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Agricultural Experiment Station

—OF THE—

AGRICULTURAL AND MECHANICAL COLLEGE,
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GRAPES, RASPBERRIES AND STRAWBERRIES.

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 The Bulletins of this Station will be sent free to any citizen of the State on application to the Agricultural Experiment Station, Auburn, Ala.

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Grape Culture--Test of Varieties.

At the earnest solicitation of many, who have been induced to embark in grape culture by reading the bulletins of this station, the following epitome of grape culture is given in connection with the report of experiments with varieties.

The interest that has been excited all over the State in the cultivation of this delicious fruit is gratifying beyond the most sanguine expectations.

Cuttings have been freely given to all who desired them, and rooted plants have been distributed free to all farmers in every section of the State for the double purpose of testing the adaptation of varieties to the different soils and climatic conditions, and to introduce the cultivation, of the vine to the homes of the people. Besides this distribution thousands of plants, which were the incidental product of instruction given the classes in agriculture in growing nursery stock, have been sold at reasonable prices. That this policy has born good fruit is manifested now in the widespread interest in grape culture, which pervades the entire State.

During an experience of thirty years in practical grape culture, an entire failure of the crop has not occurred.

There is no reason why every citizen of Alabama, who owns an acre of land, should not grow enough grapes to supply the family table from the fifth of July to the first of October. The varieties now growing upon the grounds of this station furnish an abundant supply over this period.

The varieties usually cultivated have been sufficiently tested on these grounds during the last six years to justify definite conclusions as to those best adapted to the sandy and red soils of the State; and, Bulletin No. 12, recently issued from the Canebrake Station, furnishes similar information for the prairie soils of the State. (For this, address W. H. Newman, Uniontown, Ala.) Several varieties, which fail here, have done well on the soil of the Canebrake Station.

GRAPE CULTURE.

SOIL.

The two principal requisites for a soil for grapes are fertility and drainage. Conditions of minor consideration are character and texture of soil and subsoil, elevation and exposure.

Grapes are being successfully grown upon every variety of soil in the State. Where failures have occurred they have generally resulted from a want of correct information as to varieties adapted to the locality and improper or neglectful cultivation and pruning.

PREPARATION OF THE SOIL.

Since the vine is expected to occupy the land for many years, the depth and thoroughness of the preparation of the soil cannot be too strongly emphasized. If the subsoil is clayey or of a tenacious character, the whole area to be planted should be deeply subsoiled and heavily fertilized with manures of the most permanent character, such as ashes and ground bones. The preparation should be commenced a year before planting the vines by growing humus supplying crops upon the land. A crop of rye, well fertilized, should occupy the land the winter before. When ripe, cut the stubble high and follow with a vine-producing variety of peas. Before the immediate preparation for planting is begun, sow over the dead pea vines in November half ton of air-slaked lime per acre. After plowing and subsoiling the whole area of the proposed vineyard, lay off rows eight feet apart, commence two feet from these rows on each side and bed to the middles with a good turn plow. Sow in the space, thus plowed, a ton of compost and four hundred pounds of acid phosphate or ground bone per acre. Plow and harrow until the fertilizers are thoroughly incorporated with the soil and subsoil, and fill the plowed space nearly to the level of the general surface. Open holes eight feet apart in the centre of the plowed space to suit the spread of the roots of the vines, place the roots in their natural position and firm the soil upon them.

PROPAGATION.

Grapes are propagated by cuttings, layers or grafting; most varieties grow so readily from cuttings that this method is almost universally adopted.

Cuttings of the *Labrusca*, *Æstivalis* and other types commonly known as "bunch" grapes are taken from the canes of the previous season's growth. They need not to be more than six to eight inches in length. At the base, cut half an inch below, and at the top cut half an inch or an inch above a bud. If taken from long jointed varieties, such as Concord and Perkins, there will usually be only two buds to the cutting, while in short jointed varieties, like the Delaware and Lutie, there will often be four. These cuttings may be taken and planted at any time from November to March, while the vines are being pruned.

Cuttings from the *Rotundifolia* or muscadine type must be made as early as practicable after the leaves fall—not later than November. If cut later, the vines "bleed" injuriously, and often *destructively*.

These cuttings should be eighteen inches long and cut from the canes of the growth of the previous summer.

LAYERS.

These are single or multiple. The former are made by turning down a new cane at any time during the winter or early spring and covering a part of it with soil, leaving the end above ground. Rooting is facilitated by partly cutting the portion covered with soil, but this is not necessary. During the growing season, abundant roots will form upon the covered part. These roots having formed artificially, as adventitious buds do above ground, they are easily torn from the vine, and hence the latter must be first cut from the parent and a fork or spade run under the roots before attempting to lift the plant.

Multiple layers are made by placing a long new cane in a trench dug for the purpose and staking it down, covering gradually with soil as the canes grow from the joints. The work may be finished at once by covering alternate joints leaving the others above ground. Roots will form upon the joints covered, while canes will grow from those not covered.

In the fall following, cut above each cane and lift the roots carefully as directed for single layers. Some hard wood varieties, notably Norton's Virginia, do not take readily from cuttings, except in very compact soils, and hence layering is generally resorted to as the most reliable means of propagating them. The *Rotundifolia* type are also commonly propagated in this way.

GRAFTING.

Under certain conditions, this is a desirable method of propagating new varieties rapidly, and of utilizing stocks of wild grapes or inferior varieties.

Grafting is most successfully done upon the part of the stock below the surface of the soil.

The soil is removed from six or eight inches of the base of the stock, which, if large, is cut at right angles to its axis for cleft grafting, which is done by splitting the top of the stock and inserting the scion cut in wedge shape so as to bring the inner bark of the two in contact. Cover the wounded parts of both with grafting wax and, if the stock is not stout enough to bind the scion by its own elasticity, tie with a bass-wood band or with some other soft material. Clay may be substituted for the grafting wax. As soon as the graft is inserted the earth should be drawn up to the bud on the scion and firmly pressed, using care not to displace the graft.

If the stock and scion are nearly the same size a slanting cut is made at the top of the stock and a similar one at the bottom of the scion and these bound together, uniting as much as practicable the inner bark of the two. Cover the point of junction as before.

PLANTING CUTTINGS.

