UNIVERSITY OF MINNESOTA.

EXPERIMENT STATION

OF THE

COLLEGE OF AGRICULTURE,

ST. ANTHONY PARK, RAMSEY CO., MINN.,

JANUARY, 1888.

BULLETIN No. 1.

REPORTS ON RUSSIAN APPLES, WHEAT EXPERIMENTS AND POTATO CULTURE.

INTRODUCTORY.

As the work of this Agricultural Experiment Station is now organized on a new basis, to meet the requirements of recent legislation, it may be well to present, in this first bulletin, a brief review of the work heretofore done in this department.

The act of Congress of July 2, 1862, donating public lands to the several states, for the benefit of agriculture, and the mechanic arts, authorized the expenditure of a sum, not exceeding ten per cent, of the net proceeds of the sales of such lands, for the purchase of experimental farms.

In 1868, the legislature of Minnesota authorized the board of regents of the state university to expend $8,500 from this fund for this purpose, and a tract of land near the university was bought, cleared, fenced, ditched, and put under cultivation, and under the direction of Prof. Charles Y. Lacy, was used as the Experimental Station, and School of Practice of the College of Agriculture up to 1880. Various lines of agricultural experimentation were undertaken by Prof. Lacy, and full detailed reports of the same were made annually to the board of regents, and will be found in their published reports for the years 1875–6–7–8–9 and '80.

Prof. Lacy withdrew from the institution in 1880, and in January, 1881, Prof. Edward D. Porter was placed in charge of the department of the Theory and Practice of Agriculture. After operating the farm for one season he was convinced that from the character of its soil, its proximity to the city, and continued subdivision by public thoroughfares, it was entirely unsuited for the purposes of an experiment station, and urged upon the board of regents* the necessity of disposing of it and purchasing a more desirable location. The plans proposed were approved, and the legislature having given authority for the sale, and provided that all the proceeds of the same, should be used in the purchase and equipment of the new farm, the old one was subdivided and sold from time to time up to the present, yielding sufficient funds to purchase and equip the new station. The location of this farm, its character and equipment, and the work accomplished up to Jan. 1, 1877, are fully set forth in the report of the department of agriculture, to the board of regents, and published as a supplement to their fourth biennial report to the governor.

The legislature of 1885 directed the board of regents of the University of Minnesota to establish, as soon as practicable, in

* See Fourth Biennial Report—Supplement, pp. 12 and 13.

connection with that institution, an Agricultural Experiment Station, for the purpose of promoting agriculture in its various branches, placing it under the control and supervision of said board, and making the professor of agriculture its general superintendent.

Unfortunately there were no funds placed at the disposal of the university to carry out the objects of the act, and there were none at the command of the department for that purpose, as all the funds derived from the sale of the agricultural college lands were, by act of Congress, required to be devoted to the purposes of instruction.

The experimental work given in previous reports, and accomplished up to the present time, has been done with limited and unskilled assistance, and in such intervals of time as the director could secure from a mass of other duties.

The passage, by the last Congress, of what is known as the "Hatch Bill," making liberal appropriations for the work of agricultural experiment stations in all the states, and the prospect that the funds thus provided for, will be available at an early day, will enable the board of regents to properly organize this station for the work contemplated. The increase of scientific and skilled assistants, a subdivision of labor, and release from a mass of details, will enable the director to give largely increased attention to the work of the station.

In carrying out the objects of the organization, we cordially invite the co-operation of the citizens of the State. Suggestions as to lines of experimental work, problems to be solved, inquiries relating to agriculture, horticulture, stock, and the dairy, will be cheerfully received, and answered as far as possible; but no work will be undertaken unless of public value, and the results of which we are at liberty to use for the public good.

Specimens of grains and grasses; seeds of fruit and forest trees; vegetables, plants, and flowers that are true to name; varieties of beneficial and injurious insects; samples of mineral waters and ores, and whatever may illustrate any department of agriculture will be gladly received, and due acknowledgments made in annual reports. Directions for collecting, packing and shipping such specimens will be furnished on application, and all expenses paid.

Bulletins will be issued at least quarterly, giving the results of experimental work as fast as completed, together with such suggestions and information as may be thought valuable to the farmers of Minnesota. These bulletins and the annual reports will be sent, *free of charge*, to each newspaper in the State, and to such individuals as may request the same.

