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EXPERIMENT STATION
OF THE
AGRICULTURAL COLLEGE
OF UTAH

Bulletin No. 97



Fig. 1.—Prune Orchard on the Southern Experiment Farm.

REPORT ON THE SOUTHERN UTAH
EXPERIMENT STATION

DECEMBER, 1906
LOGAN, UTAH

TRIBUNE-REPORTER PRINTING CO.
SALT LAKE CITY, UTAH

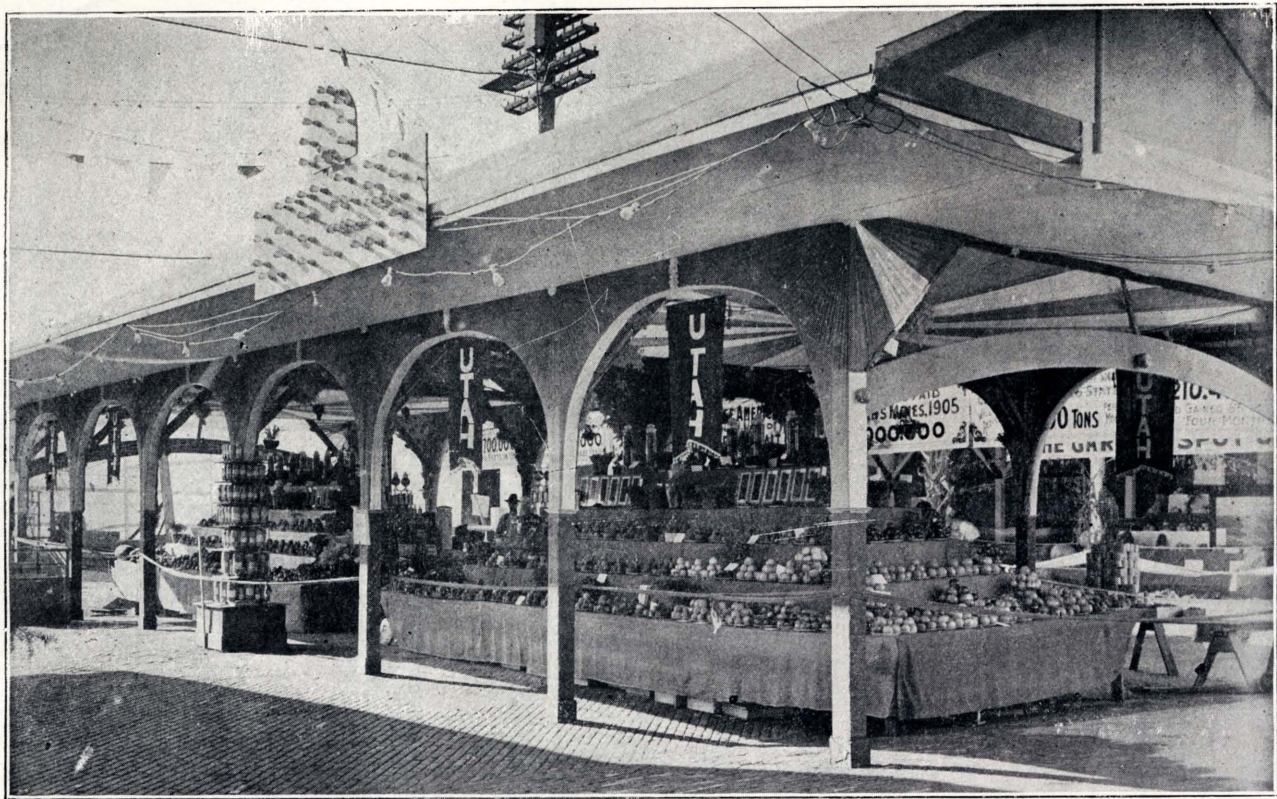


Fig. 2.—Utah Exhibit at the National Irrigation Congress, Boise, Idaho, September, 1906. Part of the Exhibit was from Washington County, and the Southern Experiment Station was very helpful in making this display and in winning honors.

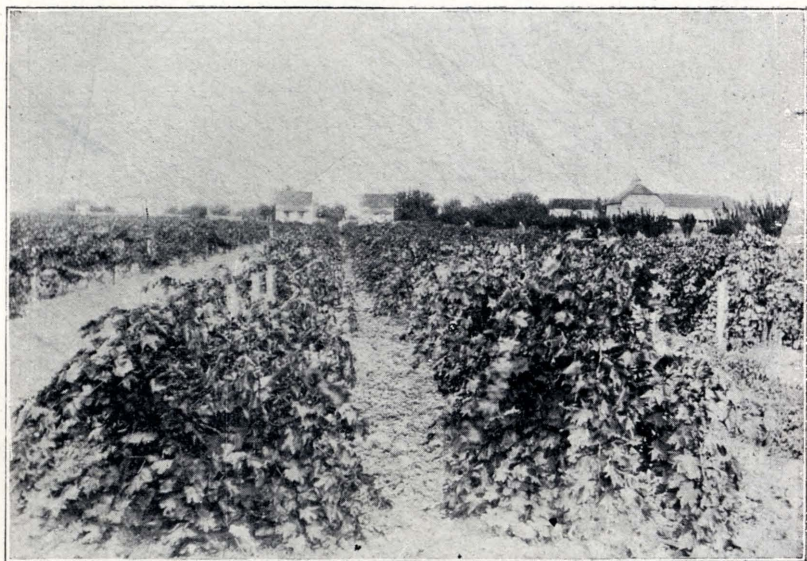


Fig. 3.—Vineyard on Southern Experiment Station composed mostly of Resistant Vines. Workmen's cottage and barns in background.