Having the cuttings properly prepared and arranged with all the buds pointing in the same direction, open trenches, three feet apart, and six inches deep with turn plow, having the furrow made by the bar side of the plow as evenly cut and vertical as practicable. Place the cuttings six inches apart against this vertical side of the furrow, forcing the lower ends into the loose soil in the bottom until the upper ends are just even with the surface of the soil. A single furrow thrown

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upon these with a good turn plow will finish the planting, or they may be covered with hoe or shovel.

The long cuttings of the *Rotundifolia* type must be placed in the furrow in such inclined position as to have the lower end at the bottom of the furrow, and the other at the top of the soil.

TRANSPLANTING THE ROOTED VINES.

After the soil has been fertilized and prepared as already described, open holes every eight feet as deep as the subsoil has been broken and put two pounds of crushed or broken bones in the bottom of each and upon these a shovel full of well rotted compost or half bushel of vegetable mold from the woods. Cover these with surface soil until the depth of the hole suits the plant to be placed in it. Have the soil highest in the center and sloping to the sides, so that, when the plant is set in the centre, the roots will slope naturally in every direction. If there are two tiers of roots from different joints of the cutting, cover the lower tier with enough soil to reach to the base of the second, holding up the latter while this is being done. Cover the second tier in the same way and fill with surface soil until the plant is set to the same depth as when in the nursery row. Press the soil firmly upon the roots and drive by the side of the plant a stake four feet long for the protection of the plant in spring and to be used for training the new cane in summer. Before setting the plant, cut back the new wood of the cane, to be left, to two plump eyes and remove entirely all others. Cut off all broken or badly bruised roots and trim the ends smoothly.

TREATMENT DURING THE FIRST YEAR.

The space between the rows should be cultivated shallow with harrow, scrape or cultivator until first of May, when two rows of peas should be planted in each, and these cultivated until they occupy the land. These will shade the land and collect plant food for the benefit of the grapes. Gather the peas when ripe and leave the vines upon the surface until the following March.

Two or more canes will grow from each vine. When these attain a length of fifteen to eighteen inches, select the

strongest and tie to the stake and remove the others. Keep all except the one cane rubbed off during the summer. When this is three feet long, pinch back the bud to induce a stocky growth.

TREATMENT THE SECOND SEASON.

When the soil is in good condition to be plowed in February or March, apply broadcast one thousand pounds of compost per acre and one hundred pounds each of kainit and acid phosphate. Set the plow to run just two inches deep and plow in the fertilizer. Cultivate shallow and plant peas as in the year before.

Cut back the cane, which grew the first year, to three good eyes. Plant posts of some durable wood in alternate spaces between the vines in the rows. The posts will, therefore, be sixteen feet apart with two vines between them. Stretch tightly two No. 10 wires on these posts—one two feet from the ground and the other four feet. When the new canes grow long enough, tie to the bottom wire, one on each side and one in the centre. When four feet long, pinch back to induce stocky growth. To avoid the danger of binding pass the string around the cane below a leaf, cross the ends between the cane and the wire and tie to the wire. This secures the vine in position and leaves room for growth under the string. There will be a few flowers upon the canes. If the vines are very vigorous these may be allowed to ripen grapes, one bunch to the cane. If not vigorous, the bunches should be removed before flowering.

There should now be three vigorous canes, two trained horizontally upon the lower wire, in opposite directions, and the third extending vertically to the top wire. In most varieties there will be a lateral at each of a majority of the joints.

TREATMENT THE THIRD YEAR.

Fertilize and cultivate as directed for the second year, except that the shallow cultivation is continued through the summer without the peas.

Cut the horizontal canes back to three feet in length, and cut back the laterals to one good eye or bud, or, in the language of the vintner, "spur back to one eye."

Cut the vertical cane one joint above the top wire and spur its laterals as before. The new canes which grow from these laterals, thus spurred, will each produce three bunches of grapes. The number of bunches which a vine will produce may, therefore, be estimated with a considerable degree of accuracy in advance. The crop may thus be regulated to suit the capacity of each vine, as indicated by its vigor. If not vigorous the crop should be reduced by the entire removal of some of the spurs.

The pruning, just described, is known as the "spur" system. This has been compared with the "renewal" system upon the same varieties. Results have invariably been in favor of the spur system.

To prevent over bearing and the production of useless wood, as soon as sufficient growth has been made to make the selection, the feeble canes should be rubbed off, leaving the most vigorous.

As soon as the new canes, from the spurs on the lower wire, are long enough tie to the upper wire. Future treatment need not vary materially from that given for the third year. A liberal manuring, shallow and clean cultivation and systematic spur pruning to one good eye on the new canes will insure annual crops in good quantity and finest quality. Paper bags will protect the grapes from rot, birds and insects, but spraying with fungicides is necessary to protect the vines from disease.

The definite determination of the varieties adapted to our soil and climate is the first requisite for success. The introduction into a vineyard of varieties especially subject to disease, may prove fatal to others which would succeed if removed from such contagion. The susceptible variety serves as a nursery for the propagation of the germs of disease and thus infects the atmosphere surrounding others adjacent. The Black Eagle variety is especially subject to black rot, while the Ives is usually exempt. For three years in succession the grapes on Ives vines growing near the Black Eagle have rotted, while they were exempt in other parts of the same vineyard removed from this, but associated with hardy varieties.

The necrological record, which follows, has no doubt been intensified by the association of so large a percentage of sus-

ceptible varieties, while, on the other hand, the "survival of the fittest" is also emphasized in the hardy varieties, the Ives, Perkins, Concord and Delaware, which withstood so well the influence of the unfavorable conditions by which they were surrounded. The probable communication of disease from vine to vine and variety to variety through the medium of the pruning shears presents food for thought and a subject worthy of inquiry. This subject will receive further attention in a future bulletin containing a report of experiments with varieties of pears.

The accompanying tabulated statement presents, in compact form, *the facts* observed in regard to the varieties named. It is indeed a necrological record in which the "survival of the fittest" is conspicuously illustrated. Fortunately, the surviving varieties are all desirable as well as hardy and disease resisting.

Many of the varieties, which failed, were successful and productive till three years old, but succumbed by the fourth season. Of the four standards, Delaware, Ives, Perkins and Concord, the latter seems the least hardy.

The Wyoming red, a very sweet red grape, is well worthy of cultivation, and is the best early red grape.

Perkins and Ives are the most hardy, productive and reliable. By bagging the Ives and thus prolonging its season, these five varieties will give a supply of excellent fruit for two months.

