



EXPERIMENT STATION  
OF THE  
KANSAS STATE AGRICULTURAL COLLEGE,  
M A N H A T T A N .

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DEPARTMENT OF HORTICULTURE AND ENTOMOLOGY.

E. A. POPENOE, A. M. . . . . PROFESSOR OF HORTICULTURE AND ENTOMOLOGY.  
S. C. MASON, B. Sc., ASSISTANT IN HORTICULTURE.

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**SECOND REPORT ON THE EXPERIMENTAL VINEYARD.**

SUPPLEMENTAL NOTES.

During the winter of 1890-'91, the vines in the experimental vineyard were covered with prairie hay, and the winter, as it turned out, was unusually mild. These circumstances resulted in a general and heavy crop of fruit, even on varieties that cannot be considered sufficiently hardy for general planting. The opportunity was taken to secure additional notes upon some of the sorts described in last year's report, and to make descriptions of many sorts not previously reported upon. The notes upon the 22 sorts immediately following are additional and supplementary to those of the same varieties as given in Bulletin No. 14, of last year.

AGAWAM. The season's yield of this variety was lighter than usual, and the bunches were small and not evenly set. This partial failure is probably to be ascribed to a late frost, by which the blooms of this and other sorts were affected.

BRIGHTON. This variety should be placed at the head of the early red grapes. It gave a fine yield of fruit of superior quality, and, when bagged, the bunches kept remarkably well, giving choice table fruit long past their usual season.

CREVELING. The vines hung very full, and the fruit showed remarkable keeping qualities either bagged or unprotected.

CROTON. Yield heavy, and bunches much larger than last year, many hanging on the vines till frost, and becoming richer and sweeter with age. The vines are somewhat lacking in vigor of growth, but the quality of the fruit will repay the care needed to secure it.

DIANA. The vines were full of finely-developed clusters, but the fruit was yet immature, for the most part, when struck by the first frost.

DOWNING. In previous years the vines of this sort had been badly diseased, and the south vine, having been killed to the ground in the winter of 1889, gave no fruit this year. The other, however, gave a full crop. The clusters were large, compact, often shouldered, oblong or tapering; berry large to very large, oval, deep purple, slightly mottled with heavy bloom, skin thick but tender, flesh breaking, juicy, pleasant but not very rich. A delightful table fruit.

DUCHESS. Vines heavily loaded with large, compact clusters. The reputation for keeping qualities of the fruit was fully sustained by the results of this season, and the greater part of the crop was yet on the vine when it was struck by the untimely frost of October 7th. The leaves of this variety are much injured by the attacks of the vine-leaf hoppers, species of the homopterous genus *Erythroneura*.

EMPIRE STATE. Crop very heavy and bunches fine, but, owing to dry weather or to some cause not perceived, the most of the bunches shriveled on the vine, but little well-matured fruit being secured.

FRANCES B. HAYES. With us, this grape has proved superior in bunch and in quality of fruit to Martha, Eva, or Lady, ripening more evenly, keeping better, and having less of an unpleasant flavor comparable to that of over-ripe pears.

HERBERT. This sort gave a lighter crop and of smaller clusters than last year.

ISABELLA. The vines of this variety, though failing utterly in previous years, bore this season a full crop, but none of the fruit was well ripened when cut off by the frost.

LENIOR. The two vines of this sort were heavily loaded, bearing about 20 pounds each, some bunches being 10 or 12 inches long. To one preferring fruit of the characteristic *Æstivalis* flavor, this grape is very palatable, being more juicy and pleasant than *Cynthiana* or *Norton*.

MILLS. This variety gave a full crop of large and handsome bunches. In handling and keeping qualities this grape is unsurpassed by any in the collection, the skin being so thick and tough that the fruit may be shipped without damage almost any distance. The strong musky flavor is objectionable to many, and must prevent this fruit from taking a high place in public favor.

