bush that stands well without support of any kind. We have made it a practice, as soon as the fruiting season is over, to take out all the bearing wood. There is some question as to whether or not this is the best plan. A row left in 1892, without taking out the old wood until the next spring, yielded more fruit than those on each side of it from which the old wood was removed as soon as the fruit was off. The question of time for taking out the old wood is now undergoing a test on a larger scale than last year and more definite results may be expected.

The red raspberries have been kept in close rows, with some thinning in the row. The plants have not been tipped during summer but the tallest ones have been cut back somewhat early in the spring.

All the European varieties of raspberries, as grown here, are very subject to the spot disease (*Septoria rubi*) of the leaves. It attacks the older leaves first, soon causing them to drop, and by fall many of the varieties have only small tufts of leaves at the tops of the new canes.

Plants so diseased are very likely to die during the winter or before the fruit is ripened the next season. The Clarke is perhaps as free from the disease as any of them.

The American red raspberries have so far seemed more subject to anthracnose than to the spot disease, the canes of some of the varieties being so badly infested as to render them almost worthless. Turner, Cuthbert, and Golden queen have been as free from diseases as any of the red raspberries.

DESCRIPTION OF VARIETIES.

Black Varieties.

AMERICAN BLACK.—The plant is a rather small grower, and is very subject to anthracnose. The berry is small and often imperfectly filled, not juicy, of fair quality; grain, of medium size, with large seeds. The records show it to have been a very shy bearer. Its season is about 2 or 3 days earlier than Gregg. It could not be recommended.

CARMAN.—The plant is a moderate grower, and has so far been comparatively free from disease. The berry is of medium size, juicy, firm, slightly acid but of good quality; grain, small; seed, small. It has been a very fair bearer. Its season is about 5 to 6 days earlier than Gregg, and it lasts longer. This would be an advantage in a berry for home use, but not in one for market.

GREGG.—The plant is a very strong grower, is hardy, and has been comparatively free from disease. The berry is very large, firm, not juicy, of only moderate quality. The bloom, or down, gives it more of a grayish appearance than other varieties have. The grain is large, and the seed very large. It is classed as a late variety, and is one of the most productive.

The Gregg is probably grown more extensively than any other variety, and, like the Snyder blackberry, seems to have become somewhat variable. There will frequently be seen a difference of two or three days in the season of ripening, and some of the plants bear fruit much more poorly filled than others, while the other characters of the plant and fruit seem the same as the typical Gregg. This is another case in which it is impossible to say whether or not the variations have come from seed. The attempt is making to see whether the variations can be perpetuated.

CONRATH'S EARLY.—The plant is a very good grower, and has so far been free from disease. The berry is above the medium size, firm, moderately juicy; quality, good. The grain and seed are of medium size. Its season is 3 to 4 days earlier than Gregg. It is not so productive as the best but is up to the average. This is a new variety not yet introduced.

HILBORN.—The plant is a good grower, fairly free from disease, and seems quite hardy. The berry is of medium size, rather soft, juicy, very good in quality; grain, of medium size; seed, small. It has been more productive than the average black raspberry. Its season is fully a week earlier than Gregg, and it lasts longer than that variety. It would be recommended for home use or a near market.

JOHNSON'S SWEET.—The plants seemed to be good growers for the first two or three years, but afterwards they gradually died out from no apparent cause. The berry is of medium size, juicy, sweetish, rather rich; quality, very good. The grain and seed are of medium size. When the plants first came into bearing they seemed to be very productive. The variety ought to be of value if frequently renewed. Its season is about 3 days earlier than Gregg, and it lasts nearly as long as that variety.

NEMAHA.—There seems to be no reason for classing this or *Naomi*, as we have them, as different from Gregg.

KANSAS.—The plant is a rank, strong grower, and has so far been free from disease. It seems perfectly hardy. The berry is large, firm, moderately juicy, very good in quality. The grain and seed are large. Its season is about a week earlier than Gregg, and it is one of the most productive varieties. It should have a high rank either for home use or market on account of its appearance, productiveness, and season. This is a new variety that seems to sustain the claims made for it.

PALMER, ACME PALMER.—This variety was sent out about six years before the Kansas. It is a day or two earlier than that variety and somewhat smaller, but is otherwise very similar to it. It is one of the best of the early black raspberries.

LOVETT.—A variety of recent introduction, it has so far been a complete failure.

