

EXPERIMENT STATION
OF THE
KANSAS STATE AGRICULTURAL COLLEGE,
MANHATTAN.

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Horticultural Department.

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GRAPES.

THERE is no question as to the importance of the grape commercially, nor as to its desirability as a table fruit. While the profits of a vineyard are, perhaps, not usually so large for a given area as from some other fruit and garden crops, the vineyard that receives proper care is nearly certain to give good returns. With a proper selection of varieties, the vineyard may be made to furnish fresh fruit for the table from early in August until well into October. With Green Mountain, Campbell's Early, Brighton, Eldorado, Worden, Concord, Agawam, and Catawba, a succession of fruit may be secured, and by bagging all or a part of each variety there need be no lack of fruit during the entire season.

Some of the white varieties will add to the pleasure of both eye and palate, and may, if judiciously handled, so help the appearance of the packages as to make the fruit sell readily on a market already overstocked. Diamond, Lady Washington and Mason are probably the best in quality, but some of the perfectly hardy varieties, as Elvira, Martha, Faith, and Pearl, are of fair quality and good appearance. For table use and the fancy trade the red grapes are very satisfactory, being of fine appearance and quality. Brighton, Brilliant, Massasoit, Catawba, Woodruff, Wyoming, Berckman, Agawam

and Delaware have been found to be the best red varieties for this locality. The Berckman, which is a cross of the Clinton and Delaware, possesses most of the good qualities of the Delaware and is much hardier. It has much the appearance of the Delaware and might easily take the place of that favorite variety. It deserves more attention than it now receives from those who are fond of good grapes.

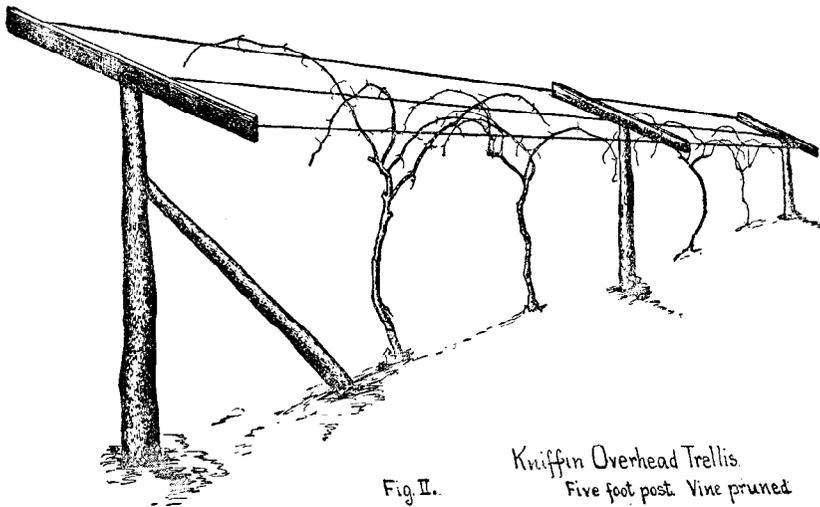
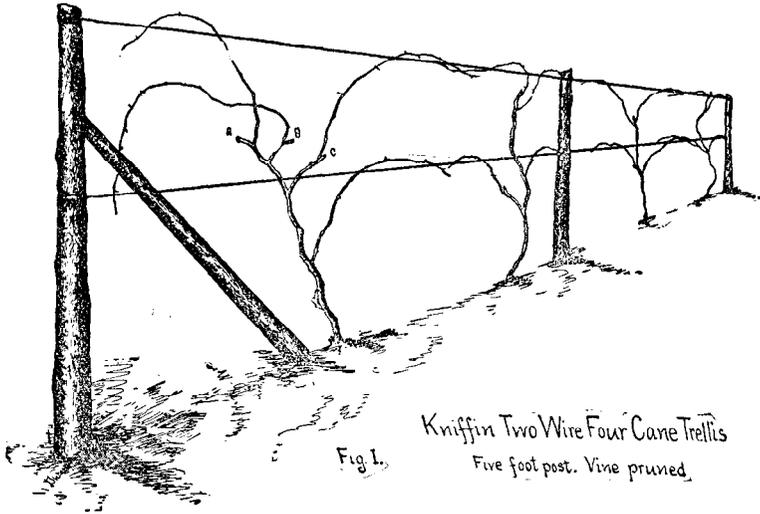
Varieties and hybrids of our common wild grape, *Vitis riparia*, have withstood the most severe droughts so well that they are believed to be well worth testing in localities where conditions are especially trying. While not equal to our best grapes, many of them are of fair quality, and as a class they are productive. Marion has been the best of the pure *riparias*. Elvira, Grein's Golden, Faith and Pearl have proved perfectly hardy, and have been regular and prolific in bearing.

The old vineyard was planted long before the establishment of the Experiment Station. It contains a considerable number of vines of a few common varieties. This has been used for experiments in spraying, bagging, and pruning. Planted on very poor, gravelly soil, it has furnished evidence that grapes may be profitably planted in almost any quality of soil, if carefully pruned and trained. Light applications of barn-yard manure—about twenty tons per acre—on the poor soil have been beneficial.

In 1888 the first planting in the experimental vineyard was made. Other and new varieties were added each season, until now over 150 varieties are represented. Many of these varieties are of little value, ripening, as they do, at the same date as the better ones. The well-known and commonly-grown varieties are planted in this vineyard for the purpose of comparison. The soil is fairly good clay loam, and the growth and crops have been satisfactory, so far, with no application of manure. The ground is kept free from weeds and well cultivated. No irrigation has been given, and in the dryest seasons the vines and crops have been injured but little. It has usually been more convenient to prune the vines in the fall or early winter, at any time after the leaves have fallen. No difference has been noticed in the fruitfulness of vines pruned in the early fall and those pruned in late winter or early spring. Twine, narrow strips of cloth and raffia have been used for ties with equal satisfaction; the material which is cheapest and most easily obtained is selected. Strips of corn-husks have given very fair satisfaction when used as ties.

TRELLIS TESTS.

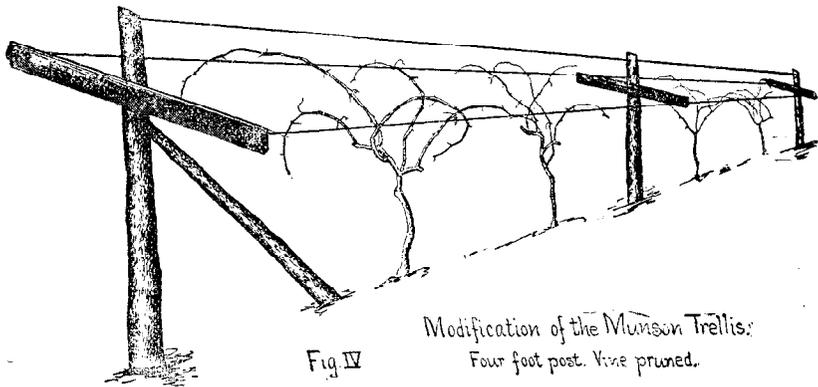
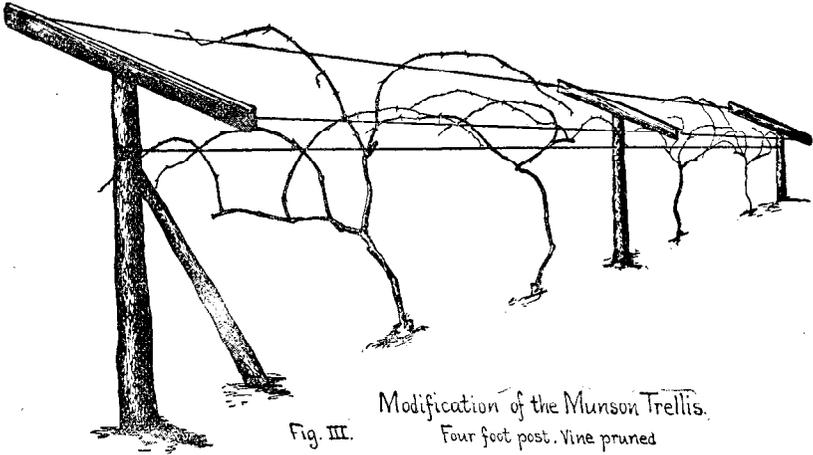
The proposed plan for testing methods of pruning and training varieties of grapes, as outlined in the Annual Report of the Experiment Station for 1897, was changed somewhat when the trellises were built.



Six forms of trellis have been under observation: The Kniffin two-wire, four-cane trellis, the Kniffin overhead or telegraph trellis, two modifications of the Munson trellis, a form of umbrella or post-and-arm trellis, and the common post-and-wire trellis. Figure 1 shows the Kniffin two-wire four-cane trellis; one wire is three feet and the other five feet from the ground. Figure 2 shows the Kniffin overhead or telegraph trellis; the cross-arm is five feet from the ground and three feet long, the wires eighteen inches apart. Figure 3 shows a modification of the Munson trellis, having a cross-arm two feet three inches long, with a wire at each end four feet from the ground, and a middle wire fastened to the post at three feet from the ground. Figure 4 shows another form of Munson trellis, having the cross-arm at three feet and the middle wire at four feet from the ground. Figure 5 is a form of umbrella or post-and-arm trellis, having arms four feet long four feet from the ground; around the ends of the arms a wire is fastened. Figure 6 is the three-wire trellis used for the fan system of training; the wires are eighteen inches, three feet and four feet six inches from the ground. With the exception of the fan system, all these forms of training are high-renewal systems, varying somewhat as to height and details of training.

