

KENTUCKY

AGRICULTURAL EXPERIMENT STATION

OF THE

State College of Kentucky.

BULLETIN No. 92.

GRAPES

LEXINGTON, KENTUCKY,

April 1, 1901.

KENTUCKY Agricultural Experiment Station.

BOARD OF CONTROL.

THOS. TODD, Shelbyville, Ky.
J. B. MARCUM, Jackson, Ky.
J. B. KENNEDY, Paris, Ky.
D. F. FRAZEE, Lexington, Ky.
J. K. PATTERSON, President of the College.
M. A. SCOVELL, Director, Secretary.

STATION OFFICERS.

M. A. SCOVELL, Director.
A. M. PETER, }
H. E. CURTIS, } Chemists.
H. GARMAN, Entomologist and Botanist.
C. W. MATHEWS, Horticulturist.
J. N. HARPER, Agriculturist.
W. H. SCHERFFIUS, }
L. O. BEATTY, } Ass't Chemists.
R. M. ALLEN, Clerk.
J. D. TURNER, Secretary to Director.
H. LUGGER, Ass't Entomologist and Botanist.
J. O. LA BACH, Ass't Chemist.

Address of the Station—LEXINGTON, KY.

NOTICE.

The bulletins of the Station will be mailed free to any citizen of Kentucky who sends his name and address to the Station for that purpose. Correspondents will please notify the Director of changes in their post-office address, or of any failure to receive the Bulletins.

ADDRESS :
KENTUCKY AGRICULTURAL EXPERIMENT STATION,
LEXINGTON, KY.

Bulletin No. 92.

GRAPES.

C. W. MATHEWS, HORTICULTURIST.

It is probably true in Kentucky as it is in many,—perhaps most,—parts of the country that the table of the average farmer is less abundantly supplied with a variety of fresh fruits and vegetables than that of his brother worker of equal intelligence and earning capacity in one of the larger cities.

While it would seem as if the farmer with ample space at his door would secure for himself and his family the most ample supplies of all the varieties suited to his soil and climate, the fact remains that very many with soil and situation well adapted to gardening purposes, content themselves with meager and intermittent supplies of the most ordinary fruits and vegetables.

This reluctance on the part of so many to undertake to supply themselves with abundant fruits and vegetables is doubtless due to several causes. Many fail to realize the high importance now being generally placed upon fruits in respect to their food and hygienic value. Others who have been familiar chiefly with the old-fashioned garden and its laborious work with the hand hoe and upon the knees are deterred by the great amount of labor necessary, in their opinion, to maintain it, whereas the modern ideal farmer's garden is one—in shape long and narrow—in which the work of cultivation, whether with asparagus or onions, strawberries or grapes, can

nearly all be done by horse power, with a consequently greatly lessened amount of necessary manual labor. Added to these reasons it is often the case that the objections to horticultural work are greatly magnified by the supposed difficulties and obscurities of certain horticultural operations.

To do something to dispel these opinions regarding one of our most valuable fruits, which ought to be found in abundance upon every farmer's table during several months of the year is one of the purposes of this bulletin. Upon far too many farms the grape when grown at all, is treated more as a luxury than as one of the common blessings which should be enjoyed in profusion. Two or three rampant vines permitted to scramble at will on the sides and roofs of the outbuildings, or to climb into some inaccessible tree top, often represent the sole source of supply of this delicious and health-giving fruit, when the product of half a hundred cultivated vines could readily and profitably be consumed by an average family in the various forms of fresh fruit, grape juice, jellies, etc.

Aside from their value in the farmer's family, it is believed that under favorable conditions the grape may also be profitably grown for many local markets over the State. Commercial grape growing in Kentucky has not been undertaken extensively except within limited areas, particularly in Oldham and adjacent counties in the vicinity of Louisville, and to a less extent in the counties near Cincinnati, O.

The earlier success in securing good returns from this fruit led to the over-production of the kind of fruit grown in these counties, with a consequent lowering of prices. The variety grown in Oldham and vicinity was chiefly "Ives," an early grape of rather inferior quality and consequently limited demand, even though shipped North, where, although early, it would come into competition with fruits like melons and other warm weather products. The shipping of these grapes has now been greatly lessened, and a large proportion of those grown in this section of the State is now converted into wine.

While the extensive shipment of such a variety as Ives may not soon become profitable again, and even much better grapes

would doubtless suffer from the reputation of this variety, if shipped to the same markets, it is still probable that there are not a few markets nearer home that would consume considerable quantities of grapes of good quality if they were regularly furnished and offered in an attractive form.

An example of a local market eager for supplies of grapes of good quality has been seen in the experience of the Experiment Station in the city of Lexington. The varieties from our experiment vineyard, many of them of excellent quality, have been easily sold in the local markets during the past four years for 3, 4 and 5 cents per pound, and there has sometimes been a demand greater than could be supplied at these profitable prices. At the same time there has been a good supply of the ordinary grade of Concords poorly ripened and carelessly grown and marketed, which were selling at 2 cents per pound or less.

This experience leads us to believe that it would frequently be possible for farmers in other parts of the State to dispose of their surplus product from a thrifty vineyard at a good profit. In many towns of the State a first-class quality of grapes is rarely seen in the markets unless it be in the latter part of the season when fruit is received from the grape districts of Northern Ohio and New York. By proper cultivation and care it is possible to greatly improve the quality of even our common varieties over that secured under the ordinary conditions of neglect.

The very ease with which the grape can be grown, and the capacity of some of our common varieties for enduring neglect and indifferent treatment, while still yielding fair products of a quality sufficiently good to be enjoyed, often hinders the adoption of improved methods of culture and the introduction of the choicer varieties. Every one can raise Concords and the Ives; but for the careful and intelligent grower, who is willing to "take pains," there is a keen interest and pleasure in the cultivation of the choicer varieties, which will not so well endure neglect.

The selection of the particular methods of growing, pruning and training the grape, which are recommended in the following

pages,—the Double Kniffin and the Munson systems,—is the outcome of careful observation and comparison of several well known methods, which have been in operation in the vineyard of the Station for a number of years. These two methods are briefly described, not so much for the experienced grape grower as for the farmer who desires to cultivate a few vines in his garden. Other methods may be, and doubtless are, just as satisfactory under many conditions as the two commended here. Any system intelligently carried out is more satisfactory than the complete neglect of the vines so often observed, and the ones recommended have the merit of simplicity and the endorsement of many commercial growers in various parts of the country, who practice them with profit.

Planting; Pruning; Training.

When received from the nurseryman the young vine has usually several canes—the ripened shoots of the past season's growth—upon it, each bearing a number of buds. When setting the plants in the garden these canes should be cut back closely, leaving only two or three buds upon the strongest cane.

A soil suitable for other general garden purposes will usually be favorable for the grape, and the young plants should be set in rows eight to ten feet apart and about the same distance in the row, depending upon the varieties grown. In our experiment vineyard the rows are eight feet apart and the vines in the row ten feet, a very satisfactory distance for use with a collection of mixed varieties.

No trellis is necessary during the first season, and the growing shoots may be permitted to ramble at will over the ground, or can be tied to a small stake driven at each plant, which will save them from being broken off.

Cultivation should be frequent and persistent until the latter part of the season, but need not be given to the vines exclusively, as some garden crop can be grown between and in the rows of grapes for a year or two without material injury to the vines, if the whole area is well cared for.

During the fall and winter at the end of the first season's

growth, the vine should again be cut back, as in the first instance, leaving only two or three buds near the ground, and from these, if the vine is strong, two shoots and two only should be permitted to grow during the second season for the permanent trunks, if the Double Kniffin system is adopted. If the growth of the second season is not strong, the same cutting process should again be repeated.