MAMMOTH CLUSTER.—The plant is a good grower, fairly free from disease, and comparatively hardy. The berry is small to medium size, apt to be poorly filled, moderately juicy, very good in quality. The grain and seed are of medium size. Its season is nearly a week earlier than Gregg. It has been a moderate bearer. This is one of the old varieties that are nearly superseded by newer and better ones.

PROGRESS.—This variety has not been grown long enough to decide its merits, but it seems to give little promise. The plant is a small grower, the fruit is small and not abundant.

SPRINGFIELD.—The plant is a very weak grower and is more subject to disease than any other variety. Berry small, firm, not juicy; grain and seed, small. A shy bearer. Of no possible use here.

Red Varieties.

BRANDYWINE.—Plant, not a good grower; cane, rather slender, about 3 to 3½ ft. high, erect, yet when full of fruit bending almost to the ground. The tips, at least, are subject to anthracnose. Berry large, slightly conical, purplish red, juicy, moderately firm, scarcely of good quality; grain and seed, large. Clusters, compact on a slender, drooping stem. This is a late variety, about with Cuthbert in season, and is not a good bearer. It would not be recommended.

CAROLINE.—The plant is a moderate grower, 2½ to 3 ft. high, not erect; cane, rather slender, with more spines than is common to the red raspberry group; comparatively free from disease. Berry, of medium size, yellow, shaped like the black-cap, juicy, soft, rather acid, of good quality; grain, large; seed, of medium size. Fruit cluster, compact and well filled. Its season is 3 to 4 days earlier than Cuthbert. It has been a fair bearer and seems hardy, but there are other varieties more desirable. Yellow raspberries are not popular.

CLARKE.—One of the European red raspberries. The plant is a moderate grower; cane, rather slender and comparatively free from disease. The leaves are subject to the spot disease that takes most of them off before the middle of summer, and by the latter part of the season the canes bear only a small tuft of leaves at the top. As a result, the wood is poorly ripened and easily winter-killed. The same statement with regard to disease of leaves would be true for all the European varieties tried here, and the rest are worse diseased than this one. Berry, large, conical purple when fully ripe, firm, meaty, mild acid, slight peach flavor; grain, large; seed, large. Its season is about 3 to 4 days earlier than the Cuthbert. It might be valuable were the plants healthy and hardy.

CRIMSON BEAUTY.—Plant a good grower and comparatively free from disease. Berry, large, round, bright crimson; grain and seed very large. Not more than one berry in a hundred is well filled; most have but one or two grains. Of no value.

CUTHBERT.—Plants grow erect and strong, 4 to 6 ft. high, and are usually comparatively free from disease. Berry, very large, reddish purple, oblong, conical, firm, juicy; quality, very good but harsh, rather sour; grain and seed, medium size,

This is one of the late red raspberries, and for a market variety stands at the head of the list. It has not been so productive here as some others.

EARLY PRIDE—The plant is a rather small grower; cane, slender, erect, $2\frac{1}{2}$ to 3 ft. high, hardy, and comparatively free from disease. The berry is of medium size, round, light red, rather soft, juicy, very good in quality, mild, and pleasant; grain and seed, of medium size. This is the earliest of the red raspberries, coming in 3 to 4 days earlier than Turner and about 10 days ahead of Cuthbert, being nearly gone before the latter variety begins to ripen. It yields very well and would be recommended for home use or market to lengthen the season.

GOLDEN QUEEN.—This might be described as a yellow Cuthbert. The plant scarcely grows so tall as the Cuthbert, but the fruit is practically the same in every way except color.

HANSELL.—The plant is rather low growing and unless grown very thick is bushy and somewhat slender. Very subject to anthracnose in all parts of the stem, even the fruit stems and sometimes the fruit itself being attacked. Berry of medium size, round, reddish purple, not always well filled, juicy; quality, very good; grain and seed, large. Its season is about two days earlier than Turner. It has yielded fairly well so far, but, on account of its liability to disease, other varieties are to be preferred.

HORNET, AND HUDSON RIVER ANTWERP.—The leaves have rusted and fallen off so badly that these varieties have been a complete failure.

HERSTINE.—The plant is a rather small, upright grower, $2\frac{1}{2}$ to 3 ft. high, hardy; cane, somewhat slender, bending down when loaded with fruit, comparatively free from disease. Berry, large, round, purplish red, moderately firm, juicy; quality very good, acid, not harsh; grain, large; seed, of medium size. Its season is 2 to 3 days earlier than Turner and it bears fairly well.