The one general principle to be kept in mind in pruning for each and every system is, that the fruit is borne on shoots which grow from the wood of the previous year's growth; that is to say, the wood grown in 1901 bears the buds from which will spring the shoots that will bear the fruit and form the new wood in 1902. In pruning, then, the one object is to secure a well-formed vine carrying sufficient young wood to bear such a crop of fruit as the vine seems able to carry. Care should be taken to plan for the continuous life of the vine, and that the new wood for future crops may be so grown as to keep the vine well within the bounds of its place on the trellis. It is often urged as a general proposition, that it is better to leave too little than too much wood. This may be true if quality alone is considered, but the aim of the grower is to raise the greatest amount of the best quality of fruit, and to attain this some experience with the variety, soil and location is necessary. Pruning is an operation which requires practical judgment. The age and general strength of the individual vine and the habit of growth of the variety must be considered.

The varieties in the vineyard being used for the trellis tests are Worden, Concord, Catawba, Green Mountain, Brighton, Herbert, and Eldorado. Part of the vines were set in the spring of 1896, and the remainder in the spring of 1897. During the first season care was taken to shorten in the vines that made a particularly strong growth, in order that, during dry periods, excessive evaporation might not



weaken the plants. The growth of the first season was cut back in the fall to two buds, and, in nearly every case, good growths were made the following season. The vines intended for the high-renewal trellises were trained to one strong cane; those for the low-renewal fan system were allowed to grow three or four good canes, which were cut back to about four feet in the fall. The severe weather of February, 1899, injured all the varieties. Only Concord and Worden bore fruit that season, and these but a light crop. The vines of the other varieties were cut back to the ground. All the vines made a very vigorous growth during the summer and were in good condition and in fairly good form on the trellises the following spring. Having been trained quite carefully during the summer, the only pruning necessary was to cut the vines back to a proper length for the next season's fruiting. It was not at all difficult to have the vines in almost ideal form for the fan system, not all of the vines intended for high-renewal trellis were in form for a full crop at the end of one season's growth, but the greater number had the four canes at proper height for the trellis. During the season of 1900, care was taken to allow the shoots starting from the first buds of the four canes to grow to a length of four or five feet; these new canes were to take the place of the four original arms in 1901. Figure 1 shows the vine as pruned in the fall of 1900, the short projections, "a," "b," "c," showing where the canes grown in 1899 and fruiting in 1900 have been cut away.

A variation known as the spur renewal is secured by retaining the original four canes and cutting the shoots which grow from them back to one bud. From these buds grow the fruiting wood for the following season, which in turn is cut back to one bud, and so continue. When this spur training is followed, it is usually necessary to renew, every few years, the arm which bears the spurs. This may be readily done if care is taken to grow a new strong cane from the spur nearest the vine. It is our judgment that the annual renewal of the entire arm is preferable to the spur pruning. When the spurs are a few years old the vine has a rough appearance, and in some cases the older spurs have been attacked by the grape-vine cane borer, *Amphicerus bicaudatus*. Vines grown upon any of the forms of high-renewal training require much the same general pruning. The details may vary for individual vines. Sometimes it is advisable to have fewer and longer canes; with other vines a greater number of short canes will be more advantageous.

With the fan system of training, as grown on the trellis shown in figure 6, the object is to keep the bearing wood as low as possible; the first vine shown in the plate is one that has the new wood some little distance from the root; the next vines are the same age, fifteen years, but the new wood has been kept growing from the base of the vine.

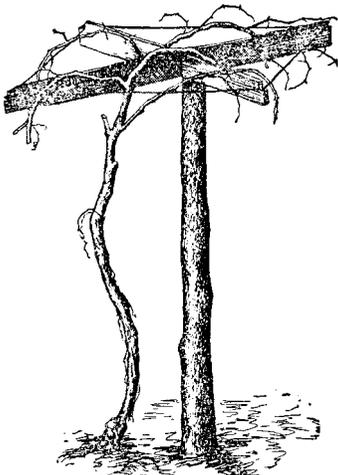


Fig. V. "Umbrella" Trellis.
Four foot post. Vine pruned.

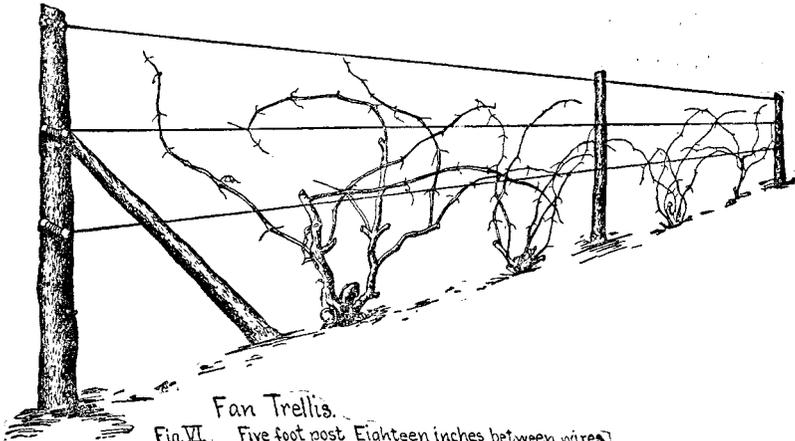


Fig. VI. Fan Trellis.
Five foot post. Eighteen inches between wires.
Vine pruned.

There has been little difference in the productiveness of the vines of the same variety grown upon the different forms of trellis. Good crops of fine fruit were produced in 1900 and 1901. The records seem to warrant the conclusion that good crops depend more upon careful training and pruning than upon the form of trellis used.

It is somewhat easier to cut the bunches of fruit from the high-renewal trellises than from the low-renewal ones, as it requires less stooping, but little difference has been noticed in the amount picked in the same length of time from the different trellises.

The date of ripening has uniformly been a few days earlier for the high-renewal vines than for the low-renewal, but the difference in time has in no case exceeded one week. No difference in quality has been noted. In 1901 there was a noticeable unevenness in the ripening of the berries of many of the bunches, but this was noted on all the forms of trellis.

More care has been required to prevent sunburning of fruit grown on the Kniffin two-wire, four-cane trellis than with any other trellis. This is not a difficult matter, requiring only that the new growth be trained over the bunches of fruit.

The fruit grown on the two forms of Kniffin trellis has been more seriously injured by birds than has that grown on any of the others, the umbrella and the fan system having had the smallest amount of injured fruit.

For varieties that are not perfectly hardy, the fan system is the most practical, as the young canes may be laid down for protection much more readily than the older wood.

It is probable that, in localities where fungous diseases are liable to seriously injure the crops, any of the high-renewal forms would be preferable to the low-renewal fan system. The high-renewal trellises more readily expose the vines and fruit to the sun and the winds, but in most localities in Kansas sun and winds are to be guarded against rather than courted, and the fan system of trellis offers the best opportunity for this.

The trellis for the fan system is the simplest and cheapest in construction. The experience in the Experiment Station vineyard seems to warrant its being commended to Kansas growers.

BAGGING GRAPES.

The opinion expressed in Bulletin 28 as to the practicability of protecting grapes from the birds by bagging the bunches with Manila paper bags has been confirmed by the results of several seasons. The cost has continued to be about one cent per pound. In localities where grapes are cheap this might not pay, but for fruit destined for the grower's table or for fancy market, the improved appearance is

well worth the cost. The lengthening of the season of fresh grapes is an item that is well worth considering by those who grow grapes for table or market. Tests made to determine the length of time that bagging would extend the season have given the following results:

Number of days that fruit in sacks was in good condition after the unbagged grapes were overripe or fallen:

Agawam.....	2	Delaware	40
Brighton.....	15	Diamond	8
Catawba.....	None	Eldorado	28
Concord	14	Moore's Early.....	20

In case of most varieties, the condition of the bunches was much better than those unbagged. Brighton, Brilliant, Woodruff, Wyoming and Catawba did not color quite so highly, and the flavor was not always up to the standard of the variety. This difference in color and flavor was in most cases slight, and, except with Catawba, did not injure the market value of the fruit.

TENDER VARIETIES.

The growing of tender and half-hardy varieties of grapes has been continued, with a degree of success that has been encouraging. The vineyard devoted to the test of varieties is trained according to the fan system; the bearing wood being close to the ground is an advantage in covering, which is necessary to some of the most desirable varieties. The vines are pruned as soon as the leaves are fallen, usually in November, and the canes are laid down and covered with four or five inches of earth. Care is taken not to cut or uncover the roots. When danger of frost is past, and the buds of the more hardy varieties are beginning to swell, the vines are uncovered and tied to the trellis, the soil is leveled, and cultivation is commenced. With the exception of the winter of 1898-'99, when an unusual amount of work and an unusually early winter combined to prevent the laying down of the vines, they have been protected in this manner each winter since 1892, and in every case this has been sufficient protection.

The accompanying table contains the condensed records of the varieties as to hardiness during 1898-'99, and the subsequent behavior of the injured varieties. Many varieties previously listed as perfectly hardy were more or less seriously injured. Nearly all varieties in list two and a number in list three have been hardy in other severe seasons. In view of the fact that many varieties of other fruits which have been hardy in other seasons were seriously injured in 1899, the record of the rapid recovery of varieties of grapes known to be more or less tender is very gratifying to those who desire to grow grapes of finer quality than the common varieties.

CLASSIFICATION.

The classification of varieties is that of the grape herbarium of the Experiment Station, used in Bulletin 44, with additional classes for later accessions to the vineyard. No attempt is made here to decide questionable points of parentage. The varieties are classified according to the parentage recorded by the originators or other authorities who have described them.

- Class I.— *Vitis labrusca*.
- “ II.— *Vitis labrusca* × *Vitis vinifera* (?).
- “ III.— *Vitis labrusca* × *Vitis vinifera*.
- “ IV.— *Vitis riparia*.
- “ V.— *Vitis riparia* × *Vitis labrusca* (?).
- “ VI.— *Riparia-labrusca* × *labrusca-vinifera*.
- “ VII.— *Vitis riparia* × *Vitis vinifera*.
- “ VIII.— *Vitis æstivalis*.
- “ IX.— *Vitis æstivalis* × *Vitis labrusca*.
- “ X.— *Vitis linsecomii* × *Vitis labrusca*.
- “ XI.— *Vitis linsecomii* × *Vitis rupestris*.
- “ XII.— *Vitis linsecomii* × *Vitis æstivalis*.
- “ XIII.— *Vitis linsecomii* × *labrusca-vinifera*.
- “ XIV.— *Vitis linsecomii* × *Vitis riparia-labrusca*.
- “ XV.— *Vitis rotundifolia*.

