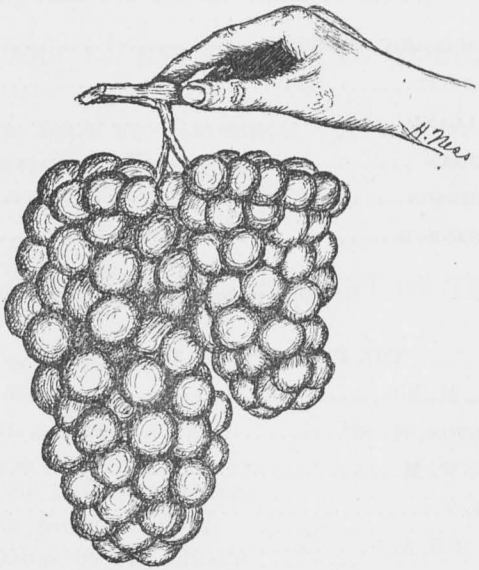
TEXAS AGRICULTURAL EXPERIMENT STATIONS.

BULLETIN No. 48.

THE GRAPE



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NOTE.—*The central station is located on the grounds of the Agricultural and Mechanical College in Brazos County. The postoffice address is COLLEGE STATION, TEXAS. Reports from this station are sent free to farmers of the State upon application to the Director.*

Reports are issued from time to time stating the results of the experiments conducted by the stations; at least four bulletins are issued annually.

THE GRAPE.

R. H. PRICE.
H. NESS.

OUTLINE OF DISCUSSION.

PART I.—EXPERIMENTAL WORK.

PART II.—CARE AND MANAGEMENT OF THE GRAPE.

I. EXPERIMENTAL WORK.

Our experiments with grapes have covered a rather wide field of work. Two hundred and five varieties were planted in the experiment station vineyard. This number includes also many pure species. The varieties in the vineyard were placed after their original species, so far as possible. In nearly all cases, four vines of each variety were planted.

The soil is a clay loam, of medium fertility, underlaid by a red clay. It has gentle drainage towards the south. Rows are eight feet apart and run east and west across the plat. Vines are set eight feet apart in the row, making 680 vines to the acre. The varieties were set in December, 1893. Good cultivation has been given with several implements de-

scribed at another place. No fertilizer has been used on the varietal test except a shovel full of common leached wood ashes scattered around each vine soon after setting, and also three rows of whippoorwill cowpeas were grown between the rows the first year. These peas grew so rank that it became necessary to mow them down early in June. For three years a careful set of notes has been taken each year on fruit and vine. Notes have been taken by R. H. Price, H. Ness, and A. M. Hilderbrandt, and a comparison of all three sets of notes has been made. A comparison with Prof. Munson's notes taken during the past twenty years has also been made. A complete set of herbarium specimens has been collected and mounted. Samples from nearly all the varieties and species of fruit have been collected and preserved in jars containing 2 per cent. solution of Formaldehyde. Sixty varieties of grapes preserved in this way were exhibited at the annual meeting of the State Horticultural Society held at College Station, July 14, 1898. These constituted a part of an exhibit for which a State medal was awarded.

In the following table some of the leading notes taken are compiled for ready reference. Some points which can be learned from the table at a glance, are: Prolificacy, flavor, color, when ripe, date of blooming, and condition of stamens at time of blooming. This later note is quite important as an indication as to whether the variety is likely to be fertile when planted by itself or not. If the stamens be erect the probabilities are it will be fertile; if recurved, the probabilities are it will not be a sure bearer when planted by itself. In such cases it would be advisable to plant a variety near by with erect stamens of the same species, and which blooms at the same time. These facts can be found out from the table and the succeeding notes:

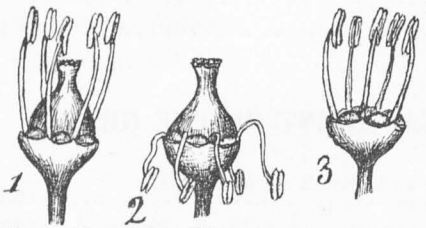

Fig. 1. Showing condition of stamens. 1. Stamens erect; 2. Stamens recurved; 3. A male flower.

*The letters in the first column indicate from whom the grapes were purchased. "M" stands for Prof. T. V. Munson, Denison, Texas; "B" for Bush & Son & Meissner, Bushberg, Mo.; "Thom." stands for J. T. Thompson, Rio Vista, Va.; "Bad." stands for George Badart, Belton, Texas.

Where blanks occur no notes were taken; in some instances the vines died.

The possessive cases some times given with the names of varieties, have been stricken out in accordance with accepted rules of nomenclature published in Bulletin No. 39.

While the yield looks small when the average yield per single vine is given, still, this method seemed more intelligible. To find the yield per acre, multiply the number of pounds given by 680, which is the number of vines that stand on an acre when planted eight feet apart each way.

Campbell Early and Columbian Imperial have been planted only one year, consequently no report can be made on them now further than to state they have both done well the first year. However, the presence of Labrusca blood is strongly shown in both varieties, and wherever much of this blood exists we do not expect staying qualities in this climate.

TABLE NO. 1.—*Varieties of Grapes.*

Name of variety.	From whom obtained.	Date of blooming.	Condition of stamens.	Date of ripening.	Average yield per vine.	Color of fruit.
Admirable	M*	April 25	Recurved	July 3	4½ lbs.	Black.
Agawam	M	April 20	Erect	July 12	3½ lbs.	Reddish brown.
Alvey	B	April 25	Recurved	July 6	2 lbs.	Black.
Amber	B	April 20	Erect	July 13	½ lb.	Light red.
America	M	April 28	Erect	July 23	8⅛ lbs.	Black.
Aminia	B	April 12	Erect	July 25	¼ lb.	Black.
August Giant	B	April 22	Erect	July 6	Dead.	Black.
Bacchus	B	April 20	Erect	July 6	¼ lb.	Black.
Bailey	M	April 24	Erect	July 3	6 lbs.	Black.
Barry	B	April 20	Recurved	July 6	4 lbs.	Black.
Beacon	M	April 24	Erect	July 6	3¾ lbs.	Black.
Beauty	B	April 20	Erect	July 10	3 lbs.	Purplish red.
Bell	M	April 18	Erect	July 20	3 lbs.	Greenish white.
Belvin	M	April 25	Erect	July 23	2½ lbs.	Black.
Berckmans	M	April 14	Erect	July 6	3 lbs.	Bright red.
Big Extra	M	April 25	Erect	July 19	4¾ lbs.	Black.
Black Bear	B	April 22	Recurved	July 3	⅛ lb.	Black.
Black Defiance	B	April 22	Erect	July 22	12 lbs.	Black.
Black Eagle	B	April 22	Recurved	July 2	4¼ lbs.	Black.
Black Hamburg	M	.....	.....	June 28	3½ lbs.	Black.
Black Hawk	B	.....	.....	Very	weak.	Black.
Black Herbemont	M	May 1	Erect	July 16	7¼ lbs.	Black.
Black July	M	April 20	Erect	July 13	2 lbs.	Black.
Brant	B	April 21	Erect	June 23	½ lb.	Black.
Brighton	M	April 17	Recurved	June 30	4¼ lbs.	Purple.
Brilliant	M	April 15	Erect	June 28	17 lbs.	Purple.
Calabrian	M	April 28	Erect	June 25	3 lbs.	White.
Cambridge	B	April 20	Erect	July 13	6¼ lbs.	Black.
Carman	M	April 25	Erect	July 13	4¼ lbs.	Black.
Catawba	B	April 20	Erect	July 16	12 lbs.	Purple.
Centennial	B	April 25	Erect	July 6	½ lb.	Pale red.
Challenge	B	April 7	Erect	July 25	¼ lb.	Purple.
Champion	M	April 25	Erect	June 25	10 lbs.	Black.
Clinton	B	April 20	Erect	July 3	4 lbs.	Black.
Concord	M	April 20	Erect	July 13	6½ lbs.	Black.
Conqueror	B	April 25	Erect	July 6	1½ lbs.	Black.
Conelva	M	April 25	Erect	July 14	1 lb.	Black.
Columbia	Thom	April 18	Erect	July 28	4½ lbs.	Black.
Cottage	B	April 20	Erect	July 14	2 lbs.	Black.
Cornucopia	B	April 20	Erect	July 3	6 lbs.	Black.
Creveling	B	April 20	Recurved	July 3	3 lbs.	Black.
Cunningham	B	April 12	Erect	July 22	5 lbs.	Black.
Delaware	M	April 24	Erect	June 25	7¼ lbs.	Purple.
Delicious	M	April 29	Erect	July 18	4 lbs.	Purplish black.
Diana	M	April 23	Erect	July 11	3½ lbs.	Pale red.
Dr. Collier	M	April 25	Erect	July 15	5 lbs.	Light purple.
Dracut (Amber)	B	April 20	Erect	July 7	15¼ lbs.	Purple.
Duchess	M	April 20	Erect	June 30	17¼ lbs.	White.
Early Golden (Campbell)	M	April 15	Erect	June 28	4 lbs.	White.
Eaton	M	April 20	Erect	July 14	4 lbs.	Black.
Early Wine	M	April 25	Erect	July 23	4¼ lbs.	Black.
Eldorado	B	April 22	Erect	July 3	Weak.	White.
Elvira	B	April 24	Erect	July 16	2½ lbs.	White.
Elvicand	M	April 26	Erect	July 14	3 lbs.	Purple.
Empire State	M	April 25	Erect	June 30	4¾ lbs.	White.
Etta	B	April 25	Erect	July 22	2 lbs.	White.

TABLE No. 1.—*Varieties of Grapes*—continued.

Name of variety.	From whom obtained.	Date of blooming.	Condition of stamens.	Date of ripening.	Average yield per vine.	Color of fruit.
Eumedel	M	April 25	Erect	June 30	6½ lbs.	Dark purple.
Eumelan	B	April 24	Recurved	July 3	4¼ lbs.	Black.
Excelsior	M	April 22	Erect	July 22	2½ lbs.	Purple.
Eva	B	April 25	Erect	July 6	4 lbs.	White.
Faith	B	April 20	Erect	July 7	2 lbs.	Pale green.
F. B. Hayes	B	April 20	Erect	June 30	2 lbs.	Greenish white.
Fern Munson	M	April 25	Erect	July 23	4⅛ lbs.	Purplish black.
Flowers	M	April 18	Recurved	July 30	1 lb.	Black.
Gazelle	B	April 25	Erect	June 30	2 lbs.	Greenish white.
Goethe	M	April 15	Erect	July 2	3 lbs.	Pink.
Golden Gem	M	April 14	Erect	June 20	8½ lbs.	White.
Gold Coin	M	April 27	Erect	July 18	7 lbs.	White.
Gov. Ross	M	April 20	Erect	July 11	4 lbs.	White.
Grein Golden	B	April 24	Recurved	July 20	¼ lb.	White.
Grayson	M	April 15	Erect	June 30	3 lbs.	Black.
Green Mountain	M	April 26	Erect	June 30	7 lbs.	Greenish white.
Hartford	B	April 20	Erect	June 30	2½ lbs.	Black.
Herbemont	M	April 29	Erect	July 25	18 lbs.	Purple.
Hermann	M	April 29	Erect	July 25	8 lbs.	Purplish black.
Hermann Jaeger	M	April 25	Erect	July 1	4½ lbs.	Black.
Herbert	B	April 23	Recurved	July 6	10¾ lbs.	Black.
Highland	M	April 20	Erect	July 27	11 lbs.	Black.
Hopkins	M	April 29	.....	July 13	3 lbs.	Black.
Humbolt	B	April 20	Erect	July 6	5 lbs.	White.
Iona	B	April 24	Erect	July 6	7¾ lbs.	Purple.
Iona Excelsior	B	April 26	Recurved	July 3	1 lb.	Light red.
Iron Clad	B	April 20	Recurved	July 3	2½ lbs.	Black.
Irving	B	April 27	.....	Dead.	.....	....
Isabella	B	April 20	Erect	July 14	1½ lbs.	Black.
Israella	B	April 20	Erect	July 14	6 lbs.	Purplish black.
Ives Seedling	M	April 18	Erect	June 30	2 lbs.	Black.
Janesville	B	April 20	Erect	June 28	3¼ lbs.	Black.
Jefferson	M	April 25	Erect	July 14	3 lbs.	Purplish red.
Jessica	B	April 20	Erect	June 26	Dead.	.....
Jewell	B	April 20	Erect	June 26	2 lbs.	Black.
Lady	M	April 20	Erect	June 30	2¾ lbs.	White.
Lady Washington	M	April 20	Erect	June 30	8 lbs.	Pale amber.
Laussel	M	April 29	.....	Aug. 2	3 lbs.	Dark purple.
Lenoir (Jacques)	M	April 25	Erect	July 13	16 lbs.	Black.
Linherde	M	April 25	.....	July 15	2 lbs.	Clear red.
Lind ey	M	April 20	Recurved	July 15	6¼ lbs.	Bright red.
Lutie	B	April 7	Recurved	June 25	2 lbs.	Reddish brown.
Marion	B	April 15	.....	June 29	½ lb.	Black.
Mary Ann	B	April 20	Erect	June 28	1 lb.	Black.
Marguerite	B	April 29	Erect	Aug. 4	2 lbs.	Purple.
Massasoit	B	April 20	Erect	July 3	9¾ lbs.	Purplish.
Mason Seedling	B	April 24	Erect	July 8	10 lbs.	Pale green.
Martha	M	April 24	Erect	June 30	2 lbs.	Pale green.
Merimac	B	April 24	Recurved	June 28	1¼ lbs.	Black.
Mrs. Munson	M	April 29	Erect	July 16	7¼ lbs.	Purplish.
Mission (El Paso)	M	April 28	Erect	July 13	Dead.	Dark purple.
Moore Diamond	M	April 20	Erect	June 26	2 lbs.	White.
Montefi re	B	April 21	Erect	July 14	4½ lbs.	Black.
Moore Early	M	April 19	Erect	June 3	1¼ lbs.	Black.
Mo. Reisling	M	April 20	Erect	July 26	1¾ lbs.	Green.
Morocco	Bad.	April 18	Erect	July 27	½ lb.	Dark purple.
Moyer	M	April 18	Recurved	July 1	2¼ lbs.	Purplish.

TABLE No. 1.—*Varieties of Grapes*—continued.