MARLBORO.—Plant, a rather low grower; cane, stiff and erect; too much subject to disease. The edges of the leaves are curled down in a way that would distinguish the variety readily from others. Berry, very large, conical, pale red, firm, juicy, mild, pleasant, not rich in quality, of fine appearance; grain, large; seed, of medium size. Its season is the same as Turner. It is not recommended.

MUSKINGUM.—Plant, a medium grower, subject to anthracnose, and not entirely hardy. Berry, large, shaped like the blackcaps, firm, purple, with a harshness that is not agreeable to most tastes; grain and seed, large. Its season is about the same as Cuthbert. Only moderately productive. Not recommended.

PHILADELPHIA.—Plant, a moderate grower, bushy, hardy, comparatively free from disease, and seems to be less influenced by drouth than most other varieties. Berry, rather small, reddish purple, juicy; quality, very good; grain and seed, large. Its season is the same as Cuthbert. This has been the most productive variety grown so far, but its small size makes very tedious picking, and, on account of its small size, it does not sell so well as some of the other varieties.

RANCOCOS.—Plant, a weak grower, very subject to anthracnose, not entirely hardy; plants that do live over winter, liable to die before they ripen their fruit. Berry, reddish purple, small, shatters to pieces easily, juicy, harsh. One of the very early varieties, but a poor bearer and of no value here.

RELIANCE.—The plant is a rather slender grower, becoming thick and bushy; canes, fruiting stems, and berries, apt to be badly injured with anthracnose, and leaves subject to the spot disease. Berry, medium to large, purple, round, moderately firm, juicy, acid, rather harsh to the taste, would be classed as good in quality; grain and seed, large. Its season is only a day or two later than the Turner. If plants could be had free from disease, it would be a very productive variety; as it is, we could scarcely recommend it.

SHAFFER'S.—This variety is by some considered as a hybrid between the black and red raspberries and by others as the representative of a distinct species. The

plant is a very strong, upright grower; cane, thickly covered with small spines, somewhat subject to anthracnose. It has so far been quite hardy. Berry, very large, rounded, purple, downy, firm, juicy, acid, of harsh taste; quality, good; grain, very large; seeds, large. Its season is the same as that of the Cuthbert. It has been very productive and the fruit is of fine appearance, but it is not pleasant to most tastes. It would be recommended for the sake of variety.

STAYMAN'S No. 5.—Plant, of rather small growth, comparatively free from disease. Berry, medium size, purple; grain, of medium size; seed, very large and hard, Season, 4 to 5 days after Cuthbert, making it one of the latest of the red raspberries. It has been so far a very shy bearer, but may improve with age.

TURNER.—The plant is one of the strongest growers of the red raspberries and more free than any other from disease. Cane, $3\frac{1}{2}$ to $4\frac{1}{2}$ feet high, naturally branching where thin, but where crowded growing up unbranched and slender, hardy. Fruit, where plants are not too much crowded, is very large, soft, juicy, sweet or sub-acid, very pleasant to the taste, though not of high quality; grain and seed, small. This is one of the early varieties, its season being a week to ten days earlier than Cuthbert, and it is also one of the most productive. It is too soft to be of value for shipping and soon becomes unsalable even for home market unless very carefully handled.

CONCLUSIONS.

There are quite a number of the newer varieties, both of blackberries and raspberries, that we have not yet tested and among them there may be something of more value for some purposes than those here described. The standard varieties are standard, because they have successfully stood a long test over a wide range of country, and so one can make no mistake in planting them.

Of the blackberries which we have grown, Snyder still takes the lead. Minnewaska would rank second. It is not so good in quality as the Snyder but it is as productive and does not seem so liable to injury from drouth. For an early variety Early king is hardier than Early harvest.

Of black raspberries the Kansas, a new variety, seems to stand at the head, next would come Gregg or Nemaha, and Palmer.

Of the red raspberries there is some question. Turner is one of the most productive, is hardy and healthy. The fruit has a mild, very pleasant taste, but it is too soft for a good market variety. The Cuthbert is healthy and nearly as hardy, the fruit larger and firmer, but for home use the taste is rather harsh. Philadelphia is very productive, healthy and hardy, the fruit smaller than that of the other two and too liable to shatter in picking.