LIST ONE.

Varieties uninjured or slightly injured and bearing a fair crop:

Name.	Class.	Name.	Class.
Bacchus.....	IV	Janesville.....	V
Beagle.....	VI	Marion.....	IV
Bell.....	V	Martha.....	I
Cambridge.....	I	Missouri Riesling.....	V
Challenge.....	II	Moore's Early.....	I
Concord.....	I	New Haven.....	I
Conelva.....	V	Noah.....	V
Conqueror.....	II	Pearl.....	V
Elvira.....	V	Potter's Sweet.....	I
Faith.....	V	Rommel's Etta.....	IV
Grein's Golden.....	V	Worden.....	I
Humboldt.....	VIII		

LIST TWO.

Varieties seriously injured but bearing some fruit:

Name.	Class.	Name.	Class.
Champion	I	Lutie	I
Cottage	I	Munson's No. 88	XI
Diamond	I	Rockwood	I
Dracut Amber	I	Ruby	VI
Early Ohio	I	Telegraph	I
Empire State	V	Ulster	II
Eva	I	Woodruff	I
Gold Coin	IX		

LIST THREE.

Varieties killed to the ground but made a good recovery:

Name.	Class.	Name.	Class
Agawam	III	Hopkins	XII
Amber	V	Iona	II
America	XI	Irving	III
Aminia	III	Isadore Bush	XIII
Antoinette	I	Lady Washington	III
August Giant	VII	Lenoir	VIII
Barry	III	Letoney	XIII
Berckmans	V	Massasoit	III
Blanco	VI	Merrimac	III
Blood	XII	Moyer	II
Brant	VII	Munson's No. 82	XIII
Brighton	III	Nectar	III
Brilliant	III	Northern Muscadine	I
Catawba	II	Norwood	III
Canada	VII	North Carolina	I
Carman	XII	Nimaba	III
Colerain	I	Opal	III
Cornucopia	VII	Pocklington	I
Columbian Imperial	V	Poughkeepsie	II
Cynthiana	VIII	Rebecca	I
Delaware	II	Requa	III
Dinkel	II	Rochester	II
Duchess	II	Red Eagle	III
Eaton	I	Rommel	V
Early Victor	I	Salem	III
Early Market	VI	Sweetey	XIII
Eldorado	III	Texas Highland	XIII
Eumelan	VIII	Umland	V
Fern Munson	XIII	Victoria	I
Goethe	III	Van Deman (Pulpless)	XIV
Green Mountain	I	Walter	IX
Hartford	I	Winchell	I
Hayes	I	Wilding	V
Herbert	III	White's Northern Muscat	III
Highland	III	Wyoming	I
Hermann	VIII		—

LIST FOUR.

Varieties killed or so badly injured that growth was very feeble:

Name.	Class.	Name.	Class.
Amber Queen.....	II	Lady.....	I
Black Eagle.....	III	Lindley.....	III
Centennial.....	IX	Mason.....	I
Creveling.....	III	Maxatawney.....	II
Croton.....	III	Mills.....	III
Downing.....	III	Monroe.....	II
Early Golden (Campbell).....	II	Niagara.....	I
Gaertner.....	III	Norton's Virginia.....	VIII
Geneva.....	III	Perkins.....	I
Golden Gem.....	IX	Peter Wylie.....	III
Iowa Excelsior.....	III	Prentiss.....	II
Isabella.....	I	Scuppernong.....	XV
Israella.....	I	Triumph.....	III
Ives.....	I	Venango.....	I
Jefferson.....	II	Waverly.....	V
Jessica.....	VII	Wilder.....	III

LIST FIVE.

Varieties of list four that had recovered so far as to bear fair crops in 1900 and 1901:

Black Eagle.....	III	Mason.....	I
Early Golden.....	II	Maxatawney.....	II
Centennial.....	IX	Mills.....	III
Creveling.....	III	Monroe.....	II
Downing.....	III	Perkins.....	I
Geneva.....	III	Prentiss.....	II
Golden Gem.....	IX	Scuppernong.....	XV
Iowa Excelsior.....	III	Triumph.....	III
Jefferson.....	II	Waverly.....	V
Jessica.....	VII	Wilder.....	III

LIST SIX.

Varieties that have died since 1899 from the effects of the freeze:

Name.	Class.	Name.	Class.
Croton.....	III	Niagara.....	I
Isabella.....	I	Norton's Virginia.....	VIII
Ives.....	I	Peter Wylie.....	II
Lady.....	I	Venango.....	I

DESCRIPTIONS OF VARIETIES.

Many of the descriptions have been published in previous bulletins which are now out of print. They are given here in order that the descriptions of all the varieties may be found together, and for those who have not the previous publications.

CLASS I.

Vitis labrusca. Northern fox-grape.

Antoinette. Vines moderately strong growing, tender, shy in bearing; bunches long, small; berry medium to large, white; pulp small, juicy, sweet, fexy. Ripens first of September.

Campbell's Early. Vines vigorous, hardy, productive; bunch medium to large, compact, shouldered; berry very large, black, with bloom; skin tough; pulp tender; flavor similar to Concord. Ripens about August 10.

Cambridge. Vines strong, vigorous, hardy, fairly prolific; bunch medium to large, shouldered; berry medium, black, with a slight bloom; skin thin; pulp large, juicy, subacid. Ripens about September 1.

Catawba. Vines vigorous and strong growing; usually stands the winters well, though it will not stand the extremes and be very prolific; bunch large, compact, shouldered; berries medium to large, deep coppery red, covered with a lilac bloom; skin thick; pulp large, juicy, sweet, with a vinous flavor; is one of the best grapes, and deserves a place in every vineyard. Season, last half of September.

Champion. Vines of medium vigor, hardy, prolific; bunch large, compact, shouldered; berry medium to large, black; skin thin, tough; pulp large, tough, subacid, not the best. Ripe about the 1st of August.

Colerain. Vines thrifty, though not rank, semi-hardy, not a heavy bearer; bunch large, loose, shouldered; berry large, greenish white, with heavy bloom; skin very thin and tender; pulp large, tender; flavor melting, sweet, very best; seeds few. Ripens about August 10.

Concord. Vines thrifty and hardy; is much esteemed for its regular and heavy bearing; bunch large, compact, shouldered; berry medium to large, nearly round, black or dark purple, with heavy bloom; skin thick and tough; pulp very tender, juicy, sweet; one of our very best market grapes. Ripens about September 1.

Cottage. Vines vigorous, strong growing, hardy, a shy bearer; bunches medium, loose; berry large, dark purplish black, with heavy bloom; skin fairly thin; pulp large, tough, juicy, sweet, much like the Concord. Ripens with Concord.

Dracut Amber. Vines strong growing and thrifty, fairly hardy, a great bearer; bunches medium to large, fairly compact, sometimes shouldered; berry large, oval, amber colored, with a thin bloom; skin thick; pulp small but tough, juicy, sweet, with a very strong *labrusca* flavor. Ripens with Concord.

Early Ohio. Vines strong or medium, hardy, not prolific, though a fair bearer; bunch medium to large, often shouldered; berry medium, black, with a heavy bloom; pulp large, tough, sour, not very good. Ripens about August 1.

Eaton. Vines of coarse growth, not very vigorous, wood dark brown; foliage resembling that of the Concord; shy in bearing; berry large or very large,

round, black, with thin lilac bloom; skin of moderate thickness, rather tender; flesh with tough pulp; fruit with much the texture and flavor of Concord or Worden. Ripe from the middle to last of September.

Eva. Vine slender but vigorous, tender, shy; bunch and berry of medium size, though rather uneven; color greenish yellow; skin tender; flavor mild and sweet and lacking sprightliness. Season from the middle to last of August.

Green Mountain. Vines of vigorous but slender habit, hardy; clusters small, compact; berry small, oval, dull pale green; skin tough; pulp rather tough; flavor fair. Ripe by middle of August.

Hartford. The vines make a long, slender growth, and are quite hardy. With us this variety has not given the abundant yield that might compensate in a measure, for the inferior quality of the fruit. The bunches have been of uneven size and thinly set. Ripe about the 10th of August.

Hayes. In vine and leaf this variety closely resembles Eva. The bunch is of middle size, rather loose and evenly filled; the berry of middle size, golden green, with white bloom; the skin rather thin and tender; the flesh juicy, melting, more sprightly and pleasant than the Eva. Season, last of August and first of September.

Israella. Vines, vigorous, tender, a shy bearer; bunch medium, shouldered; berry medium, black, with a heavy bloom; skin thin; pulp large, tender, juicy, sweet. Ripens about August 10.

Ives. The vines are rampant in growth and fruit abundantly; the berry medium sized; compact bunches, black, with a heavy lilac bloom, quite attractive, and are often marketed when first colored, though yet immature and unfit for eating. When fully ripe, however, their strong, musky flavor is against them. Their season of perfect maturity is, with us, about the same as that of the Concord.

Josselyn's No. 9. Vines very vigorous and strong growing, hardy, a very shy bearer; bunch medium, loose, shouldered; berry large, round, dark red, with heavy bloom; skin thick, tender; pulp large, very tender; juicy, sweet; seeds few. Ripens about September 25.

Lady. Vine semi-hardy and fairly vigorous, yield of fruit only medium; bunch medium to large, oblong, with heavy shoulder; berry large, rich, golden, with a thick bloom, of very fine appearance; flesh meaty, not juicy, rich, sweet, but with a flavor resembling an overripe pear, which detracts from its quality. Ripens very unevenly, from the middle of August to the first of September.