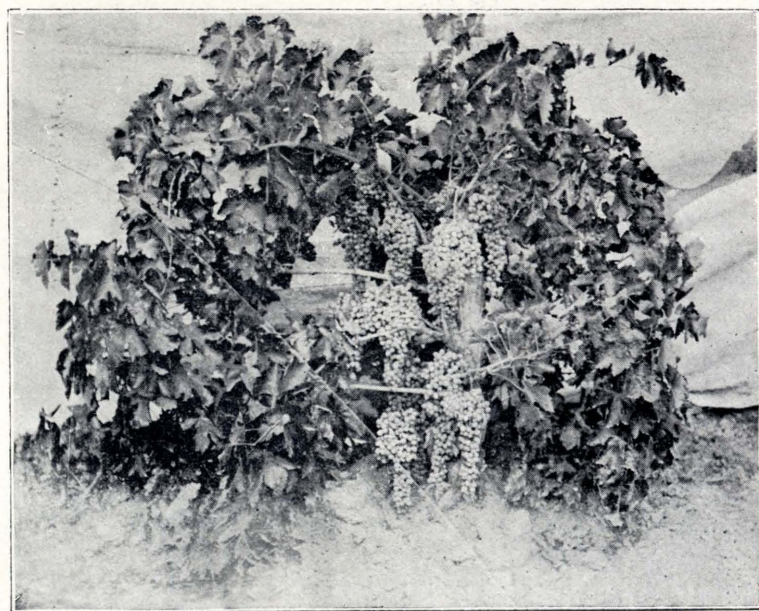


Fig. 4.—Thompson Seedless Grape Vine. This vine is on its own root and is three years old.

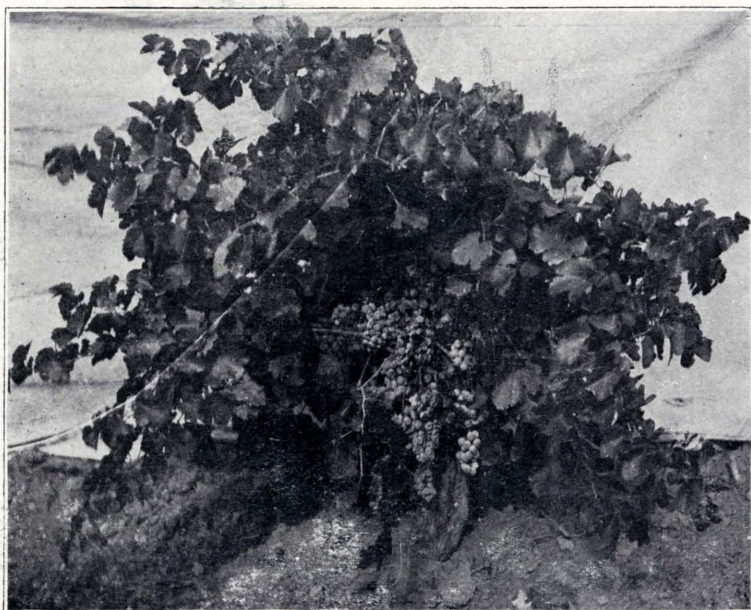


Fig. 5.—Black Ferrara Grape Vine. This vine is on its own root and is three years old.

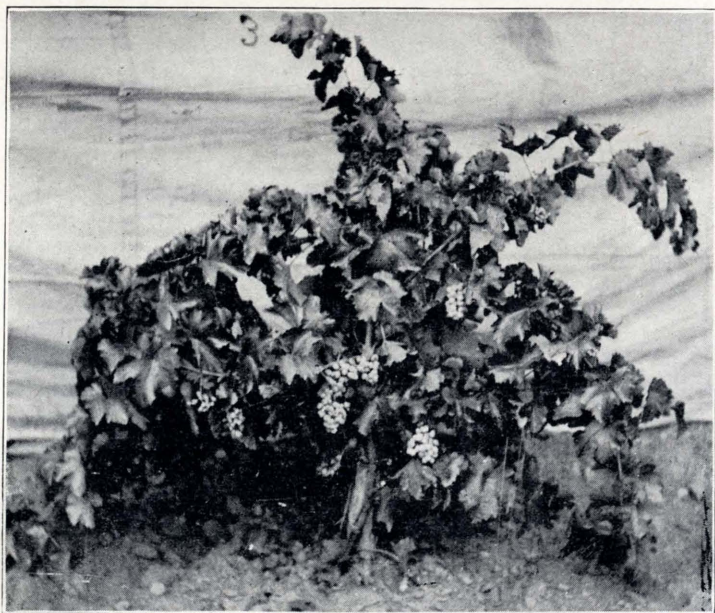


Fig. 6.—Emperor Grape Vine grafted onto Rupestris St. George. One season's growth on root two years old when grafted. All of this growth came between June 1st and Sept. 18th.



Fig. 7.—Cornichon Grape Vine on its own root. Two seasons old.

