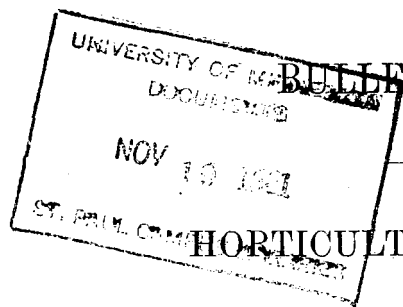


UNIVERSITY OF MINNESOTA.

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AGRICULTURAL EXPERIMENT STATION.

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BULLETIN NO. 39.

HORTICULTURAL DIVISION.

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DECEMBER, 1894.

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POTATOES,—VARIETY TESTS, POTATO SCAB, BLIGHT AND INTERNAL BROWN ROT; TOMATOES,—VARIETY TESTS, TRAINING; STRAWBERRIES,—VARIETY TESTS; APPLE-TREE SUN-SCALD; RASPBERRIES,—VARIETY TESTS, CANE RUST.

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## EXPERIMENTS WITH POTATOES.

SAMUEL B. GREEN.

Experiments with potatoes in 1894 consisted largely in the trials of forty varieties at the Experiment Station and a duplication of the same varieties at Bethel, Anoka county. Trials have also been made to determine the value of various fungicides as preventives of scab and rust of potatoes. On account of the very dry season, the yield of potatoes was very light at the University Farm and at Bethel, yet the results are not without interest to the potato growers of the state. The soil in which the potatoes were grown at the University Farm is a light, somewhat sandy, loam, in a very good state of cultivation. So far as known, however, it had never grown potatoes before. The land used for the experiment at Bethel had produced two crops of potatoes. It is sandy loam, and is representative of much of the best potato land of that section, and was selected on that account. The seed in each experiment was cut to two good eyes, to a rather large piece of potato, and was planted about the 25th of May, in rows three feet apart, with sixteen inches between the pieces of seed in the row, and was covered four inches deep. The rows were 150 feet long, and, with few exceptions, each variety occupied one row. As soon as the potato tops commenced to show, the land was dragged with a slanting-tooth harrow, to loosen the soil around the plants and to kill the weeds which had started. They were dragged also a little later and again when the tops were about four inches high. Further cultivation consisted of loosening the soil between the rows with a one-horse cultivator. This same tool was also used to throw a little earth toward the hills, but the crop was not hilled much. The land was kept nearly flat. This method of cultivation is perhaps as good as any for the general cultivation of potatoes in this state.

When the early varieties were beginning to mature they were examined every few days to note when they were of marketable size. After this time most of the other varieties were examined at frequent intervals, with the same purpose in view. The notes relating to this matter will be found in the seventh column of Table LXV.

TABLE LXV.—Potatoes,—Variety Tests. University Farm, 1894.

	YIELD IN POUNDS OF 150 FEET OF ROW.			YIELD IN BUSHELS PER ACRE.			Date when ready for market.
	Market- able.	Un- market- able.	Total.	Market- able.	Un- market- able.	Total.	
Acme Seedling.....	36	7	43	58	11	69	July 25.
American Wonder.....	23	16	39	37	26	63	Late.
Arizona.....	25	16	41	40	25½	65½	Medium.
Beauty of Hebron.....	31½	14½	46	51	23½	74½	Aug. 5.
Burbanks.....	27¼	12½	40	40	24	64	Late.
Delaware.....	17½	12½	30	29	20	49	Aug. 22.
Early Ohio.....	45	11½	56½	73	19	92	July 25.
Early Oxford.....	25	14	39	40	22	62	Aug. 5.
Early Rose.....	34	19	53	44	30½	74½	Aug. 5.
Freeman (from J. C. Vaughan).....	13½	25½	39	22	41½	63½	Early.
Freeman (from Mr. Freeman).....	9½	19½	29	15	30	45	Early.
Freeman (from De Cou & Co.).....	10½	20	30½	17	32	49	Early.
Ideal.....	25	6½	31½	44	14	58	Aug. 8.
I. X. L.....	31½	10	41½	51	16	67	Aug. 1.
Lee's Favorite.....	35½	21¾	57	49	33	82	Late.
Maggie Murphy.....	48	6½	54½	77½	10½	88	Late.
No. 5.....	42	7	49	67	11	78½	Late.
Ohio Jr.....	42	7	49	67½	11	78½	Aug. 1.
Polaris (?). .....	28½	29	57½	46	34	80	Aug. 16.
Racquet Seedling.....	..	..	..	..	..	..	Early.
Reed's Eighty-six.....	28½	21	49½	46	33	79	Aug. 1.
Red Ohio.....	25	15	40	40	24	64	July 25.
Rural New Yorker, No. 2.....	26	9	35	42	14½	56½	Late.
Snowflake.....	44½	7½	52	72	12	84	Late.
Summit.....	7½	27	34½	12	44	56	Medium.
Thorburn.....	19	8½	27½	31	14	45	Aug. 8.
Vaughan.....	40	17	57	65	11½	76½	July 25.
Vick's Champion.....	33	10¼	43¼	53	17	70	Aug. 22.
Western Red.....	33	5½	38½	53	9	62	Late.
White Prolific.....	25	18½	43½	40	29	69	Late.
World's Fair.....	8	8½	16½	13	14	27	Late.

TABLE LXVI.—Potatoes,—Variety Tests. Bethel, Minn, 1894.

	YIELD IN POUNDS OF 150 FEET OF ROW.			YIELD IN BUSHELS PER ACRE.		
	Marketable.	Un- Market- able.	Total.	Marketable.	Un- market- able.	Total.
Acme Seedling.....	50½	24½	75	81½	39½	121
American Wonder.....	40	14	54	64½	22½	87
Arizona.....	47	24	71	76	39	115
Beauty of Hebron.....	50	19	69	80½	30½	111
Burbanks.....	34	17	51	55	27	82
Delaware.....	43	16	59	68½	26	94½
Early Ohio.....	52	17	69	81	27	111
Early Oxford.....	61	19	80	98	30½	118½
Early Rose (true).....	40	29	69	64½	46½	111
Freeman (from J. C. Vaughan).....	..	22	22	..	35½	35½
Great Northern.....	44	22	66	70	35½	105½
Ideal.....	50½	14½	65	81½	23½	105
Late Rose (?).....	60	20	80	97	32	129
Lee's Favorite.....	40	21	61	64½	34	98½
Maggie Murphy.....	12	11	23	19	17½	36½
Ohio Jr.....	50½	13½	64	81	22	103
Polaris (?).....	63	28	91	101½	45	146½
Reed's Eighty-six.....	49	12	61	79	19	98
Red Ohio.....	..	20	20	..	32	32
Rural New Yorker, No. 2.....	14	10	24	22½	16	38½
Snowflake.....	48	28	76	77½	45	122½
Summit.....	48½	16	64½	78	26	104
Vaughan.....	59½	21½	81	96	34	130½
Vick's Champion.....	48	13	61	77½	21	98½
Victor White.....	61	14	75	98	22½	120½
Western Red.....	18	10	28	29	16	45
White Prolific.....	48	22	70	77½	35½	113
World's Fair.....	..	22½	22½	..	36	36

