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AGRICULTURAL EXPERIMENT STATION.

REPORT OF WORK

OF THE

AGRICULTURAL EXPERIMENT STATIONS

OF THE

UNIVERSITY OF CALIFORNIA,

For the Year 1890.

BY E. W. HILGARD,

Professor of Agriculture and Director of the Stations.

BEING A PART OF THE REPORT OF THE REGENTS OF THE UNIVERSITY.



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REPORT OF THE PROFESSOR OF AGRICULTURE AND  
DIRECTOR OF THE EXPERIMENT STATIONS

TO THE

PRESIDENT OF THE UNIVERSITY.

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## C. SOUTHERN COAST RANGE STATION.

Two miles north-northeast from Paso Robles, San Luis Obispo County.

By CHARLES H. SHINN.

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The station near Paso Robles, on the high ground east of the Salinas River, has been described in the previous report (of 1889). The tract is in the shape of a parallelogram, one thousand seven hundred and twenty feet in depth, and four hundred and twenty feet in width; the latter representing the frontage on the highway. The especial soil advantages of the tract become more evident every year, and although there is more frost than was expected, the range of culture is very extensive. The greater part of the tract is comparatively level, but there is a swale across it, and several lesser depressions, while the land rises towards the rear of the tract. The highest point is where the station buildings are situated.

Fine specimens of the native oaks remain, particularly near the buildings, but it was found necessary to remove seven others in 1890, because they took up too much ground in the orchard and vineyard. Those that remain are typical trees, and should be retained as long as possible. Owing to the nearness of the station to a noted summer resort, Paso Robles, and to the excellence of the country roads, it receives many visitors from all parts of the State.

Several important improvements have been made since the last report. A windmill now takes the place of the horse-power formerly used to raise water, and, contrary to the general opinion, is ample for the present needs of the station, though the horse-power can be used in case of long-continued calms. The worst part of the swale land has been drained, and made fit for orchard or small cultures.

The trees and vines are many of them beginning to bear fruit, and the culture-plots of grains, grasses, clovers, and other crops have attracted much attention. The Foreman, Mr. Cruickshank, is in demand every autumn at the District Fairs of Santa Barbara, San Luis Obispo, and other counties, to which he has taken a large collection of cereals and other station growths. His expenses have been paid from the funds of the respective fairs, and he has thus been able to meet the representative farmers of the entire region. He has not only distributed seed, but, in many cases, he has received valuable seeds and plants for the station. From farmers at Arroyo Grande he secured seventeen varieties of potatoes grown there, some of them seedlings; a new and promising pea from the Azores came through some Portuguese families in Santa Barbara County. The season for the District Fairs comes at a time when the Foreman can easily take a few days from his work, and there is hardly any other way in which the practical results of the experiment station can be brought so directly before the farmers.

## THE ORCHARD.

Proceeding to a more particular account of the station, the orchard claims first attention. At my first visit, in the latter part of 1890, I was much pleased with the appearance of the apples, pears, peaches, and almonds; the apricots were some of them on unsuitable soil, in the adobe of the swale across the tract; some of the figs were where the frost appeared to nip them twice a year. The general aspect of the orchard, considering its youth and the variety of soils dealt with, was far better than one had reason to expect.

*Apples* will be of great commercial value in these Coast Range districts, but will probably prove better keepers when grown west of the Salinas, in what is called the Adelaide country, where more rainfall and cooler nights are the rule. The Estrella is less of an apple than a peach district, from present indications, but apples will undoubtedly thrive there. Fifteen apple trees were set in the orchard this spring (1891), to replace losses; the only new variety was Arabskoe. No losses occurred during 1890 from the tree-borer.