All correspondence and contributions intended for the station should be addressed to

EDWARD D. PORTER,
Director of Experiment Station.

St. Anthony Park, Ramsey County, Minnesota.

NOTES

On the Condition of the Experimental Orchard of Russian Apples, after Three Seasons' Growth and Test of the Winters of 1885–6 and 1886–7.

The winter of 1886–7, like its predecessor, was one of unusual severity, differing from the previous winter in the greater snowfall, which covered the ground to a depth of from one to two feet from the middle of November well into the month of April. The snow drifted somewhat in the Russian orchard, but probably the severest time for the trees was the short season of thawing days and freezing nights which occurred in the latter part of March and the first two weeks of April. The melting snow formed sheets of ice by freezing solid at night, remaining thus, in some cases, two or three days at a time, and then thawing, only to be again frozen.

As was said of the Russian orchard in the report of this department for 1886, it had been planted in the spring of 1885 in the most exposed situation the farm afforded. It may be claimed that such a situation does not give the trees a fair chance, since any intelligent farmer would choose a protected location for an orchard; but the Russian apples were heralded as being absolute ironclads, and if there was a possibility of their growing on the open prairies of Western Minnesota, then surely they should withstand the greatest exposure that could be given them in this timbered region.

The result of the winter of 1885–6 on the Russians, as heretofore reported, was the death of thirty-two and one-half per cent of the number planted. In the place of the thirty-seven trees thus winter killed, others were set, of varieties not before standing in the orchard.

The summer of 1886 was as favorable for tree growth as could be desired, and the trees were well matured when winter set in.

Potatoes had been planted between the tree rows, and good cultivation had been given the entire orchard until about the middle of July, after which time the weeds were kept down by scalping, the ground not being disturbed save at the surface. In the forest tree nursery, cultivation was continued longer, and the plow was more frequently used, but the forest trees passed through the winter without injury, showing complete ripening of the wood.

The following notes, taken in August and in November, will show the condition of the Russian apple trees at those periods. The dead wood on the trees had been left purposely, as giving the best answer to questions regarding their hardiness. It will be noticed that a few duplicates are named, in which there is a difference in condition. The notes were taken while passing from tree to tree; in no case are there more than two trees of a kind in the orchard and in many instances there is but one; where duplicates occur, the trees were not planted together as was usual. The "killing" referred to was the result of the winter of 1886–7, and, unless otherwise noted, the measurements of dead wood refer to the growth of the summer of 1886, and the new growth to the season of 1887:

177. *Green Streaked.* Of the two trees of this variety, one killed back one inch, and in August was in fine condition, having made an excellent growth; leaves good and tree healthy. The other was barely alive. Growth of 1887, seventeen inches.

934. Both trees winter killed badly, all the one-year-old wood being dead. Strong shoots had sprung from the trunks of both trees. Growth of 1887, sixteen inches.

187. *Glass Green.* All last year's growth killed, but made a growth of twenty-six inches in 1887.

Possart's Nativ. Killed to snow line.

287. *Riga Transparent Juicy.* Dead.

287. *Kremer's.* Almost dead.

87M. *Herren Apple.* Weak.

Dobrui Krestiana. Killed back badly. Growth of 1887, twenty-six inches.

Green Sugar. Almost dead.

282. *Veronesh Reinette.* Killed slightly; made but little growth last summer, but made a growth of eighteen inches in season of 1887.

375. *Cinnamon Pine.* Killed to old wood; strong growth last summer, and twenty-two inches in 1887.

105. *Russian Gravenstein.* Killed back six inches; healthy growth this season, making shoots twenty inches in length.

442. *Yellow Calville.* Planted last spring; weak. Made but four inches of growth in 1887.

Sklanka. Planted last spring; growing first rate; shoots of this season's growth twenty inches long.

457. *Klineff's Apple.* Killed back most of the new wood; trunk sun-scalded somewhat. This year's growth good, averaging twenty-two inches.

185. *Anisette.* Killed back three inches; fine growth the past season; good foliage; shoots of 1887, twenty-four inches long.

161. *English Pippin, Longfield.* One dead; other killed almost to old wood and badly sun-scalded; vigorous new growth, averaging twenty-two inches.

316. *Red Queen.* Killed back to old wood, but made a growth in 1887 of twenty-three inches.