Lutie. Vines strong growing, vigorous, semi-hardy, very prolific; bunches large, very compact, shouldered; berry large, pale, coppery red; skin thin; pulp large, tough, juicy; flavor a sweet *labrusca*; seeds few. Ripens about August 15.

Martha. Vines of vigorous but slender growth, hardy; produced a medium crop of fruit; bunches uneven in size, some large and very fine; berry large, round, clear, greenish yellow, with white bloom; flavor rich, sweet, with an aroma similar to Eva or Hayes. Season the last of August.

Mason. Vines of only moderate vigor, yet quite hardy; yield of fruit light; bunches of medium size, but berry large and fine; the best flavored of any of the Concord seedlings. Ripe the last of August.

Moore's Early. Vines strong and thrifty, very hardy, and very prolific; bunch large, compact, shouldered; berry very large, jet black, with a heavy

bloom; skin thin, fairly tender; pulp large, tough, juicy; flavor a sweet subacid. A very fair grape, though it ripens long after it turns black. Ripens about the middle of August.

New Haven. Vines strong growing, though not rank, thrifty, hardy, prolific; bunch large, compact, shouldered; berry large, black, with bloom; skin thin, tender; pulp large, fairly tender, juicy, sour. Resembles Concord very much. Ripens with Concord.

Niagara. The vines make a strong but somewhat slender growth, tender, shy in bearing; bunches large, compact, shouldered; berry large, oval, greenish yellow, with quite heavy bloom; skin tough; fruit does not crack or drop; flesh tender, juicy, pleasant; quality excellent. Ripe with Concord.

North Carolina. Vines strong, vigorous, tender, a shy bearer; bunch small, fairly compact, shouldered; berry large, dark purple, with heavy bloom; skin very thick, fairly tender; pulp large, somewhat tough, juicy, sweet. Ripens about August 25.

Perkins. Vines strong and hardy in growth, but shy in bearing; bunches small and imperfect; berry oval, pale red, of strong foxy flavor, like that of Dracut Amber. Ripens with Concord.

Pocklington. Vines vigorous and hardy, prolific, though the crop rarely matures well; bunches are large, rather long, very compact, heavy shouldered; berry large to very large, often quite oblate; color rich golden, with fine bloom when fully matured; flesh meaty and the flavor sweet. Ripening quite unevenly the last of September, much fruit being injured by frosts.

Potter's Sweet. Vines vigorous and thrifty, hardy, and a strong grower; fairly prolific; bunch medium to large, loose, shouldered; berry round, black, with bloom; skin thin, tender, juicy, sweet. Ripens about August 15.

Rebecca. Vines weak in growth, tender, and a very shy bearer; bunch small to medium, compact; berry medium, oval, pale green, with bloom; skin thin and tender; pulp melting, juicy, sweet. Ripens about September 1.

Rockwood. Vines strong growing, thrifty, hardy, shy bearer; bunch medium to large, shouldered, rather loose; berry large, dark purple, with heavy bloom; skin thin, tough; pulp large, tough, juicy; flavor like the Concord. Ripens about August 20.

Telegraph. Vines thrifty, vigorous, hardy, very prolific; bunch medium to large, compact, usually shouldered; berry large, round to oval, black, with a heavy bloom, hanging long after ripening; skin thick, tough; pulp small, tough, subacid, good. Ripens with Concord.

Venango or Minor's Seedling. A rank grower and hardy, giving but a light crop of the most unpalatable red fox-grapes in the collection. Ripens with Concord.

Vergennes. The vines produce strong canes, but are quite tender; fairly good bearers; bunch and berry large; color dull red, with heavy bloom; skin thick; flesh tender, sweetish, but lacking in flavor. Season from the middle to the last of September.

Whitehall. Vines strong and thrifty, tender, a fair bearer; bunch medium to large, compact, shouldered; berry medium to large, dark purple, with a light bloom; skin thin, tender; pulp large, tough, sour, juicy; seeds large. Ripens about August 10.

Winchell. Identical with Green Mountain, though with us it ripens ten days later. Vines vigorous and thrifty, a very strong grower, semi-hardy, very prolific; bunches medium to large, compact, shouldered; berry medium, light green, with bloom; skin thin, tender; pulp small, tender, juicy, sweet; seeds few.

Woodruff Red. Vines hardy, vigorous, productive. The bunch is large, heavy, compact, with a short shoulder; berry very large, round, clear, pale red; flesh juicy, sweet, with a slight musky flavor. The fruit of this variety attracted much attention, and seemed to be as generally acceptable to the palate as it was agreeable to the eye. Season, late August and early September.

Worden. Cane and foliage with all the characteristics of the Concord, and the fruit also closely resembles the Concord, with which it ripens, but the bunch is more oblong and compact, and not so heavily shouldered; the berries are rather more thin-skinned and more liable to crack, and on this account the variety is inferior as a shipper.

Wyoming Red. Vines vigorous but slender growth, quite hardy, producing fair crops of fruit. The bunch is of middle size, compact, oblong, or sometimes shouldered; berry of middle size, round, light red, with a heavy white bloom; the skin thin, tough; the flesh juicy, with some tough pulp; the flavor subacid and pleasant, with a slight foxiness. The fruit is of a very attractive appearance, and sufficiently good to sell readily. Season a little earlier than the Concord.

CLASS II.

Vitis labrusca × *Vitis vinifera* (?). Probable hybrids.

Amber Queen. Vines fairly strong in growth, tender, a medium bearer; bunch small, compact, shouldered; berry large, slightly oblong, dark red, with a heavy white bloom; skin thin, tender; pulp small, tender, juicy; flavor a foxy sweet. Ripens last of August.

Challenge. Vines very strong growing, vigorous, thrifty, hardy, a shy bearer; bunch medium to small, compact, shouldered; berry medium to large, round, pale red, becoming dark red when fully ripe; skin thin, tender; pulp large, juicy, sour. Ripens about August 15.

Conqueror. Vines vigorous, thrifty, strong growing, hardy, a fair bearer; bunch medium to large, loose shouldered; berry medium, dark purple to black; skin thick, tough; pulp large, tough, juicy, sour, poor. Ripens about September 1.

Delaware. Vines slow growing, with slender canes, semi-hardy, only fairly productive; bunches small, compact, sometimes shouldered; berry small, round, red, with a bloom; skin thin; pulp tender, sweet, juicy; well deserves its popularity as a table grape. Ripens about with Concord.

Diamond. Vine vigorous and only moderately hardy; bunches large, long, compact, shouldered or doubly shouldered, and very handsome; berry medium to large, round, pale golden, with heavy bloom; skin so thin as to need very careful handling; flesh juicy, melting, leaving no pulp; flavor mild, sweet. Ripens about September 1.

Diana. Vine vigorous in growth but somewhat tender, yields moderate; clusters of uneven size, some large, compact, and fine; berry of medium size,

light red, with a delicate bloom; skin thick and tough; flavor rich and pleasant, but with a slight foxiness. Season from the middle of August to the first of September.

Dinkel (a supposed Catawba seedling). Canes vigorous in growth, stout, with many laterals, the general appearance of vine and leaf much like Catawba; bunches of medium size, compact, slightly shouldered; berry of medium size, round, deep coppery red, with thick bloom; skin thick; berry adhering firmly to the stalk; a rather tough pulp; flavor quite rich and sweet, with a slight acidity next the skin, much like Catawba. Ripens last of September.

Duchess. Vine of strong growth, but too tender to stand our winters without protection. The fruit seems subject to attack from black rot. The bunches are long, rather slender, compact, shouldered; berry of medium size, slightly oval, pale yellow, with white bloom; with a tough skin, adhering firmly to the stem; flesh tender, sweet, excellent. In handling and keeping qualities this is a remarkable grape, when it can be secured in perfection. Ripens about the middle of September.

Early Victor. Vine moderate in growth, quite hardy; bunch of medium size, compact, shouldered; berry medium, round, black; flavor mild, pleasant. This variety, though two weeks earlier than the Concord, is not valuable as a market grape.

Esther. Vines weak growing, semi-hardy, shy in bearing; bunch large, compact; berry large, white; skin thin; pulp tender, juicy, sprightly subacid. Ripens with Concord.

Iona. Vines fairly thrifty though not strong growing, tender, a fair bearer; bunch medium, compact; berry medium, red, with dark red veins, covered with a thin white bloom; skin thick; pulp large, tender, juicy, sweet. Ripens with Concord.

Isabella. Vines weak growing, tender, a very shy bearer; bunches medium, loose, shouldered; berries large, oval, black, with bloom; skin thin; pulp tough, subacid, not very good. Ripens about the last of September.

Jefferson. Vines lacking vigor, tender, shy, few bunches of fruit being produced; bunch large, compact, shouldered; berry large, oval, coppery red, with thin bloom; skin rather tough; flesh tender, juicy, pleasant. Season about the 1st of September.

Maxatawney. Vines of rank growth, with dark leaves and purplish canes; has proved hardy; only a light bearer; bunches long, rather slender, loose; berry of medium size, long, oval, pale yellow, slightly amber when fully ripe; flesh meaty, sweet, pleasant; seeds few. Season, 10th to last of August.

Moyer. Vines of slender, branching habit, forming many laterals, tender, not a very good bearer; clusters short, compact; berry small to medium, round, purplish red; skin thin, quite tough; flavor pleasant. Ripe by the middle of August.

Prentiss. Vines of only medium vigor, tender, very shy in bearing; bunch small, compact, not shouldered; berry large, nearly round or oblong, pale, transparent yellow, with a light bloom; skin thin, tender; pulp large, tender, juicy, sweet; a very fine grape. Ripens about with Concord.

Poughkeepsie. Vines of delicate growth, unhealthy and tender, only a light bearer; bunch small, compact, with short shoulder; berry about the size

of Delaware, pale red, with thin bloom; skin tough; flesh meaty, sweet, rather insipid. Ripens about the last of August.