It will be noticed by any one who carefully examines the foregoing tables that the early varieties produced far more marketable potatoes than the late or medium kinds. This was undoubtedly due to the fact that the more productive kinds made their growth during the early part of the season, when the conditions were most favorable, while the late varieties suffered more severely from the excessively dry, hot weather which prevailed during the time when they should have been in their most active period of growth. Most of the later kinds seemed to have been very sensitive to any condition affecting their growth. Many of the tubers from these kinds were on this account so rough and ill-shaped as to be unmarketable. Some single specimens showed at least three distinct periods of growth. The late kinds set a larger number of potatoes than the early varieties, but these could not mature on account of the excessively dry weather.

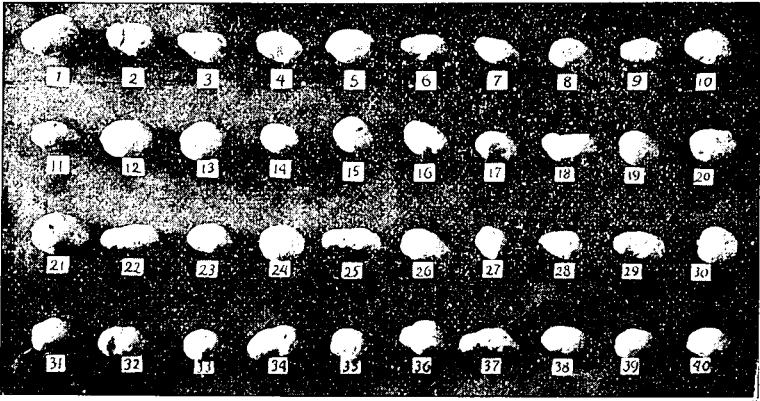


FIG. 1. Typical Tubers of Varieties Numbered Below, as Grown in 1894.

- |                      |                              |
|----------------------|------------------------------|
| 1. Acme Seedling.    | 21. Maggie Murphy.           |
| 2. American Wonder.  | 22. No. 5.                   |
| 3. Arizona.          | 23. Ohio Junior.             |
| 4. Beauty of Hebron. | 24. Polaris. (?)             |
| 5. Carman No. 1.     | 25. Racquet Seedling.        |
| 6. Colossal.         | 26. Reed's Eighty-Six.       |
| 7. Crown Jewel.      | 27. Red Ohio.                |
| 8. Delaware.         | 28. Rural New Yorker, No. 2. |
| 9. Early Everett.    | 29. Six Weeks' Market.       |
| 10. Early Ohio.      | 30. Snowflake.               |
| 11. Early Oxford.    | 31. Summit.                  |
| 12. Early Rose.      | 32. Thorburn.                |
| 13. Empire State.    | 33. Vaughan.                 |
| 14. Freeman.         | 34. Vick's Champion.         |
| 15. Great Northern.  | 35. Victor White.            |
| 16. Green Mountain.  | 36. Western Red.             |
| 17. Heavy Weight.    | 37. White Prolific.          |
| 18. Ideal.           | 38. World's Fair.            |
| 19. Late Rose (?).   | 39. Burbanks.                |
| 20. Lee's favorite.  | 40. I. X. J.                 |

#### NOTES ON VARIETIES OF POTATOES.

**Acme Seedling.**—Form, oblong, short, thick; eyes, medium to large; color, pink; skin, a little rough. Very early; ready for market July 25.

**American Wonder.**—Form, flat oblong; eyes, many, prominent near stem end and hollow near seed end; skin, smooth, white.

**Arizona.**—Form, oblong, somewhat pointed; eyes, shallow; skin smooth and white.

**Carman No. 1.**—Form, broad oval, flattened; eyes, few, medium in size; skin, nearly white.

**Delaware.**—Form, short oval; eyes, few and of medium depth skin, white, very finely netted.

**Early Oxford.**—Form, round oval; eyes, large and shallow; skin, smooth and nearly white.

**Freeman.**—Form, round oval; eyes, few and very shallow; color creamy white; skin, finely netted.

**Great Northern.**—Form, round; eyes, small and shallow; color nearly white; skin, netted.

**Green Mountain.**—Form, rather long; eyes few and shallow color, nearly white; skin, netted.

**Ideal.**—Form, long, slightly irregular; color, light red; eyes, few, small and of medium depth.

**Late Rose (?)**.—Form, round oval; eyes, few and shallow; skin heavily netted. (Probably some mistake in the name.)

**Lee's Favorite.**—Form, irregular oblong; color, white; eyes, large some of them deep, mostly shallow; skin, somewhat netted.

**Maggie Murphy.**—Form, broadly oval: light pink in color; skin, netted; eyes, few, some of them very shallow, others large and rather deep.

**Ohio Jr.**—Form oblong, somewhat pointed; eyes, many and rather prominent; skin, a little rough; color, pink.

**Racquet Seedling.**—Form, long cylindrical; color, snowy white, eyes, many and of medium depth; skin, slightly rough.

**Reed's Eighty-Six.**—Form, oblong to round; color, light rose; eyes, medium in number and depth; skin, netted.

**Red Ohio.**—Small to medium in size; red in color; form, usually round; eyes, large and medium in depth.

**Rural New Yorker, No. 2.**—Form, oblong, usually pointed; eyes; shallow and few; skin, smooth or slightly netted and white.

**Snowflake.**—Form, oblong; eyes, few and shallow; skin, netted, white.

**Thorburn.**—Form, oblong, somewhat resembles Beauty of Hebron, from which it is a seedling; eyes, medium in number and rather shallow; skin, nearly white; flesh, snowy white.

**Vaughan.**—Form, oblong, has a tendency to become pointed on seed, end this year; eyes, rather large but shallow; skin, nearly white and heavily netted.

**Vick's Champion.**—Form, rather long, slightly cubical; eyes, large and shallow; skin, white and nearly smooth.

**Victor White.**—Form, compact, oval ends flattened; eyes, few and shallow; skin, nearly white and a trifle netted.

**White Prolific.**—Form, rather long and cylindrical; skin, smooth, and white; eyes, many but small and shallow.

**World's Fair.**—Form, oval; eyes, shallow; skin, very finely netted, yellowish white; flesh, white.

**Western Red.**—Very large and irregular in form, usually oblong; skin, light red.

**I. X. L.**—Form, oblong, cylindrical, has a tendency to be pointed; eyes, large and prominent; skin, light red, somewhat resembling the Early Ohio.