MOORE'S DIAMOND. The vines were very full, the bunches very large and handsome. In quality, this grape cannot take first rank, and the skin is too tender for a good shipper. The vines have proven entirely hardy and are vigorous in growth.

NAOMI. The mild winter was suited to this tender variety, and an abundant crop was matured; the bunches of medium size, long, rather loose, shouldered; the berries of medium size, pearly white, thin skinned, finely flavored.

NIAGARA. This sort bore heavily, the bunches being large and of fine appearance. In quality, the fruit fell below the standard of other seasons, and at no time could it be ranked as first class. The need of rain at the time of ripening may be a sufficient reason for this lack of flavor.

POCKLINGTON. Though bearing heavily, this sort does not ripen sufficiently early and evenly to be profitable, and this year nearly the entire crop was destroyed by the frost of October 7.

POUGHKEEPSIE RED. For the first time this variety gave an abundant yield. The bunches were of medium size, slightly shouldered; the berry clinging firmly to the stem, medium or small, round, pale amber, with lilac bloom, skin thin but tough, flesh tender with a little tough pulp, but mostly melting in the mouth, flavor sweetish but not pronounced, and rather insipid. The fruit does not keep well on the vines, soon becoming dark and discolored. Season from the middle to the last of August.

PRENTISS. the vines well filled with very handsome fruit; bunches of medium size, very compact, heavily shouldered; berry of medium size, round, clear greenish-yellow, skin rather tough, flavor fine. Season from the first of September until cut off by frost.

TRIUMPH. Though setting a full crop, the vines failed to mature any perfect fruit. Early in the season the most of the berries developed a peculiar disease of the epidermis, in which a rusty coating covered a portion of the surface, retarding the growth, and often causing the berry to crack to the center. Specimens submitted to specialists in diseases of the grape have so far brought no satisfactory explanation of the disease.

WOODRUFF RED. Neither in the size nor the yield of fruit did this variety make a record equal to that of last year.

WYOMING RED. This sort again bore abundantly, and in size and appearance the fruit was fully equal to that of last year. The slight foxiness of the flavor is not objected to by most buyers, while its handling and keeping qualities make this grape an excellent market sort.

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NOTES UPON SORTS FRUITED FIRST IN 1891.

Of the varieties upon which no report has yet been made from this Station, several, originated by T. V. Munson, of Denison, Tex., and placed here for

trial, fruited this year, and deserve special mention. The parentage, as given by the originator, follows each name in this list.

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

**DINKEL.** (A supposed Catawba seedling.) Canes made a vigorous growth, stout, with many laterals; the general appearance of vine and leaf much like Catawba; bunches of medium size, compact, slightly shouldered; berry of medium size, round, deep coppery-red with thick bloom, skin thick, berry adhering firmly to the stalk, a rather tough pulp, flavor quite rich and sweet, with a slight acidity next the skin, much like Catawba. Ripe October 26.

**EARLY MARKE.** (Elvira x Triumph.) Vines dark brown, slender, with numerous laterals; but a few imperfect bunches of fruit were produced; berry very small, round, black, of wild-grape texture and flavor. Ripe the 13th of August. This variety shows apparently a strong reversion to the Riparia ancestry of Elvira.

**GOLD COIN.** (Cynthiana x Martha.) Canes of rampant growth, rather slender, dark red-brown. The leaves suffered much from the attacks of the downy mildew in August; bunches compact, with slight shoulder; berry above medium size, round, dull golden-green with thick white bloom, skin tough, a prominent tough pulp, and with a flavor denoting a good deal of sugar, at the same time quite acid; not a table grape. The fruit ripened early in September, and remained on the vines late, but did not improve in quality with age.

**RED EAGLE.** (Black Eagle seedling.) Canes yellowish-brown, of a stocky, short growth, with short joints; bunches this year imperfect; berry of medium size, round, clear red with thin pearly bloom, skin thin and tender, flesh melting, with but little pulp, in flavor brisk and pleasant. Ripe August 22d.