Rochester. Vines strong and vigorous, half-hardy, a shy bearer; bunch large, long, shouldered, compact; berry medium to large, dark red to purplish red, with bloom; skin thick, tough; pulp large, tough, juicy; flavor very sweet and vinous, with a strong suggestion of the *labrusca*. Season with Concord.

Ulster Prolific. Vines of heavy growth, only a light bearer; bunches of medium size, short and compact, shouldered; berry medium to large, dull mottled red; skin thick, tough; flesh with some tough pulp, sweet, but with some foxiness. Not a grape of first quality, *not* "better than Delaware," as has been claimed for it. Ripens unevenly throughout September.

CLASS III.

Vitis labrusca × *Vitis vinifera*. European grape.

Agawam. Vine of rank growth, leaves large and coarse; bunch large; berry large, a dark, handsome red; skin thick; flesh rich and sweet, but with a peculiar agreeable flavor. Season, the first of September. Yield moderate.

Aminia. Vine strong and vigorous, a fair bearer; bunch short, compact, often shouldered; berry large, black, with heavy bloom; flavor rich, sprightly; quality good. Season, first to middle of August.

Barry. Vines vigorous; clusters rather small and uneven, not usually shouldered; berry large, round, black, with heavy bloom; skin quite tough; flavor very rich and sweet, improving with age. Ripe about the first of September.

Black Eagle. Growth moderate and somewhat tender, needing winter protection here; bunch large, long, rather loose, shouldered; berry medium to large, purplish black, with a heavy bloom. A grape of excellent quality and good keeper. Ripe by the middle of August, and remained on the vines in good condition a month later.

Beauty. Vine slender but vigorous, shy in bearing; bunch small to medium, compact, slightly shouldered; berry of medium size, slightly oval, deep red, with a heavy bloom, and adhering firmly to the stalk; skin thick, tough; flesh sweetish, solid, but not rich. Fruit ripe the last of August, and remained on the vines in good condition until the middle of September.

Brighton. Vigorous in growth but not entirely hardy; bunch long, rather loose, shouldered; berry of medium size, deep red, with a handsome bloom; skin rather tender. In quality, scarcely excelled among the red grapes in this collection. Though ripe in mid-August, the fruit hangs in good condition till the 20th of September.

Brilliant (Lindley × Delaware). Canes of medium growth, light yellowish red, showing more of the character of the Lindley than of Delaware; bunches of medium size; berry medium, round, pale coppery red, with thin lilac bloom; skin rather thick, and tough enough to handle well; flesh with some pulp, rich, and sweet. A pleasant table grape, ripe by the middle of August.

Creveling. Vines of moderate growth, tender; bunch medium to large, shouldered, usually rather loose; berry large, slightly oval, deep purplish black, with thick bloom; skin thick and tough. The fruit adheres firmly to the stem and does not crack; flavor juicy, rich, and pleasant—a grape of high quality. Ripens about the middle of August.

Croton. Vines of rather delicate growth and decidedly tender, shy in bearing; fruit in small, loose clusters; berry small to medium, oval, almost pointed, clear greenish yellow, with white bloom; skin thin but tough; flesh tender, sweet. Season from 9th to end of August.

Downing. Vines so tender and so subject to disease as to incline us to declare it of no value in this locality. Ripens about the middle of September.

Early Golden. Vines weak in growth, tender, a shy bearer; bunch medium; berry medium, pale golden, with a very thin bloom; skin thin; has no pulp, juicy, and very good. Ripens about August 20.

Eldorado. Vines of rank growth, with densely woolly canes; bunches irregular, rather loose; berry medium, round, dull golden-green, with thin pearly bloom; skin rather thick but not tough; a slight pulp; flavor sweet, resembling Elvira, but better. Ripe August 13. One of our best tender varieties.

Empire State. Vines strong in growth, but not hardy; bunch large, long, compact, shouldered; berry medium to large, yellowish green, with white bloom; skin rather tough; flesh juicy, with little pulp, sweet, pleasant, with a peculiar and fine aroma. Season from the last of August to the 10th of September.

Gaertner. Vines thrifty growing, though not rank, semi-hardy, a very shy bearer; bunch medium, loose; berry medium, light brown or red; skin thin; flavor pleasant. Season with Concord.

Geneva. Vines less than strong growing, tender, a shy bearer; bunch medium, loose; berry large, oval, greenish white, with a thin white bloom; skin thin, tender; pulp large, tender, sweet. Ripens about August 15.

Golden Gem. Vines thrifty, though very weak growers, tender, a very light bearer; bunch small, compact, shouldered; berry small, a rich golden yellow; skin thick, tough; flesh juicy, sweet, with a rich flavor. Ripens with Concord.

Goethe. Vine strong but not entirely hardy, light yield; bunches varying in size, often large and fine; berry large, oval, coloring to dull red when fully ripe, with a tough skin and much tough pulp; flavor a mild acid, with a peculiar aroma. Ripens about the middle of September.

Herbert. Vine coarse and rank, with much the habit of Agawam, tender, a very good bearer; bunch short, compact; berry very large, round, purplish black, with heavy bloom; skin thick and tough; pulp large and tough; flavor brisk subacid, pleasant. Season, last of August and first of September.

Highland. Vines of slow growth and somewhat lacking in vigor, tender; clusters large or very large, often doubly shouldered, the shoulders nearly equal to the main cluster; berry very large, slightly oval, deep purple, with thick lilac bloom; skin rather tough, thick; flesh juicy, but with considerable tough pulp; flavor pleasant, sprightly, and quite acid. One cluster weighed fourteen ounces, Ripe the last of September.

Irving. Vines of medium compact habit, the canes short-jointed, tender, a shy bearer; fruit borne in rather long clusters, not evenly filled, heavily shouldered; berry medium to large, round, golden-green, with thick bloom; skin not thick, but rather tough; flesh melting, with but little pulp; flavor fair, rather acid. Ripe the first of September.

Jessica. Vines of moderate vigor, canes slender, tender, shy in bearing; clusters of medium size, slightly shouldered; berry of medium size, somewhat

oval, pale green, with white bloom; skin rather tough; flavor peculiar, but not unpleasant. Ripe the middle of August.

Lady Washington. Vines strong and vigorous, yield of fruit heavy; bunches large, shouldered or doubly shouldered, tapering, showy; berry above medium size, round, deep golden, with a thick pearly bloom; skin thin but tough; flesh juicy, with a little tough pulp, sweet and pleasant. One of the finest white grapes that we have fruited. Season from the middle to the last of September.

Lindley. Vines of only moderate growth, tender, a fair bearer; bunch and berry above medium size, dark red, with a heavy bloom; skin thick and tough; flesh with a good deal of tough pulp; flavor sweet and rich, but with a harshness if the skin is too closely pressed. Ripens about the first of September.

Massasoit. Vines rank in growth; clusters long, loose, heavily shouldered; berry medium size, slightly oval, coppery red, with thin white bloom; skin of moderate thickness, a little tender, some tough pulp; flavor rich, sweet, and decidedly of the *vinifera* character. First ripe August 22; fruit remained on vines in good condition during greater part of September.

Merrimac. Of less rank growth than the preceding sort; clusters small, compact, sometimes shouldered; berry large, round, black, with lilac bloom; skin tough, and a good deal of tough pulp; flavor rich, sweet; yield light. Ripe the last of August.

Mills. Vines make a rank growth, but tender; yield not heavy; bunches medium to large, fairly compact, shouldered; berry of medium size, slightly oval, black, with lilac bloom; skin very thick and tough; when fully ripe the flesh is meaty, sweet, quite rich and pleasant, though hardly first-class. The berry adheres very firmly to the stem, and will bear more rough handling than any other grape in the list. Ripe the first of September.

Nectar. Vines strong and thrifty, tender, very prolific; bunch medium, compact; berry medium to large, deep red, turning to jet black when fully ripe; skin tough; pulp tender, juicy, sweet, good. Ripens about August 20.

Norfolk. Vines of strong growth, with short joints, very tender (being entirely killed in 1899), shy in bearing; clusters small, compact, shouldered; berry of medium size, oval, dull red, with lilac bloom; skin thin; flesh tough; flavor rich and pleasant, showing a tincture of *vinifera* blood. Ripens with Concord.

Norwood. Vines strong and thrifty, tender, a fair bearer; bunch medium; berry large, dark purple, with heavy bloom; skin thick, tough; pulp large, tender, very juicy, sour. Ripens about August 10.

Opal. Vines thrifty though not strong growing, tender, fairly productive; bunch large, compact, shouldered; berry large, greenish white; skin thin, tough; pulp tough, juicy; flavor sweet, very good. Ripens about September 1.

Peter Wylie. Vines thrifty though not strong growing, tender (being entirely killed in 1899), a shy bearer; bunch medium; berry medium, white, becoming yellow when fully ripe; skin thin; pulp large, tough, has a Muscat flavor. Ripens about September 1.

Red Eagle (Black Eagle seedling). Canes yellowish brown, of a stocky, short growth, with short joints; bunches small to medium, compact, not shoul-

dered; berry of medium size, round, clear red, with thin pearly bloom; skin thin and tender; flesh melting, with but little pulp; flavor brisk and pleasant, Ripe August 22.

Requa. Vines thrifty and strong growing, tender, a fair bearer; bunch medium to large, compact, almost round; berry large, round, greenish bronze, turning dull red when fully ripe; skin thin, tender; pulp large, tender, juicy; flavor a sweet subacid. Ripens about September 1.

Salem. Vines vigorous and thrifty, though not strong growing, tender, a fair bearer; bunch medium, compact, often shouldered; berry large, coppery red, with a purplish bloom; skin thick and tough; pulp large, tender, juicy, sweet. Ripens about August 15.

Triumph. Of this the vines make a good growth, tender, not very much of a bearer; bunch large, long, tapering, compact, heavily shouldered; berry large, round, pale green, with heavy bloom; skin rather thick and tough; flesh tender, rich, juicy, very fine flavored. Ripens about the middle of September.