At this stage the permanent trellis may well be erected. At each end of a row a stout post is set and firmly braced. At intervals of twenty feet, or twice the distance of the vines in the row, the intermediate posts are set, thus allowing two vines in the space between any two successive posts. For this method of training, the posts should be long enough to stand five and one half to six feet above the ground, and two No. 10 wires are stretched along the row, the lower thirty-six to forty inches and the upper sixty-six to seventy inches above the ground. These wires are stapled to the posts, but except at the ends, not so tightly as to prevent the slack from being taken up from time to time. If the growth of the second year is strong and vigorous, one of the two shoots referred to above, may be permitted to grow until it reaches the lower wire and the other to the top wire and each have its tip pinched off when it reaches its respective wire. This will usually cause the development of two or more lateral branches, one of which may be trained in each direction upon its own wire and tied loosely, all others being pinched out. If this pinching of the tip should not be done at the proper time, each cane at the annual pruning time should be sharply bent at its respective wire and tied to it. This will commonly cause the pushing out of a strong shoot, when spring growth begins, at the point where the bend occurs, and this shoot can be trained out upon the wire in the opposite direction and loosely tied to it.

The object in either case is to produce two main upright stems, one stopping at each wire, each with a T-shaped head whose branches run out horizontally upon the wires. If the T-head is complete at each wire at the end of the second season, the horizontal canes, after the wood is well matured,

should be cut back in most cases to not more than three or four buds each. In later years, as the vine grows larger and stronger, the horizontal canes can be left longer at each annual pruning. Upon the opening of spring a strong shoot will commonly grow out from each bud of these horizontal canes, and it is upon the first three or four joints of these Spring shoots that the flowers and fruit are produced. In this system these shoots should not be permitted to grow out horizontally along the wires, but if they become attached by their tendrils they should be pulled loose again and allowed to hang free directly downward. This will tend to equalize the growth of the several shoots, which, under natural conditions, tend to develop most vigorously from the terminal bud.

The subsequent pruning and training of the vine can best be explained by reference to the figures. Fig. 1 represents an average six year old vine as it appeared upon January 1, 1901, just before pruning. The two year cane or arm A grew in the year 1899, and was considerably longer than now when the vine was pruned in January, 1900, one year ago. This cane was then shortened to the length now shown, all its neighboring canes were removed and it was tied to the wire. During the summer of 1900 the seven strong shoots, a, b, c, d, e, f, g, grew from it, together with one or two weaker shoots and bore fruit in that season. When recently pruned the entire arm, down to one-half inch from the base of a, together with the canes b. c. d. e. f. and g., was removed by one cut at X, and the cane a was shortened to about ten buds and tied to the wire in the same position formerly occupied by A, as will be seen in Fig. 2.

The arm B also grew in 1899 and was shortened to about seven buds in January, 1900, and from these seven buds there grew in 1900, as will be seen in the figure, six strong shoots, each of which, like the shoots from arm A, bore from two to four clusters of fruit. This arm B was also, like A, cut off at X with all its canes except the one nearest the base, which is reserved to take the place of B upon the wire, after being shortened to eight or nine buds. The same process was repeated upon the left hand side of the vine, leaving it, after

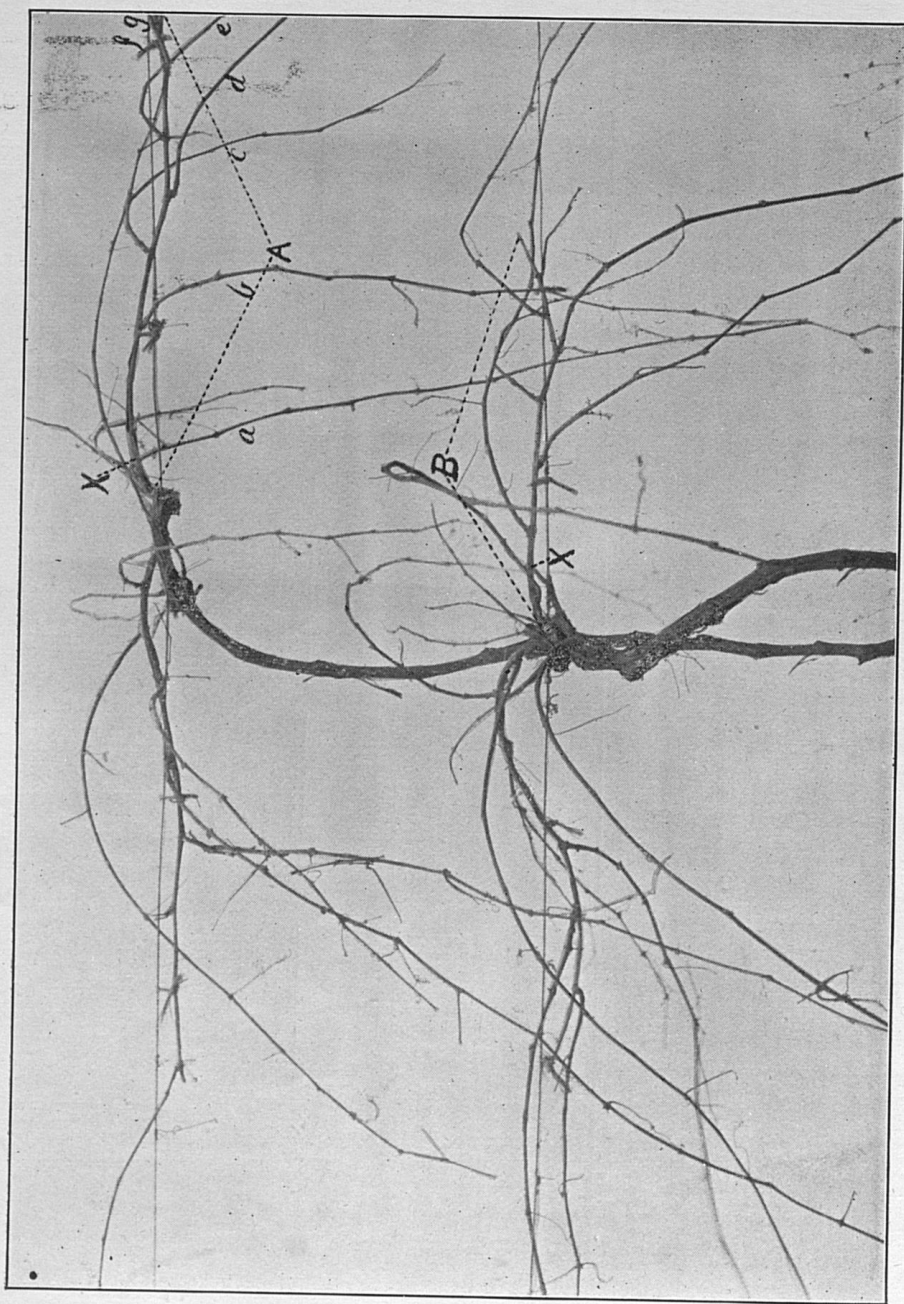


Fig. 1. The Kniffin System of Training.