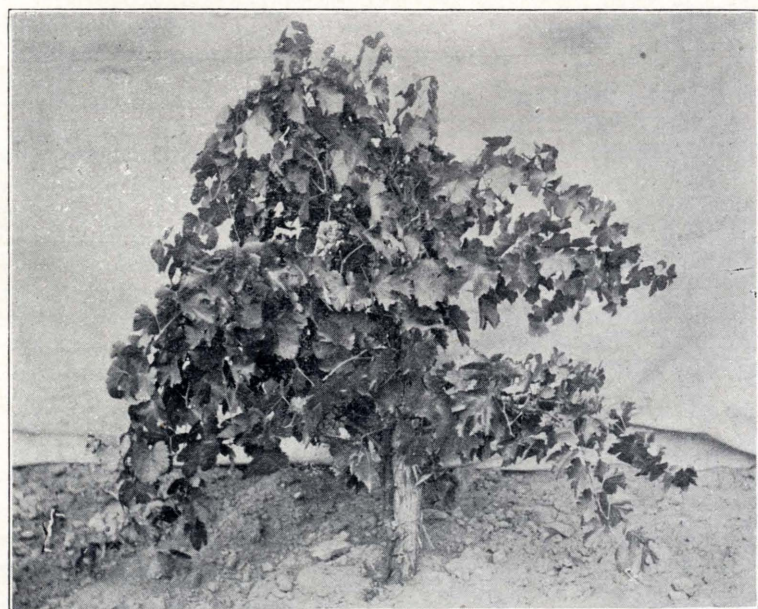


Fig. 8.—Cornichon Grape Vine grafted to Rupestris St. George. One season's growth on a root two years old when grafted.

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REPORT ON THE SOUTHERN UTAH EXPERIMENT STATION, 1906.

PREFACE BY THE DIRECTOR.

P. A. Yoder.

When, in the early part of the year 1905, the management of the Southern Utah Experiment Farm was turned over to the officials of the Utah Agricultural Experiment Station, in compliance with an act of the legislature of that year, a number of experiments were under way, principally variety tests with orchard and small fruit. The State Board of Horticulture had been in charge of this farm since its establishment in 1899, and had succeeded in making out of it not only a place that will indicate the varieties of fruits adapted to that climate and soil, but also a farm that in neatness and careful arrangement can be an instructive model to anyone contemplating engaging in that industry. The new management decided not to make any radical change in the tests that were under way, but to continue them to such a conclusion as will yield the valuable results that were to come out of them. New tests or investigations are to be started with the same crops without interfering with them as variety tests, and upon the ground still available or which has not yet been set out into orchard, vineyard, or other permanent crops. Such it is planned to do as the problems suggest themselves, and as means are available.

The foreman who had given efficient service under the State Board of Horticulture was retained. The immediate supervision of the work on the part of the officials of the Experiment Station was assigned to the Station Horticulturist, since the major portion of the work is in the line which that specialist represents. To him is assigned the supervising of the work under way, the planning of new experiments in horticultural lines, and the general management of the farm, including the expenditures for labor, equipment, repairs and supplies, and the sale of products. To

his report, which follows, the reader is referred for more detailed information relative to these matters and to the results thus far secured on variety tests.

In the summer of 1905, a systematic soil survey of the farm was started. Soil samples were taken at regular intervals on the farm and sent to the chemical laboratory at the home Station at Logan. During the following winter the chemical analyses of these, including alkali determinations, were nearly completed. During the winter of 1906-7, the mechanical analyses are being made. This work has required a considerable portion of the time of certain members of the Chemical Staff and some extra expense.

The results thus far have shown that there is considerable alkali in the soils of this farm and that along the west side especially it has reached a concentration that requires careful management to prevent the loss of the trees and vines growing there. It was a timely move affecting the future success of this farm that was made to drain the land lying west of this farm. This is being accomplished by way of drainage investigation carried on by the Utah Experiment Station in cooperation with the Irrigation and Drainage Investigations of the United States Department of Agriculture. The Southern Experiment Farm joins with other land owners in contributing labor or cash to help promote this work. A main drain is projected to have its source at the west edge of this farm, thus affording a good outlet if it becomes necessary to further drain the farm.

Besides the Horticulturist, other specialists of the Station Staff, including the Agronomist, the Irrigation Engineer, and the Entomologist, are available for consultation or for participation in the experimental work on this sub-station as the exigencies of the case make it desirable.

HORTICULTURAL REPORT.

R. S. Northrop, Horticulturist.
Joseph T. Atkin, Foreman.

Before the responsibility for the work of this farm was given to the Experiment Station, it had been under the charge of the State Board of Horticulture. The President of this Board, Honorable Thos. Judd, being a resident of the district in which the farm is located, had a thorough knowledge of the requirements of the people and the work which the station could best do to benefit them. In this section fruit growing had been carried on only in a perfunctory manner, though the soil, climate and other factors were ideal, but the distance of the district from a shipping point and its limited water supply demanded a concentrated crop of high value. He realized, therefore, that the first aim of the station should be to educate the people in regard to the crops they should grow.

With this idea in mind, a thorough test of those fruits known to succeed was started, together with a trial of other fruits, nuts and plants of high value which required a similar climate though not previously grown there. In addition to this it was planned to maintain the farm as a model for farmers of the locality, to instruct them in proper methods of planting, pruning, cultivating, etc.