*Pears* promise even better than the apples. Some two dozen trees were set last spring, and all are growing. Eight new varieties were sent from the Central Station, making the total list something like seventy-five, besides the seedlings and the Japanese stock. Here, as at the Foothill Station, the pear orchard can be increased to more than a hundred varieties without using more land than at present, as seedlings set in orchard form are to be "worked over" as fast as seems desirable. The accurately labeled pear orchards at all the experiment stations appear to me particularly useful on account of the opportunity they afford of correcting and extending local nomenclature, which is much more faulty with pears than with other fruits. The commercial orchards contain only a few kinds, though many of the finest pears known to horticulture have for years been disseminated in family orchards, where their names have been lost. Even at District Fairs I have seen Glout Morçeau labeled Bartlett, and Vicar of Winkfield misnamed Easter Beurré.

*Almonds* continue to surpass all other trees in growth. The wood is firm, the leaves dark in color and healthy, the bark clean. This seems to be a natural almond country. A few trees planted in the swale, and late in the season, died in the winter of 1889, and were replaced. Last spring four new seedling varieties were obtained—the Silver Shell, the Golden State, the Commercial, and the Ne Plus Ultra—and several others will be budded this summer.

*Cherries*.—No new sorts have been planted since 1889, the collection being large enough for the present. The growth is healthy, but not as strong as could be wished. No gum disease is yet observed. Some losses from gophers were replaced last spring.

*Apricots* promise far better results on the granite soil, such as the peach enjoys, than on the heavy swale soil. In fact, the apricot, even on Myrobalan stock, "kills out" on the stiff, fine silty soil of the swale. The few on plum stock that survived are very poor. On the lighter, well-drained lands, apricot, and peach on peach, give the best results. The replanting of last spring was done with reference to these points, and every tree is in fair condition. Luizet and Newcastle Early have been added to the varieties represented.

*Peaches* and *Nectarines* are extremely successful in both the plots devoted to them, particularly on peach stock, which has made larger growth than the plum stock. A large proportion of the peach and nectarine trees are bearing fruit this year, but it has been "thinned down" to a dozen or less on each tree. So far as I can ascertain two out of three of these bearing trees are on peach stock. Next year fruit may be expected on all or nearly all of the peaches and nectarines. Some of the trees from "dormant buds," often difficult to start, will eventually make as fine trees as any in the orchard.

*Plums* and *Prunes* show better growth than when last reported upon. This can fairly be attributed to the tile drainage of the swale land. All the gaps caused by dormant buds, late planting, and too wet soil have now been filled, and several new kinds have been added to the orchard. The Japanese plums are some of them bearing this year. Botan is far the most prolific and precocious of these; it deserves a place in every family orchard or garden. The question of stocks will require further observation; there is no appreciable difference between prunes on peach, and prunes on almond or apricot; prunes on Myrobalan seem darker in color of foliage, and slower in growth.

*Figs* were so badly frosted in the lower portion of the tract, that next year they will be taken up and moved to higher ground. Several new varieties have been planted. The light granitic soil near the buildings suits the figs better, but it is not strong soil, and they grow slowly. The "Bulletin" Smyrna, the Rocard, and the Adriatic have done rather better than the rest.

*Walnuts*.—Few trees at the station are more interesting than the English walnuts. All the leading varieties are represented. One tree, a seedling English walnut three years old from the seed-bed, set ten walnuts this summer, a remarkable example of precocity. None of the grafted and named varieties, such as the Præparturiens and Dwarf Prolific, have shown any signs of blossoming as yet; an English walnut ten years old, sent from Berkeley, is likewise without fruit. This early-bearing seedling is, therefore, worth watching hereafter, though this season the nuts were not matured. All the walnuts, most of the chestnuts, and the pecans, are doing fairly, though the latter need more moisture and a stronger soil.

The *Japanese Persimmons* are mostly poor in growth.

*Oranges*.—These were poor stock originally, and pruned very high, so that the trunks scalded. They are now beginning to root and flourish. They require much water. The leaves are healthy, and the trees were unhurt by the severe frosts of 1889-90 and 1890-91.

*Olives*.—These are likely to be the pride of the station. Some new olives, among them two of the Berkeley Seedlings, were planted last spring. Nevadillo blanco, Pendulina, Rubra, and a few others blossomed this year.