Name of variety.	From whom obtained.	Date of blooming.	Condition of stamens.	Date of ripening.	Average yield per vine.	Color of fruit.
Muench	M	April 29	Erect	July 14	5½ lbs.	Purple.
Muscat of Alex'r	M	April 28	Erect	July 6	5 lbs.	White.
Naomi	M	April 28	Erect	June 28	4¼ lbs.	White.
Niagara	M	April 20	Erect	June 30	8¾ lbs.	White.
Neosho	B	April 29	Recurved	July 24	2 lbs.	Black.
Neva Munson	M	April 29	.....	Aug. 4	2½ lbs.	Dark purple.
Newman	M	April 26	Erect	July 15	3½ lbs.	Black.
New Haven	B	April 25	Erect	July 26	4 lbs.	Black.
Noah	B	April 12	Erect	July 14	1 lb.	Yellowish.
Norfolk	M	April 20	Erect	June 28	6½ lbs.	Purplish red.
Norton	B	April 20	Recurved	July 13	1½ lbs.	Black.
North Carolina	B	April 25	Erect	July 8	1¼ lbs.	Purplish black.
N'th'n Muscadine	B	April 20	Erect	July 8	8¼ lbs.	Dark purple.
Olita	M	April 24	Erect	June 14	3 lbs.	White.
Onderdonk	M	May 1	.....	July 25	3½ lbs.	White.
Opal	M	April 25	Erect	July 18	7 lbs.	White.
Oriole	M	April 26	Erect	July 13	2½ lbs.	Black.
Othello	B	April 22	Erect	July 3	4 lbs.	Black.
Peabody	B	April 20	Erect	.....	Weak.	.....
Pearl	B	April 20	Erect	July 20	.....	White.
Perkins	M	April 19	Erect	July 30	1½ lbs.	Dull red.
Perry	M	April 29	Erect	July 15	5½ lbs.	Blackish purple.
Peter Wylie	M	April 22	Erect	June 30	8½ lbs.	Dull white.
Pocklington	B	April 20	Erect	July 30	Weak.	Yellowish red.
Poughkeepsie	B	April 20	Erect	June 28	8 lbs.	Purple.
Presly (Lyon)	M	April 20	Erect	July 3	1 lb.	Dark purple.
Prentiss	B	April 20	Erect	June 28	8½ lbs.	White.
Ragan	M	April 25	Erect	July 14	4¼ lbs.	Dark purple.
Rentz	B	April 20	Erect	July 3	2 lbs.	Black.
Requa	M	April 20	Erect	.....	Dead.	Purple.
Roanoke	B	April 20	Erect	July 28	2 lbs.	Clear red.
Rogers No. 2	B	April 20	Recurved	July 25	1½ lbs.	Black.
Rochester	B	April 20	Erect	July 14	3 lbs.	Purple.
Rommel	M	April 20	Erect	June 30	3¼ lbs.	Greenish white.
R. W. Munson	M	April 25	Erect	July 8	2½ lbs.	Black.
Salem	B	April 20	Recurved	July 11	3¼ lbs.	Dark purple.
Scuppernong	M	April 25	Recurved	Aug. 29	2 lbs.	Rusty yellow.
Secretary	B	April 20	Erect	June 28	2 lbs.	Dark red.
Taylor Bullet	B	April 7	Recurved	.....	.....	White.
Telegraph	B	April 20	Erect	July 3	12 lbs.	Black.
Thomas	M	April 18	Erect	Aug. 26	2 lbs.	Black.
Triumph	M	April 25	Erect	July 13	6¼ lbs.	Greenish white.
Transparent	B	April 28	.....	July 11	2½ lbs.	Greenish white.
Uhland	B	April 20	Erect	June 28	5 lbs.	White.
Ulster Prolific	B	April 20	Erect	July 11	1½ lbs.	Reddish.
Van Demann	M	April 29	Erect	.....	.....	.....
Venango	B	April 2	Erect	.....	.....	.....
Vineta	M	April 29	.....	July 23	2 lbs.	Purple.
Verjennes	B	April 20	Erect	.....	.....	Dark purple.
Walter	M	April 25	Erect	July 11	4½ lbs.	Purple.
Whitehall	B	April 20	Recurved	June 28	3 lbs.	White.
Wilder	B	April 22	Recurved	July 11	3 lbs.	Black.
Woodruff	M	April 18	Erect	June 28	1 lb.	Purplish red.
Worden	M	April 19	Erect	July 14	6 lbs.	Black.
W. B. Munson	M	April 25	Erect	July 15	6 lbs.	Black.
Wyoming	B	April 20	Recurved	July 13	1⅓ lbs.	Red.
Zinfandel	M	April 25	Erect	June 26	3 lbs.	Purplish black.

NOTES ON VARIETIES.

In the following notes, we have sought to convey an intelligent idea as to the more prominent features of varieties without becoming too technical and tedious in our descriptions. Considerable care has been taken to give the specific blood of each variety—so far as could be determined. In the selection of varieties for certain localitiec, scarcely too much stress can be placed upon the specific blood which goes to make up a variety. The selection of many of our varieties of fruits, which are most likely to be adapted to certain localities, is coming to be based upon scientific principles, and is no longer confined to blind guess work and uncertainty. Certain racial types and certain species are being found to be best adapted to certain isothermal lines. This we have clearly and unmistakably shown in our peach bulletin No. 39. It is also strikingly shown, in the following grape notes, that no variety with any great amount of *Labrusca* blood has stood our climate successfully. On the other hand, those varieties possessing *Lincecumi* and *Bourquiniana* blood have stood the climate remarkably well. Nearly all varieties with much *Vinifera* blood are about dead. Here is a clew to future successful grape planting in Texas, as well as in many other extreme Southern States. When a test of varieties is studied along these lines it becomes of great importance, even when conducted in one locality alone. Our location being somewhat central, varieties, which fail here, are most likely to fail south of us, and those, which are promising here, are likely to prove more so north of us. These predictions are borne out by our observations made in the coast country and in North Texas. Owing to the peculiar atmospheric conditions of the extreme Southwest Texas, some *Vinifera* varieties have been grown there profitably. This serves to show that local conditions may so modify surroundings as to enable a variety to grow successfully in some instances out of its natural isotherm.

ADMIRABLE (*Linc. x Aest.*).—Originated by Munson. Growth vigorous, purplish shoots; leaves large, smooth, 3-lobed; bunches medium size, oblong, shouldered, moderately compact; berries small, black, sprightly, sweet, and pleasant. A very fair grape but not a heavy bearer here. On 3rd of October, 1896, after severe drouth, foliage was only partially affected.

AGAWAM (*Lab. x Vin.*).—Growth rather weak, shoots green, smooth; leaves large, 3-lobed, scanty tomentose beneath; bunches rather large, oblong, moderately loose; berries large, round, dark brown; flavor sub-acid to sweet, pleasant; skin moderately tough. A fair grape here.

ALVEY (*Aest. x Vin.*).—Growth weak, shoots glabrous, leaves medium size, 3-lobed; bunches few, rather small, elongated and moderately compact; berries black, skin tough, sprightly sub-acid. On 10th of October, 1896, after severe drouth, was nearly defoliated. Not desirable here.

AMBER (*Rip. x Lab.*).—Growth medium, shoots downy when young, leaves rather large, more or less 3-lobed, jagged margin, ashy gray underneath, bunches small, oval to oblong, compact; berries light red, mildly sub-acid, pulp moderately firm. On October 10, 1896, after severe drouth was nearly defoliated. Not to be recommended either for quality or quantity.

AMERICA (Seedling of Jaegers No. 70.).—Originated by Munson. Growth very strong, shoots smooth, glaucous; leaves medim size, smooth, shallow, 3-lobed, margins jagged; bunches conical, somewhat irregular in size, moderately loose, on long peduncles; berries small to medium size, black, rather acid flavor, pulp juicy, melting, skin tender; ripe July 10th. On November 3rd, after severe drouth, the foliage was healthy and strong. This is a wine grape of much promise. Also a fair table grape when fully ripe.

Fig. 2. America.

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Fig. 3. Bailey.

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Fig. 4. Beacon.

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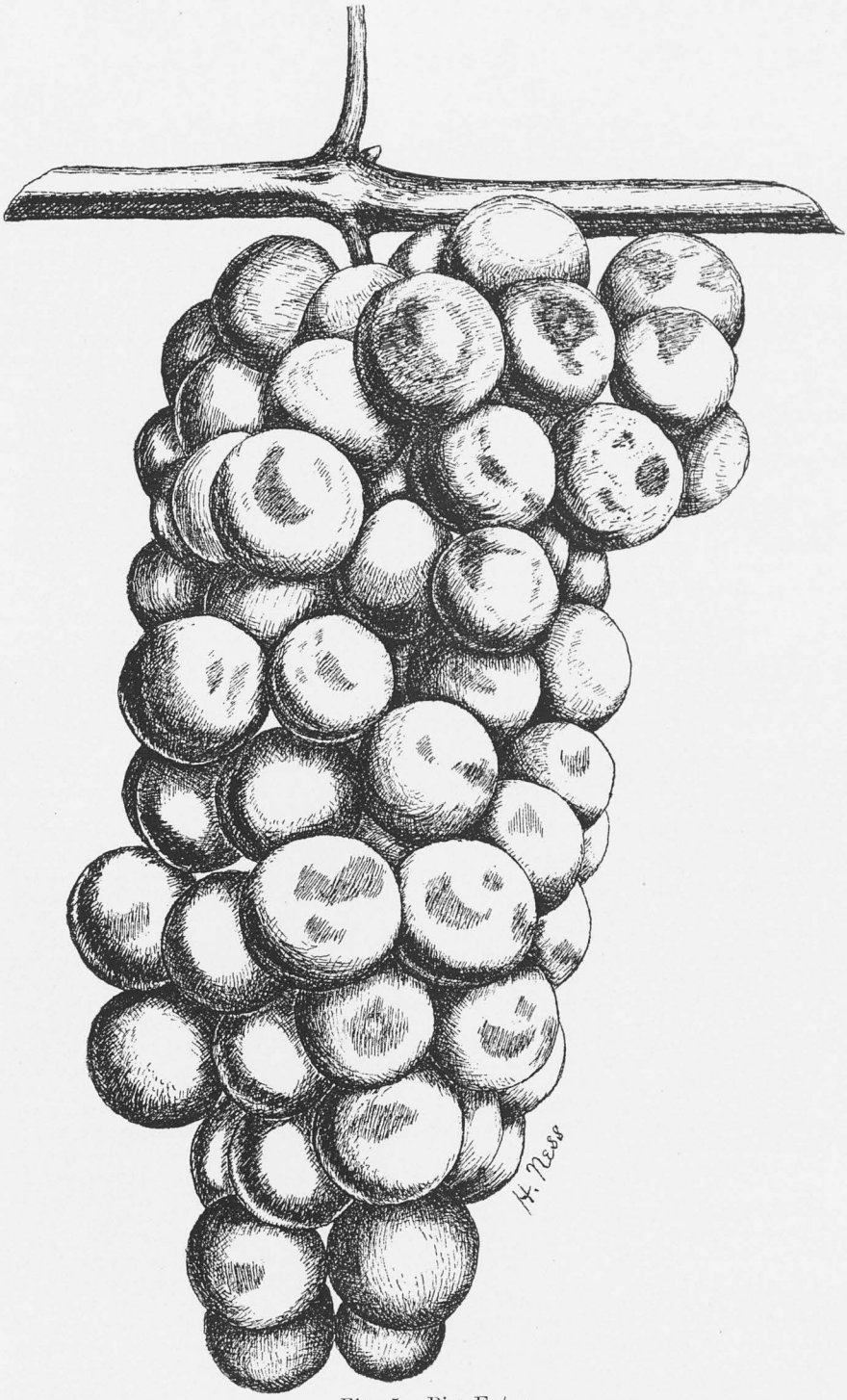

Fig. 5. Big Extra.

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AMINIA (*Lab. x Vin.*).—Growth weak, shoots smooth; leaves medium size, frequently 3-lobed, roundish; bunches few and small; berries large, black, pleasant, sweet to slightly musky. On October 10, 1896, after severe drouth, was defoliated. Too weak here.

AUGUST GIANT (*Lab. x Vin.*).—Growth medium to weak, shoots smooth; bunches small, moderately compact; berries black, sweet to sub-acid, skin tough. Dying after living four years.

BACCHUS (*Rip. x Lab.*).—Growth rather weak, shoots smooth, slender; leaves small, smooth underneath, 3-lobed; bunches small, few, compact, oblong-ovate; berries rather small, black, flavor rather harsh and somewhat musky, skin thin but tough; ripened unevenly June 30th. On October 10th, after severe drouth, defoliated. Not desirable here.

BAILEY (*Linc. x Lab.*).—Originated by Munson. Growth strong, shoots slightly tomentose; leaves large, deeply 3 to 5-lobed; downy underneath; bunches numerous, large, loose, mostly branched or simple and cylindrical; berries black, good size, sprightly acid and of quite good table quality. Ripe July 1st. Partly defoliated on October 3, 1896, after severe drouth. Well suited here and will easily take the place of Concord. More promising than Beacon with us. Recommended.

BARRY (*Lab. x Vin.*).—Growth medium, shoots smooth; leaves large, round, slightly 3-lobed; bunches medium size, berries large, black and handsome, ripe July 6th, pleasant acid, affected some by leaf roller. Strongly resembles the Herbert variety. On October 6, 1896, after severe drouth nearly defoliated. Evidently a good grape where it is adapted, but it has too much labrusca blood to stand the climate this far south.

BEACON (*Linc. x Concord*).—Originated by Munson. Growth medium, shoots slender; green smooth leaves, 3-lobed; bunches few, medium size, oblong, moderately compact; berries about size of Concord, black, sprightly acid, a little foxy, but quite good flavor; ripe July 6th. In the fall of 1896 the growth was strong, but has shown decided weakness ever since. Evidently a good grape where it is adapted.

BEAUTY (*Aest. Lab.*).—Growth weak; leaves medium to large, 3-lobed; bunches few, compact, irregular in shape; berries small, purplish red, tough skin, sweet vinous flavor. Not adapted here.

BELL (*Elvira x Delaware*).—Originated by Munson. Growth moderate; shoots green, short jointed, leaves rather large, glabrous on top, smooth underneath, frequently 3-lobed, sometimes 5-lobed; bunches small, oblong, moderately compact; berries medium size, greenish, ripe July 20, flavor pleasant acid. A good table grape but a little weak here.

BELVIN (*Linc. x Elvira*) *x Rip.*).—Originated by Munson. Growth very strong; leaves very large, shallow, 3-lobed, lobes angular and divergent, smooth underneath; bunches oblong, loose and branched; berries black, with beautiful blue bloom, pulp melting, a little vinous acid; a very fair table grape; ripe July 19; well adapted to this climate.

BERCKMANS (*Delaware x Clinton*).—Growth medium; foliage smooth on both sides; margin uneven; bunches oblong, rather loose, medium size; berries rather small, bright red, resembles Delaware, flavor rather sweet and pleasant, ripened June 25th; shows signs of weakness here. A good table grape.

BIG EXTRA (*Linc. var. Glauca x Triumph*).—Originated by Munson. Growth strong, shoots smooth; leaves large, deeply lobed; bunches oblong and rather loose, berries nearly as large as Concord; black with blue bloom; flavor sprightly sweet and pleasant; would ship well. Ripe July 19th.

BLACK BEAR.—Growth weak, shoots smooth; leaves medium size, smooth on both sides; bunch oblong, loose; berries size of Lenoir, black, with blue bloom; pulp melting, acid but rather pleasant, ripe July 7th, hardly desirable. On October 10, 1896, after severe drouth, was defoliated.

BLACK DEFIANCE (*Lab. x Vin.*).—Growth medium, shoots smooth; leaves large, more or less 3-lobed, with uneven margin; bunches large, oblong with large base, frequently branched; berries black, decidedly acid, pulp rather firm, ripe July 22; defoliated on October 6, 1896. Not good for table use.

BLACK EAGLE (*Lab. x Vin.*).—Growth medium, shoots smooth, purplish; leaves medium size, mostly 5-lobed, smooth underneath; bunches elongated, moderately compact; berries large, vinous sweet, skin tough, bluish black. Foliage weakens early in the fall.

BLACK HAMBURG (*Vin.*).—Made strong growth for five years, at present only one weak vine left; leaves medium size, 3 to 5-lobed, smooth; bunches very large, oblong shouldered and compact; berries large, slightly oval, black, sub-acid to sweet flavor, pulp firm, skin a little tough, ripens a little unevenly. A beautiful and most excellent table grape, but is not adapted here.