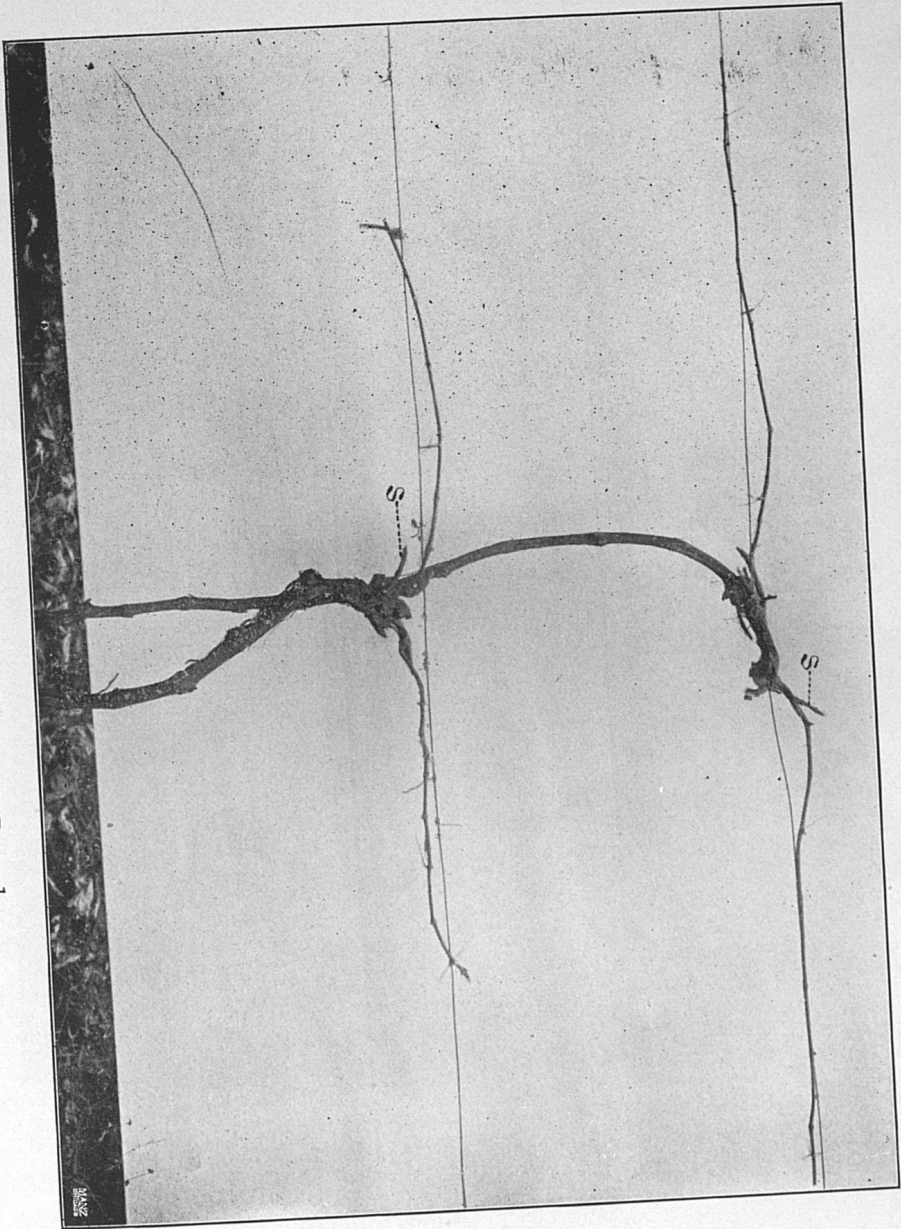


Fig. 2. The Kniffin System of Training. Pruned.



Fig. 3. End of Row. Munson System.

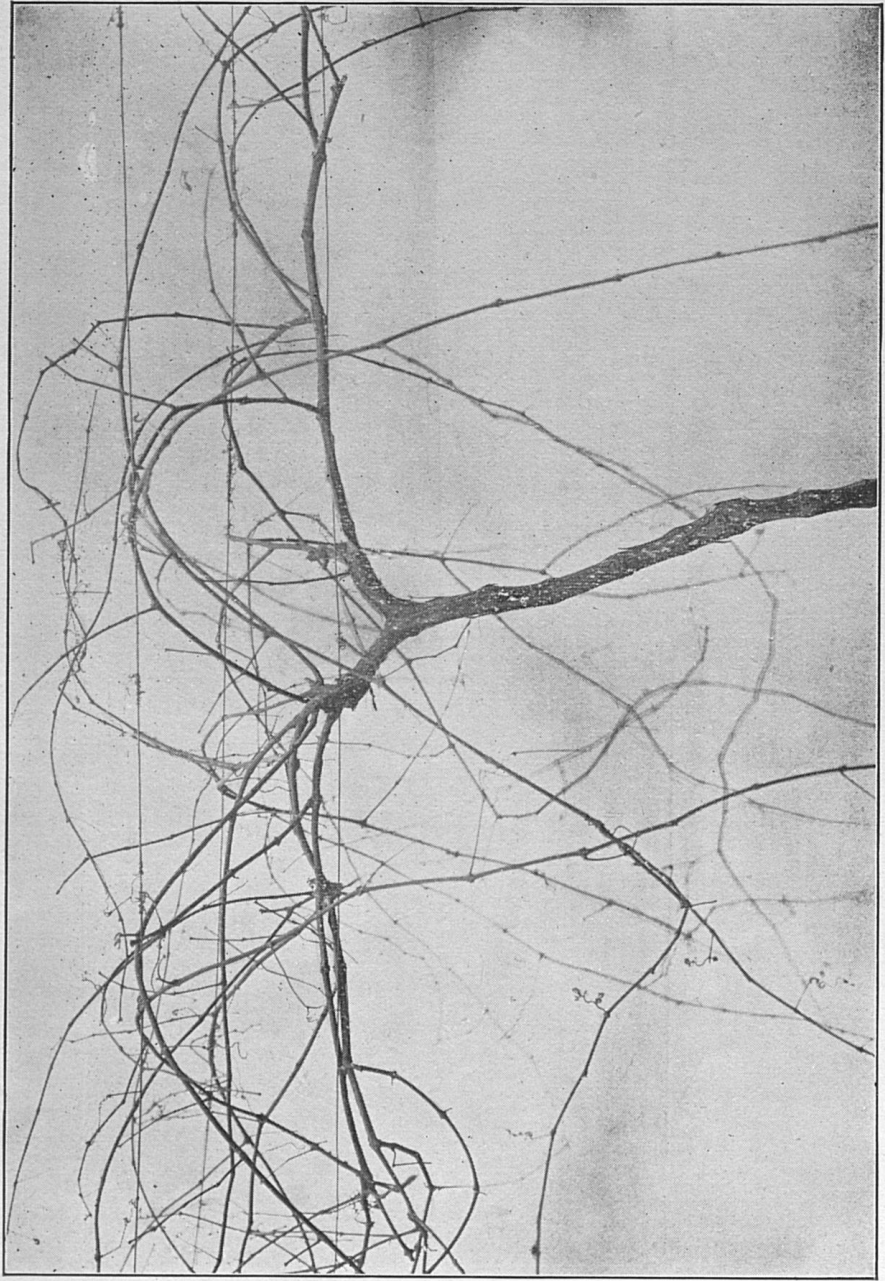


Fig. 4. Munson System of Training.