The Delaware is the standard of excellence as to flavor, and, though a short-jointed slow grower, is exceedingly productive.

These five varieties furnish all the requisites for market, table and wine, and should satisfy the most exacting taste.

From an experience of many years previous to planting this vineyard, I knew that the Ives, Perkins, Delaware and Concord were standards [hence the large number of each planted], but the results of the comparisons here exhibited have emphasized their leadership.

Even a casual examination of the tabulated statement will show the veriest novice the varieties worthy of his attention.

VARIETIES OF GRAPES PLANTED 1886—NORTHERN EXPOSURE.

| No. Vines Planted. | NAMES OF VARIETIES. | Time of Ripening | Growth of Vine. | Black Rot. | Leaf Scald. | Anthrax-nose or Scab. | Cercospora or Leaf-Blight |
|--------------------|--------------------------|----------------------|-----------------|---------------|--------------|-----------------------|---------------------------|
| 6 | Agawam | July 20th to 31st. | vigorous .. | badly. | badly | slight | slight |
| 10 | Beauty | August 5th to 15th | vigorous .. | slight. | slight | free. | slight |
| 7 | Berckman's | July 20th to 30th .. | vigorous .. | slight. | slight | badly | slight |
| 6 | Brighton | July 20th to 30th .. | vigorous .. | slight. | slight | badly | slight |
| 6 | Black Eagle | July 25 to Aug 5th. | vigorous .. | very badly .. | badly | medium | slight |
| 7 | Catawba | Aug. 10th to 20th .. | vigorous .. | slight. | slight | free | badly |
| 5 | Champion | Aug. 5th to 15th .. | vigorous .. | slight. | slight | free | slight |
| 110 | Concord | July 20th to 31st .. | vigorous .. | slight. | badly | free | slight |
| 2 | Cynthiana ..... | ..... | vigorous .. | slight. | slight | free | slight |
| 106 | Delaware | July 20th to 31st .. | vigorous .. | badly. | free | slight | slight |
| 4 | Diana ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 6 | Duchess | August 5th to 15th | medium | badly. | slight | very badly .. | slight |
| 6 | Elvira ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 6 | Grein's Golden | August 5th to 15th | vigorous .. | free | badly | badly | badly |
| 6 | Goethe | August 1st to 10th | vigorous .. | slight. | slight | badly | badly |
| 58 | Hartford | July 5th to 15th .. | medium | badly. | slight | badly | badly |
| 2 | Humboldt ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 6 | Iona | July 25 to Aug. 5. | medium | slight. | badly | badly | slight |
| 6 | Irving | July 25 to Aug. 5. | not vigorous | slight. | badly | badly | badly |
| 109 | Ives | July 20th to 31st .. | vigorous .. | slight. | slight | free | badly |
| 2 | Isabella | August 5th to 15th | vigorous .. | slight. | badly | free | badly |
| 6 | Jefferson | July 25 to Aug. 5 | medium | slight. | slight | very slight. | slight |
| 6 | Lady Washington | August 5 to 15 .. | vigorous .. | medium | badly | badly | medium |
| 6 | Lindley | July 30 to Aug. 10 | not vigorous | badly. | badly | badly | badly |
| 3 | Long or Cunningham | August 10th | vigorous .. | ..... | ..... | ..... | ..... |
| 2 | Lutie | July 20th to 30th | not vigorous | free | badly | free | free |

VARIETIES OF GRAPES PLANTED 1886—NORTHERN EXPOSURE—CONTINUED.

| No. Vines Planted. | NAMES OF VARIETIES. | Time of Ripening. | Growth of Vine. | Black-Rot. | Leaf Scald. | Anthrax-nose or Scab. | Cercospora or Leaf-Blight. |
|--------------------|------------------------|---------------------|-----------------|--------------|--------------|-----------------------|----------------------------|
| 6 | Martha..... | July 30 to Aug. 10 | vigorous .. | free | badly | badly | slight |
| 6 | Mason's Renting..... | August 5th to 15th | not vigorous | free | slight | slight | badly |
| 6 | Maxatawney | July 25 to Aug. 5 | medium | slight..... | badly..... | badly | badly |
| 6 | Meno | August 5 to 15 | not vigorous | badly..... | very badly. | slight | badly |
| 6 | Merrimac | July 25 to Aug. 5 | not vigorous | badly..... | badly | slight | slight |
| 6 | Moore's Earley | July 5th to 15th | medium | free | slight | free | slight |
| 8 | Niagara | July 25 to Aug 5 | vigorous... | badly..... | slight | badly | badly |
| 7 | Norton's Virginia..... | August 5 to 15 | vigorous .. | free | free | free | free |
| 2 | Othello..... | | | | | | |
| 6 | Pearl | August 5 to 15 | vigorous... | badly..... | badly | slight | slight |
| 107 | Perkins | July 5 to 15 | vigorous .. | very slight. | free | very slight. | slight |
| 1 | Peter Wylie..... | July 20th | not vigorous | badly..... | badly | badly | slight |
| 6 | Pocklington | | not vigorous | slight..... | badly | slight | slight |
| 6 | Prentiss | July 25 to Aug 5 | not vigorous | free | free | free | slight |
| 6 | Rogers No 11..... | July 25 to Aug. 5 | medium ... | very badly. | badly | badly | slight |
| 9 | Telegraph | July 25th to Aug. 5 | medium ... | badly..... | slight | slight | slight |
| 6 | Triumph | July 25th to Aug. 5 | medium ... | free | badly | badly | slight |
| 7 | Vergennes | July 25th to Aug. 5 | vigorous... | slight..... | slight..... | " | slight |
| 2 | Warren | | vigorous... | free | slight..... | free | slight..... |
| 6 | Wilder | July 25 to Aug. 5 | medium ... | badly..... | slight..... | slight | very slight.. |
| 6 | Worden | July 25 to Aug 5 | medium ... | slight..... | slight..... | " | slight |
| 6 | Wyoming Red | July 10th to 20th | medium ... | slight..... | free | free | badly..... |

VARIETIES OF GRAPES PLANTED 1886—NORTHERN EXPOSURE. —CONTINUED.