*Small Fruits*.—Failure was freely predicted on any or all of the uplands for small fruits grown without irrigation. The station experiments show that thorough cultivation will cause gooseberries, blackberries, and raspberries to grow well and bear largely. A new hybrid between the raspberry and blackberry, obtained at Santa Cruz by the late W. G. Klee, grows very strongly; the canes have red spines and dark leaves, and were well loaded with excellent fruit this season. This berry appears to merit dissemination. The Crandall *blackberry* (unirrigated) is a heavy

bearer. The black-cap class of *raspberry* does better than the red. *Currants* are almost a failure so far, needing more water and shade. Plants three years old have not yet fruited.

#### *Orchard Summary.*

The orchard is too young, as yet, to give more than indications of its future. But there are some points of general importance even now. The little fruit borne the present season (1891) is of unusual flavor, though not large. The Japanese plums, for instance, are sweeter and more dry than those grown in the Bay counties. They ought, therefore, to ship better. The peaches are very high in color, and of fine flavor. From the general indications, and from observations made during several journeys over the surrounding country, I think that all the deciduous fruits can be raised without irrigation, in the Paso Robles district, if care be taken in the choice of soils. West of the valley of the upper Salinas the apple orchards improve in quality towards the coast; the peach, prune, and apricot thrive. The almond, in all probability, will only be a safe crop in a few localities, owing to the frosts. I have seldom seen finer three and four-year old plum and pear trees than some on unirrigated hilltops in this west country, five or six miles from Paso Robles. East of the upper Salinas, the hill lands more nearly similar to the soils of the station tract, were for many years thought worthless, except for scanty pasturage. Even now the old settlers find it hard to believe that careful cultivation will make an orchard and vineyard thrive there. The vineyard experiment has already led to the planting of commercial vineyards on similar soils both east and west of the valley.

#### VINEYARD.

The vineyard is perhaps the most noticeable part of the grounds, for the vines are all well grown, and those of the same variety are remarkably uniform in appearance. There are one hundred and ten kinds represented, and this number will be increased to at least one hundred and fifty the next season, from vines already in the nursery. The vineyard is staked, and shows careful and constant cultivation. At the present season (1891) nearly every vine is well loaded with grapes. No disease whatever has been observed, and very little evil followed the extremely hot weather of early summer. Every gap has been filled with rooted vines.

#### THE CEREALS.

The interest in the wheats, barleys, and other cereals grown at the station is increasing, and it is evident that much good has been accomplished in the way of the distribution of improved varieties. The following tabulated reports from the Foreman, Mr. R. D. Cruickshank, will serve to show the range of these cultures:

*Report on Cereals Grown on Light Soil; Season of 1890-91.*

By R. D. CRUICKSHANK.