BLACK HAWK (*Lab.*).—Growth very weak; leaves ovate, cordate, rusty underneath. The vines yet living, but have not been strong enough to bear. Shows characteristic weakness of labrusca types here.

BLACK HERBEMONT (*Herbemont x Norton*).—Originated by Munson. Growth very strong, shoots smooth and green; leaves 3 to 5 more or less deeply lobed; bunches large, berries small, black—in nearly all respects, similar to Lenoir.

BLACK JULY (*Devereux x Bourq.*)—Growth very strong; leaves large, shallow-3-lobed, smooth on both sides; bunches medium size, cylindrical, compact, frequently branched at base; berries small, black, sprightly acid, tough skin; foliage green and vigorous on 3rd of November, 1896, after severe drouth. A wine grape which grows well here.

BRANT (*Rip. x Lab.*).—Growth very weak, shoots smooth, purplish striped; leaves deeply 3-lobed, jagged margined; bunches medium size, oblong, moderately compact; berries medium size, black, musky sweet flavor; seeds large; foliage green and vigorous November 6, 1896, but the vines are showing much sign of weakness now.

BRIGHTON (*Lab. x Vin.*).—Growth medium, shoots green and smooth; leaves large, more or less deeply 3-lobed, slightly tomentose underneath; bunches large, pyramidal, moderately compact, sometimes branched at base; berries medium size, dark purple when the heavy blue bloom is removed; sweet, pleasant flavor; ripe June 30th; moderately well adapted here.

BRILLIANT (*Lindley x Delaware*).—Originated by Munson. Growth strong, shoots dark purple; leaves large, more or less 3-lobed, slightly silvery to a little rusty tomentose underneath; bunches large, cylindrical to somewhat pyramidal, more or less compact: berries large, purplish red; flavor sprightly sweet, pulp tender and juicy. One of the most handsome varieties of grapes. Its table quality seems unsurpassed. Foliage vigorous to late in the fall.

CALABRIAN (*Vin.*).—Growth strong, shoots smooth, striped with purple; bunches very large, shouldered, compact; berries large, white and translucent, skin adheres to pulp; sweet, but acid flavor; ripe June 25th. At the present writing it shows much sign of weakness; 3 vines dead, and the other one very weak.

CAMBRIDGE (*Lab.*).—Growth medium to strong, shoots nearly smooth; leaves shallow, 3-lobed, cinereous underneath; bunches large, pyramidal to oblong, moderately compact; berries black, large, sweet to somewhat musky; thin, tough skin; ripening somewhat unevenly, resembles Concord. One of the strongest growing of the labrusca species here, but defoliated October 6, 1896.

CARMAN (*Linc. x Triumph*)—Originated by Munson. Growth medium, shoots slightly downy; leaves large, more or less deeply lobed; bunches large, conical, simple or branched at base, very compact; berries medium to small, black, sweet to somewhat insipid flavor, pulp firm, seeds large; shows signs of decline, only one vine being strong, three weak.

CATAWBA (*Lab. x Vin.*).—Growth strong, shoots smooth; leaves very large, slightly 3-lobed; bunches medium to large, moderately compact; berries size of Concord, purple, pleasant sub-acid to sweet; good wine and table grape; hardy and a heavy bearer; one of the few lobrusca hybrids adapted to our conditions.

CENTENNIAL (*Lab. x Vin.*).—Growth weak; leaves rounded, slightly 3-lobed, smooth; bunches small, moderately compact, small; berries pale red, size of Delaware, sweet and pleasant; has given only one meager crop; not adapted to this climate.

CHALLENGE (*Lab. Hyb.*).—Two very weak vines yielded a few bunches of small, sweet berries; not adapted here.

CHAMPION (*Lab.*).—Growth strong, shoots green, with white to rusty felt; leaves large, with 3 to 5 lobes, which are deep and widely spreading, smooth on top, silver tomentose underneath; bunches moderately compact, ovate to oblong; berries medium size, black, and rather musky-sweet flavor; skin thin and tough; seeds large; a very heavy bearer, but now shows strong signs of decline, two vines being dead and the other two weak.

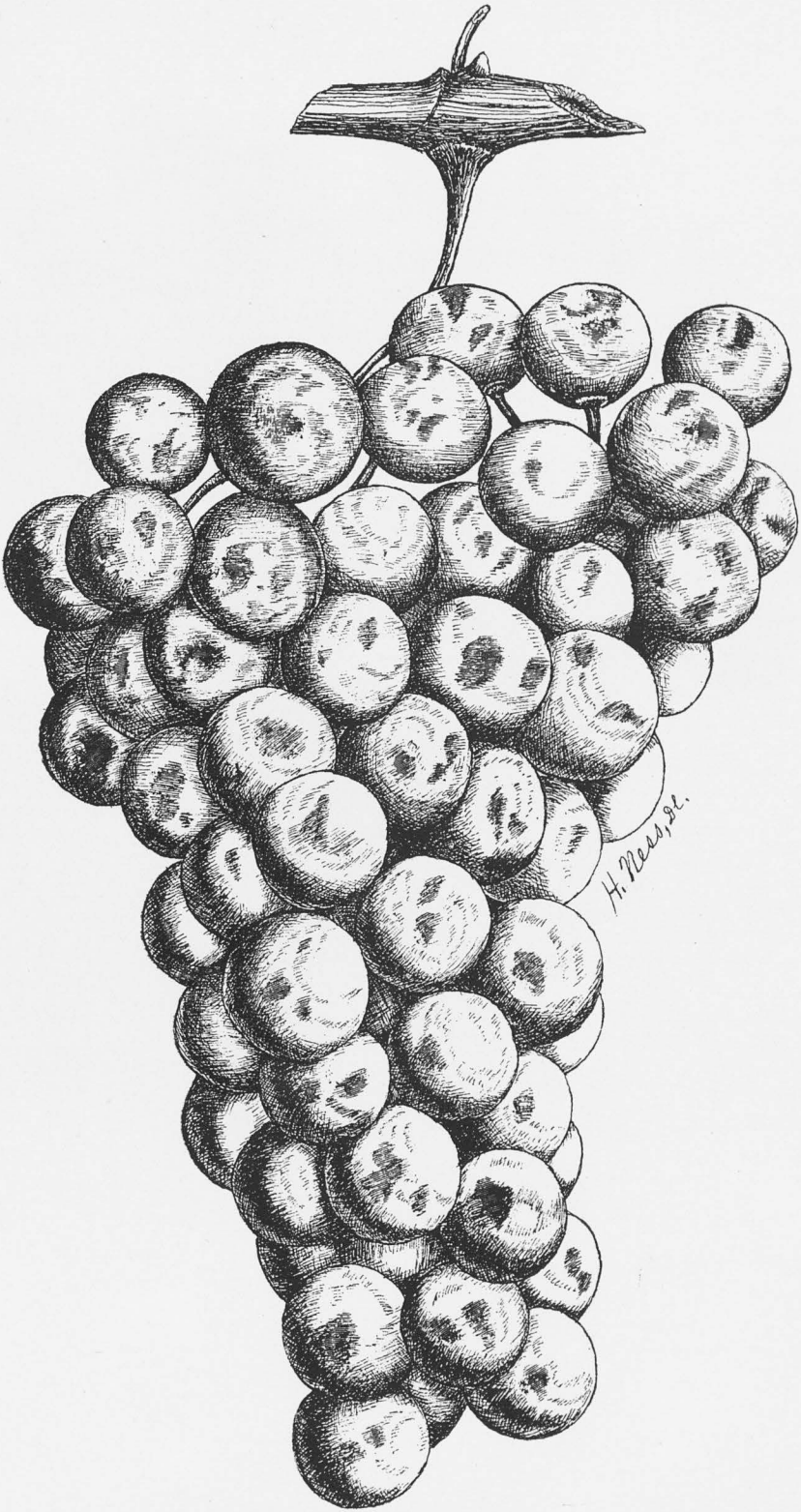

Fig. 6. Brilliant.

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CLINTON (*Lab. x Rip.*).—Growth medium, shoots smooth and purplish; leaves medium size, 3-lobed; bunches oblong, moderately compact, small to medium size; berries small, very large seed, flavor rather acid, pulp tender, juicy; a wine grape of moderate vigor; defoliated October 6, 1896.

CONCORD (*Lab.*).—This well known old grape has borne two fair crops here, but is now very weak; not well adapted to this climate.

CONQUEROR (*Lab. Hyb.*).—Growth very weak; only one vine living at present, has borne no fruit for the last two years, but gave in 1896 a few loose bunches; berries black, size of Concord, blue bloom, sprightly acid; not a table grape.

CONELVA (*Concord x Elvira*).—Growth medium; leaves large, slightly 3-lobed, silvery tomentose when young; bunches medium size, compact; berries purplish black, fall off easy, tough skin, flavor a little insipid; shows signs of decline; two vines dead.

COLUMBIA (*Rip.*).—Growth very strong and vigorous, glabrous; bunch small, compact; berries small, black, very fine flavor; not productive, but very persistent and strong here; undesirable.

COTTAGE (*Lab.*).—Growth weak, shoots smooth; leaves large, smooth, 3-lobed, rusty tomentose underneath, like all labruscas; bunches small, ovate to oblong, compact; berries moderately large, black, pleasant, sweet flavor; one vine dead; three living, but weak.

CORNUCOPIA (*Rip. Hyb.*).—Growth strong, shoots smooth; leaves roundish, 3-lobed, smooth underneath; bunches elongated to pyramidal, moderately compact; berries medium; pleasant, vinous flavor; fruit so affected with brown rot that the crop was worthless; foliage fresh and vigorous on October 6, 1896.

CREVELING (*Lab. Hyb.*).—Growth medium, shoots slightly downy and slender; leaves medium size, deeply 3 to 5-lobed; bunches medium to large, oblong, moderately loose; berries medium size, black, sweet to sub-acid and pleasant; shows signs of weakness; foliage falls off early; defoliated 6th of October, 1896.

CUNNINGHAM (*Bourg.*).—Growth very strong; leaves large, barely 3-lobed, nearly smooth underneath; bunches medium to large, cylindrical or pyramidal, with basal branches, moderately compact; berries small, black, sprightly sweet to sub-acid, seeds large; not to be recommended as a table grape; foliage shows some signs of decline.

DELAWARE (*Bourg. x Lab.* [?]).—Growth medium to strong; leaves medium size, more or less deeply 3-lobed; bunches medium size, oblong, compact, generally with a large basal branch; berries light red, sprightly sweet, pleasant flavor, skin tough and thin; an excellent table grape; vines remain strong; well known old variety, which is frequently regarded a standard for good table quality.

DELICIOUS (*Linc. var. glauca x Bourg.*).—Originated by Munson. Growth strong; shoots profuse; leaves medium size, deeply 5-lobed, smooth; bunches pyramidal, branched at base, medium size; berries small to medium, black; sprightly sweet flavor; rather large seeds, skin tough; not very desirable for table use; foliage fresh and unaffected on November 3, 1896; a wine grape.

DIANA (*Lab. x Vin.*).—Growth medium, shoots downy; leaves very large, shallow-3-lobed, silvery surface underneath; bunches oblong, compact, medium size; berries rather small, color pale red; sprightly sweet and pleasant; skin tough; seeds rather large; moderately hardy so far; a very fair grape for table use.

DR. COLLIER (*Linc. var. glauca x Lab.*).—Originated by Munson. Growth strong; shoots glaucous, somewhat streaked with purple; leaves medium to small, deeply 3 to 5-lobed, smooth, decidedly glaucous underneath; bunches medium to large size, oval to oblong, moderately compact; berries dark purple, covered with white bloom, fall off bunch some; flavor sweet to sub-acid, somewhat musky aftertaste; seeds rather large; a hardy variety here; a very fair table grape.

DRACUT (Amber) (*Lab.*).—Growth medium to strong, shoots slightly downy; leaves very large, more or less deeply 3-lobed, pubescent underneath; bunch moderately compact, large; large purplish striped berries; mild, sweet flavor, somewhat musky; prolific, good table grape; juicy, tender pulp; small seeds. It shows some signs of decline now; partly defoliated October 6, 1896.

EARLY GOLDEN (*Campbell, Seedling of Triumph*).—Originated by Munson. Growth medium; shoots smooth, striped with purple; leaves medium size, shallow-3-lobed, silvery to rusty felted underneath; bunches large, oblong, simple, often with basal branch, compact; berries medium size, greenish to yellowish white,

translucent; mild, sweet, pleasant flavor; has good table quality; declining in vigor; one vine dead; two very weak; one moderately strong; evidently would do well further north.

EATON (*Lab.*).—Growth medium, shoots green and smooth; leaves very large, shallow-3-lobed, dark green and smooth on top, grayish to rusty tomentum underneath; bunches mostly simple, medium to large, somewhat loose; slightly oval to large berries, black when fully ripe; mild, sub-acid flavor; ripens rather irregularly; shows some signs of decline in vigor of foliage, like nearly all labrusca do here.

EARLY WINE (*Linc. var. glauca x rupestris*).—Originated by Munson. Growth very strong; shoots slightly downy; leaves very large, deeply 3-lobed and somewhat downy on undersurface; bunches medium to small, ovate to oblong, compact; berries small to medium, black, with heavy bloom; slightly acid, pleasant flavor; seed large; moderate bearer, free from disease, not unpromising; better for wine than table use.

ELDORADO (*Lab. Hyb.*).—Growth weak and slender, foliage not dense; leaves medium size, rounded and entire, sometimes 3-lobed; bunches large and loose; berries large, white; sweet to sub-acid, pleasant flavor; a good table grape; shows strong signs of weakness here; only two very weak vines left; did not fruit this year.

ELVIRA (*Rip.-Lab.*).—Growth medium, shoots smooth; leaves very large, shallow-3-lobed, jagged margins, nearly smooth underneath; bunches small, oval, compact, medium to small, greenish white; mild sweet to sub-acid flavor; affected somewhat by brown rot; vigorous, but was defoliated on October 6, 1896; a wine grape of good quality.

ELVICAND (*Elvira x Mustang*).—Originated by Munson. Growth very strong, shoots and underside of leaves white woolly; leaves very large; shallow, 3-lobed; bunches small, moderately loose; berries medium size to small, dark purplish; flavor sweetish to sub-acid, with slight Mustang flavor; seed large; shy bearer, vigorous and hardy; not to be recommended for table use in view of many better varieties; evidently well adapted over a large area of the State.

EMPIRE STATE (*Lab. x Vin.*).—Growth medium; shoots smooth; leaves medium size, 3 to 5-lobed, slightly tomentose underneath; bunches medium size, oval, oblong, compact; berries medium size, mildly sweet to sub-acid flavor; shows some signs of decline now, being injured by heat and dry weather here.

ETTA (*Lab. x Rip.*).—Growth medium; shoots smooth; leaves very large, shallow-3-lobed, jagged margin, smooth undersurface; bunches small, compact; too weak for good observations on fruit.

EUMEDEL (*Lab. x Delaware*).—Originated by Munson. Growth medium to weak; leaves medium to small, deeply 3 to 5-lobed, slightly tomentose underneath; bunches medium size, oblong, moderately compact; berries medium size, dark purple color; delicate sweet to slightly musky flavor; shows signs of decline, one vine dead and the other three living have the foliage scorched in midsummer.

EUMELAN (*Lab. x Vin.*).—Growth medium; shoots smooth and purplish; leaves more or less deeply 3-lobed, smooth underneath; bunches medium to small, oblong, moderately compact, often with a large basal branch; berries small, black; sprightly sweet flavor; seeds rather large for the fruit; shows signs of decline by foliage being weak in midsummer; defoliated October 6, 1896, after severe drouth.