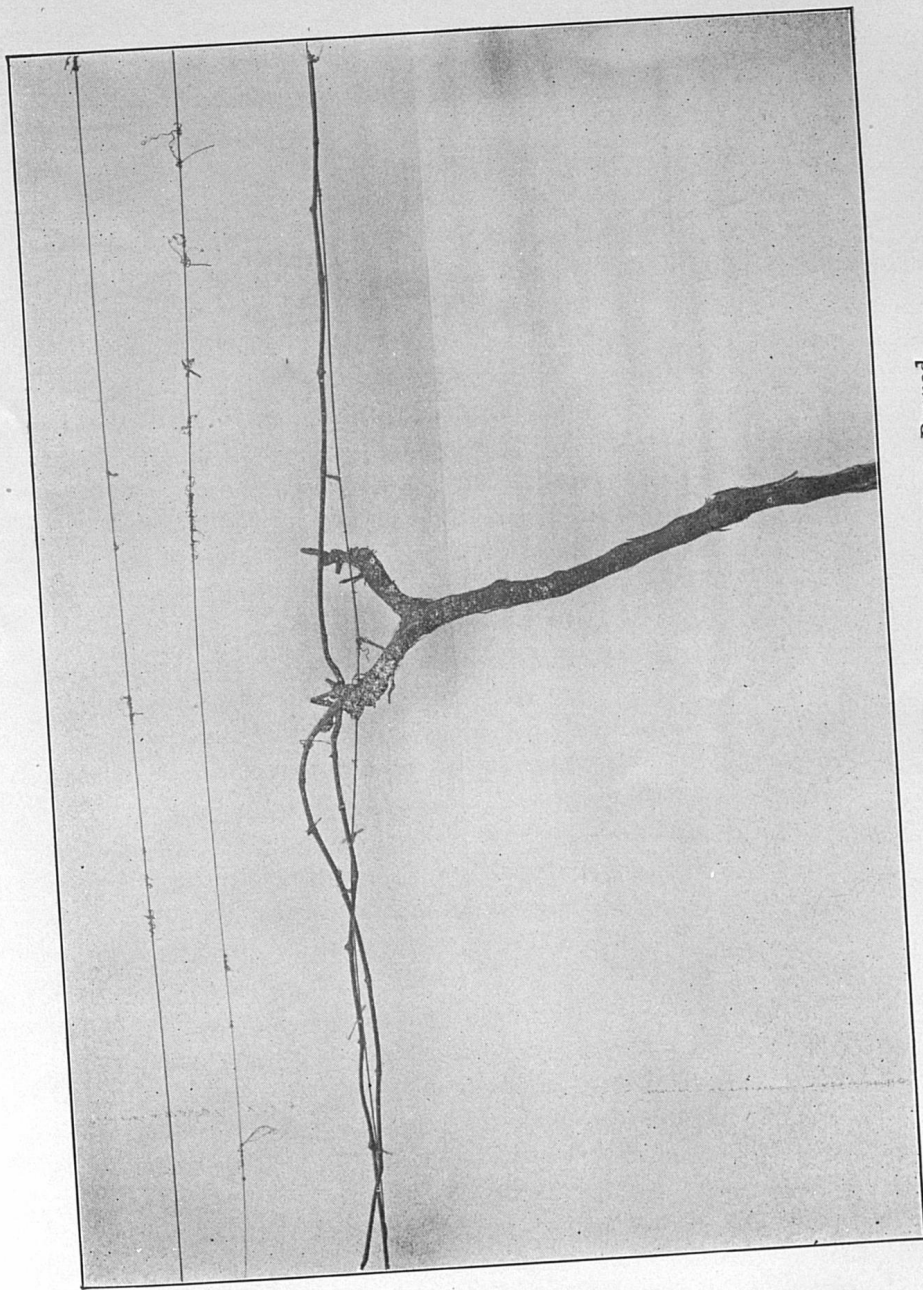


Fig. 5. Munson System of Training. Pruned.

the pruning was completed, as seen in Fig. 2. It will thus be seen that the entire pruning for a vine trained upon this method can be done with from eight to twelve cuts. As the vine grows older the canes in the annual pruning can be left a little longer, the number of buds to be left varying with the age, vigor and variety of each individual vine to be treated.

It will be noticed that two other canes growing out upon the old wood at the head have been shortened to two buds, thus making the so-called spurs as seen at s. s. in Fig. 2. This is done more or less frequently when suitable strong growing canes are developed close to the top of the main trunk, to provide a new cane to place upon the wire in the following year from a point as close to the original T head as possible; otherwise the horizontal arms will become longer each year, and it is desirable to keep the old wood as short as practicable.

To one unaccustomed to this work it would appear that the vine as seen in Fig. 2 was ruined from such close pruning, but experience demonstrates beyond question that it is only by such apparently severe treatment that the best and most profitable crops of fruit can be grown.

During the coming season a strong shoot may be expected from most of the thirty to thirty-five buds which are left upon the horizontal canes, and each of the shoots may reasonably be expected to bear from two to four good clusters of grapes. It will be seen therefore that it does not require a large number of buds to be left upon a vine after pruning to meet the requirements of a good crop of fruit, and the fruit will moreover be of a much better quality than that produced by an unpruned and neglected vine.

A second method of management which seems in our experience to possess much merit is the Munson system of training, so called from its originator, Mr. T. V. Munson, the grape specialist, of Denison, Texas. In this system as practiced by the originator, the trellis is made by placing two light posts or stakes in each hole along the row, their tops separated about 18 to 24 inches, like the two sides of the letter V, and standing six feet high. A wire is stretched lengthwise along the tops of these

posts and a third wire about a foot lower upon cross-wires midway between them.

In our own practice essentially the same arrangement of wires is secured by the use of a single post in each hole with a two foot piece of joist 2 in. by 4 in., spiked firmly against the top like the letter T, as shown in Fig. 3. The wires in this way are stretched along the ends of this horizontal piece of scantling, with the third midway between them and ten or twelve inches lower. In this system a single main trunk is grown to the middle or lower wire, and one or two canes (depending upon age and vigor) are left after pruning to run each way upon this middle wire and securely tied. The remaining or outer wires are used only to support the growing shoots which with but little attention grow out over them as seen in the illustration. As their length and weight increase they gradually droop toward the ground, having in the meantime secured by their tendrils a firm hold upon the wire. The appearance of the vine at the end of the season's growth will be easily understood by a second reference to Fig. 3 from a photograph of a vine in our experiment vineyard. The pruning of a vine in this system is done in a manner similar to that already described in the Kniffin system, except that only one main trunk is used and the canes are attached only to the middle or lowest wire, so that a strong and vigorous mature vine should have two or more canes left in each direction after pruning, in order to furnish a sufficient number of buds for fruiting, and the vine is renewed back to the head as completely as possible each year. See Figs. 4 and 5.

This system requires slightly more material and trouble in erecting the trellis, but the results secured in our own experience have been unexcelled by those of any other system, especially in the case of strong growing vines, while even with weak growers like Delaware the results have been quite satisfactory.

Among the advantages of this method of training are the favorable position of the fruit, which can not be soiled by spattering of mud in heavy rains. The grapes are overhung by a canopy of leaves which protects them from the hot sun,

while at the same time a free circulation of air is secured, and they are conveniently placed for spraying and gathering later in the season. A minor advantage, which is especially appreciated in a private garden, is the facility which it affords for passing from one row to another by slightly stooping and walking under the wires. The elevated position of the wires and vines also greatly adds to the ease of cultivating the entire ground beneath.

Several other systems of pruning and training, including the Fuller and the High Renewal have been used upon our grounds, but none have given better results, and in most cases not as good as the two mentioned.

Cultivation.

The grape, like other fruit crops, ought to have good cultivation. It should begin in the spring as soon as the ground is in fit condition to work, and it should continue at frequent intervals until the fruit approaches maturity. This cultivation serves two important purposes; first, the destruction of weeds; second, an object the value of which is not sufficiently appreciated, the saving of the soil moisture through the formation of a loose blanket of top soil. Toward the latter part of summer, however, grape growers usually find it best to stop cultivation in order to check the growth of the canes and to promote the ripening of both the shoots and the fruit.

The growth of crab grass and other annual weeds is not so serious a fault at this time, and is even desired by many good growers, as by drawing upon the scanty supplies of moisture prevalent in the soil in late summer, these plants tend to stop further growth of the vines. Such a growth of weeds or a sown crop is also beneficial in serving as a partial mulch through the winter and as a protection against the washing of the soil during winter storms. If, upon the other hand, cultivation is too long continued, it induces a late growth of green shoots which cannot become sufficiently ripened to endure the winter's cold, and are consequently killed back as far as well matured wood.

Fertilizers.

In manuring the grape the most generally needed elements are potash and phosphoric acid. In our own locality, however, the latter constituent,—phosphoric acid,—is so abundant in the soil, that there is commonly no profit in its application, so that upon the Experiment grounds the most valuable fertilizer is potash in some form.

It is often true, however, that a soil may lack sufficient nitrogenous plant food, and whenever the vines generally show a small weak growth there is probably need for this element which can be supplied in the form of nitrate of soda, barn and stable manure, or other nitrogenous fertilizers.*

Insects and Diseases.

Briefly it may be said that the most annoying insect enemy of the grape during the last three years in this locality has been the large green June bug, *Allorhina nitida*, L., which attacks the ripe fruit, disfiguring or destroying the handsomest clusters.

Its attacks have been most destructive upon the early varieties with thin tender skin, a fact which accounts for the frequent mention of this character in the discussion of varieties in the following pages.

The most effective method of combatting this pest in our vineyard has been the simple expedient of hand picking into a dish of water with a thin layer of kerosene (coal oil) over its surface. The insect will often drop at once when touched, and if the kerosene and water is held under them when they are molested, many will promptly fall into the fatal fluid.