## WHEATS.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
Volo.....	Oct. 10	May 3	June 17	Does well here; a very large, solid-stemmed variety.
Black Centennial.....	Oct. 20	Apr. 29	June 20	Does well; a very handsome wheat; grows tall; stools out well; extra fine variety.
Russian Bearded (Hessian-fly proof).....	Oct. 10	May 5	June 17	Good crop.
Palestine.....	Oct. 10	May 7	June 13	Good crop; very much bearded; good berry.
California Spring.....	Oct. 10	May 1	June 24	Crop regular; plentiful; fine heads and large berry; extra fine variety.
Royal Australian.....	Oct. 10	May 1	June 20	Stands at the very head of the list as a milling wheat; does well here.
Petali.....	Oct. 10	May 4	June 12	Fine heads; very much bearded; does well here.
Pringle's Defiance.....	Oct. 10	Apr. 27	June 17	Fine long heads; crop uneven; would make good hay.
Nicaragua.....	Oct. 10	May 1	June 15	Crop good; bearded; not recommended here.
Frankenstein.....	Oct. 10	May 5	June 15	Grew well; long heads; but not a heavy yield.
Victoria.....	Oct. 10	May 4	June 18	Partly damaged by water lying and soil subsiding; test not fair.
Taganrog.....	Oct. 10	Apr. 26	June 15	Did well; a showy wheat of the solid-stemmed style.
Red Club, or Hedgehog.....	Oct. 10	May 2	June 19	Did well; a curiosity; not heavy crop; birds fond of it; much eaten by them.
Imperial.....	Oct. 10	May 3	June 17	Crop good; showy.
Champlain.....	Oct. 11	May 9	June 20	Not adapted for grain here, but would make good hay.
Ghurka, or Odessa.....	Oct. 11	May 4	June 19	Grew well; bearded; not recommended here.
Harris from Jasper.....	Oct. 11	May 3	June 16	Grew well; stool enormous; better for hay than grain.
Blue Glass.....	Oct. 11	Apr. 29	June 19	Grew well; large heads; peculiar on account of color.
Missoyen.....	Oct. 11	May 1	June 20	Very fine crop; solid-stemmed variety.
Greek Atlanti.....	Oct. 11	May 2	June 18	Crop splendid; heads large; straw strong; stem solid.
Polish, or Diamond.....	Oct. 11	Apr. 29	June 13	Did well; a curious variety, called wild-goose wheat, used for vermicelli.
Indian, three months..	Oct. 15	Apr. 10	June 13	Sonora type; did well and made fine hay.
Arizona Indian Seed Wheat.....	Oct. 15	Apr. 6	June 13	Did very well; Sonora type; if sown thick, makes good hay.
Snowflake.....	Oct. 15	May 8	June 20	A very showy variety; did well; would make fine hay.
Tunisian.....	Oct. 15	Apr. 28	June 20	Did well; solid-stemmed, tall.
Archer's Prolific.....	Oct. 15	May 5	June 13	All that could be desired; type same as Propo; heavy yield.
Whittington.....	Oct. 15	May 2	June 13	Good crop; beardless; probably too soft.
Genoese.....	Oct. 15	May 5	June 13	A fine crop; a first rate red wheat.
Pringle's Best.....	Oct. 15	May 9	June 13	Not valuable for grain; would make good hay.
Yellow Noé.....	Oct. 15	May 12	June 18	Grew well; leafy straw; make fine fodder.
Indian Winter.....	Oct. 15	May 5	June 20	Grew well; stooled out very fine; small grain; extra fine for hay.
Fern, or April.....	Oct. 15	May 6	June 29	Heavy crop; bearded; not recommended.

## WHEATS—Continued.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
Clawson .....	Oct. 15	May 6	June 13	Grew well, but too strawy.
Touzelle .....	Oct. 15	May 8	June 13	Grew well; club type; birds partial to it; good for hay.
Thuringian .....	Oct. 15	May 13	June 15	Grew well; highly recommended for fodder; immense stool.
Improved Circassian ..	Oct. 15	May 12	June 13	Crop heavy; liable to shrink in berry.
Egyptian .....	Oct. 15	May 12	June 20	Splendid crop. A curiosity by having seven heads; not very good for milling.
Mold's Red Winter .....	Oct. 15	May 9	June 13	Seed was poor; but if under favorable conditions would make good hay.
Blood Red Indian .....	Oct. 15	May 7	June 19	Crop regular; beardless.
Chile .....	Oct. 15	May 5	June 13	Did well; not heavy, but very regular; beardless.
Red Sonora .....	Oct. 15	May 3	June 13	Very fine regular crop. If sown thick would make the very finest hay. It does well in hot upland.
Red-Bearded .....	Oct. 10	May 3	June 8	Did well, but birds destroyed before ripe.