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

**RUBY.** (Elvira x Brighton.) Canes of rampant and late growth, rather slender, dull brownish-yellow; bunches imperfect; berry small, round, dull red, in flavor and texture resembling Elvira. Ripe the first of September.

The following varieties of grapes from various sources were planted in the Station vineyard in 1889 and 1890, two vines of each sort, and are now noticed for the first time in these bulletins.

**CENTENNIAL.** Bunches small, compact, rather oblong in form, slightly or not at all shouldered; berry small, yellowish-green at first, but becoming amber when fully ripe, skin rather thick, quite tough, berry adhering firmly to the stalk, flesh juicy, melting, with but little pulp, sweet and pleasant. The fruit was ripe the last of August and remained in good condition on the vines through September.

**EATON.** Vines of coarse growth, not very vigorous, wood dark brown; foliage resembling that of Concord. Only a few small clusters were produced. Berry large or very large, round, black with thin lilac bloom; skin of moderate thickness, rather tender, flesh with tough pulp; the fruit with much the texture and flavor of Concord or Worden. Ripe from the middle to the last of September.

**ELDORADO.** Vines of rank growth, with densely woolly canes; bunches irregular, rather loose; berry of middle size, round, dull golden-green with thin pearly bloom, skin, rather thick but not tough, a slight pulp; flavor sweet, resembling Elvira, but better. Ripe August 13.

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

**GREEN MOUNTAIN.** Vines of vigorous but rather slender habit; foliage with the characteristics of the wild *Labrusca*; clusters small, compact; berry small, oval, dull pale green, skin tough, a rather tough pulp, flavor nothing fine or attractive. Apparently this variety has been very much overrated in advertising. Ripe by the middle of August.

**HIGHLAND.** Vines of slow growth and somewhat lacking in vigor. This season they fruited very heavily. The clusters were large or very large, often doubly shouldered, the shoulders nearly equal to the main cluster; berry very large, slightly oval, deep purple with thick lilac bloom, skin rather tough, thick; flesh juicy, but with considerable tough pulp; flavor pleasant, sprightly, and quite acid. One cluster weighed 14 ounces. If this grape proves sufficiently hardy to withstand our average winter, and as productive as this season would indicate, it will be a very valuable sort for a late crop. Ripe the last of September.

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

IOWA EXCELSIO. Our vines under this name proved identical with Isabella, or so closely resembling it in all characters as to render a distinction useless. The date of ripening of the fruit on these two vines was somewhat earlier than that on the Isabella vines, but not more so than often occurs on different vines of the same variety.

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

JESSICA. Vines of moderate vigor, canes slender; clusters of medium size, slightly shouldered; berry of medium size, somewhat oval, pale green with white bloom, skin rather tough, pulp tough, flavor peculiar but not unpleasant. Ripe the middle of August; yield light.

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

MOYER. Vines of slender, branching habit, forming many laterals; clusters short, compact; berry small to medium, round, purplish-red, skin thin, quite tough, flavor pleasant. Ripe by the middle of August. This variety will need to improve much under further trial to demonstrate all that has been claimed for it by the introducers.

NORFOLK. Vines of strong growth, with short joints; clusters small, compact, shouldered; berry of medium size, oval, dull red with lilac bloom, skin thin, flesh tough, flavor rich and pleasant, showing a tincture of *Vinifera* blood. Yield light.

Three of Rogers's Hybrids, fruiting with us for the first time this season, are deserving of notice.

BARRY. Vines vigorous; clusters rather small and uneven, not usually shouldered; berry large, round, black with heavy white bloom, skin quite tough, flavor very rich and sweet. First ripe on August 22d, the clusters hung on the vines in good condition through September, the flavor improving with age.

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

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

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GENERAL OBSERVATIONS.

The season of ripening with most sorts has been from a week to two weeks later than for the same vines last year, the average for all varieties noted being 10 days.