EXCELSIOR (*Lab. x Vin.*).—Growth medium; shoots green, glabrous; leaves medium size, shallow, 3-lobed; slightly downy underneath; bunches large, shouldered, moderately compact; berries medium to large, purplish red; sweet, vinous, pleasant flavor, but somewhat tough pulp; shows very little sign of weakness; rather strong for a variety having labrusca blood.

EVA (*Lab.*).—Growth weak; shoots slightly downy; leaves shallow-3-lobed, grayish to rusty tomentose underneath; bunches small, oval, moderately compact; berries medium size, white; flavor rather sweet, a little foxy; shows signs of weakness; was defoliated on 6th of October, 1896.

FAITH (*Rip. x Lab.*).—Growth medium; shoots smooth; leaves large, more or less deeply 3-lobed, with jagged margins; bunches elongated, compact; berries small, white; sprightly sweet; tough skin; many affected by brown rot; vines remain rather strong, but are somewhat injured during summer by heat.

F. B. HAYS (*Lab.*).—Growth very weak; leaves medium to large, 3-lobed, under-

surface canscent; bunches small, ovate, moderately compact; berries medium size, greenish white; sprightly sweet, a little musky; skin thin, but tough; weak; defoliated 6th of October, 1896.

FERN MUNSON (*Linc. var. glauca x Catawba*).—Originated by Munson. Growth very strong; shoots slightly downy; leaves very large, shallow-3-lobed, smooth on undersurface; bunches elongated, loose, medium size, often shouldered; berries purplish black, medium size; sprightly sweet; pulp firm; hardly recommended for table use; two vines strong, the other two nearly defoliated in July; a rather shy bearer.

FLOWERS (*Rotundifolia*).—Bunch small, loose; berry smaller than Thomas, round, black; a little more acid than that of Thomas, and not as desirable to eat.

GAZELLE (*Hyb.*).—Growth medium to weak; shoots smooth, often tinged with purple; leaves medium size, 3 to 5-lobed, smooth on both sides; bunches small, oblong, moderately compact; berries small, greenish white; sprightly sweet, pleasant flavor; shows signs of weakness in midsummer; defoliated on October 6, 1896.

GOETHE (*Lab. x Vin.*).—Growth medium; shoots smooth; leaves very large, shallow-3-lobed, slightly canescent underneath; bunches large, oblong, loose; berries very large, pink, somewhat oval; pleasant, sweet flavor; excellent table grape and good for shipping; shows considerable signs of weakness in midsummer; two vines dead.

GOLDEN GEM (*Delaware x Clinton*).—Growth medium; shoots smooth; leaves small to medium, more or less 3-lobed, nearly smooth underneath; bunches small, oval, compact; berries small to medium size, white; pulp melting, juicy; skin brittle; sprightly sweet and pleasant honey-flavor; moderately hardy, quite prolific; the earliest grape in our vineyard; quite good for table use.

GOLD COIN (*Norton x Martha*).—Originated by Munson. Growth medium; leaves very large, barely 3-lobed, smooth underneath; bunches medium to large, moderately loose, ovate, frequently shouldered; berries rather large, yellowish white; musky, sweet, pleasant flavor; prolific; a promising table grape; apparently well adapted to our conditions; only partially defoliated in November, 1896.

GOV. ROSS (*Lab. x Vin.*).—Originated by Munson. Growth medium to strong; shoots green, glabrous; leaves very large, shallow-3-lobed, jagged margin, slightly canscent underneath; bunches medium to large, oblong, and moderately compact; berries large, somewhat oval; sprightly sweet and of good flavor; a good table grape; well adapted to the soil and climate here; not so promising at Denison.

GREINS GOLDEN (*Rip. x Lab.*).—Growth somewhat weak; shoots slightly downy; leaves 3-lobed, large, nearly smooth underneath; bunches small, white, medium size; mild acid flavor; shows weakness in foliage during midsummer.

GRAYSON (*Lab.*).—Originated by Munson. Growth weak; shoots green, slightly tomentose; leaves medium size, barely 3-lobed, covered with grayish-rusty tomentum underneath; bunches small and moderately loose, round; berries black, medium size; shy bearer; shows signs of weakness under our conditions; can not reccommend it.

GREEN MOUNTAIN (*Lab. x Vin.*).—Growth medium to weak; shoots glabrous; leaves medium size, deeply 3-lobed, rusty tomentose underneath; bunches large generally with one large basal branch, appearing double, moderately compact; berries medium size, greenish white; delicate, sweet to slightly musky flavor; pulp juicy, melting; an excellent table grape; moderately hardy here, but defoliated in October, 1896.

HARTFORD (*Lab.*).—Growth medium; shoots reddish, woolly; leaves large, 3-lobed, grayish tomentose underneath; bunches cylindrical, medium size, moderately compact; berries medium size, dark blue; pleasant sub-acid flavor; a good table grape, but only moderately hardy here; shows weakness in midsummer.

HERBEMONT (*Bourq., Mun.*).—This well known old variety is one of the strongest growing and heaviest bearing varieties in our vineyard; produced 18 pounds per vine during last season. Though the berries are small, still it is a good table grape, owing to its good flavor when fully ripe. It is sometimes sold in the market before fully ripe, which does the variety a great injustice. It is also a good wine grape. For general purposes there are few varieties better adapted to the uses of the general grower in Texas.

HERMANN (*Bourq., Munson*).—Growth very strong; shoots smooth; leaves very large, more or less deeply 3-lobed; bunches long, rarely shouldered, moderately compact; berries medium to small, dark purple; vinous, sweet flavor; a hardy variety, similar to Herbemont; foliage fresh October 6, 1896.

HERMANN JÆGER (*Linc. var. glauca x Bourq.*).—Originated by Munson Growth very strong, very slightly downy; leaves very large, deeply 3 to 5-lobed, nearly smooth on undersurface; bunches very large, shouldered, pyramidal to oblong, compact; berries small, black; sprightly sweet to sub-acid flavor; pulp very juicy; seeds a little large for berry; very showy, on account of large, handsome bunches, not a first-class table grape, but good; well adapted to our conditions; foliage green and fresh as late as November in 1896.

HERBERT (*Lab. x Vin.*).—Growth strong; leaves large, scarcely lobed; bunches large, pyramidal, moderately loose; berries very large, black; mild sweet to sub-acid, very pleasant flavor; pulp firm; skin moderately tough; a vigorous grower, quite hardy, and a prolific variety; good table quality; defoliated in October, 1896.

HIGHLAND (*Lab.-Vin.*).—Growth medium; shoots smooth; leaves barely 3-lobed, jagged margin; bunches very large, pyramidal, moderately compact; berries very large, black; flavor sub-acid: pulp very tender; moderately hardy, with dense, strong foliage; bunches very handsome; shows a little weakness in midsummer.

HOPKINS (*Linc. var. glauca x Aest.*).—Originated by Munson. Bunch broad base, conical, compact; berry a little larger than Lenoir; a little acid; a wine grape; all dead at present writing except one vine.

HUMBOLT (*Elvira x Herbemont*).—Growth moderately strong; shoots nearly smooth; leaves very large, barely 3-lobed, nearly smooth on undersurface; berries dull greenish white, not atttractive, medium size; flavor sweetish to sub-acid; much affected by brown rot; defoliated in October, 1896.

IONA (*Lab. x Vin.*).—Growth medium; shoots slightly woolly; leaves large, 3-lobed; downy underneath; bunches large to medium; berries purple; sweet to sub-acid and of good flavor; pulp quite juicy; would ship well; attractive; only moderately hardy here; defoliated in October, 1896.

ISABELLA (*Lab. x Vin.*).—Growth strong; shoots smooth; leaves very large, more or less deeply 3-lobed, slightly tomentose underneath; bunches small, oval to oblong, moderately compact; berries large, purplish black; mild sweet to sub-acid flavor; pulp tender; seeds, only one or two; skin thin and tough; ripens unevenly; shows signs of weakness now; partly defoliated in October, 1896.

ISRAELLA (*Lab. x Vin.*).—Growth weak; in characteristics of vine, foliage, and fruit it resembles Isabella, but more prolific.

IVES SEEDLING (*Lab.*).—Growth somewhat weak; shoots slightly rusty, tomentose; leaves medium, barely 3-lobed, silvery to slightly rusty underneath; bunches small to medium, cylindrical, and moderately compact; berries medium size, black, very pulpy; sub-acid to slightly musky; three vines which are living are moderately hardy; not a good table grape; owing to coloring early, long before ripe, it is thrown upon the market, which it quickly demoralizes and gives little profit.

JANESVILLE (*Lab.*).—Growth weak; shoots smooth; leaves medium size, shallow-3-lobed, tomentose underneath; bunches small to medium size, oval, and compact; berries medium size, black; sweet, musky flavor; tough skin and rather large seed; moderately good table quality; not hardy here; three vines living are week; defoliated in October, 1896.

JEFFERSON (*Lab. x Vin.*).—Growth medium; shoots short jointed and slightly downy; foliage medium size, barely 3-lobed, silvery down underneath; bunches large, broadly pyramidal, somewhat irregular, and branched; berries large, purplish red; sprightly sweet, pulp melting; excellent for table use; has medium hardiness here; nearly defoliated in October, 1896.

JESSICA (*Vin. ?*).—Died before fruiting.

JEWELL (*Hybrid*).—Growth very weak; leaves medium to large, shallow-3-lobed; bunches medium size, pyramidal and moderately compact; berries medium to small, black, flavor pleasant, sweet; pulp soft and juicy; thin but tough skin. Only three weak vines living.

LADY (*Lab.*).—Growth very weak; foliage has the characteristics of the labrusca types; bunches compact; berries white, sprightly sweet. Only one weak vine living at time of writing.

LADY WASHINGTON (*Lab. x Vin.*).—Growth medium; shoots slightly downy; leaves large, rotund to slightly 3-lobed, silvery downy underneath; bunches large, pyramidal, moderately compact; berries medium size, pale amber, pleasant sprightly sweet flavor; skin only moderately tough; seeds small. Prolific. A good table variety. Only one moderately strong vine living at time of writing.

LAUSSEL (*Linc. var. glauca x Gold Coin*).—Originated by Munson. Growth strong; shoots smooth, often streaked with purple; leaves very large, shallow-

3-lobed, jagged margin; bunches oblong, compact, medium size; berries medium size, purplish black, sprightly sweet to sub-acid; skin tough; seeds, three to four, and large for a table grape; ripens a little unevenly. A hardy variety. Foliage was fresh in October, 1896.

LENOIR (*Bourq., Munson*).—Growth strong. This well known old variety is strong and vigorous here. Bears well. Strictly a wine grape. Not quite as productive as Herbemont nor near so good for table use.

LINHERBE (*Lindley x Herbemont*).—Originated by Munson. Growth strong; shoots slender, smooth and purplish; leaves medium to small, deeply 3 to 5-lobed, smooth; bunches small, oblong; berries small, reddish, translucent; flavor sweet; seeds rather large for size of grape; pulp a little firm. A hardy variety here. Foliage fresh in October, 1896.

LINDLEY (*Lab. x Vin.*).—Growth strong; shoots green and smooth; leaves large, barely 3-lobed, smoothish underneath; bunches large, ovate to oblong, moderately loose; berries large, clear red; pleasant, sprightly sweet flavor. Prolific and of good table quality. Lacks some in hardiness here; nearly defoliated in July. Was about defoliated in October, 1896.

LUTIE (*Lab.*).—Growth medium to weak; shoots downy when young; leaves medium size, barely 3-lobed, grayish downy underneath; bunches large, oblong, pyramidal, moderately compact; berries large, round, reddish brown; sprightly sweet to very musky flavor; skin tough and pulp tender. An excellent table grape, but a shy bearer. Moderately hardy. Defoliated in October, 1896.

MARION (*Lab. x Rip.*).—Growth weak; shoots downy; leaves medium size, deeply 3-lobed, grayish downy underneath; bunches medium size, oval to oblong, moderately compact; berries size of Concord; black, musky sweetish flavor; skin tough. One vine dead, the three living rather weak. Nearly defoliated in October, 1896.

MARGUERITE (*Linc. x Bourq.*).—Originated by Munson. Growth strong; shoots smooth, glaucous, often streaked with purple; leaves large, deeply 3 to 5-lobed; smoth and slightly glaucous on undersurface; bunches small, oval to oblong, and compact; berries small, black; pleasant and sprightly sweet flavor; pulp tender, but seeds rather too large for table grape; resembles Herbemont in berries and vine. Rather shy bearer on short canes. Very strong and vigorous here.

MASSASOIT (*Lab. x Vin.*).—Growth medium; shoots glabrous; leaves medium size, shallow-3-lobed, nearly smooth underneath; bunches oblong, moderately loose; berries large, purplish red; pulp melting; flavor pleasant, sprightly sweet; skin tough. Prolific. An excellent table grape. Only moderately hardy, foliage being sun-scorched in August. Defoliated in October, 1896.

MASON SEEDLING (*Lab.*).—Growth weak; shoots smooth, leaves barely 3-lobed; bunches medium size, oblong to pyramidal, somewhat loose; berries pale green; sweet and somewhat musky flavor; not hardy here. Only two weak vines living.

MARTHA (*Lab.*).—Growth rather weak; shoots with slightly rusty tomentum when young; leaves large, barely 3-lobed; bunches medium size, oblong, loose; berries dark green, nearly as large as Concord; rather musky, pleasant, sweet flavor. A very fair table grape. Shows signs of weakness during midsummer.

MERRIMAC (*Lab. x Vin.*).—Growth medium to weak; shoots smooth, leaves very large, 3-lobed, nearly smooth underneath; bunches medium to small, oval, moderately compact berries, very large, black; pulp melting; sweet to somewhat sub-acid flavor. A showy grape on account of large size. Rather shy bearer. Only moderately hardy here. Three living vines sun-scorched in August. Defoliated in October, 1896.

MRS. MUNSON (*Linc. x Bourq.*).—Originated by Munson. Growth medium to strong; shoots smooth and glaucous; leaves medium to large, barely 3-lobed, smooth and somewhat glaucous underneath; bunches oblong, pyramidal, very compact, medium to small size; berries small, dark purplish; sprightly sweet, pleasant flavor; berries rather small, otherwise a very good table grape and would ship well. The three living vines very hardy. Foliage fresh in October, 1896.

MISSION (syn. El Paso. *Vin. x Girdiana(?)*).—Growth medium to weak; shoots purplish; leaves smooth, 5-lobed, and with characteristics of vinifera type; bunches large, loose; flavor mildly sweet. All vines dead at the present writing. In extreme southwest Texas, along the Rio Grande River, it seems to do well. Large vineyards of it are planted there. Frequently found in the markets of the State until late in the winter. Ships well. Poor appearance on market stands.

MOORE DIAMOND (*Lab. x Vin.*).—Growth weak; bunch oblong, sometimes shouldered; berries white, medium size; sweet to somewhat musky, with firm pulp. Not adapted to our conditions. Only two very weak vines left.

MONTEFIORE (*Rip. x Lab.*).—Growth medium to weak; shoots smooth; leaves medium size, barely 3-lobed, slightly canescent underneath; bunches medium to small, oblong pyramidal, compact; berries black, sprightly sweet, small; moderately hardy here. Defoliated in October, 1896.

MOORE EARLY (*Lab.*).—Growth and foliage rather weak; shoots smooth, barely 3-lobed, rusty down underneath; bunches small, rather compact; berries large, black, sprightly sweet, musky flavor. A good table grape. Early; not hardy here. Defoliated in October, 1896.