365. Killed to old wood; strong shoots; growth of 1887, twenty-six inches.

38. *Vor. Flat Veronesh.* Killed but very little; in good condition; average growth of 1887, twenty inches.

502. *Rambour Queen.* Killed back badly; very strong shoots of 1887 growth, twenty inches in length.

Antinovka. Killed all new growth and part of two-year-old wood in two trees; strong growth from trunk, averaging twenty-eight inches.

252. *Aport.* Killed back to old wood, but made a growth of twenty-seven inches in 1887.

262. *Charlamoff.* Killed back to old wood.

361. *Pointed Pipka.* One tree killed eight inches; new growth excellent, averaging twenty-one inches. One tree killed but little, being the best in the orchard; no scald; fine growth; healthy foliage.

984. *Koursk Anis.* Killed but slightly; leaves small and good; tree healthy, having made a growth of twenty-eight inches in 1887.

230. *Titus.* In fine condition. Killed but very little. Shoots twenty inches long in 1887.

599. *Romna.* Two trees killed back badly, but sent out strong shoots the past summer, averaging eighteen inches.

Borovinka. Lateral branches nearly all dead, but strong new growth of twenty-six inches.

Gruchevka. Two trees have stood the two winters better than

any others in the orchard. Killed back one inch. Good growth the past season; leaf not so thick as in many more tender sorts. Growth of sixteen inches in season of 1887.

477. *Christ Birth.* One dead; one killed to snow line, but made a growth of thirty-one inches in 1887.

413. *Cross.* Killed to snow line. Made a growth of twenty inches in 1887.

269. *Rosy Aport.* Killed back six inches; good growth the past summer, averaging twenty-three inches.

Yellow Transparent. Killed to snow line, twenty-seven inches growth in 1887.

268. *Saccharine.* Killed to old wood; strong new growth of twenty-six inches.

202. *Hare Pipka.* Killed almost to old wood; fine new growth of twenty-six inches.

200. *Red Pipka.* Killed one inch; good healthy growth the past summer; two trees averaging seventeen inches growth in 1887.

52. *Vor.* Killed eight inches; poor growth the past season, only three inches.

582. Leaders killed eight inches; laterals almost to old wood; strong new growth of twenty-eight inches.

365. Killed back six inches; strong growth in the tops, averaging twenty-four inches.

Aport Orient. Killed one inch; is doing well; made a growth of twenty-four inches the present season.

284. *Kremer's Glass.* Killed back almost to two year wood, but made a growth of twenty-four inches.

290. Ukraine killed back eight inches; fine healthy growth the past season of sixteen inches.

Plodovitka. One dead; other killed one-half; growth all water sprouts.

Rubet's Nativ. Killed four inches; good new growth of twenty-one inches.

Kiev Reinette. All the one-year-old wood dead on one tree. The other killed back one to four inches and in good condition.

277. *Lead.* Killed back into old wood; growth of 1887, fourteen inches.

206. *Czar's Thorn.* Killed eight to ten inches; sun-scalded but made a growth of thirty inches in 1887.

210. *Vinograd.* Killed back four inches; good growth this season.

469. *Grandmother.* Killed to old wood; very strong new growth of thirty-six inches this season.

4M. *Ostrokoff's Glass.* Killed back six inches; top very weak; strong shoots from below of twenty-eight inches.

461. *Ribbed.* Dead to snow line.

407. *Blackwood.* Very weak in the top; strong water sprouts of thirty inches.

396. Killed one-half.

Arkad. In one all the new wood killed; the other killed back but one inch and has made good new growth of fourteen inches.

282. *Veronesh Reinette.* Killed back two inches; fairly good new growth of fifteen inches.

984. *Koursk Anis.* Killed back two inches; new growth of twenty inches; trunk clean and bark good.

21. *Vor. Yellow Calville.* Killed back one to two inches; growth in top good; trunk of one tree in bad shape, but made an average growth of twenty-eight inches.

164. *Heidorn.* Killed one inch; fairly good new growth.

56. *Vor. Gipsy Girl.* Killed back one-half inch; trunk in bad shape; leaves all eaten off by caterpillars; moderate growth in top, good shoots near the ground of fifteen inches growth.

Early Sweet Veronesh. One nearly dead; other killed back four inches and in weak condition; growth for the season of 1887, eighteen inches.