| No. Vines planted. | NAMES OF VARIETIES. | Downy Mildew. | Grape Curculio. | Type. | Number Dead. | When Died. | Number Living | BERRIES. | |
|-----------------------|-------------------------|------------------|--------------------|------------------|-----------------|-----------------------|------------------|---------------|---------------|
| | | | | | | | | Size. | Color. |
| 6 | Agawam..... | badly..... | badly .. | Hybrid..... | 6 | 4 in '89, 2 in '90-91 | ... | large | dark red. |
| 10 | Beauty | free | slight .. | Labrusca. | 10 | 2 in '89, 8 in '90-91 | ... | medium | red. |
| 7 | Berckman's..... | free | free..... | Clinton & Del. | 7 | all in 1890-91. | ... | small. | red. |
| 6 | Brighton..... | very slight | free..... | Labr. cross... | 6 | 4 in '89, 2 in 1890. | ... | medium | red. |
| 6 | Black Eagle..... | free | free..... | Hybrid | 6 | 1 in '89, 5 in '90-91 | ... | large | black. |
| 7 | Catawba | free | free..... | Labr. | 6 | 2 in '89, 5 in '90-91 | ... | medium | red. |
| 5 | Champion..... | free | badly .. | Labr. | 5 | all in 1890 | ... | medium | black. |
| 110 | Concord..... | free | badly .. | Labr | 37 | n '90 and '91.... | 73 | large | blue-black. |
| 2 | Cynthiana..... | slight .. | free..... | Æstivalis.... | 1 | in 1890 | 1 | small..... | black.* |
| 106 | Delaware..... | badly .. | slight .. | Labr. | 7 | in '90-91 | 99 | small | red. |
| 4 | Diana..... | ..... | ..... | Labr. | 4 | in '89 | ... | medium | reddish.* |
| 6 | Duchess..... | slight .. | free..... | Hybrid | 4 | in 89-90 | 2 | medium | white. |
| 6 | Elvira..... | ..... | ..... | Rip. cross .. | 6 | ..... | ... | large | white. |
| 6 | Grein's Golden..... | free | free..... | Rip cross | 5 | 2 in '89, 3 in '90-91 | 1 | medium | amber. |
| 6 | Goethe..... | free | free..... | Hybrid..... | 6 | 5 in '89, 1 in '90 | ... | large, obl'ng | purple. |
| 58 | Hartford..... | free | free..... | Labr. | 58 | 21 in '89, 37 in '90 | ... | large..... | black: |
| 2 | Humboldt..... | ..... | ..... | Rip. cross | 2 | in 1889 | ... | large | white * |
| 6 | Iona..... | free | free..... | Labr. | 6 | all in 1890 | ... | large..... | pale red. |
| 6 | Irving..... | free | free..... | Hybr | 6 | 4 in '89, 2 in '90. | ... | large..... | white. |
| 108 | Ives..... | free | slight .. | Labr. | 1 | in 1890..... | 108 | medium | black. |
| 2 | Isabella..... | slight .. | badly .. | Labr | 2 | in 1890..... | ... | medium | black. |
| 6 | Jefferson..... | free | slight .. | Labr. cross .. | 3 | in 1890..... | 3 | large | red. |
| 6 | Lady Washington..... | free | free..... | Hybrid..... | 6 | 5 in '89, 1 in '90.. | ... | medium | white. |
| 6 | Lindley..... | slight .. | slight .. | Hybrid..... | 4 | 1 in '89, 3 in '90.. | 2 | large..... | red. |
| 3 | Long or Cunningham..... | free ..... | ..... | Æst. | 3 | ..... | ... | small..... | dark purple.* |
| 2 | Lutie..... | free | free..... | Labr. | 2 | ..... | 2 | large..... | dark red.* |

VARIETIES OF GRAPES PLANTED 1886—NORTHERN EXPOSURE—CONTINUED.

| No. Vines Planted. | NAMES OF VARIETIES. | Downy. Mildew. | Grape Curento. | Type. | Number Dead. | When Died. | Number Living. | BERRIES. | |
|--------------------|---------------------|----------------|----------------|--------------|--------------|------------------------|----------------|--------------|------------------|
| | | | | | | | | Size. | Color. |
| 6 | Martha. | free | free | Labr. | 3 | in 1890. | 3 | large | white. |
| 6 | Mason's Renting. | free | free | Labr. | 6 | 1890-91. | .. | medium | white. |
| 6 | Maxatawney. | badly | slight | Labr. | 6 | all in 1889. | .. | oblong, med. | white. |
| 6 | Meno | free | free | Labr. | 6 | 2 in '89, 4 in '90. | .. | small. | amber. |
| 6 | Merrimac | free | free | Hybrid. | 5 | 2 in '89, 3 in '90. | 1 | very large. | black. |
| 6 | Moore's Early | free | free | Labr. | 5 | 1 in '89, 4 in '90-91. | 1 | large. | black. |
| 8 | Niagara | badly | free | Labr. cross. | 5 | 1889-90. | 3 | large. | white. |
| 7 | Norton' Virginia. | badly | free | Est. | 3 | in 1890. | 4 | small. | black. |
| 2 | Othello. | .. | .. | Hybr. | 2 | all in '89. | .. | very large | black.* |
| 6 | Pearl. | slight. | free. | Rip. cross. | 6 | 3 in '89, 3 in '90-91. | .. | medium | white. |
| 107 | Perkins | free | slight | Labr. | 2 | in 1890-91. | 105 | large. | brown-red. |
| 1 | Peter Wylie | badly | .. | Hybrid | 1 | .. | .. | small | white.* |
| 6 | Pocklington | free | free | Labr. | 6 | all in '89-90. | .. | large | amber. |
| 6 | Prentiss | free | free. | Labr. | 6 | all 1890. | .. | medium | white. |
| 6 | Rogers No. 11 | badly | free. | Hybr | 6 | all '89-90. | .. | large | black. |
| 9 | Telegraph | free | free | Labr. | 9 | 5 in '89, 4 in '90. | .. | medium | black. |
| 6 | Triumph | free | free | Hybr | 5 | 1889 | 1 | large | white. |
| 7 | Vergennes | free | free | Labr. | 7 | 2 in '89, 5 in '90. | .. | large. | red. |
| 2 | Warren | badly | free. | Est. | 1 | 1889. | 1 | small. | blue with bl'om* |
| 6 | Wilder | slight | slight | Hybr. | 6 | all '89-90. | .. | very large. | black. |
| 6 | Worden | free | slight | Labr. | 5 | all '89-90. | 1 | large | black. |
| 6 | Wyoming Red | free | badly | Labr. | 1 | in 1891. | 5 | medium | red. |

*Planted 1889.