MO. REISLING (*Rip. x Lab.*).—Growth medium; shoots green; leaves medium size, shallow-3-lobed, glabrous on top; close, silvery tomentum underneath; bunches oblong to oval, compact, small; berries small, pale green; sweet to slightly musky, pleasant flavor; moderately hardy. Shy bearer here.

MOROCCO (*Vin.*).—Vines short jointed, somewhat weak; bunches small; only a few very large, dark purple berries; mildly sweet to sub-acid flavor. Not adapted to our conditions, only one weak vine being left.

NAOMI (*Rip. x Lab.*) *x Vin.*).—Growth medium to strong; shoots smooth; leaves shallow-3-lobed, jagged margin; bunches medium size, elongated, moderately compact; berries small, white to amber; pulp rather hard; skin tough; pleasant acid flavor. Good table grape. Not hardy here, only three weak vines living now. Sun-scorched in August.

NIAGARA (*Lab. x Vin.*).—Growth medium to strong; shoots green and smooth; leaves large, shallow-3-lobed, silvery down underneath when young; bunches large, ovate to oblong, moderately compact; berries large, white; pulp melting; vinous sweet flavor; skin thin and tough. A good table grape and would ship well. Not hardy here. Gradually shown weakness until only one weak vine is alive. A good grape where it is adapted. Too far south here to live long.

NEOSHO (*Linc. var. glauca*).—Wild, from woods of Southwest Missouri; growth medium; shoots glaucous, purplish tinged; leaves large, shallow-3-lobed, glaucous underneath; bunches oblong, moderately loose and mostly small; berries medium to small, black, sprightly sweet flavor, firm pulp with rather large seed; vigorous.

NEVA MUNSON (*Neosho x Herbemont*).—Originated by Munson. Growth strong; shoots and leaves much like those of Marguerite; bunches oblong, pyramidal; berries dark purple, small, pleasant, sprightly sweet flavor; pulp tender and juicy; resembles Marguerite, but berries a little smaller. A hardy variety here, but not a heavy bearer. Foliage fresh in October, 1896.

NEWMAN (*Linc. var. glauca x Triumph*).—Originated by Munson. Growth strong; shoots slightly downy, streaked with purple; leaves large to very large, shallow-3-lobed, coarse serratures on the margin; bunches medium to large, loose; berries large, black, sub-acid to sweet, pulp rather firm, pleasant flavor. A hardy variety. Promising late grape, was a little defoliated in October, 1896.

NEW HAVEN (*Lab.*).—Growth weak; leaves deeply 3-lobed; bunches small, oblong, oval, moderately compact; berries medium to small, pale green, sweet to slightly musky flavor; skin tough. Not hardy here. Defoliated October, 1896.

NOAH (*Elvira Seedling.*)—Growth medium to weak; shoots smooth, leaves shallow-3-lobed, rusty, downy underneath; bunches small, rather irregular in shape; yellowish, large, pleasant, sweet to sub-acid flavor. Vines dying at the present writing.

NORFOLK (*Lab. x Vin.*).—Growth medium; shoots smooth; leaves medium size, 3-lobed, grayish, downy underneath; bunches large, oblong, moderately compact; berries large, purplish red, flavor sweet, pulp tender and juicy. Vines weak here, foliage scorched in July. Nearly defoliated in October, 1896.

NORTON (*Aest.*).—Growth strong; shoots smooth and glaucous; leaves medium size, 3-lobed, somewhat glaucous underneath; bunches elongated, compact; berries black, rather small, flavor rather acid. A wine grape. Hardy here, shy bearer.

NORTH CAROLINA (*Lab.*).—Growth medium; shoots rusty, downy; leaves medium size deeply 3-lobed, grayish downy underneath; bunches small, oval to oblong and moderately compact; berries large, light reddish, sweet but a little musky. Moderately hardy, but nearly defoliated in October, 1896.

NORTHERN MUSCADINE (*Lab.*).—Growth medium; shoots rusty-downy; leaves medium size, barely 3-lobed, grayish to rusty downy underneath; bunches small, roundish, mostly compact; berries large, dull, reddish color; flavor a little musky,

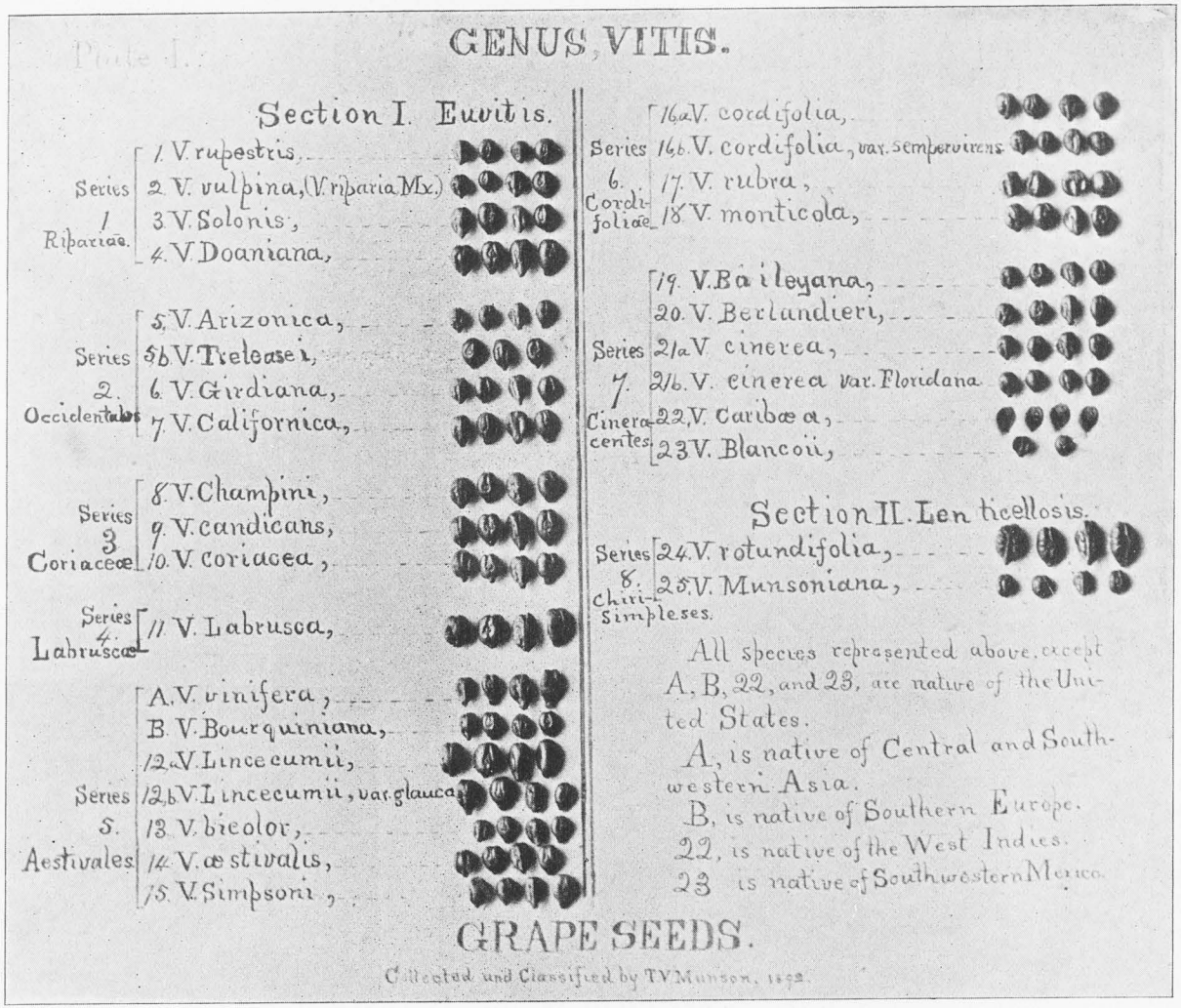

Fig. 10. Seeds of Munson System of Classification.
(Photo by Munson.)

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sweet; pulp firm; skin tough. A heavy bearer; strongly resembles Dracut Amber. Moderately well adapted here. Injured some by hot weather during mid-summer.

OLITA (*Delaware x Irving*).—Growth medium; shoots smooth; leaves medium size, 3 to 5-lobed; bunches large and shouldered; berries medium size, white; flavor sprightly sweet. Excellent table quality. Good for shipping. Moderately hardy. Nearly defoliated in October, 1896.

ONDERDONK (*Seedling of Herbemont*).—Originated by Munson. Growth very vigorous; shoots smooth; leaves large, more or less deeply 3 to 5-lobed; bunches medium to large, oblong to pyramidal, compact; berries small, white, translucent, with minute dots, sprightly sweet to sub-acid flavor; pulp rather scant. Affected some by soft rot. Very hardy here. Foliage vigorous in October, 1896. A good small grape.

OPAL (*Lab. x Vin.*).—Growth strong; leaves medium size, barely 3-lobed, silvery downy underneath; bunches large, oblong, compact, sometimes shouldered; berries medium size, white, flavor sweet, somewhat firm pulp; moderately good for table use. Shows signs of weakness during midsummer. Nearly defoliated in October, 1896.

ORIOLE (*Linc. var. glauca x Bourq.*).—Originated by Munson. Growth strong; shoots slightly downy, smooth and purplish streaked; leaves very large, shallow, 3-lobed, smooth underneath; bunches oblong, medium size, often shouldered, moderately compact; berries black, small, sweet; skin tough; seeds large for berry. A hardy variety. Foliage fresh in October, 1896. Shy bearer.

OTHELLO (*Rip. x Lab.*) *x Vin.*).—Growth moderate; leaves medium size, glabrous; bunches oblong, moderately compact, medium size, berries black, sprightly, sweet, sub-acid, pulp firm. Too weak for bearing during last year.

PEABODY (*Rip. x*).—Too weak for notes.

PEARL (*Rip. x Lab.*).—Growth medium, leaves large, 3-lobed, and smooth; bunches small, compact; berries pale yellow, pulp soft, sweet. Moderately hardy, but unproductive here.

PERKINS (*Lab.*).—Growth weak; shoots slightly downy when young; leaves medium size, shallow-3-lobed; silvery downy underneath; bunches small, compact; berries dull red, about size of Concord; flavor a little musky, sweet. Not hardy here—all dead but one weak vine.

PERRY (*Linc. var. glauca x Bourq.*).—Originated by Munson. Growth medium; shoots slender, short jointed, smooth and glaucous; leaves medium size, 3-lobed, jagged margin, glaucous underneath; bunches oblong, pyramidal, irregularly shaped, loose; berries black, small, sweetish to sub-acid flavor; seed large for a small table grape. Moderately prolific. Very hardy. Foliage fresh in October, 1896.

PETER WYLIE (*Lab. x Vin.*).—Growth medium to strong; shoots smooth; leaves medium to small, shallow-3-lobed, glabrous underneath; bunches medium to large, oval, sometimes shouldered; berries medium size, greenish white, sweet, pleasant flavor when fully ripe; skin thin, but tough; pulp tender and juicy. One of the most prolific table varieties here, and moderately hardy. Defoliated in October, 1896.

POCKLINGTON (*Lab.*).—Too weak for notes.

POUGHKEEPSIE (*Delaware seedling*).—Growth rather weak; shoots purplish, smooth; leaves 3 to 5-lobed, smooth underneath; medium size, pyramidal, frequently shouldered, moderately compact; berries about one-third larger than Delaware, light red, sprightly, sweet and very pleasant flavor. An excellent table variety. Quite prolific. Only moderately hardy. Defoliated in October, 1896.

PRESLY (*Elvira x Champion*).—Originated by Munson. Growth medium; shoots reddish; leaves large, deeply 3-lobed, glabrous on top, rusty tomentose underneath; bunches, oblong, oval, moderately loose; berries small, dark purplish, musky sweet flavor; pulp very tender and juicy. Moderately hardy.

PRENTISS (*Lab. x Vin.*).—Growth medium; leaves medium size, 3-lobed, smooth underneath; bunches oblong, compact; berries medium size, white, sprightly, sweet, table quality quite good. Not hardy here. Prolific. Defoliated in October, 1896.

RAGAN (*Linc. var. glauca x Triumph*).—Originated by Munson. Growth strong; shoots smooth, purplish; leaves large, 3-lobed, smooth; bunches medium to small, oblong, berries small, black, mildly sub-acid to sweet, skin tough, thin, seeds too large for a table grape. Hardy. Was partly defoliated in October, 1896.

RENTZ (*Lab.*).—Growth weak; leaves medium size, scarcely 3-lobed, silvery underneath; bunches few, small, irregular in shape, smooth; flavor a little acid and foxy, color black. Not adapted to our climate. Vines about dead.

REQUA (*Lab. x Vin.*).—Growth long, slender; leaves medium size, deeply 3-lobed, silvery downy underneath; bunches medium to large, loose; berries purple. Too weak for further notes. Dying at present.

ROANOKE (*Cord. x Lab.*) *x Vin.*).—Growth medium; shoots smooth; leaves very rotund, cordate, entire, with small serratures on margins. Not enough fruit to take notes on.

ROGERS NO. 2 (*Lab. x Vin.*).—Growth moderately strong; bunches large and loose; berries large, dark brown, rather acid. Moderately hardy. Defoliated October, 1896. A large, handsome grape.

ROCHESTER (*Lab. x Vin.*).—Growth medium; shoots smooth; leaves very large, shallow-3-lobed, slightly grayish downy underneath; bunches large, elongated, moderately compact; berries large, purple, sweet to sub-acid, pleasant flavor, thin skin. Moderately hardy, but not very prolific. Defoliated October, 1896.

R. W. MUNSON (*Linc. var. glauca x Triumph*).—Originated by Munson. Growth strong; shoots smooth, leaves 3 to 5-lobed, smooth underneath; bunches oblong to oval, moderately loose, small to medium size; berries small to medium size, black, sweet to sub-acid; pulp very juicy; bunches and berries similar to those of Beacon. Quite hardy, but somewhat defoliated October, 1896.

ROMMEL (*Elvira x Triumph*).—Originated by Munson. Growth medium to weak; shoots often purplish striped; leaves medium size, shallow-3-lobed, smooth on both sides; bunches medium to small, oblong, moderately compact; berries large, greenish white, sweet, sub-acid, pleasant flavor, sprightly. A good table grape. Shows some signs of weakness in midsummer, especially if over-cropped.

SALEM (*Lab. x Vin.*).—Growth very weak; leaves medium size, scarcely 3-lobed, silvery downy underneath; bunches large, compact, oval; berries large, dark purple, pleasant, mild, sweet flavor; pulp rather firm. Not hardy here. Only one weak vine alive.

SCUPPERNONG (*Rotundifolia*; synonyms, Yellow Muscadine, White Muscadine). We have not known an insect nor a disease to attack this grape. Bunch very small; berries large, round, light rusty yellow, flavor pleasant, sweet and quite good table quality. "Was discovered by the colony of Sir Walter Raleigh in 1554, on the Island of Roanoke, N. C. (in the Scuppernong River, hence the name), and the original vine is said still to exist there, being over 300 years of age."* Ripe August 29th. Very hardy.

SECRETARY (*Vulp. x Vin.*).—Growth medium; leaves small, rotund to 3-lobed, glabrous; bunches medium to large; berries a little smaller than Concord, dark red; pulp melting; skin tough; flavor pleasant, acid. Too weak for bearing during the last two years.

TAYLOR BULLET (*Rip. x Lab.*).—Growth rather strong; leaves rather small, rotund, smooth, scarcely 3-lobed; bunches small. Too weak for fruiting during the last two years.