All of the variety tests started at that time are still incomplete, while the varieties in some of the tests have required transplanting on account of the alkali, which is everywhere present in that district, having risen near enough to the surface to interfere with the proper development of the plants on the west side of the farm.

In this connection, it is well to call to mind the soil and topographic character of the land. The farm consists of a forty-acre square with the foreman's residence in the center and avenues extending from this to the four sides, dividing the land into four ten-acre plats. It is a fair sample of the tillable soil of that section. Its slope is to the west, having a fall of about six feet to forty rods. The upper or eastern half is a sandy loam, while the lower half is heavier, and on the extreme west especially,

where it is lowest, it is a heavy clay loam. Here the water has been constantly rising, bringing alkali with it. It was very unfortunate that most of the first varieties of grapes planted for testing should have been on this ground, for they did not do well. In the spring of 1906, twenty vines of each of the varieties were planted on the higher ground and it is expected they will be producing next year.

Meanwhile, considerable valuable information has been secured as regards the relative adaptability of varieties of the European species of grapes upon soils more or less alkaline. It has been found that while all of the grapes do better on the higher and lighter soils, the Cornichon, Purple Damascus, Golden Champion and Thompson Seedless are the best yet tried on heavy land. Of those fruited on the lighter land, the above named, together with the Black Ferrara and Muscat of Alexandria, are at present most promising. A detailed report of these will be given some time in the future.

Following is a list of the grapes under trial, planted in the spring of 1902 on the lower soil, with notes on those which have fruited:

1. **Almeria.**—On this soil it grows so late that it freezes down each year; has produced no fruit in consequence.
2. **Black Hamburg.**—Ripens Aug. 20; does not bear regularly; skin thick and coal black; quality of fruit, excellent.
3. **Black Malvoise.**—Ripens Aug. 25; bears heavily; quality, delicious, but soft.
4. **Black Morocco.**—Ripens Sept. 10; bears poorly; skin, dark red; quality, excellent; grapes large.
5. **Bowood Muscat.**—Ripens Aug. 25; poor bearer; quality, good.
6. **Chasselas de Fontainbleau.**—Ripens Aug. 5; bears quite well; a fairly early white grape.
7. **Chasselas Rose.**—Ripens Aug. 15; bears heavily; grapes small, red, of medium quality.
8. **Cornichon.**—Ripens Oct. 1; is one of the heaviest bearers we have; grapes, excellent in quality, and admirable shippers; stands alkali and heavy soil very well.
9. **Early Madeleine.**—Ripens July 18; shy bearer on heavy soil; cluster fine and large; berries greenish white; quality, excellent; the best early grape yet bearing on the farm.

10. **Early Silver Frontignon.**—Ripens Aug. 5; very heavy bearer; vines slender and not very healthy; fruit has very tender skin; of high flavor and quality.

11. **Fehér Zagos.**—Ripens Aug. 15; medium bearer and average quality; berries yellowish green; for wine or raisins.

12. **Flame Tokay.**—Ripens Sept. 1; has not done well on this location; 75 per cent freeze every winter; grows rapidly in summer, but does not produce much; quality, excellent.

13.—**Golden Champion.**—Ripens Sept. 15; bears heavily; bunches large and compact; quality, excellent; makes a first-class raisin; stands alkali very well.

14. **Golden Chasselas.**—Ripens Aug. 10; bears poorly; quality good, but a little soft; berries amber in color.

15. **Gros Colman.**—Ripens Oct. 10; medium bearer; grapes dark, large, but medium in quality.

16. **Johannesberg Riesling.**—A poor, small pink grape of very tender skin; is always eaten by bees and other insects.

17. **Lady Downs.**—Has done very poorly on heavy soil; 85 per cent of vines freeze down every winter.

18. **Muscat Gordo Blanco.**—Ripens Sept. 1; medium heavy bearer; very sweet and high in flavor; quality, excellent. This grape makes a fine raisin, for one pound of which, four pounds of grapes are required.

19. **Purple Damascus.**—Ripens Aug. 28; bears well and is a good shipper; quality, excellent for table purposes.

20. **Royal Muscat.**—Ripens July 25; Very poor in all respects in this soil.

21. **Rupestris St. George.**—Grafted to Thompson Seedless, Cornichon and Muscat Gordo Blanco; resists alkali quite well, but grows so late on this soil, it freezes down, consequently no fruit.

22. **Thompson Seedless.**—Ripens Aug. 10; after which they take on a rich amber color. The vine is a vigorous grower and very heavy bearer, hardy, seldom freezing down after the first year. The grapes, though small, produce a raisin of first class quality, taking $3\frac{1}{2}$ pounds of grapes to make one pound of raisins. This vine does quite well on alkali ground, but it is also growing on lighter and better drained soil, where it is much more promising.

23. **Zante.**—Ripens Oct. 1; should be seedless, but ripens with one large seed; bears very heavily, but is of rather poor quality.

24. **Zinfandel.**—Ripens Aug. 15; bears very heavily, almost to death; one of the best dark grapes for wine.

In addition to these, all of which are, as has been stated, on heavy soil more or less alkaline, the following were planted on higher, lighter, well drained soil in the spring of 1904. Some of these are now producing fruit, and it is expected that most of them which are adapted to the locality will be ready for report in another year. Most of these varieties are planted with the idea of securing information as regards their adaptability in this region on such soil, this being a fair average of the general nature of the district.