## BARLEYS.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
Himalaya .....	Oct. 15	Apr. 6	June 1	Remarkably heavy crop.
Small Blue Naked .....	Oct. 10	Apr. 12	June 8	Good crop; misnamed—not blue.
Hallett's Pedigree .....	Oct. 15	Apr. 28	June 8	Extra fine crop; Chevalier type.
Manchurian .....	Oct. 11	Apr. 6	May 23	The earliest; subject to breaking down.
Kalina .....	Oct. 11	Apr. 6	June 1	Did very well.
Black, six-rowed .....	Oct. 15	Apr. 25	June 8	Did well.
Imperial .....	Oct. 10	Apr. 15	June 8	Good crop.
Italian .....	Oct. 10	Apr. 19	June 8	Did well; very pretty.
Chevalier .....	Oct. 15	Apr. 20	June 8	Did well, but better on adobe.
Six-rowed .....	Oct. 11	Apr. 12	June 1	Fine crop.
Bluish .....	Oct. 11	Apr. 13	June 1	Did well; liable to get broken by wind.
Scotch, two-rowed .....	Oct. 15	Apr. 19	June 8	Did well.
Carter's Prolific .....	Oct. 15	Apr. 10	June 8	Heavy crop; Chevalier type.
Large Naked, two-rowed .....	Oct. 11	Apr. 5	June 1	A very heavy crop.
Nepaul .....	Oct. 11	Apr. 10	June 1	Did well; good for hay.
Rice, or "Sprat" .....	Oct. 15	May 5	June 11	Heavy crop; great curiosity; very contorted.
Department of Agriculture No. 6 .....	Oct. 15	Apr. 10	June 8	A new barley received in 1890 from Department of Agriculture, Washington. Excellent heavy crop.



## OATS.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
Scotch Hopetown .....	Oct. 10	May 4	June 17	Can be highly recommended in this section for milling.
Gray oats from Houdan .....	Oct. 10	May 5	June 25	No use here, too late to come to maturity; has been the same three years.
Early oats from Georgia	Oct. 10	May 5	June 25	No use; too late in ripening.
Bald oats .....	Oct. 10	May 7	June 16	This oat does well; would make fine oat hay; it has no beard, and plenty of leaf.
Early August .....	Oct. 15	May 9	June 25	Good style, and does fairly well.
Surprise .....	Oct. 15	May 10	June 15	Does well, and can be recommended.
Black Tartar .....	Oct. 15	May 10	June 25	Does not do well; all straw.
White Wonder .....	Oct. 15	May 6	June 25	A very prolific oat; does well; came from the Department of Agriculture, 1890.
E. K. Carr, Texas .....	Oct. 11	May 6	June 8	Suitable for this section; has done well three years here.
Canadian .....	Oct. 10	May 2	June 26	Not adapted for this section; ripens imperfectly.

## RYES.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
Perennial Saxon .....	Oct. 10	Apr. 28	June 25	Did extra well.
St. John's Day .....	Oct. 10	May 5	June 27	Made very handsome heads; recommended.
Swedish Sand .....	Oct. 10	Apr. 28	June 25	Made very large stool; fine.
Excelsior Winter .....	Oct. 10	May 5	June 20	Did well; fine, even crop.
Spanish Double-bearing .....	Oct. 10	May 5	June 25	Did splendidly; made very fine stools.

## SPELTS.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
Common White-Bearded .....	Oct. 10	May 5	June 26	Did extra well.
Red Emmer .....	Oct. 15	May 12	June 26	Did the poorest of all the spelts tried.
White Silesian .....	Oct. 10	May 12	June 26	Medium crop; did fairly well.
White Emmer .....	Oct. 15	May 9	June 26	Grew well, but points blasted.