The old vineyard having a northern exposure, it appeared desirable that the same varieties should be planted on a southern exposure, and hence the new vineyard was planted in 1889. Results are shown in the tabulated statement, which follows. These vines bore their first full crop last summer, and yet the mortality is already great—greater than occurred in the old vineyard during the corresponding period. In two more years the record will no doubt differ but little from that now given of the old vineyard. It will be observed that the veteran survivors of the old vineyard are sustaining their reputation for hardiness in the new.

VARIETIES OF GRAPES PLANTED 1889. SOUTHERN EXPOSURE.

| Number Planted. | Names of Varieties. | Time of Ripening. | Growth of Vine. | Black Rot. | Leaf Scald. | Anthraco-nose or Scab. | Grape Leaf Blight. | Downy Mildew. | Type. | No. Dead When Died | Number Laying. | Size of Berries. | Color of Berries. |
|-----------------|---------------------|---------------------|-----------------|-------------|-------------|------------------------|--------------------|---------------|-----------------|--------------------|----------------|------------------|-------------------|
| 2 | Agawam..... | July 20 to 31.... | Vigorous.. | Free | Slight..... | Free | Badly.. | Free | Hybr | 1 1891 | 1 | Large | dark red. |
| 1 | Amber..... | ..... | Medium.. | Free | Badly..... | Free | Badly.. | Free | Rip | 1 1891 | 1 | Medium..... | pale amber. |
| 6 | Beauty..... | Aug. 5 to 15 | Vigorous.. | Slight..... | Free | Slight..... | Slight.. | Free | Labr. cross | 1 1891 | 5 | Medium..... | red. |
| 22 | Berkman's.. | July 20 to 30 | Medium.. | Free | Slight..... | Slight..... | Slight.. | Free | Clinton & Dela. | 4 1891 | 18 | Small..... | black. |
| 24 | Black Eagle. | July 25 to Aug. 5 | Vigorous.. | Badly | Badly..... | Free | Slight.. | Free | Hybr | 12 1890-1 | 12 | Very large.. | black. |
| 3 | Black Hawk. | ..... | Not vig .. | Free | Slight..... | ..... | ..... | ..... | Labr..... | 3 1890 | ..... | Large | *black. |
| 2 | Brandt..... | ..... | Medium.. | Free | Slight..... | ..... | Free .. | Free | Hybr ..... | ..... | 2 | Small | black. |
| 2 | Brighton .. | July 20 to 30.... | ..... | Free | Slight..... | ..... | Slight.. | Free | Labr..... | 1 1891 | 1 | Medium..... | red. |
| 2 | Canada..... | ..... | Not vig .. | Free | Badly..... | ..... | Free .. | Free | Hybr ..... | ..... | 2 | Medium..... | black. |
| 6 | Catawba.... | Aug. 10 to 20 .. | Vigorous.. | Slight..... | Slight..... | Free | Badly.. | Free | Labr..... | ..... | 6 | Medium..... | red. |
| 2 | Champion .. | Aug. 5 to 15 | Vigorous.. | Free | Free | Free | Slight.. | Free | Labr..... | ..... | 2 | Medium..... | black. |
| 1 | Colrairie .. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 1891 | 1 | ..... | † |
| 25 | Concord | July 20 to 31.... | Vigorous.. | Free | Badly..... | Free | Slight.. | Free | Labr..... | 2 1891 | 23 | Large..... | blue black. |
| 2 | Cynthiana.. | July 20 to 31.... | Vigorous.. | Slight..... | Free | Free | Slight.. | Slight..... | Est..... | ..... | 2 | Small..... | black. |
| 24 | Delaware .. | July 20 to 31.... | Vigorous.. | Slight..... | Slight..... | Free | Badly.. | Free | Labr..... | 5 1891 | 19 | Small..... | red. |
| 2 | Diana..... | ..... | Not vig .. | Free | Free | Free | Badly.. | Free | Labr..... | ..... | 2 | Medium..... | reddish. |
| 2 | Duchess.... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | Hybrid..... | 2 1891 | ..... | Medium..... | *white. |
| 2 | Eldorado .. | July 25 to Aug. 5 | Vigorous.. | Free | Badly..... | Very slight | Slight.. | Very slight.. | Labr..... | 2 1891 | ..... | Large | amber. |
| 2 | Empire State. | ..... | Vigorous.. | Free | Free | Free | Badly.. | Free | Labr. and Rip. | ..... | 2 | Medium..... | yellow. |
| 3 | Excelsior .. | ..... | Medium.. | Slight..... | Slight..... | Badly..... | Badly.. | Free | Hybr | 1 1891 | 2 | Medium..... | pale red. |
| 11 | Goethe..... | Aug. 1 to 10 | Vigorous.. | Free | Badly..... | Free | Badly.. | Free | Hybr | 7 1891 | 4 | Oblong large | purple. |
| 3 | Golden Chasselas | ..... | Vigorous.. | Slight..... | Slight..... | Badly..... | Free .. | Free | Hybr | 3 1891 | ..... | Medium..... | white. |
| 4 | Green Mountain | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 1890 | 3 | ..... | † |
| 2 | Grein's Golden | Aug. 5 to 15 | Vigorous.. | Free | Slight..... | Free | Slight.. | Free | Rip. cross .. | 1 1890 | 1 | Medium..... | amber. |
| 1 | Grein's No. 4 | ..... | Vigorous.. | Free | Free | Free | Slight.. | Free | Hybr ..... | ..... | 1 | Medium..... | white. |

VARIETIES OF GRAPES PLANTED 1889. SOUTHERN EXPOSURE—CONTINUED.