All fungous attacks such as mildew, black rot of the berry, etc., are best prevented by the well known Bordeaux mixture applied with some form of spraying pump.

The mixture is prepared by the following formula:

*Fruit growers desiring to use commercial fertilizers should send to the Director of this station for the latest bulletins upon this subject, which publish the analyses of the various brands offered in the markets of the State.

- a.* 40 gallons of water.
- b.* 6 pounds of bluestone.
- c.* 4 pounds of fresh lime.

Dissolve *b* in three or four gallons of hot water taken from the supply *a*. Slack the lime and make of it a paste about as thick as cream. Now stir the latter into the bluestone solution, and finally turn the whole into the remaining water.

The preparation should be applied first before the buds break in Spring, coating the entire vine very thoroughly with the mixture, again just before the blossoms open, and twice more at intervals of about two weeks.

If any biting insects are observed eating the leaves or young shoots, they may be effectively treated by the addition of one-fourth pound of Paris Green to the 40 gals. of Bordeaux mixture referred to above, and applied with it, taking care to keep the preparation thoroughly agitated when applying, to prevent the settling of the poison.

In the family garden, a large part of the injury done to grapes by the black rot, and by birds and various insects which attack the clusters can be prevented by sacking the clusters. For this purpose the ordinary grocers' 1 or 2 pound Manila sacks can be used. They are put on just after the blossoming period is past while the young grapes are still not much larger than a pin head. Selecting a sack of the proper size for the kind of bunch to be enclosed, it is drawn over the little cluster and pinned snugly above the fruit, thus keeping out the spores of fungi as well as insect enemies.

This operation, while not practicable for an extensive vineyard, is very satisfactory in the home garden, as in addition to the protection afforded, it greatly improves the appearance and often the quality of the fruit so protected.

Varieties.

The varieties of grapes grown in our vineyard, as elsewhere in the Eastern United States, are of various and diverse origin. Many are descended directly from the wild American species found growing in our woods and thickets. Others are hybrids between these species or between one or more of

these and the European species of grape.

The following are the principal parent species:

Vitis Labrusca, L. The Northern Fox Grape found growing wild throughout the Northeastern States is the ancestor of many of our best hardy and productive varieties such as Concord, Catawba, Moore's Early, Worden and Niagara, some of the oldest of these varieties being immediate seedlings of the wild vines. As a class they are self-fertile, that is, the pollen of their flowers is capable of fecundating or making fruitful their own pistils or forming grapes, and may therefore in most cases be safely planted alone.

Vitis vinifera, L., the wine grape of Europe, is wholly unadapted to general outdoor culture in this part of the United States, although largely grown in California. Hybrids between this species and *Vitis Labrusca* are often, however, with good care, successfully grown, and afford us some of our most beautiful and high flavored varieties such as Lindley, Brighton, Barry, Herbert, Aminia and others indicated in the discussion following. As a rule the pollen of one of these hybrids is infertile upon the flowers of its own variety and often upon other varieties of similar parentage. They should, therefore, be planted in the vicinity of some strong pollen producers such as those of the *Labrusca* class, which includes Concord, Worden and other standard varieties.

Such hybrids are also somewhat more susceptible than other varieties to various fungous attacks, and should not be grown generally by those who are not able and willing to give their vines the best of care, including timely spraying.

Vitis aestivalis, Michx. and *Vitis riparia*, Michx. are also two native species of grapes from which a number of excellent cultivated varieties have been derived, either as pure seedlings or as hybrids between these and other species. *Vitis lincecumii*, Buckley, (Post Oak Grape) *Vitis rupestris*, Scheele, and other native species of the Southwest have played an important part in the parentage of certain varieties produced through the labors of Mr. T. V. Munson, Denison, Texas, many of which varieties are of value in Kentucky, and of even greater importance to the states south and west of us.

The varieties listed below have been obtained from the following sources as indicated by abbreviations after the name of the variety :

- B. S.—Bush & Sons, Bushberg, Mo.
 C.—R. G. Chase & Co., Geneva, N. Y.
 E. B.—Ellwanger & Barry, Rochester, N. Y.
 F.—L. J. Farmer, Pulaski, N. Y.
 Ford.—Frank Ford & Sons, Ravenna, Ohio.
 H.—H. F. Hillenmeyer, Lexington, Ky.
 J.—Geo. S. Josselyn, Fredonia, N. Y.
 M.—T. V. Munson, Denison, Texas.
 R.—Lewis Roesch, Fredonia, N. Y.
 S. B.—Stayman & Black, Leavenworth, Kansas.
 S. H.—Storrs & Harrison, Painesville, Ohio.
 Y.—Fred E. Young, Rochester, N. Y.

AGAWAM, Rogers' No. 15. *Labr. Hybr.* B. S.
 A very handsome red grape. Bunch of medium size, fairly compact. Berry of good size with tough skin; the flesh is juicy, rich and sweet. The single vine in our vineyard is young and not in full bearing; a moderate grower and generally well spoken of in its class. It ripens first week in September.

ALICE. Y.
 A beautiful, pale red grape. The vine is a strong grower; bunch is of medium size, compact, frequently shouldered. The berry is of medium size with an exceedingly tough skin; the flesh tender and of superior quality. Ripens first week in September. It is a promising variety of recent introduction.

AMERICA. M.
 A very rank grower and a large yielder when well pollinated. The bunch is medium to large, the berry small to medium. The skin and flesh are tender with red juice. The quality is fair; rather acid. Ripens last of August.

AMINIA, Rogers No. 39. *Labr. Vin.* R.
 The vine is a vigorous grower, producing a fair crop of

handsome clusters of delicious black berries. It is early, ripening about the middle of August. The berry is large with firm skin and flesh, juicy and sweet. It was partially killed back by the severe winter of 1898-99 but has not suffered before or since from the same cause while grown here.

BARRY, Rogers' No. 43. *Labr. Vin.* B. S.

Another of Rogers' Hybrids ripening about the last week in August. The vine is a fairly vigorous grower. Bunch good, compact; berry large and black with abundant bloom; skin firm; flesh juicy, sweet and rich. A handsome and very superior table grape, but with us only moderately productive.

BEACON. *Post Oak and Concord.* M.

Our specimen of this variety, originated by Munson, is yet a young vine. It is a very strong grower, bearing small, compact clusters of medium berries, which resemble Norton's Virginia. The flavor is good, though rather acid.

BERCKMANS. *Rip. Hybr.* B. S.

The vine is a strong or even rank grower; a rather small, dark red grape of excellent quality, somewhat acid, but juicy and tender. The bunch is rather loose and ragged, thus detracting from its appearance, a fault which is reported elsewhere and seems to be characteristic of the variety.

BRIGHTON. *Labr. Vin.* S. H.

This standard red grape is now one of the best known of the *Labrusca vinifera* hybrids; quality excellent. Self sterile and must be planted near other varieties that can furnish pollen.

BRILLIANT. *Labr. Hybr.* M.

One of the most noted of the productions of the grape specialist, T. V. Munson, A beautiful red grape, but scarcely better upon our grounds than one of its parents, the Lindley, which it most resembles in fruit. The vine is moderately vigorous, generally

hardy, though partially killed back in the trying winter of 1898-99. Bunch of medium size, fairly compact; berry of medium size, with tough skin; flesh tender, rich, juicy and sweet. In general, reports upon this variety in this latitude are highly commendatory.

CAMPBELL. *Labr. Hybr.* J.

A recent introduction which has not yet come to full fruitage upon our grounds. So far as our experience goes, the vine is vigorous, bunch good, berry large, black, with tough skin; flesh juicy, rich and sweet. Nearly as early as Moore's Early. Quality better than Concord. A very promising early variety.

CARMAN. *Post Oak and Aest.* M.

One of Mr. Munson's productions, and in our judgment one of the most valuable of them all. Vine very vigorous, hardy and exceptionally free from disease. Clusters rather long, moderately compact, or sometimes rather loose. Berry a little smaller than Concord; black, very firm, holding well to the stem; skin tough, flesh meaty, but tender, moderately juicy, sweet and excellent flavor. Ripens first week in September.