TELEGRAPH (*Lab.*).—Growth medium; leaves medium size, broadly cordate, barely 3-lobed, silvery downy underneath; bunches medium to large, compact; berries size of Concord; pulp hard, skin tough, flavor a little acid. This variety bore very heavily during the first year of its fruiting, but now all vines are about dead, which is characteristic of most labrusca species here.

THOMAS (*Rotundifolia*).—Growth strong; bunches small, round, loose; berries very large, larger than Scuppernong, glossy, black, adheres to peduncle much more firmly than Scuppernong, but is not so good.

TRANSPARENT (*Rip. x Lab.*).—Growth very weak; shoots short jointed and reddish; leaves smooth, 3-lobed, jagged margin; bunches small; berries small, greenish white. Weak and defoliated in July. Not adapted here.

UHLAND (*Rip. x Lab.*).—Growth medium; shoots smooth, reddish; leaves medium size, barely 3-lobed, jagged margin, smooth; bunches oblong, compact; berries small, whitish green, pleasant, sweet flavor; seeds rather large for berries. Shows signs of decline; one vine dead, three vines very weak.

ULSTER PROLIFIC (*Lab.-Hyb.*).—Growth weak; leaves small, 3-lobed, reddish tomentose underneath; bunches small; berries small, reddish brown, rather large seed, pleasant, sweet flavor. The four vines are weak now.

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* Bushberg Catalogue, p. 177.

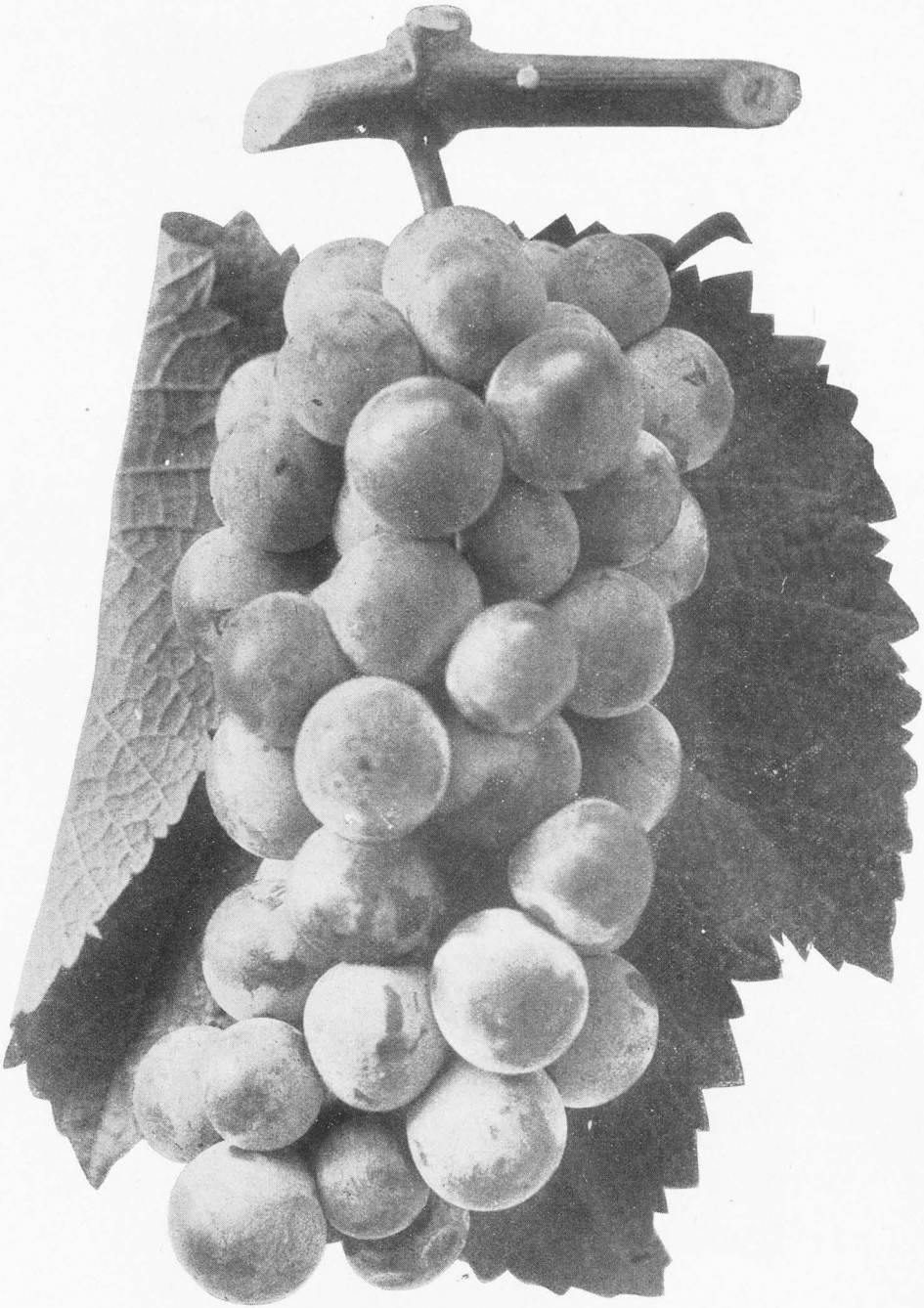

Fig. 8. Rommel.

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Fig. 9. Varieties of Grapes Preserved in 2 per cent. Formaldehyde.

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VENANGO (*Lab.*).—Growth medium; leaves rotund, scarcely lobed, silvery downy underneath. Bore a little fruit the third year; has been too weak to bear since then.

VERGENNES (*Lab.*).—Growth slender; foliage rather scanty, medium size leaves, silvery downy underneath. Too weak for bearing during the last two years.

WALTER (*Bourq. x Lab.*).—Growth medium; leaves large, deeply 3-lobed, smooth on both sides; bunches medium size, oblong to pyramidal, compact; berries light red, sprightly sweet. A hardy variety here, but was somewhat defoliated on October, 1896.

WHITEHALL (*Lab.*).—Bunches oblong, medium size; berries large as Concord, white, pulp melting, flavor pleasant, acid. A fine table grape. Very weak here, not at all adapted to this climate.

WILDER (*Lab. x Vin.*).—Growth medium; leaves large, deeply 3-lobed, silvery downy underneath; bunches large, elongated; berries large and black, closely resembling Herbert; moderately prolific; good table quality. The three vines now living are very weak; not long lived here.

WOODRUFF (*Lab.*).—Growth weak; leaves medium size, shallow, 3-lobed, silvery underneath; bunches pyramidal, oblong, compact; berries medium to large, pale red; flavor sprightly, sweet, and somewhat musky; skin tough, but cracks; pulp firm; good table quality. Prolific. Weak here. Only one weak vine alive at time of writing.

WORDEN (*Lab.*).—Growth medium; shoots smooth; leaves very large, 3 to 5-lobed, grayish to rusty tomentose underneath; bunches large, oblong, moderately compact; berries large, black, mild, sweet to slightly musky flavor. One vine moderately strong now; two very weak. Drops from bunch and cracks open.

W. B. MUNSON (*Linc. var. glauca x Triumph*).—Originated by Munson. Growth strong; shoots glabrous; leaves large, 3-lobed, coarsely serrated margin, smooth on both sides; bunches medium size, oblong, moderately compact; berries medium size, black, quite pleasant, sweet flavor, seeds a little large. Moderately prolific. Promising as a table grape. Ripe July 15th; foliage fresh in October, 1896. Mildews at Denison. Promising for Southwest Texas.

WYOMING RED (*Lab.*).—(Synonym, Wilmington Red)—Growth weak; leaves scarcely 3-lobed, rusty underneath; bunches medium size, pyramidal, moderately loose, berries medium to small, purplish red, sprightly sweet flavor. Not hardy here.

ZINFANDEL (*Vin.*).—Growth medium to weak; foliage as in Muscat of Alexander, or characteristic of vinifera species; bunches very large and pyramidal, compact, so much crowded on bunch that many berries burst; berries large, black, roundish, mild and pleasant sub-acid flavor; skin a little tough, pulp somewhat firm, ripens a little unevenly; very prolific. A good table grape; showy. Not hardy here; only one weak vine left at time of writing.

WHAT VARIETIES TO PLANT?

No one variety can scarcely be recommended for general planting in the State. The purposes for which people want a grape may be quite different, and the soil, climate, and latitude affect varieties very materially. It would be best, therefore, for the grower to go over the notes and select out from the varieties those most likely to succeed in a given location, and which will bear fruit of the kind wanted. The following varieties have done well for us as table grapes: Brilliant, Bailey, Delaware, Dracut, Duchess, Golden Gem, Gold Coin, Green Mountain, and Herbert. The following are wine grapes of much promise: America, Catawba, Herbemont, Hermann, Le Noir, and Mrs. Munson.

CLASSIFICATION OF GRAPES.

So much has been written upon the classification of grapes, and so much doubt still exists in the minds of specialists upon this subject, that it is not deemed advisable nor necessary to enter into a lengthy discussion

of the subject here. At the same time, it must be admitted that to be most successful in viticulture, some knowledge of the classification of grapes is necessary. Perhaps T. V. Munson has done more than any other man in giving accurate information on this difficult subject. We will, therefore, give a short outline of Prof. Bailey's recent classification of Vitacea as published in Gray's Syn. Flora, Vol. I., Fascicle, 2. This classification is the Munson classification with a few modifications, and perhaps is the best we have at the present time. The statement presented consists of compiled extracts from Bailey, with some of our own alterations.

I. MUSCADINIA, *Planch. Bark bearing prominent lenticels, never shredding; nodes without diaphragms; tendrils simple; flower clusters small and not much elongated; seeds oval or oblong, without a distinct stripe like look.*

VITIS ROTUNDIFOLIA, *Mich.* (*Muscadine, Southern Fox grape, Bullace or Bullet or Bull grape.*)

VITIS MUNSONIANA, *Simpson.* (*Mustang grape of Florida, Bird or Everbearing grape.*)

II. EUVITIS, *Planch. Bark without distinct lenticels, on the old wood, separating in long thin strips and fibers; nodes provided with diaphragms; tendrils forked, flower clusters mostly large and elongated; seeds pyriform.*

A. GREEN LEAVED GRAPES. *At maturity mostly have white or rusty or blue tomentum.*

1. VULPINA-LIKE GRAPES. *Thin glossy leaves, broader than long, with truncate-oblique base.*

VITIS RUPESTRIS, *Scheele.* (*Sand, Sugar, Rock, Bush, or Mountain grape.*)

VAR. DISSECTA, *Eggert, in herbarium.*

2. *Leaves ovate, mostly with sinus. Diaphragms thin; young shoots not red; leaves not deeply lobed.*

VITIS MONTICOLA, *Buckley.* (*Sweet Mountain grape.*)

VITIS VULPINA, *L.* (*Riverbank or Frost grape.*)

VAR. PRŒCOX, *Bailey, N. Comb.* (*June grape of Missouri.*)

VITIS TRELEOSEI, *Munson, in herbarium.*

VITIS LONGII, *Prince.* V. Salonis, *Munson.*

VAR. MICROSPERMA, *Bailey, N. Comb.* (V. Solonis, Var. Microsperma, Munson.)

VITIS CHAMPINI, *Planch.*

3. *Diaphragms very thick and strong; young shoots bright red; leaves often strongly lobed.*

VITIS PALMATA, *Vahl.* (*Red or Cat grape.*)

4. CORDIFOLIA-LIKE GRAPES. *Plant strong and climbing. Shoots terete, and glabrous or very soon becoming so.*

VITIS CORDIFOLIA, *Mich.* (*True Frost grape, Chicken, Raccoon or Winter grape.*)

VAR. FŒTIDA, *Engelm.*

VAR. SEMPERVIRENS, *Munson.*

VAR. HELLERI, *Bailey, N. Var.*

5. *Young shoots angled and covered the first year with tomentum or wool.*

VITIS BAILEYANA, *Munson.* (*'Possum grape.*)

VITIS BERLANDIERI, *Planch.* (*Mountain, Spanish, Fall or Winter grape.*)

VITIS CINEREA, *Engelm.* (*Sweet Winter grape.*)

VAR. FLORIDIANA, *Munson.*

VAR. CANESCENS, *Bailey, N. Comb.*

6. *Plant scarcely climbing, tendrils perishing if failing to find support.*

VITIS ARIZONICA, *Engelm.* (*Cañon grape.*)

VAR. GLABRA, *Munson.*

7. *Orbicular-scalloped-leaved species of the Pacific Coast.*

VITIS CALIFORNICA, *Beuth.*

B. COLORED LEAVED GRAPES. *Marked by thick or at least firm foliage, leaves prominently rusty or white. Tomentose or glaucous, blue below.*

1. *White-tipped grapes, comprising species with the ends of the growing shoots, and the under surfaces of the leaves whitish or gray.*

VITIS GIRDIANA, *Munson.* (*Valley grape.*)

VITIS DOANIANA, *Munson.*

2. *Rusty-tipped grapes, comprising the Æstivalian group, the unfolding leaves and the young shoots distinctly ferrugineous, and the mature leaves either rusty or bluish below, or sometimes becoming green in* v. bicolor.

VITIS ÆSTIVALIS, *Mich.* (*Summer, Bunch or Pigeon grape.*)

VAR. GLAUCA, *Bailey, N. Comb.*

VAR. LINCECUMII, *Munson.* (*Post-oak, Pine-wood or Turkey grape.*)

VAR. BOURQUINIANA, *Bailey, N. Comb. This is an off shoot from v. Æstivalis, which Munson characterizes as a distinct species, and from our investigations of the subject we are inclined to agree with Munson. This class of grapes stands our climate much better than the* Æstivalis *types.* (R. H. P.)

VITIS BI-COLOR, *LeConte.* (*Blue grape, or summer grape of the North.*)

VITIS CARIBÆA, *D. C.*

3. *Leaves densely tomentose or felt-like throughout the season, covering white, or rusty white. Tendrils intermittent.*

VITIS CANDICANS, *Engelm.* (*Mustang grape.*)

VAR. CORICEA, *Bailey, N. Comb.* (*Leather-leaf or Callose grape.*)

VITIS SIMPSONI, *Munson.*

VITIS LABRUSCA, *L.* (*Fox grape, Skunk grape.*)

II. PROPAGATING AND CULTIVATING THE GRAPE.

(1.) PROPAGATION OF THE GRAPE.

(a.) By seeds. (b.) By layers. (c.) By grafting. (d.) By cuttings. In the following notes it has been thought best to give some information on general vineyard work to answer such questions as frequently come to us from people who are just beginning to cultivate the grape.

(a.) FROM SEEDS:—Growing grapes from seed is seldom practiced except by one who wishes to originate new varieties. Gather the grapes when fully ripe from good varieties. Let them dry like raisins and then put them away carefully where mice will not injure the seed. Select some light, well drained soil and plant the seed early in the spring, where they will not be scratched up by the fowls, nor injured by stock. Keep the weeds out and give good cultivation. The seeds may also be sown in

boxes, hot beds, and green houses, where it is easier to care for them. The first year vines are frequently grown two or three feet in length. Frequently it is best to discard all vines which make weak growth or are much diseased. The second year the vines are taken up and transplanted in rows wider apart.

(b.) By Layering is meant a vine which comes from the main stock and is bent over on the ground and dirt placed on it. The vine takes root at the nodes, which enables it to draw food from the soil, while at the same time it draws some food from the parent stock. While this method is almost a sure one, it is a rather slow one. There are some species and varieties of grapes which are difficult to propagate any other way. Herbemont and Lenoir varieties are two of them.