A point of considerable significance is to be noted regarding the susceptibility of different varieties to attack from the black rot. After thoroughly spraying the entire vineyard during the early part of the season with Bordeaux mixture, there were still 15 varieties that showed traces of this disease as the fruit ripened, though none in destructive amounts. Of these sorts, 10 were hybrids containing *Vinifera* blood, 4 were of *Labrusca* origin, and 1 a *Riparia*.

When we consider the flavor and keeping qualities of these same species and hybrids, we find that with the most of the *Labrusca* varieties the quality deteriorates rapidly if they are allowed to remain on the vines long after they are fully ripe. To a less extent the same is true of those of *Riparia* origin, while it is to the *Vinifera* hybrids that we look for fruit which, if undisturbed by birds, will hang on the vines for weeks after it is ripe, becoming all the richer and sweeter, even in some cases after the berries become decidedly shriveled. *Aminia*, *Black Eagle*, *Creveling*, *Croton*, *Barry*, *Brighton*, *Duchess*, *Massasoit*, *Merrimac* and *Wilder* are conspicuous examples of this quality. The fact that *Catawba* and *Delsware* would fall equally well into this list only strengthens the belief held by some of the most careful investigators of grape varieties, that both of these have a strain of foreign blood. Our trials thus far of these hybrid varieties would encourage the belief that, with the aid of the sprayer in summer and a slight amount of protection in winter, the superior qualities of these grapes may be enjoyed in Kansas with considerable regularity.

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NOTES ON SPRAYING GRAPES.

For the purpose of a trial of the effect of spraying vines with Bordeaux mixture, the old vineyard, containing 13 rows of about 20 vines each, was chosen. The rows of odd numbers from 1 to 13 were treated and the others left as a check. The majority of the vines were of the *Concord* variety, irregularly interspersed with other sorts.

Bordeaux mixture was prepared by dissolving 12 pounds of copper sulphate or blue vitriol in 32 gallons of water, then slacking eight pounds of good quicklime and adding water till the amount was brought to 12 gallons, when it was strained into the copper solution, and the whole thoroughly

stirred. This quantity makes a barrellful, and with a barrel cart may be conveniently wheeled to any part of the vineyard.

Spraying was commenced when the first leaves were about the size of a dollar, and continued at intervals of about two weeks till the grapes were well grown.

When the fruit matured, but a small amount of black rot could be detected on the sprayed rows, amounting only to a few single berries. Concord vines in the unsprayed rows showed but little rot, scarcely more than the same variety in sprayed rows. On a vine of Agawam in row 10, unsprayed, 10 to 15 per cent. of the fruit was noted as being affected by black rot July 29th. In September the same vine furnished no eatable fruit, even that which showed no outward injury being very bitter. A large vine of this variety in row 5, sprayed, showed no damage; also two vines of the same in the experimental vineyard, where all were sprayed, showed fruit entirely sound. Considerable damage by black rot was noted on unsprayed vines of Taylor and Salem, but of these sorts no vines were sprayed and no comparison could be made.

In the experimental vineyard, all varieties were sprayed alike, and but little diseased fruit could be found. The cases, where any occurred, were usually in clusters underneath the vines, and not readily reached by the spray. They were noted as follows: Concord, August 5th, a few berries; Croton, July 13th, a few berries rotted; Downing, July 6th, a few berries; Duchess, July 6th, a portion of a bunch; Gœthe, July 6th, a few berries; Herbert, July 18th, a single berry noted; Isabella, July 30th, slight traces of rot; Jefferson, July 30th, same note; Lenoir, July 18th, a single berry, Lindley, July 18th, traces of rot; Maxatawney, August 20th, a trace; Elvira, July 18th, a trace; Naomi, August 22d, a few berries; Niagara, August 6th, a few berries which touched the ground; Pocklington, July 18th, one bunch affected; Prentiss, July 30th, traces.