### POTATO SCAB.

The seed tubers of nearly all the varieties of potatoes planted at the University Farm in 1894 were to some extent marked with the fungus disease commonly known as potato scab. All kinds were treated with corrosive sublimate, as recommended in Bulletin No. 32, with the result that the crop was almost entirely free from any appearance of scab, while a few that were not treated were quite rough from the work of the scab fungus. This treatment seems to have been so thoroughly tried that it is no longer a doubtful matter, but it is a step in the cultivation of the potato that growers cannot afford to overlook. The method of treatment adopted this year was as follows: Two ounces of powdered corrosive sublimate was dissolved in a wooden bucket, and when all had dissolved the liquid was poured into fourteen gallons of water contained in a barrel and thoroughly stirred. The potatoes were put in sacks and were thus soaked in the corrosive sublimate solution for one and one-half hours. They were then taken out, dried and cut into pieces for planting. It was found that soaking them for two hours did not injure the growth in any way, but that one and one-half hours was sufficient time to kill the scab fungus where the tubers were only slightly affected. In one case where the tubers were excessively covered with the scabs, so that even the eyes could not be made out, soaking for one and one-half hours was not long enough to kill the scab fungus. I would recommend that, where the potatoes are excessively rough, they be soaked in the corrosive sublimate solution for at least two hours. But potatoes that are excessively scabby should, if possible, be avoided for planting purposes. The expense of the treatment above referred to for the prevention of scab should never exceed \$1 per acre, including the cost of the materials and the labor of treatment.



As the peculiarities of this disease, which we commonly call "scab," are not as well known as they should be, I give below a short abstract from Bulletin No. 32 of this station, in which its peculiarities and characteristics are treated at considerable length:

"(1) Scab of potatoes is caused by a fungus plant working in the surface of the potato. The germs of it are very abundant and live for many years in the soil and also over winter on the potatoes. If these germs are fed to stock, they undoubtedly grow in the manure, and the use of such manure may often be a cause of infection. Also, they may be spread in the soil by the natural drainage and land receiving the drainage from infected fields may become infected even without ever having potatoes on them.

"(2) Scabby seed, when planted on new or old potato land, will generally produce a scabby crop, but the amount of the disease will generally be much more on the old than on the new land.

"(3) Perfectly clean seed planted on land which is free from scab fungus will always and in any season produce a crop of smooth, clean potatoes, no matter what the character of the land. But seed potatoes apparently clean may have the germs of the scab fungus on their surface. This is often the case where they have been sorted out from a lot that is somewhat infected with the scab. In this latter case, the tubers should, at least, be thoroughly washed in running water, to remove any germs that may be present, or, what is better yet, be treated with corrosive sublimate (mercuric bichloride), as recommended.

"(4) Land infected by the germs of this disease will produce a more or less scabby crop, no matter how clean and smooth the seed used.

"(5) Scabby potatoes should be dug as soon as mature, since the scab fungus continues to grow on the potatoes as long as they are in the ground.

"(6) Scabby potatoes may be safely used for seed, provided they are first treated with corrosive sublimate, as recommended. The cost of this treatment is a mere trifle, not exceeding one cent a gallon for the solution used."

### BLIGHT OF POTATOES.

In a previous bulletin the results of the treatment of blight of potatoes by Bordeaux mixture were given at considerable length. This season the treatment gave but very slight returns, and although

it increased the yield, it was such a small increase that it did not pay for the labor involved in the application of the poisoned solution. The most probable reason for the slight returns from the treatment given this year is, I think, to be found in the fact that the potato seed was treated with corrosive sublimate before planting and was planted on new land, not near where potatoes had been grown for many years, consequently the disease was not present to a serious extent. The excessively dry season was also unfavorable to the growth of diseases. However, our experience for several previous years, and the experience of many others elsewhere, make it certain that in seasons favorable to the growth of blight, it will pay well to apply Bordeaux mixture to the potato tops in those locations where this disease is commonly destructive. Bordeaux mixture is made as follows:—

5 lbs. blue vitriol (sulphate of copper).

5 lbs. quicklime.

50 gallons water.

Perhaps the simplest method of making it is as follows: Slack five pounds of the best quicklime in three gallons of water. Dissolve five pounds of blue vitriol, by frequently stirring, in three gallons of hot water in a wooden vessel. When both are cool, pour the slacked lime through a gummy sack strainer into two barrels containing twenty-two gallons of water each, and then pour in the blue vitriol solution. The result should be a sky-blue colored mixture that will settle to the bottom in a few hours. In use, it must be kept well stirred. If cold water is used, it will be found that the blue vitriol will dissolve most quickly if it is kept suspended at the surface of the water, as solutions of it are heavier than water. Of course, if it is stirred all the time, nothing would be gained by this treatment. When a large amount of Bordeaux mixture is to be used at the University Farm, we dissolve about twenty pounds of blue vitriol in twenty gallons of water, and in making the mixture, instead of weighing out the blue vitriol, we measure out one gallon of the solution.

The lime is used for the purpose of preventing any injurious action from the presence of soluble copper compounds. If the proportion used is five pounds of blue vitriol, five pounds quicklime and fifty gallons of water, as recommended above, there is no danger

from the presence of soluble copper compounds; but in practice we find it more convenient to slack a large amount of lime and then add it to the blue vitriol solution until the following simple test gives the proper reactions: Get from the druggist or chemist a few cents' worth of red litmus paper and cut it into strips about one-half inch wide. So long as there is free acid present, the paper will remain red or become a brighter shade of red, when wet with the mixture. When sufficient lime has been added, the litmus paper will turn deep blue if put into the Bordeaux mixture. If this simple test is used, there will be no injurious results from the Bordeaux mixture.

Bordeaux mixture should not stand more than a day or two before being used. It should be strained through gunny sacking, so as to remove all lumps that might clog the nozzle. It is best applied by means of a force pump having an especially prepared nozzle that will deliver it as a fine spray on the foliage. In a small way, for experimental purposes, it may be applied with a brush-broom. The nozzle which has given us the best success for this purpose is the "Bordeaux Nozzle," manufactured by the Deming Co., of Salem, Ohio.

## INSECTICIDES FOR THE POTATO BEETLE.

The high price of Paris green as a poison for the potato beetle has stimulated inquiries for substitutes for it at a lower price. London purple is much cheaper than Paris green, but it has been found in practice that the results were not so uniformly successful with it as with Paris green, on account of the greater danger of burning the foliage. In our practice, for some time past, we have found that by using as much quicklime as London purple, in the water in which the poison was applied, that it was a safe and satisfactory poison to use. The past season it gave excellent results, but in order to have it work satisfactorily, we had to use it at the rate of one pound of London purple to about seventy-five gallons of water.