Select a strong and vigorous cane. After the buds begin to swell in the spring, dig a trench a few inches deep and as long as the cane. Fasten the cane down in the trench by forked sticks and place the dirt back on it. When the shoots come up select from them the strongest and most vigorous and pull up the other ones.

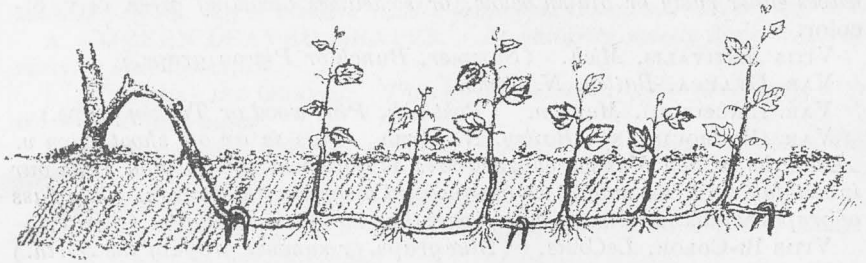

Fig. 11. Vine Layered. (From Georgia Station.)

Sometimes immature vines are layed down in this way during summer, but success is not so sure in this way.

(c.) Grafting:—Propagation of the vine by grafting is not near so common as it is with many larger fruits, but it is frequently used where it is desired to place a tender growing variety onto the roots of a strong growing variety. In this way many valuable tender varieties may be grown in a climate where they are not otherwise adapted. The mustang and post-oak grapes of Texas, which stand this climate well, are valuable for grafting stock and are frequently used. This method comes in well where these varieties are frequently found growing wild around the farm homes of the State and it is desired to grow grapes quickly for family use. The method may also be used to bring a variety into bearing quickly.

The time at which grafting is usually done in this latitude is in February or early in spring.

One of the main things to observe in grafting the grape, as well as many other fruits, is that the young tender growing wood, found just beneath the outer bark of both the graft and the stock, should fit up together evenly. Some loose fibred material, like raffia or soft twine, should be used to tie the graft to hold it firmly in place. Grafting wax has sometimes proved injurious when used on the grape. There are two methods of covering the graft. One is to cut the stock off beneath the surface of

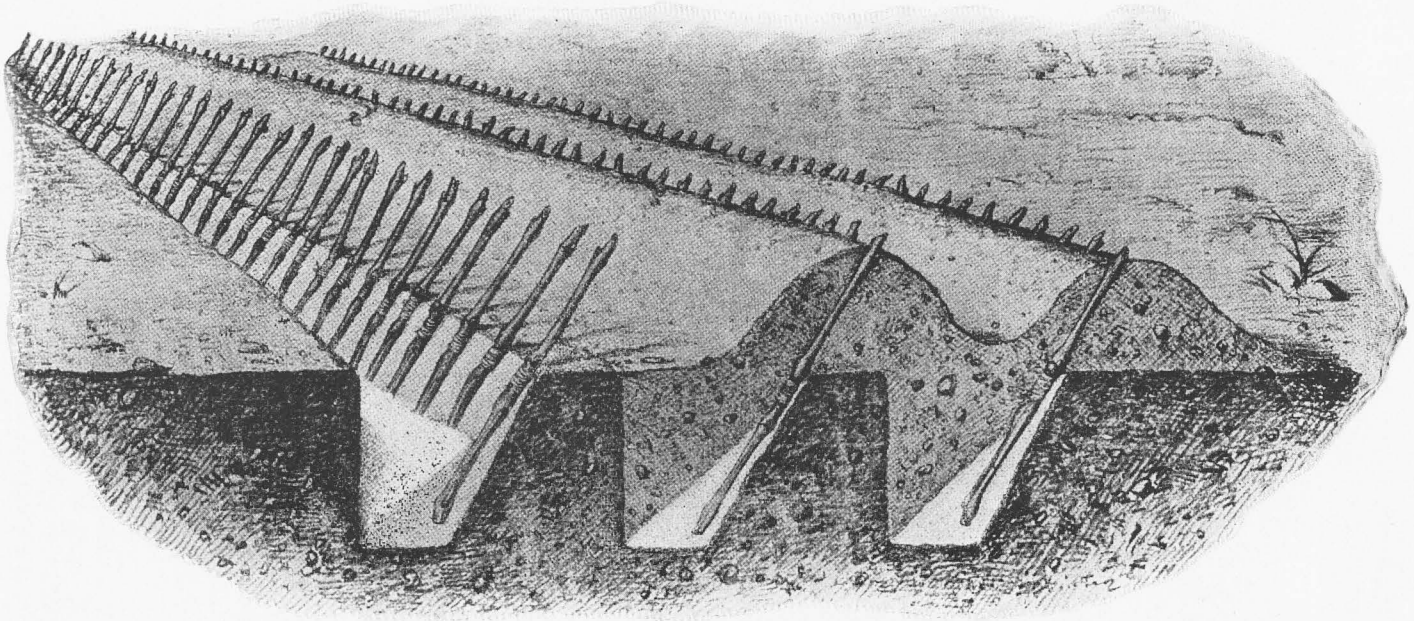

Fig. 12. Grafted Cuttings Placed in the Ground.
(From California Station.)

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the soil and, after the graft is put in, dirt is placed back around the graft and up to the first bud. The other is to cut the stock off at the top of the ground and heap dirt up around the graft to the top bud. Another method reported by some in this State is to bury the vine and split it at different places with a chisel, then insert the grafts at the split places; afterwards place dirt around the grafts and over the vine.

Sometimes grafts are inserted in cuttings before they are placed out.

(d.) By Cuttings:—The grape is most commonly propagated by cuttings. There are several ways of making cuttings. Where wood is scarce and the conditions good for getting cuttings to grow the "one eye" cutting is sometimes used to save wood. This cutting contains only one bud. When this is placed out to grow it is put about one-fourth inch beneath the soil, angling downwards. It is often best to put these "one eye" cuttings in pots where they can be watered and cared for more easily, as they are more difficult to make grow.

We have obtained the best results with a "three eye" cutting. Two of the eyes, or buds, on the cutting are placed under ground to obtain roots from their nodes, while the other bud is left above the soil to grow the vine.

Cuttings are often made early in the winter and tied in bunches of about fifty cuttings each and buried top downwards in the ground till planting time early in the spring. Select well ripened canes for marking cuttings, and the bottom end which goes into the ground should be cut smooth and slantingly.

Plant them in good loamy soil and give them cood cultivation. If they be placed where they can be watered when needed, the chances for success will be much better.

(2.) Setting a Vineyard.

Select a well-drained location for a vineyard. Low heavy land is conducive to disease. A loose, loamy soil is among the best. Prepare the land carefully and harrow it level. Make the rows straight across the field. For this purpose, a long line with colored strings tied at the intervals which the grapes are to be set is a very good thing to use. For ordinary growing varieties, we plant them eight feet apart each way. For more vigorous growing varieties like Herbemont and Lenoir, a greater distance is better. After the line is stretched across the field mark the place where each vine is to go, then remove the line and dig the holes about twelve inches deep. We have found it best in this latitude to set the vines in November or December. Well grown, one year vines have given us good results. Trim off all the roots to within about six inches of the young vine before beginning to set out, because it will prevent the exposing of the roots to the sun and atmosphere while setting out. Spread the roots out, and the first soil thrown on them should be loose, top soil. When the hole is about half filled, press the dirt down rather firmly with the foot around the roots, then fill the hole up above the level so that water will not stand around the young vine. The top of the young vine should now be cut back to three buds, and the vineyard has been set and is now ready for the sunshine and the rain to begin work.

(3.) Vineyard Cultivation.

Good, shallow cultivation should be given all through the growing season till fall, when some crab grass may be let grow to keep the soil from washing and also to add a little humus to the soil. On land which is inclined not to be so well drained, we prefer to keep the dirt a little

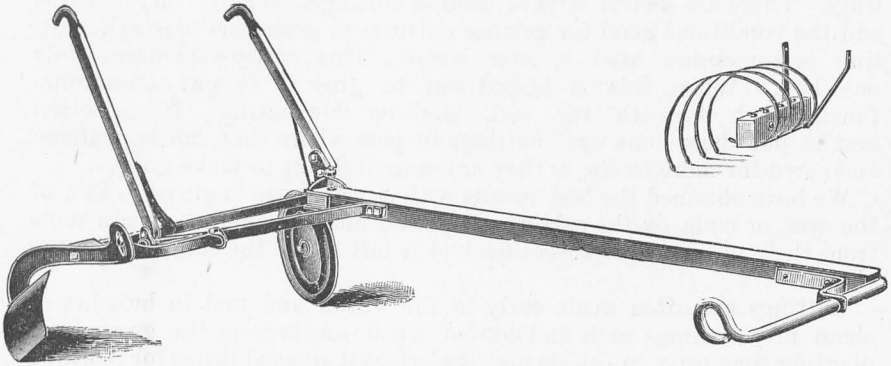

Fig. 13. Grape Hoe.

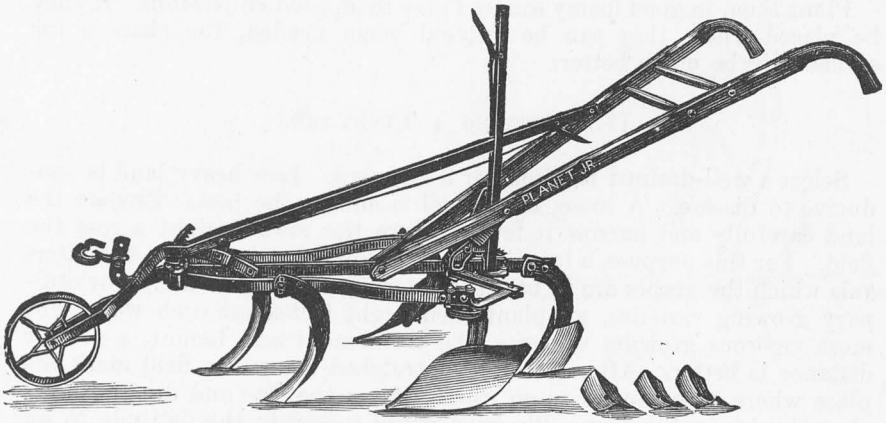

Fig. 14. Planet, Jr., Cultivator.

higher around the vines than elsewhere, so that the surplus water will settle in the middle of the rows. In the spring when the ground is a little settled and packed by winter rains, we use a small one-horse turning plow first. The soil is turned very shallow, especially near the vines. When the vines are large we use a special turning plow made for the purpose of running next to the vines. This plow has a special chain running alongside of the beam so that the plow can be made to go very close to the vines while the horse can walk along further away.

After the ground is once cultivated in this way, we use the spading disk harrow to keep it in fine tilth. We have also used the Morgan Horse

Hoe to run next to the vines. This implement does good work on rather loose soil when grass and weeds are small, but when grass and weeds get a few inches high and the ground is a little hard this implement has hardly proved satisfactory with us.

The Planet Jr. cultivator is quite a good implement for general cultivation.

(4.) Trellising the Vineyard.

In the fall season (after the first year's growth) is a good time to set the posts for holding up the wires on which the vines must rest. We have our posts set sixteen feet apart in the grape rows, leaving space for two vines between each two posts. It pays to get posts which will last well, such as bois d'arc or locust. The end posts should be set at least three feet deep and be well braced. We are using No. 11 smooth wire, which takes twenty-six feet to weigh a pound. When the posts are set 8 by 16 feet apart it will take 333 posts to the acre, besides the braces at the end. It can easily be calculated how much wire it will take for an acre when it is known how many strands of wire are to be used to the row. We use only three wires to each row of posts.

There is some difficulty in tightening the wires if they be not properly fastened at the end posts. The method we are using satisfactorily consists in boring 2-inch holes through the end posts and using large pins made of hard wood to fit in these holes and project some ten inches out from the posts. These pins are square on the ends which project out. The end wires are wrapped around these and afterwards the pins are turned till the wires become tight enough and then a few taps with a hammer drive the pins in tight enough to keep the wires from turning them. To turn the pins, we make them square on the outer ends and use a strong plank with a square hole in it which fits over the pins. The pins are inserted on the outside of the posts. When it is desired to tighten or loosen the wires the pins are simply knocked loose and turned and tightened again. Three-quarter inch staples are used to hold the wires to the center posts. We place the first wire about eighteen inches from the ground; the second twelve inches from this one; and the third about fifteen inches above the second wire. Of course this does not apply to the Munson or overhead systems of training, which will be described further on.

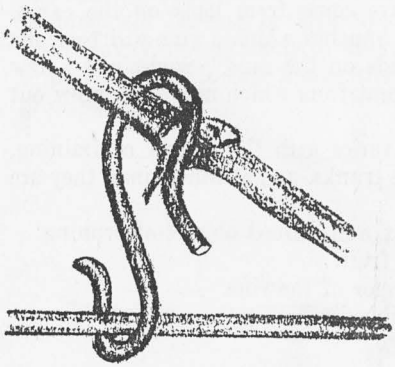

Fig. 15. The Wire-Hook.
(From Georgia Station.)

(5.) GRAPE PRUNING AND TRAINING.

(a.) Grape Pruning. (b.) Grape Training.

Pruning the grape is quite a different thing from training the grape. Pruning is the operation of cutting off certain undesirable parts. Training is the operation of arranging the vines in the desired form. Pruning necessarily comes before and underlies successful training. Different species of grapes have different habits of growth, consequently, no one system of pruning nor no one system of training is suitable to all species and all varieties. But there are certain fundamental principles which have wide application, and it is our purpose to mention here only these, leaving the grower to exercise his own judgment in individual cases.

(a.) *Pruning*:—In pruning it is very important to remember that the fruit is borne in a few clusters near the base of the growing shoots, and which come from wood of last season's growth. It will thus be readily seen that one can easily control the amount of fruit the vine will bear by intelligent pruning. Before discussing the function of the different parts of the vine it is important to have a clear understanding as to what constitute the different parts. A growing leafy branch is called a *shoot*; a ripened *shoot* is called a *cane*; and a cane two or more yeears old, is called an *arm*. Each shoot will average from two to four clusters of fruit, and these shoots nearly always come from buds on the canes. Therefore, to control the number of bunches which a vine will bear one must leave a definite number of buds on the cane. Sometimes a few shoots will bear no bunches. The point from which new canes grow out each year we will call a *spur*.

The arrangement of these spurs varies with the system of training. Sometimes they are kept close to the trunks, and at other times they are kept close to the arms.

Objects of Pruning:—There are six well-defined objects of pruning:

1. To produce larger and better fruit.
2. To maintain or increase the vigor of the vine.
3. To keep the vine in manageable limits.
4. To make cultivation easier.
5. To make spraying more easy.
6. To facilitate gathering the fruit.

After the first year's growth, the *young vines* are again cut back to three or four buds. To the novice this may seem extremely severe, but it must be remembered that the main object the first year is to get root growth and development. At the beginning of the second year's growth training proper begins according to the method decided upon. Vines during the first year were allowed to grow free upon the ground. Sometimes small stakes are placed by them so as to prevent a careless person doing them injury with the cultivator.

We prefer to prune our vines in this climate in *December* and *January*. What activity the sap may manifest from that time on will not be wasted upon surplus wood but will go to make the remaining buds stronger. If pruning be delayed till growth starts in the spring the vines will bleed very much, which, to say the least, is not beneficial.