1. **Black Ferrara.**—Heavy bearer; good shipper and excellent in quality.

2. **Black Prince.**

3. **Cornichon.**

4. **Emperor.**

5. **Muscat of Alexandria.**

6. **Thompson Seedless.**

In the spring of 1906 the following varieties were planted to continue and make more complete the variety test:

FOREIGN.

1. **Alicante.**
2. **Blue Spanish.**
3. **Lady Finger.**
4. **Malaga.**
5. **Sultana.**
6. **White Corinth.**

AMERICAN.

1. **Agawam.**
2. **Brighton.**
3. **Catawba.**
4. **Concord.**
5. **Eaton.**
6. **Goethe.**
7. **Isabella.**
8. **Moores Diamond.**
9. **Vergennes.**
10. **Worden.**

As yet, none but foreign grapes have been grown in that district and it was thought wise to try some of the American species in connection with those of the European species, for which purpose the above-named ten varieties were planted.

EXPERIMENTS ON GRAPE PRUNING AND TRAINING.

Experiments are being conducted to ascertain the relative advantage of various methods of pruning. It has always been the custom in this locality to train the vines to a single stake about three feet high. Near the top, the vine is cut off, forcing out spurs near this point, which provide the growth bearing the fruit for next year. Each year these are cut back, until eventually the vine resembles a stump from which it is called the stake or stumps plan of pruning.

For the last four seasons, we have had two rows of Thompson Seedless grapes side by side, one row trained to the stump plan and one on a trellis, a modified type of the horizontal arm plan. The first bearing season, the vines on the trellis produced double the amount of fruit produced by the other row, but since then the two rows have produced practically the same. At first it was thought that the trellis system would be much more profitable than the other, but it seems that when only the first crop is benefited the extra expense for trellis, and the inability to cultivate both ways, will more than offset the gain.

For the future it is planned to carry on some thorough tests of this nature in order that we may have full and definite data as regards the influence of form of pruning and training on bearing, freedom from mildew and other fungus diseases, and all other points wherein any difference appears. For this purpose we now have growing about three hundred vines of the Cornichon variety upon some of the best and most uniform soil.

In the coming summer the trellis will be arranged and the vines pruned for about eight of the leading systems in the United States. The result will probably be reported annually for some time.

EXPERIMENTS ON VINES RESISTANT TO PHYLLOXERA.

As has been stated previously, practically all of the vines grown in Southern Utah are of the European species (*Vitis vinifera*). The varieties of this species are all subject to the ravages of a small insect called phylloxera, which attacks all parts of the plant. It is on the root, however, where the damage is done, for there the insects lodge and puncture the roots. Wherever this happens the roots fail to do their work and the plants soon die.

This insect is a native of the eastern part of the United States, and here lives on various species of the native grape, which through ages of natural selection have reached a condition which allows the insect to attack its roots without serious results following.

Some years ago the insects became established in Europe and within a very short time the vineyards of France were practically exterminated. The insect defied efforts to eradicate it, and if it were not for the discovery that the American species were not troubled to the same extent and that the European species could be grafted onto the American roots, grape growing in that country would have been at an end. Now, however, France is producing more grapes than ever before, and this condition has been brought about by the introduction of resistant or American stock for grafting to the other species.

The insect also abounds in California, as well as in all other vineyard districts where grapes are grown in large quantities. All of our nursery stock has so far been brought from California, for there are the only near nurseries handling stock of the sorts needed for such a climate. As yet, Southern Utah has been very fortunate in not having this insect secure a foothold in the locality, but it is beyond all reason to hope or expect that the time is far off when it will arrive, and as certain as it comes will it wipe out those vineyards of European varieties which are not growing on American roots.

It is for this reason that we are conducting experiments with various resistant vines to ascertain which species, hybrids of species, or varieties are best adapted to the soils of the district, as well as to gather all information possible as regards their ability to receive and develop grafts of the other species; what the effect of certain roots is upon certain varieties grafted thereon, as regards the maturity, character of fruit, fruitfulness, development of vine and other points of like nature. It cannot be doubted but that these experiments are intensely practical in their nature and will be of great value to the viticulturists of that section, and when this enemy makes its appearance there, will keep them from the necessity of turning to some other crop concerning which he has less information.

The *Rupestris* St. George is one of the leading resistant stocks of other regions. It has been more widely distributed and

more extensively planted throughout Europe and in California than any other resistant. It is the most vigorous of all, makes a strong head with heavy, close-jointed canes, and is adapted to a wide variety of soils. It has the faculty of sending its roots down deep and for this reason should not be planted on shallow soils, but does very well on those quite dry and seemingly arid.

At the Experiment Station, this was the first resistant vine to be planted and its behavior so far indicates that it is adapted to the locality. On the heavier soils it seems somewhat inclined to make too late a growth and the canes are in consequence often frozen back, but on the higher and drier soils it is doing very well indeed. On it we have several varieties grafted as shown in the accompanying list, which shows the various sorts of resistants, and to what they are grafted. The first five of the list were grafted in 1904, the balance in 1906. Although the grape is somewhat difficult to graft, the station has been very successful in its work, securing about 90 per cent, most of which make a growth five to ten feet in length and about an inch in diameter.