CATAWBA. *Labr.* H., S. H.

An old, well known standard late red grape; still a favorite in many localities, and has done well upon our grounds.

CENTENNIAL. *Aest. and Labr. Hybr.* B. S.

A pale red grape of good quality, but with us neither vigorous nor productive.

CHAMPION. *Labr.* B. S.

A black grape of good size, color and vigor, but of poor quality. Its earliness is by general consent its chief or only recommendation to cultivation.

CLINTON. *Rip.* E. B.

An old variety of vigorous growth. Bunch and berry rather small. Flavor good, but acid, though improving when allowed to hang late upon the vine. Not valuable for general culture, but liked by some for the

home garden for covering arbors, and for its late-perfecting peculiar flavor.

COLERIAN. *Labr.* E. B.

A white grape of vigorous growth and superior quality; bunches good; berry a clear golden green, very juicy, rich and sweet. Its main defect for general culture is its very thin, tender skin, which is readily punctured by June bugs and other insects, which quickly make the beautiful berries unsightly and unmarketable.

DR. COLLIER. *Post Oak and Concord.* M.

A very dark red or almost purple variety borne in abundance upon a strong growing vine. It produces a somewhat long, moderately compact, good looking bunch, but with us is rather poor in quality; juice abundant, but watery and lacking in sweetness.

CONCORD. *Labr.* H.

Too well known to require any description or discussion. The standard grape for the entire eastern United States for many years past, as it doubtless will continue for some years to come.

CORNUCOPIA. *Rip. Hybr.* B. S.

A fair grower of the Clinton type; bunch of medium size, compact; berry medium size, black, juicy, but rather acid. It is of no special merit for general purposes.

DELAWARE. H., S. H.

This old variety, long known as the standard of excellence among grapes, still compares favorably with all the newer varieties. It is a slow grower, must have good culture and close pruning. Under these conditions with us it persists in bearing year after year good crops of its handsome and delicious little red grapes. It is one of the best for home use or for a market that appreciates quality in fruit.

DELAWBA. B. S.

A seedling of Delaware and Catawba, ripening about with Delaware. A recent introduction that produces a

handsome bunch and berry intermediate in most characters between its parents. Has a tough skin, tender pulp, is sweet, rich and good. It has not yet fruited sufficiently to permit of final judgment, but appears quite promising.

DIAMOND. (Moore's Diamond). *Labr. X.*

A strong growing white grape, a seedling of Concord. Upon our grounds not as productive as Niagara, but of finer quality; clusters of good size, compact and handsome, though sometimes, on account of its thin skin, disfigured by insects, etc., and also appears somewhat susceptible to black rot. Berry, when fully ripe, a beautiful yellowish green color. Pulp melting, rich, juicy and sweet. Ripens about the third week in August.

DIANA. *Labr.*

E. B.

A moderately vigorous grower, producing medium-sized compact clusters of handsome pale red berries; skin tough; pulp juicy, tender and excellent. Quite free from insects and fungous attacks. Ripens about the first week in September.

DUCHESS. *Labr. Hybr.*

E. B.

A good grower, bearing abundantly of rather small white grapes. Bunch large and fairly compact; berry small, yellowish green, minutely dotted with dark spots which give it a somewhat dingy appearance. The skin is very tough and firm, pulp very tender, juicy and delicious. Appears to be a very superior variety for the home garden. Ripens first week in September.

EATON. *Labr.*

B. S.

A strong, vigorous growing seedling of Concord. Produces a good yield of medium sized clusters of handsome appearance. The berries are black, very large and showy; flavor pleasant, but quite watery, and only fair in quality. Ripens first week in September.

ECLIPSE.

S. B.

A strong growing variety. Fairly productive with

bunch of medium size and rather loose. Berry is yellowish white with a small black spot in each one, which appears at first somewhat like the early stage of black rot, but is characteristic of the variety. Skin is thin, not very tough. Pulp juicy, sweet, tender and very superior in quality. Ripens about the first of September.

ELDORADO. *Labr. Hybr.*

B. S.

Vine strong, only moderately productive. Bunches loose and quite susceptible to insect attacks and rot. Berry of medium size, golden green. Pulp sweet, tender and of excellent quality. Ripe last week in August.

ELVICAND.

M.

An exuberant grower originated by T. V. Munson. Bunch small to medium, not very compact. Berry medium sized, very dark red. Skin tough. Pulp moderately juicy, somewhat acid, only fair quality. Moderately productive, Ripens about the second week in September.

ELVIRA. *Rip. Hybr.*

H.

Vine a vigorous grower and very productive. Bunch small to medium size, moderately compact. Berry medium in size, greenish white, often somewhat dingy and unattractive in appearance. Skin thin and tender and hence often disfigured by insects. Quite good in quality when well grown, but often held in bad repute because of its poor quality when allowed to overbear. Ripens last week in August.

EMPIRE STATE. *Labr. X Rip.*

S. H.

Only moderately vigorous with us, and suffered from the winter of 1898-99. Not very productive; bunch rather small; berry green, medium size, tender sweet and juicy, but no better than other varieties which thrive better. Ripens toward the end of August.

EUMELAN. *Aest.*

E. B.

The single vine of this variety in our collection is a

young specimen, not yet in full bearing and appears to be not very vigorous. Berry black, medium size, and in quality one of the juiciest and richest flavored grapes in our collection. Ripe about the first of September.

FERN (Fern Munson). *Linc. Hybr.* M.
A strong growing and productive black grape. Bunch large and somewhat loose; berry medium in size with thin firm skin. Pulp juicy and good. Ripens about second week in September.

GAERTNER. *Labr. Hybr.* E. B.
A moderate grower bearing very beautiful clusters of large amber berries. Skin tough, pulp tender, juicy, rich and high flavored. Appears to be fairly productive and one of the best in quality.

GENEVA. *Labr. Hybr.* C.
A good grower and fairly productive. It has beautiful white berries of good size; skin tender, very sweet and one of the best half dozen in quality. Its chief fault upon our grounds is that on account of its tender skin and pulp it is almost ruined by "June bugs," wasps and bees which swarm upon the beautiful fruit.

GOETHE. *Labr. Hybr.* S. H.
With us rather a weak grower and not very productive. The berry is large and of a beautiful pale red color. Pulp tender and of high quality.

GOLD COIN. M.
Upon our grounds, one of the best of Munson's introductions, produced, as he states, by pollenating Norton with Martha. A very strong grower with bright healthy foliage. Bunch of fair size, compact and handsome, and unusually exempt from insects and fungus attacks. Berry of medium size, a rich golden color. Skin tough; pulp juicy, rich and sweet. Ripens about the first of September. A very promising grape.

GOLDEN DROP. *Labr. Hybr.* E. B.
A rather small golden yellow grape of superior quality,

very rich and sweet, but with us too weak a grower to be promising.

GREIN'S GOLDEN. *Rip. Hybr.* B. S.

A good grower, bunch small and compact; berry size of Delaware; yellowish color tinged with red. Pulp sweet and tender; only fair in quality.

HARTFORD. *Labr.* R.

An old and well known black grape. Vine vigorous; bunch medium size, rather loose. It drops its berries early. Ripens about the first week in August. Quality fair, but now generally superseded as an early variety by better kinds.

HERBEMONT. *Aest.* M.

A rampant grower and very productive of big bunches of little black grapes. It is very late, ripening the third or fourth week in September. Clusters compact; the berries have thin skin with tender and juicy pulp, which, when fully ripe, has a pleasant and sprightly flavor. Rather tender here; was killed back in winter of 1898-99.

HERBERT. *Labr. Hybr.* B. S.

A splendid black grape and appears to be one of the best of its class as grown upon our grounds. The vine is a good grower, the bunch medium to large, compact and handsome resembling Barry in both cluster and berry, having the same parentage. Berry large black with tough skin; the pulp is sweet, juicy and of a very superior flavor. Ripens third week in August.

HEXAMER. (Dr. Hexamer.) S. B.