### ARSENATE OF LEAD AS AN INSECTICIDE.

Arsenate of lead for use on potato vines to kill the beetles may be prepared as follows: Put eleven ounces of acetate of lead and four ounces of arsenate of soda into a hogshead containing 150 gallons of water. These substances dissolve quickly and form arsenate

of lead, which is a fine white precipitate that does not settle, but remains in suspension for a long time. If two quarts of molasses or glucose are added it aids in making the poison stick to the leaves. It adheres very tenaciously to the foliage, and the "gypsy-moth commission" of Massachusetts reports it as a most satisfactory insecticide. Boston parties offer the acetate of lead at 14 cents per pound and arsenic of soda at 8 cents per pound in twenty-five pound packages. This poison has given us good results the past season and is well worthy of trial.

### INTERNAL BROWN ROT OF POTATOES.

During the past season the potato crop in a large part of Minnesota was affected with a new potato disease. In Ramsey and Hennepin counties probably one-half of the potatoes brought into market were affected with what has come to be known as rot, or brown rot. This disease affects the inside of the potato, while the outside appears perfectly healthy and normal. When the potato is cut open, the diseased condition shows very plainly as an aggregation of brown spots. These may accumulate directly through the



FIG. 2. Potato Infected with Internal Brown Rot.

center or near the outside, or, as in most cases, be distributed throughout the potato. It does not appear to decrease the amount of starch.

But little seems to be known about this disease. It seems to affect most varieties of potatoes, as shown in the following table, which gives the condition as regards this rot of thirty-one varieties which were grown at the University Farm in 1894:

TABLE LXVII.—Per Cent of Diseased Tubers Among Different Varieties of Potatoes.

NAME.	Per Cent of Disease.			Per Cent of Disease.	
Acme .....	70	Badly discolored.	Ohio Jr.....	50	Very bad.
American Wonder...	10		Racquet Seedling.....	5	
Arizona .....	0		Reed's Eighty-six.....	5	
Beauty of Hebron..	20	Badly discolored.	Red Ohio.....	0	
Crown Jewel.....	30	Slightly discolored.	Rural N. Yorker, No. 2	8	
Delaware.....	0		Snowflake.....	30	Very slight.
Early Ohio.....	80	Quite badly discolored.	Summit.....	8	
Early Oxford.....	10		Thorburn.....	20	
Early Rose.....	80		Vaughan.....	40	
Freeman.....	70	Very much discolored.	Vick's Champion.....	40	
Great Northern.....	10		Victor White.....	20	
Ideal.....	50		Western Red (Own)...	10	Very little.
I. X. L.....	60	Very bad.	Western Red (Bethel).	100	Very much discolored.
Late Rose (?).....	55		White Prolific.....	5	
Lee's Favorite.....	70		World's Fair.....	20	Some very bad.
Maggie Murphy.....	60				

## EXPERIMENTS WITH TOMATOES.

SAMUEL B. GREEN.

Six plants each of eighteen different varieties of tomatoes were set out May 29, 1894, in a plot of rich open clay land, sloping slightly to the south. The plants were rather tall; therefore, when planting, the lower part of the stems were bent over and covered. The rows were laid out six feet apart, and the plants were set as follows: Three plants of each variety were set five feet apart, then three more of the same variety, with three-foot intervals between the plants. The object of this was to allow room for the plants set five feet apart to spread on the ground in the usual form, while the plants set near together were to be trained on single stakes and pruned to a single stem. Those on stakes were closely watched, and the sideshoots were removed as fast as they appeared. This is the plan recommended very generally for the production of the earliest fruit. The results were as follows: Three varieties that were staked ripened before those plants of the same variety that were on the ground. Four varieties that were allowed to run naturally on the ground ripened before plants of the same kind that were staked and pruned. The results this season seem to indicate

that there is no profit in the practice of staking and trimming tomatoes in this section and under conditions similar to those that accompanied this experiment.

The following table gives the date of the first ripe fruit of all varieties. The third column gives the results of the total yield of the different varieties, but not the comparative yield, as it is well known that pruned plants produce less than those not trained; but the advantage claimed for the method is that more plants can be planted on the same amount of land, and that the increased earliness will much more than compensate for the lessened quantity:

TABLE LXVIII.—Tomatoes, Varieties and Date of Ripening of Staked and Not Staked Plants.

	Date of First Ripe Fruit.		Average Yield.
	Staked.	On Ground.	
Atlantic Prize.....	July 25.	July 25.	7
Buckeye State (Vaughan).....	Aug. 25.	Aug. 11.	4
Chemlin Market.....	July 24.	July 30.	3
Earliest of All (Vaughan).....	July 20.	Aug. 11.	6
Early Acme.....	July 30.	July 19.	10
Dwarf Champion (Vaughan).....	Aug. 3.	Aug. 3.	10
Dwarf Champion (Own).....	Aug. 3.	Aug. 3.	10
Ignotum.....	July 30.	July 30.	7
Long Keeper.....	July 30.	July 30.	8
Meteor.....	Aug. 3.	July 30.	6
Matchless.....	Aug. 6.	July 30.	9
Northern Light.....	Aug. 3.	Aug. 11.	5
New Stone.....	Aug. 11.	Aug. 11.	5
Picture Rock.....	July 30.	July 30.	7
Royal Red.....	July 30.	July 30.	5-1
Terra Cotta.....	Aug. 3.	Aug. 30.	6-1
Trucker's Favorite.....	Aug. 3.	Aug. 3.	7-1

It will be seen from the above table that the results as to earliness are very much in favor of the plants that were not staked but which were allowed to lie on the ground in the ordinary way. It will be noticed, also, that the varieties known as the Dwarf Champion and Early Acme produced the most fruit. These are excellent varieties in every way.

#### EXPERIMENT IN REGARD TO AMOUNT OF ROT FROM TOMATO VINES STAKED AND TOMATO VINES LEFT ON GROUNDS IN USUAL WAY.

The past season was a very favorable one for the tomato rot, and it was very abundant. There is, however, a great difference in the liability to rot of the various kinds of tomatoes, as will be seen from reading the notes on varieties. To determine the comparative

susceptibility to rot, of the fruit from trained and untrained vines, the fruit from each set of plants was carefully counted and a record kept of the diseased and sound fruit. The results will be found in Table LXIX. which follows:

TABLE LXIX.—Tomatoes,—Fruit Rotten and Sound, on Staked Vines and on Those Not Staked.