Walter. Vines fair growers, though not rank, tender, a fair bearer; bunches medium, compact; berry small to medium, of the color of Delaware, covered with a light bloom; skin thick, tough; pulp large, solid, though not tough, juicy; flavor a spicy sweet. Ripening about September 1.

White's Northern Muscat. Vines very strong growing, vigorous, tender, fairly prolific; bunch medium, very compact; berry medium to large, dark amber, with a thin bloom; skin thick, tough; pulp large, tender, juicy; flavor a sweet *labrusca*. Ripens about August 20.

Wilder. Canes of strong growth, tender, not a very good bearer; bunch and berry large and of fine appearance; skin rather tough; flesh with little pulp and with a fine rich flavor. Season, the middle of August to the first of September.

CLASS IV.

Vitis riparia. Common river grape.

Bacchus. Vines strong and vigorous, hardy, a good bearer; bunch small, compact; berry small, black, with a heavy bloom; skin thick, fairly tender; pulp large, fairly tender, sour. Ripens throughout September.

Clinton. Vines strong growing, thrifty, and hardy; bunch medium, compact; berry small, black, with a blue bloom; skin thin, tough; pulp tender, juicy, vinous, sour, not very desirable until fully ripe. Ripens throughout September.

Marion. Vine in habit much resembling Clinton, hardy and vigorous, but canes slender and much branched; produces a fair yield of fruit, valued chiefly for jelly-making; bunch and berry of medium size, black, with lilac bloom; skin tough; flavor sharply acid, much resembling Clinton, but better. Colored in July, but not fully ripe till the 1st of September.

CLASS V.

Vitis riparia × *Vitis labrusca*.

Amber. Vines very strong and vigorous, hardy, a shy bearer; bunches long, shouldered, slightly loose; berry medium, oblong, pale coppery red; skin thin; pulp tender, juicy, sweet. Ripens about the 1st of September.

Beagle. Vines thrifty and hardy, prolific; bunch medium to small, usually shouldered; berry small, nearly round, dark purple, with thin white bloom; skin thin, tough; pulp tough, juicy, acid. Ripens about the middle of August.

Blanco. Vines of much the same character as Amber, of the Taylor family, and has nothing in common with the Delaware, its other parent; fruit ripens latter part of August, and is of a pale, waxy, yellow color, with just a shade of amber in the sun. In flavor and texture it is an all-around Taylor, and could most readily be accounted for by supposing it to be a plain Elvira seedling. Ripens about August 18.

Conelva. Vines have much more of the Concord characters than of the Elvira; thrifty and strong, and are perfectly hardy; bunch medium, loose, long, symmetrical, shouldered; berry small, round, dark purple, with a thin white bloom; skin thick; pulp large, tender, with a sweetish flat taste. Ripens about August 15.

Elvira. Vine very strong in growth, branching freely, entirely hardy, a heavy bearer, often four bunches on one spur; bunches of medium size, very compact, shouldered; berry of medium size, round, clear, yellowish green; skin thin and tender, cracking and handling badly; flesh tender, of considerable sweetness, but with the immature flavor which characterizes the class. Season from the last of August to the middle of September.

Faith. Vine of strong but slender growth and quite hardy, yield light; bunch long, slender, loose; berry small, round, yellowish green, with white bloom; skin rather tough; flesh tender, sweet, and pleasant. Season from last of July to the middle of August. Our earliest white grape.

Grein's Golden. Vine of medium strength, nearly hardy, a very good bearer; bunch is loose, uneven in size; berry large, round, and when ripe pale amber in color; skin tough, but berry drops badly as soon as mature; the flavor is strongly acid, with considerable sweetness, not unlike sweetened vinegar. Season from the first to the middle of September.

Missouri Riesling. Vines hardy and very strong, making a rampant growth and bearing heavy crops of fruit; bunch medium to large, compact, shouldered; berry medium to large, slightly oval, greenish yellow, with a thin pearly bloom; skin so thin as to crack and handle badly; flavor sweet, subacid, with the immature flavor peculiar to the class. Season from the middle to the last of September.

Montefiore. Growth of vine slender, but vigorous and hardy, produces a good yield of fruit; bunch rather small, compact, with heavy shoulder; berry of medium size, slightly oval, black, with heavy lilac bloom; skin tough; flesh tender, juicy, subacid, not rich; berry adheres firmly to stem and does not crack. This has some of the qualities of a good market sort to follow the Concord.

Pearl. Vines quite hardy, and produce many long, slender canes, giving a fair yield of fruit; the bunches vary in size, and are rather long and loose; berry medium, yellowish green, with a pearly bloom; skin thin; flavor similar to that of Elvira or Missouri Riesling, of medium quality as a table fruit. Ripens from the first to the middle of September.

Rommel's Etta. Growth vigorous, hardy, yield of fruit fair; bunch medium to large, compact, heavily shouldered; berry large, round, yellowish-green, with a pearly bloom; skin thin but tough; flesh a little pulpy but juicy, sweet, and with less of the unripe flavor than any other white *riparia*. Season from the middle to the last of September, some holding on into October, when most other grapes are gone. A fairly good table grape, and handles well.

CLASS VI.

Riparia-labrusca × *labrusca-vinifera*.

Bell. Vines vigorous and thrifty, hardy, a very good bearer; bunch small, compact, often shouldered; berry round, yellowish white, with a delicate bloom; skin thin, very tender; pulp large, somewhat tough; has a peculiar sweet, agreeable flavor. Ripens about August 18.

Berckmans. Vines strong growers, thrifty, semi-hardy, usually bear a fair crop; bunch medium, compact, shouldered; berry medium or below, bright red, with a heavy bloom; skin thin, tough; pulp large, tender, juicy, sweet, good. Ripening with Delaware.

Early Market (Elvira × Triumph). Vines dark brown, slender, with numerous laterals, hardy; bunches imperfect; berry very small, round, black, of wild-grape texture and flavor. Ripe August 13. This variety shows apparently a strong reversion to the *riparia* ancestry of Elvira.

Janesville. Vines strong growing, vigorous, and thrifty, hardy, a good bearer; bunch medium, compact, shouldered; berry large, round, black, with bloom; skin thick; pulp large, juicy, sour, has a good deal of the *riparia* flavor. Ripening first week in August.

Naomi. Vines make a heavy growth of long, slender canes, very tender, a shy bearer; bunches too imperfect to show character; berry of medium size, clear, greenish yellow, with thin bloom. Ripe the last of August.

Noah. Vines vigorous and thrifty, canes strong growing, hardy, a good bearer; bunch large, shouldered, well filled or slightly loose; berry green or turning yellow when fully ripe; skin thin, tender; pulp large, tender, sweet, not very juicy. Ripens about September 10.

President Lyon (Elvira × Lindley). Vines hardy, free growing, rather slender, showing many Taylor characters. The fruit, ripe by the first of August, is borne in medium-sized, rather compact, shouldered bunches; berry about the size of Delaware, purplish red. A very fair early table grape, but quickly past flavor, overripe, and shriveled.

Rommel (Elvira × Triumph). Wood of medium strength, with short joints, and dull, brownish-yellow bark; bunches small and imperfect; berry of middle size, round, golden, with pearly bloom; skin quite tough; flesh melting, juicy, rather pleasant, but somewhat resembling Elvira in flavor. Ripe the first of September.

Ruby (Elvira × Brighton). Canes of rampant and late growth, rather slender, dull brownish yellow; bunches imperfect; berry small, round, dull red, in flavor and texture resembling Elvira. Ripe the 1st of September.

Uhland. Vines strong and vigorous, thrifty, hardy, a shy bearer; bunch small, compact; berry medium to large, round or oblong, greenish yellow, with bloom; skin thin, tender; pulp tender, juicy; flavor a sweet subacid. Season with Concord.

Waverly. Vines weak growing, tender, a shy bearer; bunch medium, shouldered, compact; berry medium, round to oval, black, with bloom; skin thick, tough; pulp large, tender, juicy, sweet. Ripens about August 15.

Wilding. Vines strong growing, a fair bearer; bunch large, loose, shouldered; berry round, yellowish green, with bloom: skin thin, tender; no pulp; juicy, subacid. Season slightly later than Concord.

CLASS VII.

Vitis riparia × *Vitis vinifera*.

August Giant. Vine very rank in growth, tender, and fairly productive; bunch large, long, and rather loose; berry large, black; skin thick; quality good. Season, latter half of August.

Brant. Vines fairly strong growing, thrifty, tender, a good bearer; bunch small to medium, compact; berry large, round or oblong, dark purple, with heavy bloom; skin thick, tough; pulp large, tender, juicy, sour, has much of the *riparia* flavor. Ripe from the middle of August until October 1.

Canada. Vines fairly strong growing, tender, a good bearer; bunch medium to large; berry small to medium, black; skin thick, tough; pulp large, fairly tender; flavor a sour *riparia*. Ripens about September 1.

Cornucopia. Vines vigorous, thrifty, tender, a shy bearer: bunch large, compact, shouldered; berry above medium, black, with bloom; skin thin; pulp very small, tender, juicy, sour. Ripens about August 20.

Othello. Vines fairly strong growing, tender, a shy bearer; bunch large, loose, shouldered; berry medium to large, oval, black, with bloom; skin thick, tough; pulp large, tender, juicy; flavor a sour *riparia*. Ripens about the last of August.

CLASS VIII.

Vitis aestivalis. The summer grape of the South.

Cynthiana. Vines make a strong growth and the wood is very hard. The tender shoots are covered with a rusty-red pubescence; semi-hardy, a shy bearer; bunch medium in size, compact, heavily shouldered; berry small, round, black, with a heavy bloom; juice sharply acid until the fruit is well matured, then quite sweet, with a spicy mild flavor. Fruit begins to color early in August, but is not fairly eatable until a month later, showing no tendency to drop or crack.