On account of the practical results which this experiment promises and from the request of the leading vineyardists of the locality, I think that more attention should be given this matter and the experiment enlarged, that our information shall be made as complete as possible.

RESISTANT ROOTS AND VARIETIES GRAFTED UPON THEM.

These roots were all grafted to Thompson Seedless, Cornichon and Muscat of Alexandria in the spring of 1904:

Rupestris St. George.

Solonis.

Riparia a grandes feuilles.

Rupestris Metallica.

Riparia Gloire de Montpellier.

The following were grafted as noted below in the spring of 1906:

Riparia grafted to Jarvis.

Riparia Gloire de Montpellier, grafted to Isabella.

Riparia Gloire de Montpellier, grafted to Hungarian Tokay.

Rupestris Metallica, grafted to Emperor.

Riparia, grafted to Muscat of Alexandria.

Rupestris St. George, grafted to Black Ferrara.

Rupestris St. George, grafted to Muscat Gordo Blanco.

Rupestris St. George, grafted to Muscat Bowood.

VARIETY TESTS OF ORCHARD FRUITS AND NUTS.

Grape culture has been and probably will be for many years the chief subject of our work with fruit, but since the climate, soil and other features of this section are so favorable to the growth of nearly all other fruits, the former management decided to carry on other work. Inasmuch as the number of varieties planted did not include some of the later important ones, they, together with some other species of fruits and nuts, such as persimmons, pecans, walnuts, chestnuts, and small fruits were planted in the spring of 1906.

Since it requires several years for most of these to come into bearing, it will be some time before they are reported upon. At present there are but few of the first planting in fruit. The results of those ready are included in the complete list which follows:

VARIETIES OF FRUITS AND NUTS UNDER TRIAL.

PEACHES.

(Planted in 1901.)

1. **Elberta**.—Ripens about the first of August; tree fine, vigorous grower; bears heavily; fruit large, good flavor, rather coarse and separates easily from stone. It will make a relatively large amount of dried fruit and can be highly recommended for this purpose as well as to ship fresh.

2. **Foster**.—Ripens Aug. 5; very good little peach, but fresh clings somewhat, making it defective.

3. **Golden Drop**.—Ripens Aug. 28; tree is poor; fruit of no account here.

4. **Hales Early**.—Ripens about July 10; tree is vigorous and bears well; fruit is excellent in quality and flavor; medium size and very tender; a semi-cling; will not ship well.

5. **Heath Cling**.—Ripens Aug. 20; tree vigorous and good bearer; fruit is very fine in texture and flavor; can be recommended highly as a cling.

6. **King Prize.**—An excellent free-stone; very much like Elberta, but later; ripens here about Aug. 8; tree is vigorous, fruit is large and fine for canning or drying.

7. **Lemon Free.**—Ripens Sept. 10; tree bears heavily when nearly all other fruit has been killed by frost; fruit is large, coarse, rough and very pubescent; flavor is fair and fresh dry; would make a large amount of fair dried fruit.

8. **Lemon Cling.**—Ripens Sept. 11; tree is very vigorous; fruit is large and delicious, but stone cannot be removed, making it undesirable to can or dry.

9. **Old Mixon Free.**—Ripens Aug. 18; tree vigorous and bears heavily even when most others fail on account of frost; fruit very good; free and dries well.

10. **Old Mixon Cling.**—Ripens Aug. 23; tree good; fruit large and beautiful; flavor excellent; strictly a cling and of no account for canning or drying.

11. **Orange Cling.**—Ripens Aug. 20; very large and good; genuine cling; can be recommended as a cling.

12. **Stewart.**—Ripens Aug. 25; tree and fruit only fair.

13. **Stump the World.**—Ripens Aug. 20; tree good; fruit free from stone; medium large; good flavor and white flesh.

14. **Thurber.**—Ripens Aug. 20; tree moderately strong; fruit fair, white, free-stone.

15.—**Utah Orange.**—Ripens Aug. 5; tree is a moderate grower; fruit a good free-stone.

None of the following are bearing:

PRUNES.

- | | |
|-------------------|----------------|
| 1. Alexander. | 6. Leavy Late. |
| 2. Champion. | 7. Muir. |
| 3. Crawford Late. | 8. Sneed. |
| 4. Elberta Cling. | 9. Wheatland. |
| 5. Indian Cling. | |

Some of the prunes have not fruited.

1. **French.**—Ripens Sept. 10; tree good grower and productive; fruit very sweet and excellent for drying.

2. **German.**—Ripens Sept. 10; tree vigorous and is doing well.

3. **Golden.**

4. **Hungarian.**—Ripens Aug. 18; tree fine, heavy bearer; fruit very large, delicious flavor, dries well when stone is out; can be recommended highly.

5. **Imperial Epineuse.**—Ripens Sept. 5; tree good, fruit fair in size, very sweet, but not of good appearance.

6. **Italian.**—Ripens Sept. 10; tree good, bears well; fruit very good.

7. **Silver.**—Ripens Aug. 15; tree fine, heavy bearer; fruit very large; dries well if stoned.

8. **Splendor.**—Not bearing; tree is doing well.

9. **Sugar.**

10. **Tragedy.**—Ripens July 28; tree good, bears well; fruit large, excellent in flavor, dries well by taking out stone; an excellent prune for early purposes.