DATE OF PICKING.	VINES TRAINED TO STAKES AND PRUNED.		NOT TRAINED.	
	Rotten.	Sound.	Rotten.	Sound.
Aug. 27.....	40	40	70	100
Aug. 31.....	36	30	25	187
Sept. 3.....	20	60	40	225
Sept. 6.....	25	50	27	240
Sept. 11.....	21	90	25	225
Sept. 18.....	25	125	55	225
Total from Aug. 27 to Sept. 18.....	167	395	242	1,292

From the above table it will be seen that forty-three (43%) per cent of the tomatoes that grew on the staked plants rotted, while only nineteen (19%) per cent of the tomatoes rotted grown on the vines which were not trained but were allowed to spread out on the ground in the ordinary way.

#### DESCRIPTION OF VARIETIES OF TOMATOES.

**Atlantic Prize.**—Vines, medium in size; staked vines grew about five feet high. The fruit small; skin, red; flesh, pulpy and pink; form, rather flat, with some specimens very irregular.

**Buckeye State.**—Vines, very vigorous; staked vines grew seven feet high. Fruit, globular, large and smooth. The skin is of an even, pink color, except near the stem, which is a yellowish green. Flavor, very good. The plants grow too large for this climate, and unless trimmed back severely, very little fruit will ripen. Rotted some.

**Chemin Market.**—Vines, quite vigorous; fruit, apple shaped; color, red. Very little fruit ripened without rotting.

**Dwarf Champion.**—Vines, vigorous for a dwarf variety; leaves broad and heavy; fruit, globe shape; color, a good pink; medium in size; quality extra good; very few rotted.

**Earliest of All.**—Vines not very large; fruit, red, very irregular, very difficult to detach from the stem, ripens very early; not a good variety for market gardeners, but very desirable for gardens in

severe locations on account of its early ripening.  $\frac{7}{8}$  About 20 per cent rotten.

**Early Acme.**—Vines, medium; fruit, medium in size and of a good pink color, globe-shaped. This variety rotted somewhat, but not over four per cent. A standard variety for marketing.

**Ignotum.**—Vines, medium in size; flesh, pink in color, with the skin red; shape round, somewhat flattened, often irregular. The season of fruiting is comparatively short; flavor rather poor; a few rotted.

**Long Keeper.**—Vines, very thrifty, but not quite as vigorous as Buckeye State; fruit, pink, medium in size, a little soft when ripe, and rotted badly.

**Meteor.**—Vines, of medium size; fruit, small to medium and quite seedy; flavor, fairly good; rotted quite badly.

**Matchless.**—Vines, quite large; fruit, red; skin thick; flat-shaped, with hollow at stem; rotted badly.

**Northern Light.**—Dwarf; fruit, small, pale red in color; skin, thin; flavor, poor; some rotted.

**New Stone.**—Vines, vigorous; fruit, large and quite smooth; color, a bright scarlet; does not ripen well near stem. This variety rotted more than any other, and it was very hard at any time during the season to get a healthy specimen.

**Picture Rock.**—Vines, medium to large; fruit large, somewhat flattened, rotted quite badly.

**Royal Red.**—Vines vigorous, skin of fruit red and flesh pink; quite seedy and soft; form, globular, slightly flattened; rotted badly.

**Terra Cotta.**—Vines, thrifty; fruit globe-shaped and pale red in color, soft and hollow; rotted quite badly.

**Trucker's Favorite.**—Vines, medium in size; fruit, pale red, resembling the Acme; rather pulpy, globe-shaped; ripens well to stem; many rotted.

#### SUMMARY.

(1) The results of this season seem to show that there is but little difference between the period of ripening of tomato plants that are pruned and trained to stakes and of those that are allowed to grow on the ground in a natural way, and consequently no profit from the operation of pruning. But these results are contrary to the experience of some of the most practical men, and should not be thought conclusive.



(2) The earliest variety was "Earliest of All," the seed of which was received from J. C. Vaughan, of Chicago. This variety is of special value for very short seasons. The Early Acme and Dwarf Champion, while about ten days later in ripening, yield much more and better fruit than the Earliest of All.

(3) Forty-three per cent of the fruit rotted that was produced by vines trained to stakes, while only nineteen per cent of the fruit rotted from vines allowed to grow naturally on the ground. This also is contrary to the usual experience of tomato growers, and should not be thought conclusive.



FIG. 3. Trunk of Apple Tree Showing Effect of Sun-Scald on Trunk.

## APPLE-TREE SUN-SCALD.

SAMUEL B. GREEN.

It is probable that more apple trees that are well located and selected die from sun-scald in this state than from any other cause, and this loss is entirely preventable. By the term sun-scald

is meant the trouble that shows itself by the trees becoming rotten in the trunk on the south side, which finally so weakens it that it cannot support its top, and consequently breaks down, very likely when loaded with fruit. It is probable that this trouble is generally caused by a part of the bark on the south—or, more commonly, the southwest—side of the tree starting into growth before the rest of the tree, during some warm period in the latter part of winter or early in the spring. Such warm periods are generally followed by a severe freeze, in which case the newly-formed immature cells are ruptured, or the cell contents injured, which results in the bark on the affected side dying and falling off. Fig. 3 represents a Duchess of Oldenburgh apple-tree, which has been severely injured by sun-scald. One of the three parts of the trunk has so far rotted that



FIG. 4. Protecting Trunks of Trees from Sun-scald by Wrapping Them in Autumn with Cornstalks.

it has broken down to the ground, another part still stands, but is badly rotted on the southwest side for a distance of three feet and will probably break down in a short time; the other part of the trunk is still quite sound.

#### PREVENTION OF SUN-SCALD.

(1) Sun-scald may be prevented by anything that will shade the trunk and limbs; even a few branches furnish sufficient shade. If the top of the tree is kept inclined to the southwest until it is firmly established, it will shade the trunk sufficiently to prevent sun-scald.

There is a tendency in this section for all trees to incline to the northeast, due, largely, to the fact that the prevailing winds are from the southwest during the growing season and while the ground is soft. Trees that incline to the northeast receive the rays of the sun directly upon the trunk, and are most liable to sun-scald. In order to keep the tops of trees inclined to the southwest, they must be planted with a decided slant in that direction, though not so much so as to disfigure the trees. Even when this is done the trees will need annual attention to keep them in that position. One large and



FIG. 5. Protecting Trunk of Tree from Sun-scald by Shading with Board.

successful apple-grower in this state goes so far as to tie each tree to a small stake to hold it in position. If the trees are planted in Quincunx fashion, so that the rows run southwest and northeast, as well as north and south, they will largely shade one another when of bearing size.

(2) Protection by means of a screen of laths and wire woven together and wrapped around the trees is advocated, and has been extensively and successfully used. It is cheaply made and easily applied, but it does not fit the trunk well if the trees are crooked, and it should be supplemented by some material for shading the crotches, which are the weak spots of many kinds of apple trees. On straight trees it affords excellent protection to the trunks, and it is easily supplemented each autumn by stuffing the crotch with hay.