| Number Planted. | Names of Varieties. | Time of Ripening. | Growth of Vine. | Black Rot | Leaf Scald. | Anthrac- nose or Scab. | Grape Leaf Blight. | Downy Mildew. | Type. | No. Dead | When Died | Number Living. | Size of Berries. | Color of Berries. |
|--------------------|---------------------|----------------------|--------------------|-----------|-------------|---------------------------------|--------------------------|------------------|--------------|----------|--------------|-------------------|------------------------|-------------------|
| | | | | | | | | | | | | | | |
| 2 | Grein's No. 7 | | Medium | Free | Badly. | Slight. | Badly. | Free. | Hybr. | 2 | 1891 | ... | Medium. | white. |
| 22 | Hartford | July 5 to 15 | Medium | Slight | Badly. | Slight. | Slight. | Free. | Labr. | 5 | 1891 | 17 | Large. | black. |
| 2 | Herbert | | Vigorous | Free | Badly. | Slight. | Slight. | Badly. | Hybr. | 2 | | 2 | Large. | black. |
| 2 | Hermann | | Vigorous | Free | Slight. | Slight. | Free | Slight. | Æst. | 1 | | 3 | Small | black. |
| 4 | Highland | | Medium | Free | Free. | Free. | Slight. | Free. | Hybr. | 1 | 1891 | 3 | Large | black with blo'm |
| 2 | Humboldt | | Vigorous | Slight | Badly. | Free. | Slight. | Free. | Rip. cross. | 1 | | 2 | Large. | white. |
| 2 | Iona | | | | | | | | Labr. | 1 | | 1 | Large. | *pale red. |
| 2 | Irving | July 25 to Aug. 5 | Not vig. | Free | Free | Free. | Free. | Free. | Hybrld. | 2 | 1891 | 2 | Large. | white. |
| 1 | Israella | | Not vig. | Free | Slight. | Free. | Badly. | Free. | Labr. | 1 | 1890 | 1 | Large. | black with blo'm |
| 22 | Ives | July 20 to 30 | Vigorous | Free | Free. | Slight. | Slight. | Free. | Labr. | 1 | | 22 | Medium | black. |
| 2 | Jefferson | July 25 to Aug. 5 | Medium | Free | Slight. | Free. | Slight. | Free. | Labr. cross. | 1 | | 2 | Large. | red. |
| 1 | Jessica | | Medium | Free | Free | Free. | Badly. | Free. | Hybr. | 1 | | 1 | Medium. | yellowish white. |
| 10 | Lady Washington | Aug. 5 to 15 | Medium | Badly | Badly. | Free. | Free. | Free. | Hybr | 10 | 1890-1 | 10 | Medium. | white. |
| 2 | Lenoir | | Vigorous | Slight | Badly. | Very badly | Badly. | Badly. | Æst. | 1 | | 2 | Small. | blue black. |
| 2 | Lindley | July 30 to Aug. 10 | Vigorous | Free | Slight. | Free. | Badly. | Slight. | Hybr | 1 | 1891 | 1 | Large. | red. |
| 2 | Long or Cunningham | | Vigorous | Free | Slight. | Slight. | Badly. | Free. | Æst. | 1 | | 2 | Small. | dark purple. |
| 10 | Martha | July 30 to Aug. 10 | Medium | Free | Badly. | Free. | Slight. | Free. | Labr | 3 | 1891 | 7 | Large. | white. |
| 1 | Mary Wylie | | Vigorous | Slight | Badly. | Badly. | Slight. | Free. | Labr. | 1 | 1891 | 1 | Large. | greenish white. |
| 2 | Mason's Renting | Aug. 1 to 15 | Vigorous | Free | Slight. | Free. | Free. | Free. | Labr. | 2 | 1891 | 1 | Medium. | white. |
| 9 | Maxatawney | July 25 to Aug. 5 | Medium | Free | Badly. | Badly. | Slight. | Free. | Labr. | 5 | 1891 | 4 | Oblong med. | white. |
| 8 | Merrimac | July 25 to Aug. 5 | Vigorous | Slight | Badly. | Badly. | Badly. | Badly. | Hybr | 1 | | 8 | Very large. | black. |
| 2 | Miland | | Vigorous | Free | Badly. | Badly. | Slight. | Very slight. | Labr. | 2 | | 2 | Medium. | amber. |
| 1 | Moore's Diamond | | Medium | Free | Slight. | Badly. | Slight. | Very slight. | Labr. | 1 | | 1 | Large. | greenish white. |
| 2 | Moore's Early | July 5 to 15 | Not vig | Free | Free | Free. | Slight. | Free. | Labr. | 2 | 1891 | 1 | Large. | black. |
| 2 | Missouri Riesling | | Vigorous | Free | Slight. | Free. | Badly. | Free. | Rip. | 2 | 1891 | 1 | Medium. | white. |
| 4 | Naomi | | Vigorous | Slight | Free | Slight. | Slight. | Slight. | Hybr | 1 | 1891 | 3 | Medium. | pale green. |
| 10 | Niagara | July 25 to Aug. 5 | Vigorous | Badly | Badly. | Slight. | Slight. | Free. | Labr. cross | 2 | 1891 | 8 | Large | white. |
| 2 | Noah | | Not vig | Free | Badly. | Slight. | Slight. | Free. | Rip. | 3 | 1891 | 1 | Large | white. |
| 2 | Norton's Virginia. | Aug. 5 to 15 | Vigorous | Free | Free | Free. | Slight. | Slight. | Æst. | 1 | | 2 | Small | black. |
| 2 | Northern Muscat | | | | | | | | | 1 | | 2 | Small | + |
| 2 | Othello | | Vigorous | Slight | Slight. | Free. | Badly. | Free. | Hybr | 1 | | 2 | Very large. | black. |
| 1 | Peabody | | Vigorous | Badly | Badly. | Badly. | Slight. | Badly. | Labr. | 1 | 1891 | 1 | Large. | black. |
| 10 | Pearl | Aug. 5 to 15 | Vigorous | Slight | Badly | Free. | Badly. | Free. | Rip. cross. | 10 | 1891 | 10 | Medium. | white. |
| 23 | Perkins | July 5 to 15 | Vigorous | Free | Free | Free. | Slight. | Free. | Labr. | 1 | | 23 | Large | brown red. |
| 2 | Pocklington | | Medium | Free | Free | Free. | Slight. | Free. | Labr. | 2 | 1891 | 1 | Large. | amber. |

VARIETIES OF GRAPES PLANTED 1889. SOUTHERN EXPOSURE—CONTINUED.