Vine very vigorous and productive. Bunch large, long, fairly compact and more or less shouldered. Handsome when not disfigured by insects. Berry black, of medium size; skin not very tough. Pulp meaty, moderately juicy, sweet and good.

IDEAL. *Aest.* S. B.

A good grower, moderately productive of dark red grapes of medium size. Bunch of good size, rather

long, moderately compact ; skin thin and tender ; juicy, rich and delicious flavor when well ripened. Ripens last week in August.

IMPERIAL. (White Imperial.) *Labr.* X.

A small, white berry in medium sized clusters ; sweet and good. Vine a good grower, moderately productive.

IRON CLAD. *Rip.* X *Labr.*

B. S.

A strong growing variety, bearing small compact bunches of small black grapes. Is not full ripe until about the second week in September, although well colored some time before that. Has a sprightly, somewhat acid flavor, but too small and not good enough to be in demand when better varieties are on hand.

ISABELLA. *Labr.*

R

One of the oldest American cultivated grapes, but now mostly superseded by better varieties.

IVES. *Labr.*

H.

A well known, strong growing, early black grape, which has been largely grown in Kentucky in the past, for shipment North. Owing to the fact that it colors long before it is ripe, it has often acquired a worse reputation than it deserves. When at its best it is fairly good in quality, but not good enough to be cultivated primarily for table purposes.

JAEGER, (Hermann Jaeger). *Linc.* X.

M.

One of Munson's seedlings, which seems rather tender for our climate. Was severely killed back in 1898-99.

JEFFERSON. *Labr.* X.

R.

A handsome red grape of very high quality, but the vine is rather delicate in growth and not productive enough for general cultivation.

JESSICA.

B. S.

A small, early white grape; a rather weak grower; cluster small; berry sweet and good. Of no decided merit.

- LADY. *Labr.* B. S.
A white grape of moderate growth, resembling Martha, which is of the same parentage, both being seedlings of Concord. Cluster compact, berries under medium size, of a rich golden color and very sweet and excellent flavor. On our grounds is badly disfigured by insects.
- LADY WASHINGTON. *Labr. Hybr.* S. H.
A small, early white grape of good appearance and of very excellent quality, but is neither a strong grower nor productive here.
- LEAVENWORTH. *Labr. X.* S. B.
Another small white grape, small in bunch and berry, resembling the Lady mentioned above. Pulp is less juicy, and is much less injured by insects.
- LINDLEY (Rogers' No. 9). *Labr. Hybr.* R.
Among the most satisfactory of the Rogers grapes. Vine quite vigorous on our grounds, producing handsome clusters, though sometimes rather loose. Berry red, medium to large; skin tough, flesh tender, melting, rich and juicy. Like others of its class, it should be planted near other varieties (preferably Labrusca) to insure pollination. Ripens about the last week in August; fairly productive and a very fine table grape.
- MAGNATE. *Labr. Hybr.* S. B.
Vine vigorous, moderately productive. Bunch of medium size, fairly compact; berry medium size, white skin, rather tender; pulp juicy and excellent.
- MARTHA. *Labr.* B. S.
A well known standard early white grape, worthy of general culture. A good grower, and a very good table grape.
- MASSASOIT. *Labr. Hybr.* E. B.
Not yet in full fruiting condition. A beautiful red grape, but so far a rather weak grower with us.
- MENDOTA. *Labr.* S. B.
A strong growing vine, bearing a good yield of medium

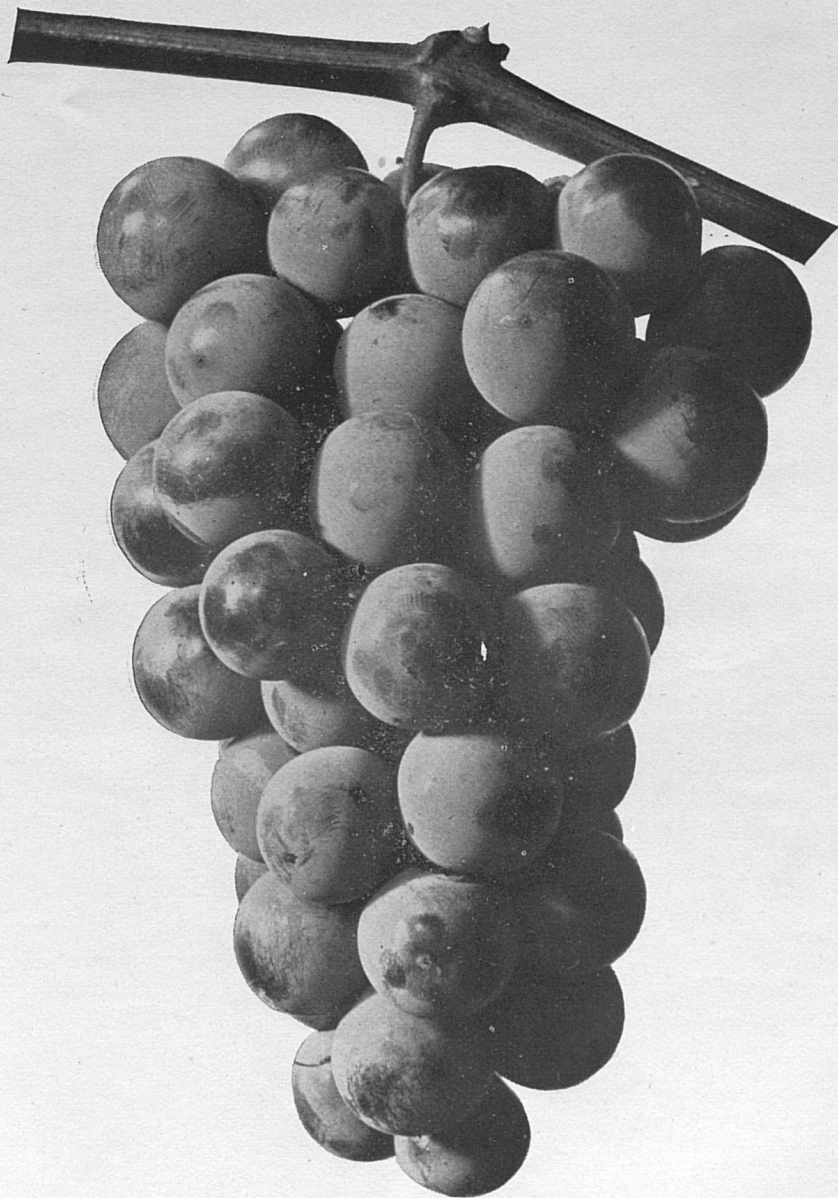


Fig. 6. Moore's Early.

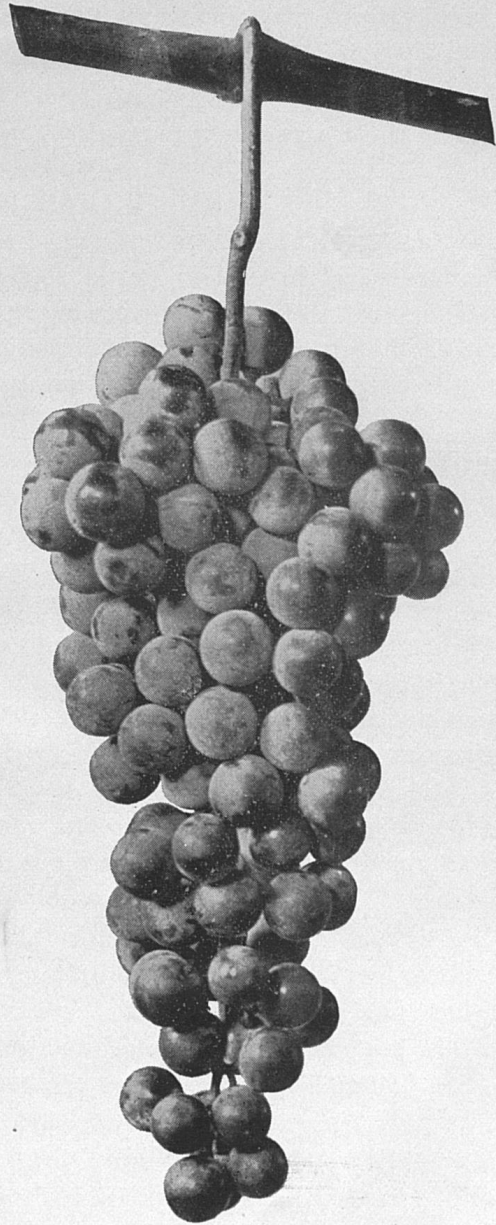


Fig. 7. Ozark. (Reduced to one-half diameter.)

black grapes. Clusters of medium size, compact; berries have tough skin; pulp meaty, juicy, good sprightly flavor. Ripens about the last week in August.