(3) Thin veneers of wood are manufactured which, when soaked with water, may be easily wrapped around the trunks and held in place by two wires. These have recently come into use, and are received with considerable favor by apple-growers. They are open to the same objection as the lath screen, but are easily supplemented in the same way, and are very desirable.

(4) Wire screen, such as is used for mosquito netting, has its advocates as protection against sun-scald. It has the merit of being more flexible than those mentioned before, and it easily conforms to the shape of the trunk. It is, however, necessary to supplement it with some material for protecting the crotches.

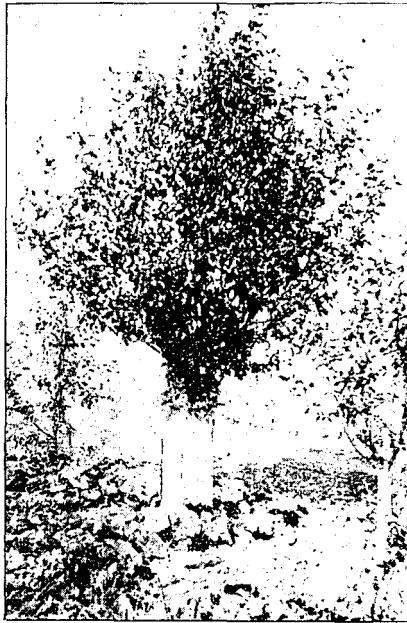


FIG. 6. Protecting Trunk of Tree from Sun-scald with a Wooden Box and the Crotches with Hay. To the Right, Trunk of Small Tree Protected by Wood Veneer.

(5) Flexible materials, such as burlap and building paper, is excellent for this purpose. They should, however, be taken off in summer and the burlap, when thus cared for, may be used for several years.

(6) An excellent method of protection is that given by wrapping the trunk of the tree with a hay rope or by tying cornstalks (Fig. 4) on the south half of the tree on the approach of winter. These

should extend up far enough to protect the crotches and lower branches as well as the trunk.

(7) The planting of a shrub, such as a barberry bush, an *Artemisia abrotans*, or similar hardy plant, on the south side of apple trees, has been recommended and to some extent practiced for the prevention of sun-scald.

(8) Protection by boards has been followed to a considerable extent. This is effected by standing up a six-inch board on the south side of the tree (Fig. 5) so as to keep the sun's rays off from the trunk. Sometimes two boards are nailed together, so as to partly inclose the trunk. This is an excellent method of protection. An objection to it is that unless the boards are very carefully placed the bark on the branches may be injured by them.

(9) Protection by boxing the trunks of the trees and filling the boxes with soil (Fig. 6) has come into use within a few years. This is probably the safest and most complete method known. It protects the trunk against sudden changes in temperature, as well as against sun-scald, and the adoption of this method of protection will undoubtedly make it practicable to grow the hardiest apple trees much farther north than it has been heretofore believed possible. This practice is especially adapted to the purposes of protection of the few trees so desirable in the farmer's garden and is worthy of very general use under such conditions. The expense for material is very little, and generally the necessary material for use in a small way can be had without any appreciable cost whatever. The question of removing the earth from the boxes in summer has been considerably discussed. At the University Farm the boxes filled with earth have been allowed to remain around a large number of the trees for three years, and no harm has resulted from the practice. Judging from this experience, I am of the opinion that no harm can result from the practice of allowing the boxes to remain on all the year round. However, if at any time the boxes were to be dispensed with, I should be very much afraid of removing them on the approach of winter, but if removed in the spring I do not think that their having been used would increase the susceptibility of the trees to injury from sun-scald. This method of protection, however, does not cover the crotches of the trees, and these should be protected as previously recommended.

The methods of protection suggested here as being such as should be left on all the year round, referred to in paragraphs 2, 3, 4, 5 and

9, protect from all injury from mice, and, to a large extent, from all injury from rabbits, and on this account alone, in many sections, will be worth all they cost. While all varieties of apples are liable to sun-scald, some are much more subject to this injury than others. The varieties recommended by this Experiment Station and by the State Horticultural Society are most desirable for planting in this state. And the selection of other kinds, especially those that are generally grown in more favored locations, leads to disappointment and loss.

The extent of sun-scald is much greater in this section than is commonly thought. Besides the apple, the plum and cherry are occasionally thus injured, while sun injuries are very common on black walnut and basswood, and occasionally almost any of our deciduous trees are so affected. Newly transplanted basswoods are frequently injured by sun-scald when unprotected, and when used for street trees should always be shielded from the sun's rays, at least until well established and growing freely, after which such injuries are less frequent.

#### SUMMARY.

(1) Sun-scald is a frequent cause of loss of apple trees in the Northwest, and is entirely preventible at slight expense.

(2) Anything that will shade the trunks of the trees will protect them from sun-scald.

(3) Many methods that are admirably adapted to protect from sun injuries, also protect against injury from rabbits, mice and borers.

(4) It is recommended that planters of apple trees, on a small scale, at least, protect the trunks of their trees by boxing them up.

(5) All fruit trees should be inclined to the southwest when planted.

(6) Sun-scald affects most of our deciduous trees to some extent, and a few of them, under certain conditions, quite disastrously.

## STRAWBERRIES.

SAMUEL B. GREEN.

The strawberry crop in 1894 has been generally a poor one on account of the late spring frosts when the plants were in blossom and the severe drouth which commenced to be injurious when the crop was about one-third grown. At the University Farm the crop was fairly good. I attribute our success to the fact that the beds are on a retentive soil well cultivated, and, also, to the fact that the mulch was kept over the plants until as late as practicable. Our beds were not in flower until after the damaging late frosts, and the space between the rows and around the plants being heavily mulched were protected from the sun and the rapid evaporation. Our beds which produced their second and third crop were much more productive than the new beds. I account for this from the fact that last season being very dry, the newly set plants did not perfect their fruit buds so well as the older and more vigorous plants of the old beds. But I would not wish to be understood as advocating the retention of old beds except where they are mowed over and renewed by plowing and manuring, according to the well known practice of this Station. By following the practice outlined above, we have not failed to secure at least a fair crop any year for four years at this Station. Of new varieties there is little to report, none of them having done better than the best of the older varieties. The most promising kinds for general planting are Warfield, Haverland and Crescent of the pistillate, and Beder Wood, Parker Earle and Enhance of the bi-sexual class. The best early berry here is the Warfield, the best late one the Parker Earle. The new kinds worthy of special mention are Swindle, Edgar Queen and Leader. These fruited in beds bearing their second crop. Other new kinds in the new bed did not have as good a chance as those in the old bed and should not be condemned on this account. The strawberry beds at the University Farm were sprayed with Bordeaux mixture in the spring, but they were very healthy, and no particular benefit seemed to follow this application. However, it is my opinion that it will, as a rule, pay well to spray at least once with this material in the spring, though there may be occasional years when there is no apparent benefit.