| Number Planted. | Names of Varieties. | Time of Ripening. | Growth of Vine. | Black Rot. | Leaf Scald. | Anthrax-nose or Scab. | Grape Leaf Blight. | Downy Mildew. | Type. | No. Dead | When Died. | Number Living. | Size of Berries. | Color of Berries. |
|-----------------|---------------------------|-------------------|-----------------|------------|-------------|-----------------------|--------------------|---------------|------------------|----------|------------|----------------|------------------|-------------------|
| 2 | Poughkeepsie | | Medium .. | Slight | Free | Free | Badly.. | Free..... | Hybr | 2 | 1891 | ... | Large..... | red. |
| 1 | Progress or Norfolk | | | | | | | | Labr | 1 | 1890 | ... | Large..... | red. |
| 1 | Rebecca ..... |  |  |  |  |  |  |  | ..... | 1 | 1891 | ... | ..... | * |
| 2 | Rogers' No. 11 | July 20 to 30... | Vigorous .. | Badly .. | Badly .. | Slight..... | Slight.. | Badly..... | Hybr | 1 | 1891 | 1 | Large..... | black. |
| 2 | Rulander | | Vigorous .. | Free | Badly .. | Free..... | Slight.. | Free..... | ..... | 1 | 1891 | 1 | ..... | ..... |
| 2 | Telegraph | July 25 to Aug. 5 | Vigorous .. | Slight | Slight .. | Free..... | Slight.. | Slight..... | Labr | ... | | 2 | Medium | black. |
| 1 | Transparent | | Vigorous .. | Free | Slight .. | Free..... | Badly.. | Free..... | Rip, cross | 1 | 1891 | ... | Small | white. |
| 3 | Triumph | | Not vig.... | Free | Badly .. | Free..... | Free .. | Free .. | Hybr | 3 | 1891 | ... | Large..... | white. |
| 1 | Ulster Prolific ..... |  |  |  |  |  |  |  | ..... | 1 | 1890 | ... | ..... | ..... |
| 1 | Vinango | | | | | | | | Labr | 1 | 1890 | ... | Large..... | red. |
| 9 | Vergennes | July 25 to Aug. 5 | Vigorous .. | Free | Slight | Badly..... | Slight.. | Free..... | Labr | 4 | 1891 | 5 | Large..... | red. |
| 4 | Warren | | Vigorous .. | Free | Slight | Slight..... | Slight.. | Badly..... | Æst | ... | | 4 | Small | blue with bloom. |
| 1 | Wilder | July 25 to Aug. 5 | Vigorous .. | Free | Slight | Badly..... | Free .. | Free .. | Hybr | 1 | 1891 | ... | Very large.. | black. |
| 1 | Wilding | | Medium .. | Slight | Free | Free..... | Slight.. | Free .. | ..... | ... |  | 1 | ..... | ..... |
| 1 | Worden | July 25 to Aug. 5 | Medium .. | Slight | Slight | Slight..... | Free .. | Free .. | Labr | 1 | 1890 | ... | Large | black. |
| 6 | Wyoming Red | July 10 to 20... | Not vig.... | Free | Free | Free..... | Free .. | Free .. | Labr | 2 | 1891 | ... | Medium | red. |
| 3 | Isabella | Aug. 5 to 15... | Vigorous .. | Badly | Badly .. | Free..... | Badly.. | Slight..... | Labr | ... | | 3 | Medium | black. |
| 2 | Lutie | July 5 to 15... | Not vig.... | Free | Free | Free..... | Slight.. | Free .. | ..... | ... |  | 2 | Medium | brown red. |

* Replanted 1890. † Planted 1890. ‡ Not fruited at the Station.

ROTUNDIFOLIA OR MUSCADINE TYPE.

This is peculiarly a child of the south which has, hitherto, been sadly neglected. Men are prone to overlook blessings by which they are immediately surrounded while searching abroad for those less to be desired but enchanting in the distance.

The scuppernong is the only variety of this type usually planted, very few farmers being aware of the fact that there are others very much its superior.

In 1886 eight varieties were planted twenty feet apart in rows, along the margin of a branch, and trained upon a trellis of three wires. The vines have been annually pruned by spurring back the canes of the growth of the previous season to six inches.

This type must be pruned in autumn, just after the leaves fall. If pruned later there is danger of destructive bleeding. This method of training places the crop of fruit in easy reach, increases the size of the berries and bunches, and insures a larger yield of grapes of better quality.

The Thomas commences to ripen August 15th, thus continuing the supply from the vineyard of the other types. Other varieties ripen in succession until the middle of September and furnish fruit till October.

The Memory and Mish are especially desirable, combining the good qualities of vigorous growth, hardiness, productiveness and very superior quality.

Desiring to secure the verdict of as large a jury as possible, very many visitors were taken through this vineyard for the purpose of comparing the varieties. Without exception the Memory and Mish were pronounced superior to the Scuppernong. Of the ten varieties compared, the Memory is by far the most vigorous grower.

All are free from disease except an occasional very slight attack of black rot. The proximity of diseased vines of other types may have furnished the spores for the disease.

To propagate this type use *long cuttings*, taken in October or early in November, or layer the vines at any time from October to March.

The tabulated statement sufficiently describes the character-

istics of these varieties, except as regards adhering to the stem.

The Scuppernong, James and Jeter drop so readily from the bunch as to cause great waste in gathering. The stem is attached to the berry externally. The Thomas, Memory and Scuppernong seedling do not shed so readily though attached externally. The Flowers, Flowers Improved, Mish and Tenderpulp adhere firmly to the bunch, having the stem attached internally. These last named varieties can be gathered and shipped in bunches as readily as Concord or Ives.

The Mish and Memory are both rated *best* as to quality, though they differ in many respects. The Memory is best in flavor and the Mish best in sweetness. The Memory produces a very large berry while the Mish is small. Both continue long in season. The following tabulated statement needs no comment :

ROTUNDIFOLIA OR MUSCADINE TYPE.—PLANTED IN 1886.