22M. *Blushed Calville.* Killed back one inch; slow grower but evidently in perfect health; made shoots of nineteen inches in length during 1887.

20M. *Kursk Reinette.* Killed one to four inches; growth healthy, and twelve inches in length.

378. *Hibernal.* Killed very little; good growth.

Arabskoe. One year-old-tree, set in spring of 1886, killed back eight inches, and made a growth of twenty inches in 1887.

214. *Garden.* Tree same as last; killed back four inches; good growth the past season.

44M. *Sandy Glass.* Weak during summer, but made a growth of twenty-eight inches during the season.

304. *Switzer.* Killed back six inches; good growth of twenty five inches.

4M. *Ostrokoff's Glass.* Killed back one inch; good healthy growth of twenty-six inches.

Duchess. Of fifty-two Duchess trees planted in the spring of 1885, at the same time and in the same orchard with the forego-

ing list of Russians, half are dead and of the remainder the new growth killed back almost as bad as did Antonovka. The average growth of these trees in 1887 was sixteen inches. In another orchard, which stands on a northeast slope and is well protected on the south and west by an oak grove, the Duchess killed back but little.

REMARKS.

Of the sixty-five varieties noted, *not one* started growth from terminal buds in the spring of 1887. Those which killed back one inch or less, and which, in such situations as are ordinarily chosen for orchards, may fairly be presumed to be perfectly hardy in this latitude are Green Streaked, Veronesh Reinette, Flat Voronish, Koursk Anis, Pointed Pipka, Titus, Gruchevka, Red Pipka, Aport Orient, Arkad, Yellow Calville, Heidhorn, Gipsy Girl (56 Vor.), Blushed Calville, Hibernal and Ostrokoff's Glass.

It is not fair to assert, however, that the remainder of the list is too tender for culture in Minnesota; nor, on the other hand, can entire hardiness be claimed for the above list.

The foregoing notes merely tell the action of the varieties named under certain conditions, and, so far as location is concerned, it should be borne in mind that these conditions were decidedly the most severe that could be chosen.

A comparison of the foregoing list with the Duchess will prove interesting. While the average of the Duchess trees did not stand the winter much, if any, better than Antonovka, which killed back to old wood, there were a few trees that produced good growth from buds near the base of the one-year-old branches, and averaging twenty-two inches in length. The Duchess seems to have, in an unusual degree, the power of recovery from winter injury, and it may be that many other Russians will develop the same quality. The Duchess has long been known to winter kill in this latitude, but all apple growers regard it as a safe investment, and they take it as a standard of hardiness.

The experimental orchard in its two year's history has shown sixteen varieties of apples to be hardier than Duchess, when grown under exactly similar conditions, and side by side. There yet remains in the Russian nursery over one hundred and fifty varieties to be subjected to the same test that these have stood. When an effort is made to name sixteen varieties of *native* apples which would show equal hardiness under the same conditions, the comparison must result favorably to the Russians.

The following varieties of Russian apples have been grown on the grounds of this station, either in orchard or nursery. We have about 3,000 young trees two and three years old which will be distributed in the spring of 1888 in small quantities, for trial, to the several experiment stations of the State Horticultural Society, and to careful cultivators in each county of the State for the purpose of testing the adaptation of these apples to the diversities of soil and climate found in Minnesota:

LIST OF VARIETIES.

	Great Mogul,		Bellordoskoe,
	Anisomovka,		Karalovka,
	Gipsy Girl,		Reinette Red,
	Summer Calville,		Karitsnoe Potasdtoe,
	Bowery,		Gaine's Swedisher,
	Aport Rother,		Grand Duke Constantine,
	White Transparent,		Arabian,
	Cardinal Cellina,		Yellow Transparent,
	Ostronskoe,		Sklanka Bog,
	Aport Orient,		Rinabouski,
	Peter the Great,		Antinouka,
	Groskoe Sklanka Gruner,		Charlottenthaler,
	Gros Mogul,	285	Juicy,
	Shining Aromatic,	286	Kremer,
	Moskaroe,	290	Ukraine,
	Cardinal,	304	Switzer,
	Moscow,	316	Red Queen,
	Vineuse Rouge,	317	White Pigeon,
61	Noble Redstreak,	321	Sweet Pipka,
70	Winter Pear,	322	Cinnamon,
105	Russian Gravenstein,	323	Reponka,
111		324	German Kalville,
120		328	Peterhoff,
128	Sheepnose,	330	Juicy Streaked,
151	Sweet Miron,	337	Grayest,
153	Juicy Transparent,	339	White Queen,
157	Juicy White,	340	Liveland Raspberry,
161	Longfield,	343	Red Wine,
162	Buschbon,	350	Burr,
164	Heidorn,	354	Spiced Aromatic,
166	Summer Aport,	356	Round Borsdorf,
167	Yellow Sweet,	361	Pointed Pipka,
169	Green Sweet,	364	White Vochin,
170	Revel Glass,	365	
177	Green Streaked,	367	Stripe,
180	Negoloff,	371	German Skrute,
181	Champagne Pippin,	375	Cinnamon Pine,