## DESCRIPTION OF VARIETIES.

A tabular statement of the growth, period of ripening and productiveness of the following and other varieties was published in the "Minnesota Horticulturist" for August, 1894, and is consequently omitted here.

**Atlantic** (Bi-sexual).—Fruited in beds two and three years old. Quite productive; medium early; foliage and growth good.

**Beder Wood** (Bi-sexual).—Fruited in beds two, three and four years old, and very productive in each; blooms early and is full of pollen; fruit medium in size; season medium, holds on well; growth and foliage very good.

**Boynton** (Pistillate).—Early and holds on quite well; moderately productive. Nearly the same as Crescent.

**Crescent** (Pistillate).—As compared with the Warfield, which is taken as the standard, it ranked about third. Fruit not as large as Warfield, but it holds out better at latter end of season. This old variety is still one of the most reliable.

**Edgar Queen** (Pistillate).—Very vigorous both in foliage and growth and very productive; fruit large; a good variety and well worthy of trial by commercial growers.

**Eureka** (Pistillate).—Fruited in beds two and three years old. A very strong grower, foliage good; fruit of good size and color and firm; quite productive; season very long; worthy of trial.

**Esther** (Bi sexual).—Medium size, conical, red; quite productive.

**Gillespie** (Bi-sexual).—Foliage and growth poor, with little fruit.

**Gov. Hoard** (Bi-sexual).—Foliage and growth good; not very productive.

**Great American** (Pistillate).—Sets large quantities of fruit, but only a small part ripens; fruited in all beds and the results the same in each.

**Greenville** (Pistillate).—Foliage and growth vigorous; productive; season very long; fruit of good size.

**Haverland** (Pistillate).—An excellent variety. Season very long; yielded well in all beds; a close second to Warfield; fruit large.

**Leader** (Bi-sexual).—Very vigorous both in growth and foliage; very productive.

**Lovett's Early** (Bi-sexual).—A very handsome berry of good size; fairly productive.

**Michel's Early** (Bi-sexual).—An early flowering kind with an abundance of pollen; produces very little fruit. As a pollenizer it is very good, but otherwise almost useless.



**Middlefield** (Pistillate).—A fairly good grower; not very productive.

**Ona** (Pistillate).—Not very productive; fruit red, conical.

**Parker Earle** (Bi-sexual).—A large vigorous and thrifty grower; foliage good; season very late; fruit large; very productive. One of the best of the bi-sexual kinds.

**Putnam** (Pistillate).—Moderately productive; foliage and growth very good.

**Saunders** (Bi-sexual).—Fruit medium to large, compact; not very productive; foliage not very good.

**Southard** (Bi-sexual).—Medium in size, red, usually broad conical; fairly productive; foliage and growth good.

**Standard** (Bi sexual).—Of but little value here.

**Stevens** (Bi-sexual).—Season early, ripens well together, quite productive; foliage and growth good.

**Swindle** (Pistillate).—Fruit large, usually quite irregular, very firm; in large clusters; foliage and growth very good; very productive. A very promising variety.

**Timbrell** (Pistillate).—Plants large and vigorous, somewhat resembling the Bubach. I am disappointed in the amount of fruit it produced this year, which was very little, but as it fruited in the new bed and had been seriously dug into for plants I feel that it has hardly had a fair chance.

**Tippecanoe** (Bi-sexual).—A fairly good berry.

**Warfield** (Pistillate).—As in several previous years this variety stands at the head of the pistillate varieties. Yielded the most fruit of all the varieties; fruit medium in size, quite dark, very regular; fruited well in all beds.

**West Lawn** (Pistillate).—Of little value here.

**Waupon** (Bi-sexual).—Fairly productive.

**Williams** (Bi-sexual).—Fruit medium in size, broadly conical; clusters very large; somewhat seedy; moderately vigorous; does not ripen on end very well; fruited only in new bed.

## RASPBERRIES.

SAMUEL B. GREEN.

The raspberry crop at the University Farm in 1894 was considerably shortened by the severe drouth, and yet the returns from the productive kinds compare favorably with the returns of other years. The raspberries here are grown in rows seven feet apart and are mulched for two feet on each side of the row. The three-foot space between the rows not mulched is kept loose by frequent stirring with a one-horse cultivator. On approach of cold weather the canes are bent to the ground and enough soil put on to hold them down, and



FIG. 7. Raspberries Laid Down for Winter.

then the whole row is covered with the mulch from between the rows. (Fig. 7.) The land on which they are grown is a loose clayey loam. In very severe locations, especially where the land is dry in autumn, this protection is not enough, but the canes should be covered their whole length with earth by plowing against them from both sides and then covering with mulch.

## VARIETY TESTS OF RASPBERRIES.

TABLE LXX.—Variety Test.—“Tip-Rooting” Raspberries at University Farm in 1894.

VARIETIES.	Date of Blooming.		Date of First Picking.		Date of Last Picking.		Quality (scale 0 to 10).	Firmness (scale 0 to 10).	Vigor (scale 0 to 10).	Productiveness (scale 0 to 10).
	June.	July.	July.	July.	July.					
	Ada .....	10	18	21	8	8				
Brackett .....	8	10	22	8	9	9	9	9		
Conrath's Early .....	6	1	20	8	9	9	9	9		
Cromwell .....	6	4	16	8	8	9	9	9		
Cook's Seedling .....	4	7	16	6	7	10	5	5		
Gregg .....	10	9	20	8	10	10	8	8		
Hopkins .....	4	7	.....	8	9	8	8	8		
Kansas .....	6	2	18	8	9	9	9	9		
Lovett .....	8	6	20	7	9	8	4	8		
Mystery .....	6	3	20	9	9	9	8	8		
Nemaha .....	8	9	25	8	10	10	9	9		
Ohio .....	6	6	25	9	10	9	8	8		
Older .....	6	9	26	10	9	9	10	6		
Palmer .....	7	4	18	7	8	8	6	6		
Progress .....	8	6	26	8	8	8	8	8		
*Smith's Giant .....	10	10	20	8	8	8	6	6		
Smith's Prolific .....	6	2	23	8	8	8	7	7		
Shaffer .....	12	9	24	8	9	10	10	10		
Tyler .....	15	14	18	8	8	7	4	4		
Wade .....	10	10	22	..	..	..	7	7		
Wonder .....	10	11	22	..	..	..	3	3		

\*Suffered from drouth.