| No. Vines. | NAMES OF VARIETIES. | Time of Ripening. | Growth of Vine. | Form of Grape | Size of Grape. | Size of Bunch. | Productive-ness. | Sweetness | Flavor. | Quality. |
|------------|------------------------|-------------------|-----------------|-----------------|----------------|----------------|-----------------------|------------|------------|-----------------------------------|
| 6 | Flowers..... | Sept. 10 | vigorous.. | slightly oblong | medium.. | large.... | very produc- tive. | acid..... | poor..... | Thick skin hard pulp. Good. |
| 6 | Flowers Improved..... | Sept. 5 | vigorous.. | slightly oblong | medium.. | very large | v. prod'ctive | acid..... | poor.... | " |
| 2 | James* | Sept. 10 | medium.. | slightly flat.. | large.... | medium.. | medium.. | very sweet | very good. | very good. |
| 5 | Jeter* | Aug. 25. | vigorous.. | round..... | large.... | small.... | medium.... | medium.. | foxy..... | good. |
| 6 | Memory | Aug. 20. | very vig's. | slightly oblong | very large | medium.. | medium.... | very sweet | best..... | best. |
| 6 | Mish. | Sept. 1. | vigorous.. | round..... | small.... | medium.. | productive.. | best..... | very good. | best. |
| 2 | Scuppernong..... | Aug. 20. | vigorous.. | round..... | medium.. | small.... | medium.... | very good. | very good. | very good. |
| 6 | Scuppernong Seedling.. | Sept. 10 | vigorous.. | slightly flat.. | medium.. | medium.. | very prod'e | medium.. | good.... | good. |
| 6 | Tender Pulp..... | Sept. 10 | vigorous.. | slightly oblong | medium.. | large.... | best..... | medium.. | good.... | good. |
| 6 | Thomas | Aug. 15. | vigorous.. | oblong..... | large.... | medium.. | medium.... | very sweet | very good. | very good. |

*Planted in 1887.

RASPBERRIES.

The following varieties have been tested on the grounds of this Station, commencing in 1886:

| BLACK CAP TYPE. | RED CAP TYPE. |
|-----------------------------------|-----------------------------------|
| (Propagated by layering of tips.) | (Propagated by underground Stem). |
| Caroline. | Brandywine. |
| Doolittle. | Crimson Beauty. |
| Davidson's Thornless. | Cuthbert. |
| Florence, (Hybrid, yellow). | Early Prolific. |
| Gregg. | Golden Queen. |
| Hopkins. | Highland Hardy. |
| Mammoth Cluster. | Hansell. |
| Ohio. | Marlboro. |
| Sauhegan. | New Rochelle. |
| Shaffer's Colossal, (Hybrid). | Rancocas. |
| Tyler. | Reliance. |
| | Superb. |
| | Thompson's Early Prolific. |
| | Thompson's Early Pride. |
| | Turner. |
| | Welch. |

Of the Black Caps the Sauhegan and the Shaffer's Colossal are the most reliable and desirable varieties, but none of this type have proved satisfactory in open field culture here. In garden culture, where they can be partially shaded, they succeed reasonably well. In the field they sun-scald at the arch of the new canes, and on account of our dry falls, fail to propagate.

Of the Red Caps, the Turner has been perfectly satisfactory, being hardy and prolific, with a fruiting season of from three to five weeks. Next to this ranks the Cuthbert, which produces a larger plant and a larger berry, but is less prolific.

Golden Queen ranks first as to the size and quality of the berries, but is neither so hardy nor prolific as the other two.

Thompson's Early Prolific ranks next to the Golden Queen in quality of berry, is prolific, but not so hardy as the Turner and Cuthbert. The remaining varieties have proved unreliable on these grounds.

Since 1886, the following varieties of Strawberries have been planted on the grounds of this Station. Detailed reports have been made upon nearly all of them, from time to time,

since 1887. Three new varieties, viz: Banquet, Everbearing and Dubravas No. 3, have not been sufficiently tested for report. The last named has been fruited sufficiently to justify rating it as "promising well."

From the long list of tested varieties, the following six are recommended as those most worthy of cultivation, and are rated in the order named: 1st, Sharpless; 2d, Wilson; 3rd, Belmont; 4th, Buback; 5th, Eureka or 1001; 6th, Haverland. These are all good varieties for the soil of this Station, which represents nearly three-fourths of the soil of the State of Alabama, with sufficient accuracy to render the results of experiments conducted here valuable.

Three of these, Sharpless, Wilson and Eureka or No. 1001, are recommended in Bulletin No. 12, of the Canebrake Station as best, and Haverland did well. Buback and Belmont were not tested there. Gandy, and Champion of Kentucky, did well here but not sufficiently so to be included in the six varieties most highly recommended.

Some of the most desirable varieties of grapes, raspberries and strawberries, tested upon these grounds have been distributed to farmers in nearly all of the counties of this State for experiment and report to this Station. Sufficient time has not elapsed since such distribution to authorize reports, but very valuable results are expected within the next two years from experimental comparison of varieties under such varied conditions.

VARIETIES OF STRAWBERRIES.

| | |
|------------------------|-------------------------|
| 1 Agriculturist. | 33 Jewell. |
| 2 Atlantic. | 34 Jucunda. |
| 3 Banquet. | 35 Jumbo. |
| 4 Belmont. | 36 Kentucky. |
| 5 Bidwell. | 37 Lacon. |
| 6 Big Bob. | 38 Lady Rusk. |
| 7 Boyden's No. 30. | 39 Legal Tender. |
| 8 Bubach. | 40 Lida. |
| 9 Captain Jack. | 41 Longfellow. |
| 10 Champion. | 42 Manchester. |
| 11 Champion of Ky. | 43 May King. |
| 12 Charles Downing. | 44 Miner's. |
| 13 Cornelia. | 45 Monarch of the West. |
| 14 Continental. | 46 Monmouth. |
| 15 Crescent. | 47 Mt. Vernon. |
| 16 Crystal City. | 48 Mrs. Garfield. |
| 17 Cumberland Triumph. | 49 Nig's Superb. |
| 18 Daniel Boone. | 50 No. 3 Dubravas. |

- | | | | |
|----|---------------------|----|---------------------|
| 19 | Early Canada. | 51 | No. 1001 or Eureka. |
| 20 | Everbearing. | 52 | Old Iron Clad. |
| 21 | Finch's Seedling. | 53 | Parry. |
| 22 | Galceran. | 54 | Piper's Seedling. |
| 23 | Gandy. | 55 | President Lincoln. |
| 24 | Glendale. | 56 | Primo. |
| 25 | Golden Defiance. | 57 | Prince of Berries. |
| 26 | Harris' Mammoth. | 58 | Sharpless. |
| 27 | Haverland Seedling. | 59 | Triomphe de Gand. |
| 28 | Henderson. | 60 | Vineland Seedling. |
| 29 | Hoffman. | 61 | Warren. |
| 30 | Indiana. | 62 | Wilson. |
| 31 | James Vick. | 63 | Windsor Chief. |
| 32 | Jersey Queen. | 64 | Wonderful. |