LIST OF VARIETIES — Continued.

184 Arabian,
185 Anisette,
187 Glass Green,
190 Tiesenhausen,
196 Sweet Stripe,
200 Red Repka,
202 Hare Pipka,
203 Arcad,
206 Czar's Thorn,
207 Stupka,
208 Korolevskoe,
210 Vinograd,
213 Stepanoff,
214 Garden,
215 Bushy,
217 Sweet Sugar,
224
230 Titovka,
240 Recumbent,
242 Broad Cheek,
243 Throne,
245 Borovinka,
246 Prolific,
247 Popoff,
252 Aport,
260 Winter Stripe,
262 Charlamoff,
264 Smelling,
265 Bitter Pipka,
267 Pear,
269 Rosy Aport,
272 Little Hat,
275 Zolotoreff,
276 Half Glassy,
277 Lead,
82 Veronesh Reinette,
599 Romna,
874 Sweet Mushroom,
940
962 Queen Muscatels,
971 Vasilist Largest,
975 Red Teat,
977 Aromatic,
984 Koursk Anis,
988 Pineapple,
1260 Red Raspberry,
Vor. 6
" 9

378 Hibernal,
380 Moscow Pear,
382 Russian Green,
387 Good Peasant,
398 Enormous,
401
406 Sweet Pipka,
407 Blackwood,
408 Gen. Sreig,
413 Cross,
424 Bergamot,
427 Anissunis,
428 Fonaric,
432
437 Saxonian,
442 Yellow Calville,
444 Lubsk Reinette,
447 Kiev Reinette,
448 Cardinal,
450 Handsome White,
455 Berry,
457 Klineff,
461 Ribbed,
468 Pointed White,
469 Grandmother,
475 Holdfast,
476 Red Arkad,
492
515
540
557 Streaked Revel,
565 Worgunok,
574
578 Leipzig Bordorf,
579 Summer Lowland,
585 Zusoff's Winter,
Vor. 99
M, 4 Ostrokoff's Glass.
" 5 Royal Table,
" 30 Ledenets,
" 98
" 136
" 148
" 149
T, 1
" 2
" 5
" 11

LIST OF VARIETIES—Continued.

Vor. 21
" 38
" 41
" 50
" 64
Arkad,
Antinovka,
Aport Orient,
Arabskoe,
Borovinka,
Dobrin Krestiana,
Early Sweet (Vor.),
English Pippin,
Green Sugar,
Gruchevka,
200 Rosy Little Turnip,
202 Hare Pipka,
206 Czar's Thorn,
252 O'Porto,
262 Charlamoff,
277 Wargul,
282 Woronech's,
284 Kremer's Glassy,
286 Kremer's (seedling),
316 Red Queen,
361 Pointed Pipka,
365
375 Browny Pine,
382 Russian Green,
402 Borsdorf,
407 Blackwood,
410 Little Seedling,
413 Cross,
4 M Ostrokoff's Glass,
24 " Sandy Glass,
29 " Melonen,
87 " Herren,
140 " Czar's Thorn,
149 " Revel Glass,
38 Vor. Flat Veronesh,
50 " Cinnamon,
52 "
Possarto Nalin,
Sklanka,
Simbrisk,
164 Heidarn's Streaked,
181 Champagne Pipka,