Eumelan. Vines strong in growth, making an abundance of rather slender canes, tender, a shy bearer; bunches uneven, often large, heavily shouldered, of fine appearance; berry of medium size, round, black, with thick white bloom; skin thin but tough; flesh juicy, melting, with but little pulp; flavor rich, sweet. Season the last of August and the first of September.

Hermann. Vines strong growing and thrifty, tender, a shy bearer; bunch long and narrow, fairly compact; berry small, black, with blue bloom; pulp small and tender, juicy; flavor spicy.

Humboldt. Vines of medium vigor, yield of fruit light; clusters short, compact, some slightly shouldered; berry small to medium, round or a little oblate, dull golden green, with a thick bloom, becoming amber when fully ripe; skin thick but rather tender; flavor quite sweet, but resembling Elvira or Missouri Riesling. Ripe the last of August.

Lenoir. Vines thrifty, semi-hardy, and quite prolific; bunch very large, tapering, heavily shouldered; berry medium size, larger than Cynthiana or Norton's, round, black, with lilac bloom; skin tough; flesh juicy, brisk subacid; has a little tough pulp. Ripens latter part of September. This is evidently too far north for the successful growth of this grape.

Norton. In vine and foliage we see nothing to distinguish this from the Cynthiana. The bunch and berry have been somewhat smaller and the yield considerably less. Ripens about the middle of September.

CLASS IX.

Vitis æstivalis × *Vitis labrusca*.

Centennial. Vines thrifty though not rank, tender, fairly prolific; bunches small, compact, rather oblong in form, slightly or not at all shouldered; berry small, yellowish green at first, but becomes amber when fully ripe; skin rather thick, quite tough; berry adhering firmly to the stalk; flesh juicy, melting, with but little pulp, sweet and pleasant. The fruit ripens the last of August and remains in good condition on the vines through September.

Gold Coin (Cynthiana × Martha). Canes of rampant growth, rather slender, dark red brown; bunches compact, with slight shoulder; berry above medium size, round, dull golden green, with thick white bloom; skin tough; a prominent tough pulp, and with a flavor denoting a good deal of sugar, at the same time quite acid; not a table grape. The fruit ripens early in September and remains on the vines late, but does not improve in quality with age.

CLASS X.

Vitis linsecomii, the post-oak grape, × *Vitis labrusca*.

Dr. Collier. Vines very strong and rank, tender, only a light bearer; bunch medium to large, cylindrical; berry medium, dark red, becoming purple when fully ripe; skin thin, tough; pulp tender, juicy, red, good Concord flavor; berries hang well. Ripe about August 10.

CLASS XI.

Vitis linsecomii × *Vitis rupestris*. Sand grape.

America. Vines very strong and rank, half hardy, not a very good bearer, bunch medium, shouldered, loose; berry medium, round, black; skin thick, tough; pulp large, firm, but tender, juicy, sour. Ripens about August 17.

CLASS XII.

Vitis linsecomii × *Vitis æstivalis*.

Blood. Vines strong and vigorous, tender, a fair bearer; bunch medium to large, compact; berry small, black with bloom; skin thick, tough; flesh without pulp, juicy, with a sprightly subacid flavor. A few days earlier than Concord.

Carman. Vines thrifty, rank, tender, a fair bearer; bunch small to medium, often shouldered, fairly compact; berry large, black, with bloom; skin thick, tough; pulp large, tough, juicy, sour, but rather rich; seeds few. Ripe about August 11.

Hopkins. Vines vigorous, rank, a shy bearer; bunch medium, conical; berry medium, black, with bloom; skin fairly thin, tough; pulp large, tender, juicy, subacid. Ripens about September 4.

CLASS XIII.

Vitis linsecomii × *labrusca-vinifera*.

Fern Munson. Formerly disseminated under the name of Admirable. Vines very strong and vigorous, semi-hardy, a fair bearer; bunch medium to large,

loose; berry large, dark purple, almost black; skin thin, tough; pulp tender, juicy, sprightly acid, only fair in quality. Ripens last of September.

Letoney. Vines very thrifty and rank, tender, a shy bearer; bunch large, long, compact, shouldered; berry small, round, deep purple, with heavy bloom; skin thin and tough; pulp small, very tender, juicy, sour; seeds few but very large. Ripens about October 10.

Munson's No. 82. Vines fairly strong, thrifty, tender, a shy bearer; bunch medium, compact; berry small, dark purple, with heavy bloom; skin thick, tough; pulp very small, tender, juicy, sour; seeds almost fill the berry. Ripening with Concord.

Sweetey. Vines very strong, vigorous, tender; bears small crops each year; bunch medium to large, compact, shouldered; berry small, round, dark purple, with heavy bloom; skin thin, tender; pulp large and rather tough. Season a few days earlier than Concord.

CLASS XIV.

Vitis linsecomii × *riparia-labrusca*.

Pulpless. This variety was disseminated under the name of Van Deman. Vines strong growing, vigorous, tender in our climate. a fair bearer; bunch medium to large, loose, very long, sometimes shouldered; berry medium, round, dark purple, with heavy bloom; skin thick, tough; flesh without pulp, seeds in a granular juice; flavor with a great deal of the *riparia* sourness. Ripens about September 1.

DATES OF BLOSSOMING.

It has often been noticed by small planters that, where a few vines of some desirable variety are planted alone, they are a source of disappointment, refusing to bear more than a few ragged bunches. Very often the reason for this is due to the fact that such varieties as the Brighton require that they be planted near another variety having the same blossoming season, being themselves self-sterile. In all small plantings, where but a few vines are required, it is well to plant more than one variety, and varieties should be selected having the same time of blooming. Almost any variety having the same season of blossoming is safe to use as a fertilizer for the partially fertile varieties, as the different species of *Vitis* hybridize very readily. Below is given the blossoming chart, showing the season of blooming for each variety. It will be noticed that the varieties belonging to any class nearly all bloom at the same time, though there are some very striking variations from this rule.

Blossoming Chart, Grapes, 1900.

VARIETY.	Class.	First bloom.	Full bloom.	Out of bloom.	VARIETY.	Class.	First bloom.	Full bloom.	Out of bloom.
Agawam.....	3	May 25	May 28	May 31	Iona.....	3	.....	May 31	June 7
Amber.....	5	" 25	" 28	" 31	Iowa Excelsior.....	3	May 28	" 31	" 7
Amber Queen.....	3	" 25	" 28	" 31	Janesville.....	5	" 14	" 23	May 28
America.....	11	" 25	" 31	June 7	Jefferson.....	2	" 31	June 2	June 7
Aminia.....	3	May 23	May 31	.....	Jessica.....	7	" 23	May 28	May 31
August Giant.....	7	" 25	" 31	" 31	Letoney.....	13	" 31	June 7	.....
Bacchus.....	4	" 17	May 28	" 31	Lenoir.....	8	" 31	.....	.....
Barry.....	3	" 23	" 28	" 31	Lindley.....	3	" 31	.....	June 2
Beagle.....	6	" 14	" 28	" 31	Lutie.....	1	" 28	May 28	May 31
Beauty.....	9	.....	.....	.....	Marion.....	4	" 17	" 21	" 25
Bell.....	5	May 25	May 28	May 31	Martha.....	1	" 25	" 28	" 31
Berkman's.....	5	" 23	" 28	" 31	Mason.....	1	" 28	" 31	.....
Black Eagle.....	3	" 25	" 31	" 31	Massasoit.....	3	" 28	" 31	June 2
Blanco.....	6	" 25	May 28	" 31	Maxatawnoy.....	2	" 28	" 31	" 2
Blood.....	12	" 31	June 7	" 31	Merriamac.....	3	" 17	" 28	" 2
Brant.....	7	" 28	May 31	June 2	Mills.....	3	" 28	" 31	" 7
Brighton.....	3	" 28	.....	May 31	Montiflore.....	5	" 25	" 28	" 31
Brilliant.....	3	" 25	" 31	" 31	Moore's Early.....	1	" 25	" 28	" 31
Cambridge.....	1	" 23	May 28	" 31	Missouri Riesling.....	5	" 17	" 25	" 31
Campbell's Early.....	1	.....	" 31	June 2	Moyer.....	2	" 25	" 31	" 7
Canada.....	7	.....	" 28	May 31	Munson's 82.....	13	" 31	.....	.....
Carman.....	12	May 31	" 8	.....	Munson's 88.....	11	.....	May 31	June 7
Catawba.....	2	May 25	" 28	May 31	Naomi.....	7	May 28	.....	May 31
Centennial.....	9	.....	.....	.....	Nimalba.....	3	.....	May 17	June 7
Challenge.....	2	May 14	.....	May 22	Noah.....	5	May 23	" 28	May 31
Colerain.....	1	" 25	May 28	" 31	Northern Muscat.....	1	" 25	" 28	" 31
Columbian Imperial.....	1	" 23	" 31	" 31	Norwood.....	3	" 28	" 31	June 2
Concord.....	1	" 23	May 28	" 31	Opal.....	3	" 28	" 31	" 2
Conselva.....	5	" 23	" 28	" 31	Othello.....	7	" 23	" 28	" 7
Conqueror.....	2	" 17	" 28	" 28	Pearl.....	5	" 17	" 25	May 28
Cornucopia.....	7	" 21	" 28	June 7	Perkins.....	1	" 23	" 28	" 31
Cottage.....	3	" 23	" 28	May 31	Pocklington.....	1	" 21	" 28	" 31
Crawling.....	3	" 28	.....	" 31	Potter's Sweet.....	1	" 17	" 25	" 28
Cynthiana.....	8	.....	May 31	.....	Foughtkeepsie Red.....	2	" 31	June 2	.....
Delaware.....	2	May 23	" 31	June 2	Frentiss.....	2	" 21	May 31	June 2
Diamond.....	1	" 25	.....	May 31	Fres. Lyon.....	6	" 17	" 21	May 31
Diana.....	2	" 31	June 2	June 6	Purple.....	14	" 28	" 31	June 7
Dinkel.....	2	" 25	May 28	May 31	Red Eagle.....	3	" 25	" 31	May 31
Downing.....	3	" 31	June 2	June 5	Requa.....	3	" 28	May 31	June 7
Dracut Amber.....	1	" 14	May 25	May 28	Rockwood.....	1	" 25	" 28	May 31
Duchess.....	2	" 14	" 31	June 7	Rommel.....	1	" 24	" 28	" 31
Early Market.....	6	May 23	" 28	" 31	Rommel's Etta.....	5	" 25	" 28	" 31
Early Ohio.....	1	" 25	" 28	May 31	Ruby.....	6	" 23	" 28	" 31
Early Victor.....	1	" 25	" 28	" 31	Salem.....	3	" 28	" 31	June 2
Eldorado.....	3	" 23	" 31	June 8	Sweetey.....	13	" 31	June 8	.....