Pruning in the Summer is frequently practiced by some growers, but we doubt its utility, as a rule. The shoots which have the fruit on are pinched off, leaving the sap, is it is claimed, to go to the fruit. Undesirable shoots are also pinched to check their growth and to throw the sap into more desirable ones. We believe the vine needs about all the

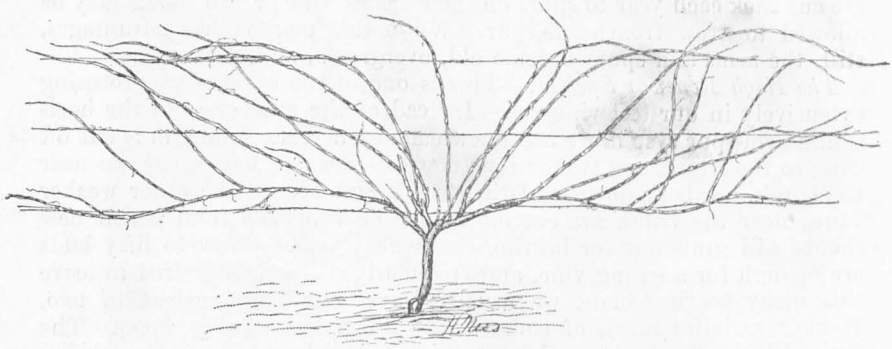

Fig. 16. Grapevine before Pruning.

leaf surface it can get to mature its fruit properly. Shoots which are pinched will often throw out undesirable side shoots and thus summer pruning will have to be kept up *ad infinitum*. Summer pruning, if done heavily, is very likely to weaken the vine. Of course it is desirable to pull off the side shoots near the ground as they come out during the growing season.

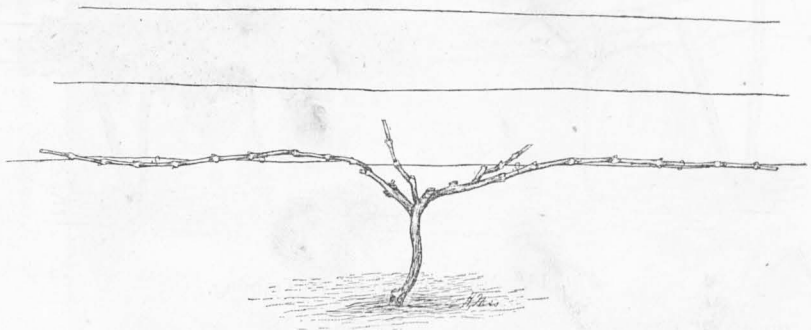

Fig. 17. Grapevine after Pruning.

GRAPE TRAINING:—While there are many so-called systems of grape training, neary all of them can be reduced down to three: the upright, the drooping, and the horizontal systems, the terms referring to the direction of the bearing shoots. It must be understood that no one system is best suited for all varieties. The climate and soil also make a great difference. There are vineyards in Southwest Texas, grown on a sandy loam soil where the rainfall is light, without any posts or wire trellising. The top is formed close to the ground on a short heavy trunk. While this method is very inexpensive and does well in the locality men-

tioned, it is not at all suited to more moist climates. It is not our object to enter here into an exhaustive discussion of grape training, but only to give notes upon systems we have used.

Horizontal Arm Spur System:—This system has also been called the "Fuller System." It consists in having two arms run in opposite directions on the first wire, and which remain somewhat definitely. The canes are cut back each year to spurs on these arms. One or two shoots may be allowed to grow from each spur. While this method has advantages, still, the arms and spurs become old, overgrown, and weakened.

The High Renewal System:—This is one of the systems we are using extensively in our test vineyard. Instead of the arms used in the horizontal arm-spur system we use a new cane each year. The arm is cut off close to the trunk, and two or four new canes, which have come out near the trunk, are bent down and tied to the first wire. The other weaker canes near the trunk are cut off to one or two buds from which new shoots will grow out for bearing canes next year. Forty to fifty buds are enough for a strong vine, and frequently where it is desired to leave this many bearing buds, we usually leave four canes instead of two. Weaker varieties must, of course, have much less bearing wood. The fruit will usually be borne between the first and second wires, and frequently will be shaded enough to prevent injury from the sun. It may be well to state that in selecting the bearing canes it will usually be found that canes of hard, smooth wood, and of medium size, will be better than large overgrown ones. Shoots which come out from the arm and do not catch on readily to the second wire with their tendrils should be tied in place with some loose material.

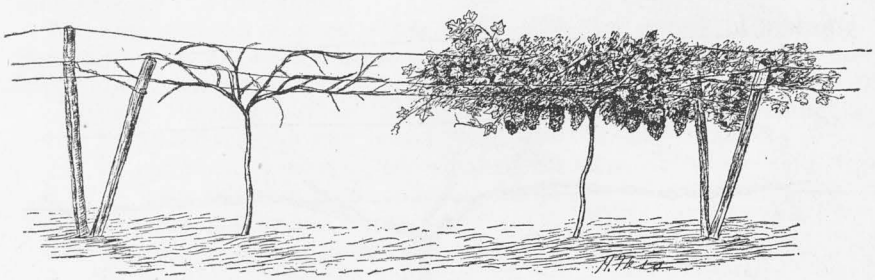

Fig. 18. Munson System of Training.

The Munson System:—This system was devised by T. V. Munson, Denison, Texas, and has been under test here for five years. We have also investigated this system in Mr. Munson's own vineyard. It is the best system we know of for such vigorous growing varieties as Herbemont and Lenoir. Some of the advantages which seem evident to us are: 1. A good leafy canopy to shade the fruit; 2. The fruit is borne well up from the soil, where it is not injured by dust; 3. It facilitates cultivation, spraying and gathering the fruit; 4. For many varieties it enables the vine to grow more nearly like its natural habit, which is quite important with many of Munson's new varieties in particular. The system embodies many of the principles of the well-known "Kniffin System." In-

Fig. 19. Herbemont on Munson System in our Vineyard.

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stead of one post being set at a place, two small ones are set, spreading out at the top some three feet in the form of a V. About two feet down from the top of the posts a wire is tied across from each post. On this cross wire the first wire of the trellis rests. The other two wires are stretched along on the tops of the posts.

The arms are stretched along on the first wire and the shoots which come out from the buds on the arms grow up and hang over the two upper wires. These arms are cut off at pruning time and others are bent down in their places, thus renewing all the bearing wood each year. If the variety be strong, two arms are left on each wire instead of one. Canes which come out at the point of division of the arms are cut off to short spurs to grow arms for next year. The system is a simple one and easily understood. It requires but little work to keep the vine in shape.

The following figure shows the Herbemont bearing in our testing vineyard when trained according to the Munson system:

(6.) Diseases of the Grape.

Some 200 diseases have been found in the grape, but space will forbid us mentioning those only which we have had to contend with here in our vineyard. For an exhaustive treatise on black rot of the grape the reader is referred to our Illustrated Bulletin No. 23, on black rot, from this Station, issued in 1892.

Black Rot. (*Physalospora Bidwellii, Ellis; Læstada Bidwellii Sacc*).—The cause of this disease is due to a well-known fungus. It usually makes its appearance upon the foliage some two days before it does upon the fruit. Upon the leaves it appears in the form of well-defined reddish brown circular spots. Small, dark brown pimples (pustules) can be seen by close observation by the unaided eye, and quite clearly with a common hand-glass; appearing thickly over the area of the diseased spot. It makes its appearance upon the fruit first in the form of a light brown spot, which rapidly increases in size till the whole berry is involved. Soon the berry shrivels up, leaving the skin drawn tightly in ridges over the seeds. In this condition the berries may adhere to the vine till spring. Frequently two or three outbreaks of the disease appear upon the crop before it is entirely destroyed. When it first appears, frequently only two or three berries will be affected on the bunch, and the grower is frequently deceived by thinking the disease will not spread further. In about ten days another outbreak will occur, affecting a much larger per cent. of the crop, and so on, until frequently the entire crop is destroyed. From this short description the ordinary grower may easily distinguish the black rot from most other diseases.

Brown Rot. (*Peronospora Viticola*).—This disease has not been near so bad with us as the black rot. Upon the foliage it presents the appearance of a downy, white substance on the underside, with greenish yellow spots on the upper side. The affected fruit has a dull brownish appearance and gradually shrinks up and drops off.

Anthracnose. (*Sphaceloma Ampelinum.*)—This disease is sometimes called "Birds-eye Rot," from the peculiar resemblance to the eye of a bird which the diseased fruit presents. Upon some varieties this disease has been quite serious with us, and is one of the most difficult we have

had to treat. Upon the leaves it appears in the form of blackish-brown spots, with raised, dark colored margin. Sometimes the diseased spots turn dull gray in the center and frequently fall out, leaving many irregular holes in the leaves. The shoots are also affected.

The first attack on the fruit appears in the form of a brownish circular spot, sunken in the center and surrounded on the border, frequently, by a bright red colored area. The diseased area gradually spreads over the entire berry. The tissues do not soften in this case like they do in the case of brown rot, but become tough.

Root Rot.—By the name of root rot several diseases are included, such as root rot of cotton, *Oozonium auriconium*, *Dematophora necatrix* and *Agaricus melleus*. It is difficult for the ordinary grower to distinguish them apart. These diseases are frequently found on low, heavy, damp soils of Texas, and a vineyard should never be set on such soils.

Grape Leaf Blight. (*Cladosporium Viticolum.*)—This disease has been quite common with us on many varieties late in the season. It can usually be distinguished by the great number of small dark brown diseased spots which appear thickly over the upper surface of the foliage. Where we have not sprayed, it has utterly defoliated some varieties. This disease should always be looked for, and whenever it begins to appear one or two sprayings should be given with bordeaux after the crop is gathered. This subject will be further discussed, together with spraying machinery, following the notes upon injurious insects.

(7.) Some Insect Enemies of the Grape.

While there are many insects injurious to the grape, fortunately not a large number are very injurious in one locality. Only those will be considered here which we have met with.

The Grape Leaf Folder. (*Desmia maculalis*).—During mid-summer this insect appears on some varieties in large numbers and folds up the leaves and eats out the interiors, which afterwards present to the eye a skeletonized appearance. If the folded leaf be opened, an active, wriggling, greenish larva will often fall out, or sometimes hang suspended by a thread. The larva hatches out into a black moth with a few white spots on the wings. It is seldom seen. There seem to be about three broods in this latitude. It is the most injurious insect found on the grape here.

The Grape Leaf Hopper. (*Typhlocyba Vitifex*).—This insect appears here early in summer and frequently increases in numbers during the later part of the summer. It is found on the underside of the leaves or on the sides of the small shoots. There are several species of this insect closely resembling each other. The one which occurs here is about one-eighth of an inch in length. It has the peculiar habit of running sidewise when disturbed. It can both jump and fly. The prevailing color is light yellowish green with reddish yellow spots on the wing covers. It injures the vine by sucking the sap out. Kerosene emulsion diluted ten times should be used for this insect.

The Grape-Berry Moth. (*Eudemis botrana*).—During some years we have found this insect quite injurious here on some varieties. It does its injury to the grapes when they are about full grown. The injured grape is frequently discolored at the point where the insect has

eaten its way into the grape. If the injured grape be cut open and examined a whitish larva will be fund on the inside. When the insect is abundant many of the berries will often be found held together by silken threads. The larva not only injures the pulp but frequently bores into the seeds also. When full grown it has an olive green, dark brown color; it then pupates and hatches out into a slate colored moth. The last brood of this insect, like that of the leaf folder, live over winter in the pupa state among the dried up leaves.

There are some other insects quite serious in other States, but we have not found them here. Among them may be mentioned Phyloxera, Grapevine Fidia, Grape Cane-Borer, Flea Beetle, and Rose Chafer. A few hawk moths have been found here, but as their larvae are so large and conspicuous they can be easily seen and can be readily destroyed.

It should be stated, however, that phyloxera does occur in the State, but we have not known it to do much damage.

(8.) Remedies or Preventive Measures for Diseases and Insects.

It is best to use general preventive measures rather than to depend upon spraying. All dead leaves and pieces of vines pruned off had best be gathered up and burned. Much loss from insects and fungus diseases may be avoided in this way. Plow the vineyard early so as to turn under all dead grass and other vegetable matter in order that it will partially rot before the growing season commences and thus help to destroy spores of disease which remain on pieces of leaves scattered over the ground. Good cultivation will help very much to keep the vines strong and vigorous. When in this condition they are much more able to successfully resist the attacks of diseases and insects.

During each season of the past four years we have sprayed our vineyard regularly and we have met with but very little loss from insects and diseases. It must be stated, however, that bordeaux has not been so satisfactory against anthracnose as it has been when used for black rot and several other diseases. Full directions for making bordeaux are given in our Bulletin No. 23, consequently, short directions only will be given here. Dissolve two pounds copper sulphate, "blue stone," in twelve gallons of water; dissolve two and a half pounds of unslaked lime in twelve more gallons of water. Pour the two quantities together, and this makes bordeaux mixture according to the plan we have followed for a number of years. This makes a preparation which is neutral and will not burn the foliage. The use of the potassium ferrocyanide test to see whether the mixture is neutral or not does not appear to be at all necessary, and to the ordinary grower, it frequently complicates the subject and makes him less desirous of spraying. An excess of lime does not appear to be undesirable, and the formula we have used has been satisfactory in all cases for which it has been reported to give good results and for which we have had occasion to use it. The material should be strained through some coarse cloth before using it in spraying, as this will save much time in unclogging the spraying machinery. We usually make four sprayings, beginning when the buds commence opening; repeating it about every twelve or fifteen days afterwards, according to the weather. If the weather remains dry, a longer period between the spray-

ings may elapse; if wet, a shorter period. If spraying be done while the grapes are blooming it is liable to prevent the fruit from setting well. We use a common barrel pump hauled by one mule between the rows on a plank sled or drag. One man drives and does the pumping while another sprays the sides of two rows while going through once. A fine mist-like spray is used to thoroughly coat all parts of the vine.

For all biting insects, we put into every twenty-four gallons of bordeaux three ounces of paris green. The mixture is kept well stirred while spraying. In this way we fight both diseases and biting insects at once.

For the sucking insects, we use kerosene emulsion diluted ten times. The formula for making this preparation has been published so often in our bulletins that it is not thought necessary to repeat it here.

Spraying machinery can be bought of the Deming Co., Salem, O.; The Goulds Manufacturing Co., Seneca Falls, N. Y., and William Stahl, Quincy, Ill.

SACKING GRAPES:—This is one of the surest ways of protecting grapes from injury done by diseases, insects, and birds. The method is a little costly, being about one-third of a cent per bunch. Very light paper sacks, two to three pounds capacity, should be used. They can be bought in most grocery stores at $1.00 per 1000. Before using cut a small hole in the bottom to allow water to pass out when necessary. Fasten them around the bunches when the grapes are about the size of duck shot. The tops may either be pinned over around the bunches or a common twine string may be used to tie them. When twine is used a small hole should be made near the top of the sack and a piece of twine run through it and tied before using the sack. In this way we have saved fine specimens of grapes during the season of 1898 from nearly all the varieties. Whenever diseases or insects are bad and grapes are worth considerable money this method is likely to pay well. It is claimed that mocking birds are held in check some by the sacks.

Those tender-skinned varieties like Brilliant will often be most benefited by sacking. It is often thought by the inexperienced that the ordinary paper sacks will not stand the effects of the weather. This year we have had paper sacks to stand well through a rather wet season. The grapes came out of the sacks clean and nice, without any dust on them.