MERRIMACK. *Labr. Hybr.* B. S.

A Rogers grape, which is a weak grower with us. Not promising.

MOORE'S EARLY. *Labr.* B. S.

One of the best standard early black grapes. Is a good, but not large, yielder of large and handsome black grapes of excellent quality. Ripens about the first of August, and is vigorous and healthy. A valuable early market or table grape. See Fig. 6.

MOYER. *Aest. Hybr.* B. S.

A small early red grape, somewhat resembling Delaware. Berry juicy, sweet, tender and excellent, ripening about the second week in August.

MRS. MUNSON AND MUENCH. M.

Two of Munson's seedlings that are a little tender in our severest winters without protection. The two are of the same parentage and resemble each other considerably. Both rank growers, producing large quantities of fruit. Bunches large, long, compact; berries very dark red, a little under medium size; skin firm, flesh meaty and of excellent quality when full ripe. Mrs. Munson a little better in bunch and flavor, ripens about the middle of September.

NIAGARA. *Labr.* H.

A standard white grape, and one of the best for general purposes. Strong growing and very productive of large, handsome bunches, as good as Concord. Ripens about the second week in August.

NOAH. *Rip. X.* B. S.

A strong growing, productive white variety, ripening about the second week in August. Produces a good-looking, compact bunch, of green or yellowish green color; skin tender, flesh firm, not very juicy, but excellent in flavor.

NORTON'S VIRGINIA. *Aest.* B. S.

An old variety still worthy of attention. A vigorous grower and productive of small, compact clusters of small black berries, having a spicy, somewhat acid flavor, which is very agreeable to many.

EARLY OHIO. *Labr. Hybr.* F.

The earliest grape in our plot, ripening usually about the last week in July. A moderate grower and fairly productive; bunch of medium size; berry black, tender and fair quality.

OMEGA. *Labr.* S. B.

Generally admitted by those who have tried it in our vineyard to be scarcely equalled in quality by any other grape in our collection. Unfortunately, it is not a strong grower and only moderately productive. Clusters small to medium; berry large, pale rusty red in color; skin firm; flesh rather tenacious, juicy, sweet, exquisite flavor. Ripe last week in August.

ONDERDONK. *Aest.* M.

A seedling of Herbemont, and like its parent, an exuberant grower and producing very large clusters of small berries and so compact as to appear jammed together. Berry a clear green, becoming amber when full ripe, or sometimes rather dingy; tender, sweet and excellent flavor. Ripens about second week in September.

OPAL. *Labr. Hybr.* M.

Vine vigorous and productive. Bunch small to medium size, a clear green in color, becoming golden when exposed; skin tough, flesh tenacious, juicy, sweet and good.

OSAGE *Labr. X.* S. B.

A fair grower, bearing small clusters of medium sized black berries; skin tough, flesh firm, but sweet, juicy and of good flavor; ripens about first week of September.

OZARK. *Aest. X.*

S. B.

The best of the varieties originating with Stayman & Black, and appears to be a very valuable late grape. Vine rampantly vigorous, very productive. Bunch handsome, long, compact, well shouldered; berry slightly under medium size, black, with abundant bloom. Skin tough, flesh moderately juicy, excellent but not high flavor. A very promising variety, particularly because of its vigor, great productiveness and freedom from insects and fungus attacks. Ripens about the first week in September. See Fig. 7.

PARAGON. *Labr X.*

S. B.

A promising black grape among the Stayman & Black introductions. Vine fairly vigorous, productive. Bunch large, compact. Berry black, juicy, sweet and good.

PERFECTION.

S. B.

A seedling of Delaware originated with Stayman & Black. An early red grape, resembling, but a little larger in bunch and berry than its parent. More vigorous in growth, but scarcely equal to Delaware in quality here.

PERKINS. *Labr.*

H.

A good dull red variety, which, however, was almost completely killed by the winter of 1898-99.

POCKLINGTON. *Labr.*

H.

A white grape, a seedling of Concord. Not a thoroughly satisfactory variety with us; ripens very unevenly and is only fair in quality, though handsome when perfect.

POUGHKEEPSIE RED. *Labr. Hybr.*

B. S.

A red grape resembling Delaware. A weak grower not so hardy as the Delaware and no better in other respects, as grown here.

PULASKI.

S. B.

Vine vigorous; berry small and black, in compact clusters, fairly productive, but only fair in quality.

Bulletin No. 92.

- ROCHESTER. *Labr. X.* R.
Of the same general type as the Delaware. A weak grower.
- ROMMEL. *Rip. Hybr.* M.
A white grape originated with T. V. Munson. Has not reached full maturity yet. A fair grower and of good quality, but has not shown any striking merit as yet.
- SALEM. (Rogers' No. 53.) *Labr. Hybr.* R.
A strong growing variety, but was cut back by winter of 1898-99. Bunch rather long and often loose. Berry very dark red, large with tough skin, firm flesh; juicy and rich though somewhat acid flavor. Appears quite susceptible to fungus diseases in leaf and berry and often loses its leaves early. Ripens third week in August.
- STANDARD. S. B.
A strong growing productive vine. Bunch medium to large, compact and shouldered. Berry medium size, dark purple, almost black, tough skin, flesh tender, rich and good; of higher quality than Concord. A very promising market grape, ripening about the first of September.
- ULSTER. *Labr. X.* B. S.
A weak grower with us producing a small crop of grapes of high quality, but not promising here.
- VERGENNES. *Labr.* R.
A beautiful red grape, a rather weak grower and seems inclined to overbear. Bunch of good size, compact; berry large light red, similar in appearance to Jefferson; skin firm; pulp juicy, tender, rich, very good. A little tender in some winters. Ripe third week in August.
- VICTOR (Early Victor.) *Labr. X.* B. S.
Vine shows a fair growth upon our grounds. Bunch of medium size, compact, frequently shouldered. Berry slightly under medium size, black, tough skin, pulp

rather firm, sweet and very good flavor. Ripens second week in August. An excellent early grape for home use.

WOODRUFF. *Labr.*

H.

Vine healthy and vigorous. Bunch medium to large, compactly filled with large bright red handsome berries. Skin thin but tough; pulp juicy and good. Presents a very attractive appearance and ripens about third week in August. Has the fault of dropping from the stem soon after ripening.

WORDEN. *Labr.*

S. H., H.

A well known seedling of Concord. It resembles its parent rather closely, and is taking its place to a considerable degree because a little earlier and perhaps a little better in quality. Bunch and berry large and handsome. Ripens about second week in August.

WYOMING. *Labr.*

H.

A vigorous and productive red grape. Bunch of medium size, moderately compact; berry bright red, skin thin; pulp tough and rather tenacious; quality good. Sells well in market.

Summary of Varieties.

For a standard collection of vigorous and productive varieties of the various colors, including early and late kinds, the following may be suggested for this State :

Black.—Moore's Early, Worden, Concord.

Red.—Delaware, Wyoming, Brighton, Catawba.

White.—Martha, Niagara.

For a supplementary list of very promising recent introductions, or varieties valuable with good care, the following:

Black.—Aminia, Herbert, Campbell, Carman, Standard, Ozark.

Red.—Alice, Brilliant, Jefferson, Lindley, Mrs. Munson.

White.—Gold Coin, Eclipse, Geneva, Colerain, Duchess, Noah.