PLUMS.

Trees not in bearing, but all doing well except *Prunus Simoni*, which is badly affected with gumosis.

1. **Blue Damson.**

4. **Satsuma.**

2. **Imperial Gage.**

5. **Wickson.**

3. **Prunus Simoni.**

6. **Yellow Egg.**

ALMONDS.

1. **Jordon.**

3. **Paper Shell.**

2. **Ne Plus Ultra.**

PEARS.

1. **Bartlett.**

5. **Col. Wilder.**

2. **Beurre Clairgeau.**

6. **Seckel.**

3. **Beurre de Anjou.**

7. **Winter Bartlett.**

4. **Beurre Bosc.**

QUINCES.

1. **Pineapple.** — Tree doing well; fruit large and fine flavor.

2. **Reas Mammoth.**

3. **Smyrna.**

PECANS.

1. **Frotcher.**

4. **Pabst.**

2. **Mammoth Paper Shell.**

5. **Russell.**

3. **Paper Shell.**

WALNUTS.

- | | |
|----------------------------|------------------------------|
| 1. Ford's Improved. | 4. Santa Barbara Soft Shell. |
| 2. Improved Santa Barbara. | 3. Persian. |

CHESTNUTS.

- | | |
|-----------------------|--------------------|
| 1. Italian. | 4. Marron de Lyon. |
| 2. Jumbo. | 5. Paragon. |
| 3. Marron de Combale. | 6. Ridgely. |

POMEGRANATES.

- | | |
|-------------------|---------------|
| 1. Paper Shell. | 3. Wonderful. |
| 2. Sweet Fruited. | |

PERSIMMONS.

- | | |
|--------------|-------------|
| 1. American. | 2. Hachiya. |
|--------------|-------------|

APPLES.

- | | |
|-------------------------|----------------------------|
| 1. Ben Davis. | 2. Bietigheimer. |
| 3. Fameuse. | 4. Gano. |
| 5. Hubbardston. | 6. Hyslop. |
| 7. Jonathan. | 8. Maiden Blush. |
| 9. Missouri Pippin. | 10. Martha Crab. |
| 11. Newton Pippin. | 12. Red Astrachan. |
| 13. Red June. | 14. Rhode Island Greening. |
| 15. Yellow Transparent. | |

APRICOTS.

1. *Bengorme*.—Ripens June 3; tree vigorous and bears heavily, but fruit is of no use—sour and bitter.
2. *Coles Mammoth*.—Very much like *Hemskirke*.
3. *Hemskirke*.—Ripens June 22; tree very good, heavy bearer; fruit good.

CHERRIES.

- | | |
|----------------------|-------------------------|
| 1. Belle Magnifique. | 2. Black Tartarian. |
| 3. Early Richmond. | 4. Early Purple Guigne. |
| 5. Elton. | 6. Great Bigarreau. |
| 7. Lewelling. | 8. May Duke. |
| 9. Napoleon. | 10. Reine Hortense. |
| 11. Rockport. | 12. Windsor. |
| 13. Yellow Spanish. | |

FIGS.

- | | |
|---------------------|---------------------|
| 1. Black Mission. | 2. Brown Turkey. |
| 3. Capri. | 4. Native White. |
| 5. San Pedro Black. | 6. San Pedro White. |
| 7. Smyrna. | 8. White Endich. |
| 9. White Adriatic. | |

MISCELLANEOUS PLANTING.

Along the avenues leading from the four sides to the foreman's residence, considerable planting of a general nature has been done for several purposes. Flowers and ornamental shrubbery have been planted to ascertain which ones are best adapted to the conditions and to show the people what can be used for home ornamentation. They are also propagated from and the new plants are sold to those who may desire them. Thus they are of value to the farm from a monetary and educational standpoint, and add greatly to the appearance of the place which, from its carefully cultivated and well pruned orchards and vineyards and orderly grounds, has a beautiful appearance. There are also several plantings of trees, both ornamental and experimental, in forestry.

Timber is very scarce in that section and good posts are quite high in value. A large number of trees of the *Catalpa speciosa* have been planted with the idea of encouraging local farmers to set aside a small piece of ground for the purpose of growing trees for posts and like purposes. These trees have not done as well here as in some other parts of the country, but nevertheless, have made a good growth. They should be cut down after the first or second season, when two or three shoots will spring up from the stumps and make a long, straight growth, very often of eight or more feet. It is expected that this planting will be enlarged in the future by the addition of several other species and that we will eventually be able to give thorough information as to the profit, method of handling and other points in connection with the growing of trees for practical purposes.

Considering that our nursery stock must be purchased in California, where the season for shipping is not identical with our season for planting, that the stock purchased there is usually tender or at least in a tender condition, and that if the stock ar-

rives at the farm in time to be properly planted in the spring, it must cross the mountains in this tender condition during February or March, it is easily seen that we have considerable difficulty in getting some of our material to do well. It is largely for this reason that we are now propagating some of our own stock, and in the future will plan on raising as much of it as possible. This will not only benefit us, but will help to educate the farmer to the end that he may do the same thing for himself. There are not many farmers who care to take the chance of losing a valuable shipment of nursery stock, and therefore the fruit industry is not as prominent with all of them as it might and probably would be if they could get cions and information as to their use from the Experiment Station.

VEGETABLES.