*Report on Cereals Grown on Adobe Soil; Season of 1890-91.*

## WHEATS.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
Missoyen .....	Dec. 26	May 2	June 22	Heavier heads than on the light soil; very fine, solid-stemmed variety.
Greek Atlanti .....	Dec. 26	May 5	June 20	Splendid crop; noble heads.
Diamond, or Polish .....	Dec. 26	May 10	June 18	Crop splendid; evidently does to perfection on adobe; tapioca variety.
Palestine .....	Dec. 26	May 8	June 15	Did not do so well as on light soil.
Oregon Club .....	Dec. 26	May 9	June 25	Very fine; yields well.
Centennial .....	Dec. 26	May 15	June 24	Strong, handsome variety; quality fine.
Hallett's Pedigree (White Victoria) .....	Dec. 26	May 11	June 20	Very fine.
Mold's Red Winter .....	Dec. 26	May 9	June 19	Seed was old; does not look promising.
California Spring .....	Dec. 27	May 3	June 25	One of the finest; can be highly recommended for trial.
Russian Bearded (Hessian-fly proof) .....	Dec. 27	May 5	June 20	Fine crop; does well here.
Propo .....	Dec. 27	May 9	June 15	All that could be desired; in great favor about here.
Blue Glass .....	Dec. 27	May 9	June 20	Fine crop; peculiar metallic color.
Frankenstein .....	Dec. 27	May 6	June 25	Not very good; too light crop.
Fern, or April .....	Dec. 29	May 12	June 13	Did well, but a little irregular.
Forelle .....	Dec. 29	May 12	June 13	No good on adobe.
Petali .....	Dec. 29	May 13	June 15	Did well.
Taganrog .....	Dec. 29	May 15	June 18	Did well.
Nonpareil .....	Dec. 29	May 9	June 21	Fine, even crop; long heads.
Whittington .....	Dec. 29	May 9	June 20	Did very well.
Chiddam .....	Dec. 29	May 6	June 19	The poorest of any.

## BARLEYS.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
Hallett's Pedigree of Chevalier.	Dec. 26	April 28	June 9	A very fine barley; an improvement on the ordinary Chevalier.
Early Black, two-rowed	Dec. 26	April 27	June 9	Very fine, heavy crop.
Italian .....	Dec. 26	April 19	June 13	A very fine crop.
Scotch, two-rowed .....	Dec. 26	April 15	June 14	Fine crop; regular.
Carter's Prolific .....	Dec. 27	April 10	June 13	Did extra well; straw short.
Early Black, six-rowed	Dec. 27	April 25	June 9	A very heavy crop.
Kalina .....	Dec. 27	April 6	June 9	A very fine crop.
Large Naked, two-rowed	Dec. 27	April 5	May 12	A heavy yield; grain large.
Department of Agriculture No. 2 .....	Dec. 27	April 6	June 18	Did first rate.
Six-rowed (Brenner) .....	Dec. 27	April 7	June 18	Did very well.
Berkeley Hybrid .....	Dec. 27	April 5	June 9	Does well; a fine variety for straw.
Six-rowed (Winter) .....	Dec. 29	April 12	June 15	Did first rate.
Small Naked .....	Dec. 29	April 12	June 9	Did well; heavy yield.
Department of Constantinian No. 2 .....	Dec. 29	April 12	June 13	Did first rate; heavy crop.
Himalaya .....	Dec. 29	April 10	June 15	Finest crop of all.
Department of Agriculture .....	Dec. 29	April 10	June 15	Did very well; a good barley.
Chevalier .....	Dec. 29	April 5	June 13	Did well; heavy crop.

## OATS.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
Bald .....	Dec. 29	May 10	June 17	Did very well.
Gray oats from Hou- dan .....	Dec. 29	May 8	June 20	Not good.
Canadian .....	Dec. 29	May 2	June 20	Of no use.

## SPELTS.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
Black Emmer .....	Dec. 27	May 6	June 20	Did not fill well.
Red Emmer .....	Dec. 27	May 5	June 20	Not large head; did fairly.
White Silesian .....	Dec. 29	May 10	June 21	Light crop.
White Emmer .....	Dec. 29	May 8	June 23	Did very well.

## RYES.

Varieties.	Sown.	Bloomed.	Cut.	Remarks.
St. John's Day .....	Dec. 29	April 5	June 25	Did very finely.
Excelsior Winter .....	Dec. 29	April 6	June 25	Did fairly well.
Perennial Saxon .....	Dec. 29	April 7	June 28	Even crop.