## NOTES ON TIP-ROOTING RASPBERRIES.

**Ada.**—Bushes, medium in size and vigorous; spines, few as compared with others; flavor, a little tart.

**Brackett's Seedling, No. 101.**—Plants, thrifty; fruit, rather seedy.

**Cook's Seedling.**—Vines, very tall and thrifty; fruit, dark red, quite juicy, small, of inferior quality. This variety is reported by Mr. Dewain Cook, of Windom, Minn., as being exceedingly hardy and more productive than any of the other varieties he has grown.

**Conrath's Early.**—Vines, very thrifty and large; spines, strong; flavor, fair.

**Cromwell.**—A strong growing, productive variety.

**Gregg.**—Well and favorably known as one of the best late black-caps.

**Hansell.**—A bright red, early berry; valued chiefly for its earliness.

**Hopkins.**—Vines of medium growth; fruit of fair size and good quality; quite productive.

**Kansas.**—Vines, very large, with many spines; very early and generally productive; fruit somewhat seedy.

**Mystery.**—Bushes, medium to large; fruit of fair size; not of good quality.

**Nemeha.**—A very reliable variety, closely resembling the Gregg, but think it rather more desirable and destined to supplant that kind.

**Ohio.**—One of the most productive of the early kinds. Of excellent quality and fine appearance.

**Older.**—Vines very vigorous and very productive; fruit of large size and good quality, and the fruiting season is a very long one. Rather too soft for shipment, but excellent for the near market and for home use. The most productive of the black-caps grown at the station the past season.

**Palmer.**—Very vigorous, very early and generally productive. One of our trial stations reports it as being the most productive of a number of popular kinds tried the past year.

**Progress.**—Very similar to Palmer in appearance, but a little later in ripening.

**Shaffer.**—An old, reliable and productive berry that is very desirable for canning. Its dull color makes it a poor berry to sell.

**Smith's Giant.**—Very late in season, and consequently suffered badly from the drouth. Plants made a good growth and set considerable fruit which failed to mature.

**Smith's Prolific.**—Vines, good size; fruit, medium too late in season, a little seedy and dry.

**Wade.**—Of fair quality, but not very productive.

**Wonder.**—Fruit, very poor; vines, not vigorous.

TABLE LXXI.—Raspberries.—Variety Tests of those which increase by suckering.

VARIETIES.	Date of Blooming.	Date of First Picking.		Date of Last Picking.	Quality (scale 0 to 10).	Firmness (scale 0 to 10).	Vigor (scale 0 to 10).	Productiveness (scale 0 to 10).
	June.	July.	July.	July.				
Caroline .....	6	7	23	7	7	4	6	5
Champlain .....	12	9	24	9	9	8	8	7
Clark .....	10	7	28	9	9	9	9	8
Cuthbert .....	10	9	27	9	9	9	9	8
Gladstone .....	12	7	25	4	4	10	8	8
Golden Queen.....	10	9	26	9	9	9	9	8
Hansell .....	10	9	28	9	9	7	9	9
Kenyon's Seedling.....	2	12	24	7	7	9	9	9
Marlboro .....	8	6	28	6	6	10	7	9
*Reliance .....	10	10	..	6	6	5	5	..
Royal Church.....	5	15	24	7	7	10	..	..
*Superlative.....	10	9	20	9	9	9	..	..
Thompson's Early.....	10	9	24	9	8	9	..	8

\*Very badly affected with "Leaf Curl"

NOTES ON THE VARIETIES OF RASPBERRIES WHICH ARE  
PROPAGATED BY SUCKERS.

**Caroline.**—Golden yellow color. Vines, low and bushy. It sets large quantities of fruit, which is rather acid.

**Champlain.**—Nearly white in color and rather sweet; foliage, very heavy and dark. Vines very bushy and heavy. Not sufficiently productive here to be of any value.

**Clark.**—Bushes, medium size; flavor of fruit very good. A very good variety for general planting.

**Cuthbert.**—An old, popular variety that does well where it is healthy. In some sections it is badly diseased.

**Golden Queen.**—Bushes, medium in size, productive; fruit large, golden yellow in color and of good quality.

**Kenyon's Seedling.**—Bushes, medium in size, quite vigorous; fruit, quite large and firm, but crumbles a little; color, deep dark red; quite productive on bushes that were large enough to bear well. Berries cling to the stems very closely and must be well ripened before they will separate; flavor, fair.

**Logan.**—Received from California in spring of 1894. Growth, very vigorous. In appearance it closely resembles the dewberry, and is propagated the same way. The foliage is of a dark purplish color and very healthy. Have not fruited it.

**Marlboro.**—Perhaps the most valuable of all red raspberries for market, although of inferior quality. Careful attention, however, should be given to having all the sets of the plant very healthy, as it is quite liable to the disease known as leaf curl.

**Reliance.**—Our plants of this kind have become badly diseased with the leaf curl.

**Royal Church.**—Vines recently planted are very vigorous and healthy. But very little fruit produced, and that seemed to have a tendency to crumble.

**Superlative.**—Judging from its appearance here, I think it one of the most worthless varieties ever sent out.

**Thompson's Early.**—Vines, healthy and vigorous; fruit, of good size and color and very sweet; quite productive. It seems to be a promising early variety.

**Turner.**—A reliable, well known variety, especially desirable for home use, and recommended as best for severe locations.

## CANE RUST OF RASPBERRIES (ANTHRACNOSE).

On account of the adverse season of 1894, the cane rust (anthracnose) and the disease commonly known as "leaf curl" were unusually destructive, and in some sections of the state seriously lessened or destroyed the crop. Some varieties are much more subject to these diseases than others, and few, if any, kinds are entirely exempt from them. Cane rust is probably always present in a small way in raspberry plantations (see Fig. 8), but in average seasons vigorous



FIG. 8. Raspberry Cane Affected with Cane Rust.

plants are able to resist the disease and mature a crop of fruit, while in very dry seasons the plants cannot perfect the fruit, the wood for the next year and the disease, and as a consequence the fruit is the part that is especially liable to suffer. A peculiar trait of this disease is that it does not seem to affect the vigor of growth of the young canes, but injures the crop just when it is ripening. Experiments are in progress at the station in combating these diseases, and we seem to have been quite successful in preventing the cane rust (anthracnose).

*Treatment for Cane Rust of Raspberries.*—Judging from the result of experiments in the prevention of cane rust at the University Farm and elsewhere, it would seem that the most rational treatment for it is as follows :

In the spring, before the canes start, spray them with a solution of sulphate of copper (blue vitriol) made by dissolving one pound of it in fifteen gallons of water. Later, spray the new canes with Bordeaux mixture, probably about three times, at intervals of about two weeks, commencing as soon as the new canes are one foot high. Care should be taken not to get the Bordeaux mixture on the leaves of the fruit-bearing canes, as they are quite liable to be burned by it.