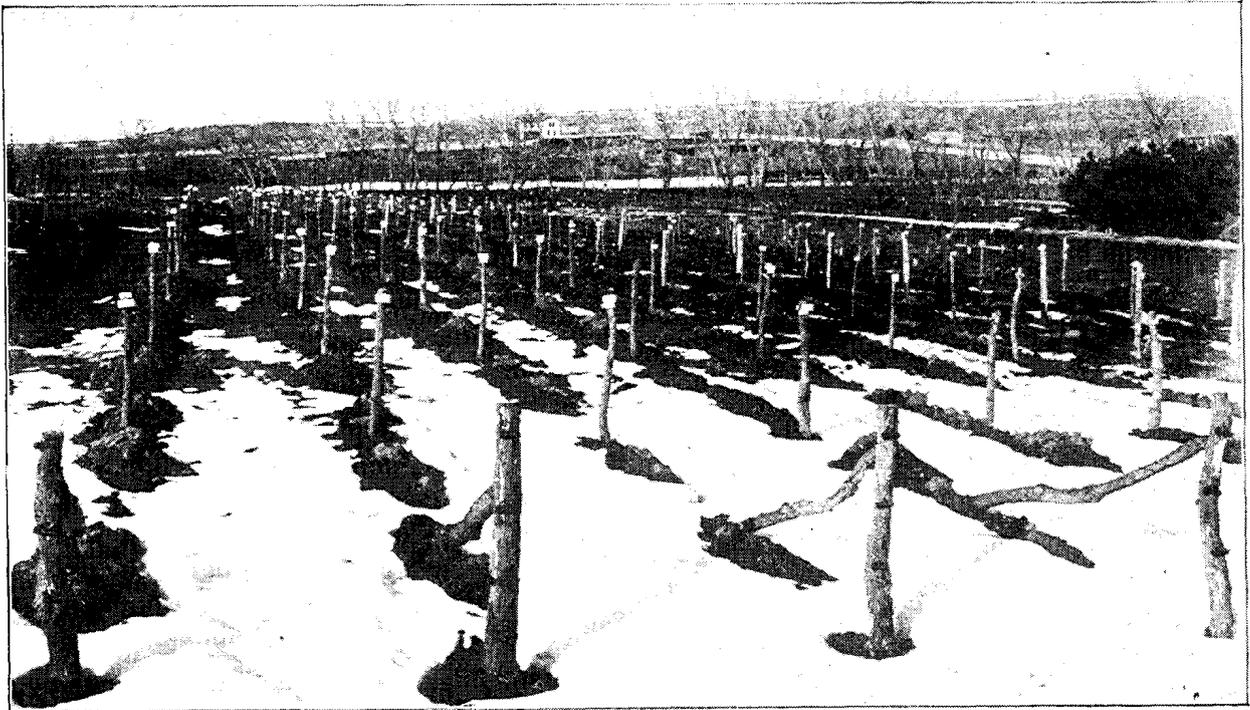
May 1902.]

Grapes.

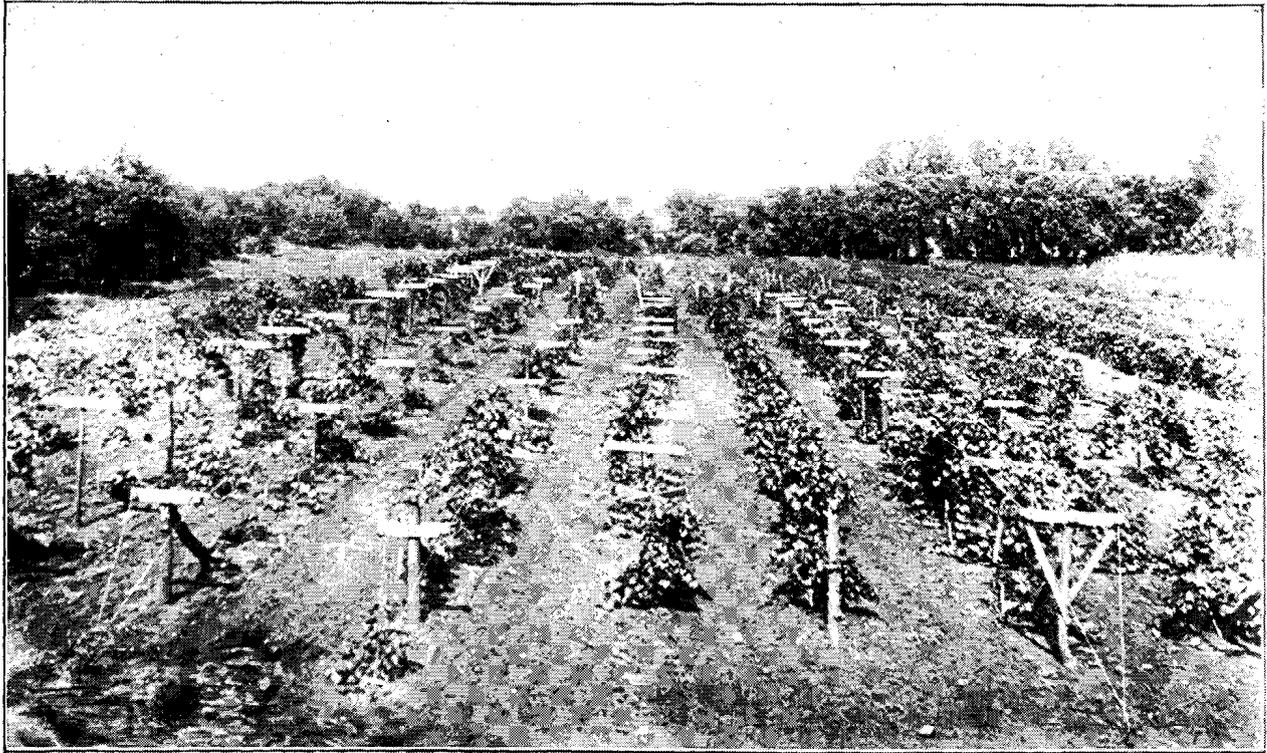
Blossoming Chart, Grapes, 1900—Concluded.

VARIETY.	Class.	First bloom.	Full bloom.	Out of bloom.	VARIETY.	Class.	First bloom.	Full bloom.	Out of bloom.
Elvira.....	5	May 17	May 21	May 28	Telegraph.....	1	May 23	May 28	June 2
Empire State.....	5	" 28	" 31	June 4	Texas Highland.....	13	" 31	June 7	.....
Esther.....	2	" 23	" 31	" 2	Ulster Prolific.....	2	" 21	May 25	May 31
Eumelan.....	8	" 28	" 31	" 7	Upland.....	5	" 25	" 28	" 31
Eva.....	1	" 23	" 28	May 31	Victoria.....	1	" 25	" 28	" 31
Faith.....	5	" 25	" 28	" 31	Vitis solonis.....	1	" 25	" 28	" 31
Fern Munson.....	13	" 31	June 2	.....	Walter.....	9	" 31	" 31	June 7
Gaertner.....	3	.....	.....	.....	Whitchull.....	1	May 28	" 31	" 2
Geneva.....	3	May 28	May 31	June 7	Wilder.....	3	" 28	" 28	May 31
Goethe.....	3	" 25	" 28	May 31	Winchell.....	1	" 28	May 31	June 7
Gold Coin.....	9	" 28	" 31	June 7	Woodruff.....	1	" 25	" 28	May 31
Golden Gem.....	9	" 23	" 25	May 28	Worden.....	1	" 25	" 28	" 31
Green Mountain.....	1	" 28	" 31	June 2	Wyoming.....	1	" 23	" 28	" 31
Grein's Golden.....	5	" 25	" 28	May 28	Eaton.....	1	" 28	May 31	June 2
Hartford.....	1	" 25	May 28	" 31	Irving.....	3	" 28	" 31	" 2
Hayes.....	1	" 28	" 31	.....	Lady Washington.....	3	.....	" 31	" 7
Herbemont.....	8	" 25	" 28	May 31	Vitis A.....	.....	.....	" 17	May 25
Herbert.....	3	" 23	" 31	June 2	Vitis berlandieri.....	.....	May 31	.....	.....
Hermann.....	8	" 31	June 2	.....	Vitis cinera.....	.....	" 31	.....	.....
Highland.....	3	" 31	" 2	June 7	Vitis champini.....	.....	" 17	May 21	May 31
Hopkins.....	12	" 31	" 7	.....	Vitis doamiana.....	.....	" 17	" 25	" 28
Humboldt.....	8	" 23	May 28	May 31	Vitis monticola.....	.....	" 23	" 31	.....
Isadore Bush.....	13	" 31	" 28	.....	Vitis riparia.....	.....	" 17	" 23	May 28
Israella.....	1	" 28	May 31	June 2	Vitis rupestris.....	.....	" 21	" 25	" 31

Historical Document
Knoxville Agricultural Experiment Station



Protection of Tender Varieties by Covering with Earth.



Trellis Experiments.