Vegetables thus far have not received the attention they deserve. The distance from the railroad, fertility and limited amount of land, and the fact that the climate is such that most early vegetables can be grown and put on the market in as good condition and as cheaply as those that come from California, are sufficient reasons why more attention should be given to vegetables. The distance from the railroad demands that the crops grown be high in value, condensed, hardy, not immediately perishable, and able to stand the rough handling met in transit, all of which points are found to a greater or less extent in crops of early vegetables, while some late crops, such as sweet potatoes and peanuts, both of which have been satisfactorily produced in small quantities on the Station Farm, may also be handled to advantage.

Thus far our experiments have been very limited on account of our inability to afford the labor necessary for such work. For the future it is planned to make some thorough tests of the best means of growing, handling and marketing such products with the object of helping the farmer in starting such work, by showing him what the profits of his labors will be and how they may be attained.

MAINTAINING FERTILITY.

In the maintenance of fertility throughout most of this district, considerable difficulty is met with. In a large number of

cases the people live in the nearby towns, while their fields may be several miles away. There is ample manure at hand to supply the humus needed by the soil, but it is generally so far away from the fields tht by the time it is applied to the farms, it has cost a dollar or more per wagon load. Realizing the importance of this through the inability of obtaining a cheap supply for the Experimental Farm, we have outlined a series of cover crop or green manuring tests upon part of our land.

It is our plan to try a large number of species of plants at various seasons of the year, thus getting information as to what crop can best be depended upon to germinate and make good growth during various seasons and also what the effect will be upon the soil, trees, vines, etc., from various crops, times planted, amount of growth, etc. So far, out of a considerable number tried for fall planting, rape seems to make the best stand and heaviest growth. In fall planting considerable difficulty is experienced in having a satisfactory number of most crops germinate and then have water sufficient to cause ample growth. Of the non-leguminous plants, rape seems to fulfill the requirements, while hairy vetch does well as a nitrogen producer. This experiment will be continued for several years.

DRYING FRUIT.

One of the chief aims in our variety test of fruit is to find the varieties best adapted for drying, as it is in this form that a large amount of it must be sold. It is so condensed in its nature, not subject to injury from rough roads and also imperishable if properly packed, that it is probable most of it will be sold in this form for many years. We have therefore given some attention to the manner of drying and handling our crops, thus endeavoring to get all information possible on the question.

The disposal of our product, however, presents one of the most serious problems with which we have to deal. We have nearly one hundred varieties of the various fruits and from one tree of some of the orchard fruits to several hundred vines of some grapes. It is practically impossible to handle the small amount of fruit from those varieties represented by but few plants without incurring considerable loss, except for the information gained, which of course is the end for which they were planted. Our efforts in drying fruit are meeting with success, and those

varieties well represented, such as Thompson Seedless and Muscat grapes, are easily handled at remunerative prices. The quality of the dry fruit produced in this region is attested by the fact that at the last National Irrigation Congress held at Boise, Idaho, in September, 1906, the first and second prizes on dried fruit were awarded to that produced in this district. The Experiment Station is the possessor of a fine silver cup which was the highest award on the product.

FARM MANAGEMENT.

The Station Farm is very well and economically managed. For the past two years the foreman and one man have done practically all of the work. In the future there is no doubt but that it will be necessary to employ one more man, as the work is increasing each season with the maturity of the fruits planted. The ever-increasing number of lines of investigation also are multiplying the amount of labor, and to meet the requirements of the work and maintain the farm in its present excellent condition, more labor must be employed. It is noticeable also that each season the farmers of the surrounding country are realizing the importance of the work and are taking every opportunity to visit and study the results obtained. These visits, of course, demand that the foreman spend considerable time in discussing the various experiments and their results. The Public Schools are taking advantage of the Station as a means of disseminating knowledge of fruit growing and gardening and the school children and teachers have made several trips there for this purpose.

During the past season the number of visitors has been so large that in order to keep the farm in the orderly condition required, it has been necessary for the foreman to publish in the local papers that Saturday afternoon would be reserved for "Visitors' Day" and that at this time the public was invited to attend. It was also planned to devote the afternoon to practical illustrations of the various work in season, as well as to discuss the results of experiments completed and under way. This brought the people out by the score and has greatly increased their appreciation of the work that the Station is doing. This, together with the exhibit made annually at the County Fair, which is comprised of varieties of fruit, both in their fresh condition and preserved as far as possible in their natural color, or dried, is accomplish-

ing considerable towards enlightening the public upon important questions and conditions.

The foreman keeps in his office a complete record of all planting made upon the farm. Notes are taken regularly upon such points as, where plants are obtained, when planted, age when planted, leafing and blooming periods, irrigation, cultivation, spraying, fruit thinning, ripening and harvesting period, amount of fruit, average growth and general condition of plant and all other points worthy of record.

Upon the station grounds are the following buildings: Foreman's residence, storage house and cistern, barn, two workmen's cottages, hay shed and implement shed, besides the necessary out-buildings. They are all in good condition. We have, besides, a large cistern reservoir, over which is a shed supporting a tank, for use only in case of danger to the crops under experimentation from lack of water, should a break occur in the main canal. These, together with the team and all implements, are in good condition. The orchards are all kept thoroughly cultivated and the trees are well pruned, making with the well-kept avenues and substantial buildings an attractive and pleasing appearance.