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As much of the fruit at the time of ripening showed a greenish-blue discoloration from the deposit of lime and copper, which had been applied twice since a rain had fallen, some persons feared that it might be poisonous. A basket of grapes showing the heaviest deposit that could be selected was submitted to Professor Willard, of the Chemical Department, for determination of the amount of copper sulphate. The coating was carefully dissolved from the entire bulk of fruit, stems and berries, in a warm acid solution, and recovered in the form of metallic copper, giving .00188 per cent. of the weight of fruit.

The equivalent of this in copper sulphate being .00747 per cent., it follows that the actual amount on one pound of grapes was .52+ of a grain.

According to Blyth's "Poisons: their Effects and Detection," this material is given in doses of from  $\frac{1}{4}$  to 2 grains as an astringent or tonic, and in doses of from 5 to 10 grains as an emetic, serious symptoms of poisoning



having followed only when a dose of 120 grains was taken. A short time after this sample was taken, a heavy shower washed off so much of the deposit that little of the remaining fruit was injured in appearance.

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Two styles of knapsack sprayers were used in this work: The Galloway knapsack sprayer, manufactured by the Columbia Brass Works, Washington, D. C., and the Excelsior knapsack sprayer, manufactured by William Stahl, Quincy, Ill. The Galloway proved to be much the most effective machine, having the following points of superiority: First, better general mechanical construction, superior workmanship being shown in the construction of the working parts; second, convenience, the concave side of the reservoir worn next to the back, making it easier to carry, and the arrangement of the pump lever being such as to enable the operator to work to greater advantage; third, the construction of the pump, the most important part, being such as to give a more powerful and positive stream, which was shown at once by the difference in the spray secured from the pumps with the same number of strokes; fourth, the delivery pipe and nozzle is provided with an automatic clearing point, with a thumb lever in reach of the hand, by which any clogging material can be instantly removed. The Excelsior machine had one advantage, in having a draining plug in the reservoir, and this it was found desirable to add to the Galloway reservoir, so that all the material could be rinsed out and the can dried. The prices of these sprayers are the same, \$14 each.

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NOTE ON BAGGING GRAPES.

In order to secure fine sample clusters of each of the many sorts of grapes, as well as to test the practicability of protecting grapes for home use or for market, two dozen bunches on each of 75 varieties were in closed in paper sacks. There was no attempt to protect the fruit against fungus attack, and the work was not done till July 17th to 21st, when the berries were nearly grown.

Common manilla grocery sacks were used, No. 1½ or No. 2 being the most convenient size, though No. 1 is large enough for grapes with small clusters, like Delaware and Elvira. They were prepared for use by taking a number of them in a bunch and with a belt punch making a hole in each upper corner through the folded side, then stringing each sack with a bit of twine, or raffia, which is better. Slipping the sack over the cluster and tying is than rapidly performed. Slitting the top of the sack, then folding over the vine and securing with a pin is a still more expeditious method. Sacks of these sizes should cost no more than \$1.50 per 1,000. Our labor account shows 33 hours for bagging 1,800 bunches. This would not make the cost to us over a cent a pound, and with the cheap labor that might be employed this figure could be very much reduced.

As to the advantages, the fruit came out of the sacks in the most perfect

condition. The ripening in many cases was retarded a few days, and in some sorts the flavor seemed to be somewhat impaired; but with few exceptions, both flavor and appearance were perfect. For securing exhibition samples and preserving choice fruit for home use, there can be no doubt as to the advantage of bagging grapes. Whether it would pay on a large scale for market must depend upon the demand for fancy table fruit at prices above the average for grapes in baskets as commonly shipped. We were enabled to hold such choice kinds as Black Eagle, Brighton, Delaware and Lady Washington some time past their season. They can be cut from the vines in the sack, and packed in this way, shipped long distances without the bloom being disturbed or a berry broken. Where a market can be found for this grade of fruit, at corresponding prices, the outlay would be doubly repaid.