Experiment No. 52. Raspberries, Management.

In the spring of 1889 an experiment was started to determine something of the effects of cultivation on the productiveness of black raspberries. For this purpose a plat of Greggs (eight rows sixteen rods long) was taken. These had been planted about 1882, and up to that time had received only ordinary cultivation. Early in the spring of 1889 the four rows on one side of the plat were set apart to be kept thoroughly cultivated from the time the ground was in good condition until the latter

part of August, when the work would stop for the sake of putting down the tips. The other four rows were to be allowed to go until after the fruiting season, only having the weeds mowed off in the meantime, then to be thoroughly cultivated until the end of the season. This gave an average of about $4\frac{1}{2}$ months cultivation for the first four rows and $1\frac{1}{2}$ months cultivation for the others. This scheme has been carried out with practical uniformity since.

No account had been taken of the comparative yields of the separate rows up to this time, but there had appeared to be very little difference. The yields for the season of 1889 were, for the four rows cultivated during the whole season, 287 quarts, and for those cultivated only during the latter part, 262 quarts. After the fruit was gone the old wood was at once taken out. By the time the year's growth was completed there was apparently little difference between the rows cultivated all the season and those cultivated the latter part only, and after the spring pruning had been done, no difference could be noticed.

The crop in the summer of 1890 was, for the four rows cultivated all the season, 358 quarts, and for the others, 274 quarts. At the close of the season there was more difference in favor of the well cultivated rows than had been seen the previous year, and some difference could be seen after the spring pruning.

The crop for the season of 1891 was, for the four rows cultivated all the time, $487\frac{1}{2}$ quarts, and for the other four rows, $272\frac{1}{2}$ quarts, the difference in actual yield being very much more than the apparent difference during the fruiting season. Up to this year there had been no apparent difference in the size and development of the berries, but during this season the fruit on the well tended rows was much finer than on the others.

The respective crops of the four rows cultivated all the season, and the other four for the summer of 1892, were 448 and 244 quarts.

During the summer of 1892 the new canes did not make so good a growth as they had in previous years, and unfavorable conditions later destroyed many of the plants; those in the four rows receiving the most attention, being damaged the worst. As a consequence the results, though not contradicting those of previous years, would not help them out. The yields were for the four rows cultivated all the season, 119 quarts, and for the others, 117 quarts.

As a total result of this line of work so far, there would be the following:

	Four rows kept cultivated from early spring until fall.	Four rows cultivated from the time the fruit was off until fall
1889.....	287	262
1890.....	358	274
1891.....	$487\frac{1}{2}$	$272\frac{1}{2}$
1892.....	448	244
1893.....	119	117
Total.....	<u>1699$\frac{1}{2}$</u>	<u>1169$\frac{1}{2}$</u>

This experiment has so far been made to include only the black raspberry; and as it has been conducted shows only the difference between a full season's culture and culture the latter part of the season. It is probably safe to say that the rows receiving the least attention had more cultivation and better than the average of the berries grown in this locality. As a result of the test it is at least safe to draw the conclusion that it would be profitable to give the black raspberry much better care than it gets.

There is always more or less discussion as to whether or not it is best to take out the fruiting wood from a field of raspberries or blackberries as soon as the crop is off. Our practice heretofore has been to take out the old wood at once when the last picking was done. The reasons were that as we must hire the work done, it was as cheap doing it one time as another, and the clearing out improved the appearance. It was supposed also that the old canes would be a detriment rather than an advantage to the new ones, on account of crowding, which would not allow the plants to develop fully, and it was also supposed that there was no value in the old wood after the fruit was off. X

As a preliminary test of this point, a single row 16 rods long was in 1892 left with the old wood in, while corresponding rows on each side that appeared equally good, were cleaned out in the usual manner. As a result of the one trial there is one row in which the old wood was left until spring (March), yielding 73 quarts, and two rows, one on each side of the preceding, from which the old wood was taken as soon as the fruit was off the previous year, yielding 41 and 48 quarts, respectively. X

While this one test is not conclusive, it points to the probability that it may be better to leave in the old wood until the regular spring pruning than to take it out as soon as the fruit is gone. It might at least pay the raspberry grower to try to see if the old, but yet living canes are of value to the new growth. X

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All communications intended for the Station should be addressed, not to any person, but to the

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