T 15
" 18
" 21
" 25
" 31
Large Borsdorfer,
Plodovitka,
Serinka,
Yellow Transparent,
105 Russian Gravenstein,
122 Borsdorf Revel,
169 Green Sweeting,
177 Green Streaked,
185 Anisette,
187 Glass Green,
442 Yellow Calville,
447 Queen of Kiew,
447 Klineff's.
469 Grandmother,
477 Christ Birth,
502 Rus. Rambour Queen,
599 Omensk,
934
984 Koursk's Anisette,
1277
3 M Lead,
4 " Ostrokoff's Glass,
18 " Anisim,
20 " Kursk Reinette,
22 " Blushed Calville,
5 Orel (Names Orel list all lost.)
21 Vor. Yellow Calville,
56 " Gipsy Girl,
230 Titus,
243 Throne,
252 O'Porto,
268 Saccharine,
269 O'Porto Rosy,
275 Zolotoreff's,
282 Woronech,
292 Imperial,
304 Switzer,
315 Lord's Herrenapfel,
321 Sweet Pipka,
363
365
378 Hibernal,

*

LIST OF VARIETIES — Continued.

210 Cut Wine,
214 Garden Apple,
215 Bushy,
3 M Lead,
87 " Herren,
140 " Czar's Thorn,
184 "
52 Vor.
428 "
Arabskoe Vor.
Plodovitka,
English Pippin,
Arkad.
437 Saxonian,
475 Holdfast,
984 Koursk's Anisette,
Gruchevka,
Harvey,
Dartt's Seedling,
122 Borsdorf Revel,
225 Getman's Bean,
268 Saccharine,
363
964 Autumn Streaked,
982 Round White,

EXPERIMENTS IN WHEAT CULTURE.

While numerous experiments have been conducted in other states, and at other stations, to determine the effects of quantity of seed, depth of seeding, and time of planting, upon the yield and quality of the crop, these experiments have been confined almost exclusively to the *winter varieties*, and are therefore not applicable to the agriculture of Minnesota where *spring wheat* and a *short* season of growth are the prevailing conditions.

The following experiments have been carried on for two years, and will be continued with some modifications until some definite conclusions can be reached. The summer of both 1886 and 1887 were marked by unusual heat, and deficiency of rainfall, and these conditions, combined with the ravages of chinch bugs and grasshoppers, reduced the yield of the experimental plats far below the average of the farm.

The seed used both seasons was the "Blue Stem," sown with a Hoosier drill, with a "press regulator attachment," by which both the quantity and depth could be accurately adjusted.

The experimental plats of grains, containing thirty-three varieties of wheat, eighteen varieties of oats, and six varieties of barley, were entirely destroyed by the flood of "chinch bugs" which swept over our grounds the first week in July, and these tests of varieties will have to be repeated in 1888.

LIST OF VARIETIES — Continued.

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THICK AND THIN SEEDING.

1886.

No. of Plat.	Depth of Seed.	Quantity Per Acre.	When Sown.	When Up.	When Ripe.	When Cut.	Yield Per Acre.
7	1½ in.	4 pecks	May 7	May 13	Aug. 1	Aug. 6	1208 lbs.
8	1½ in.	5 pecks	May 7	May 13	Aug. 1	Aug. 6	1012 lbs.
9	1½ in.	6 pecks	May 7	May 13	Aug. 1	Aug. 6	1096 lbs.
10	1½ in.	7 pecks	May 7	May 13	Aug. 1	Aug. 6	1152 lbs.
11	1½ in.	8 pecks	May 7	May 13	Aug. 1	Aug. 6	912 lbs.

1887.

5	2 in.	4 pecks	April 29	May 7	July 22	July 22	757½ lbs.
4	2 in.	5 pecks	April 29	May 7	July 22	July 22	877½ lbs.
3	2 in.	6 pecks	April 29	May 7	July 22	July 22	755 lbs.
2	2 in.	7 pecks	April 29	May 7	July 22	July 22	912½ lbs.
1	2 in.	8 pecks	April 29	May 7	July 22	July 22	677½ lbs.

DEEP AND SHALLOW SEEDING.

1886.

1	1½ in.	6 pecks	May 6	May 13	July 30	Aug. 6	1260 lbs.
2	2 in.	6 pecks	May 6	May 14	July 30	Aug. 6	1300 lbs.
3	2½ in.	6 pecks	May 6	May 15	July 30	Aug. 6	1220 lbs.
4	3 in.	6 pecks	May 6	May 16	July 30	Aug. 6	1208 lbs.
5	3½ in.	6 pecks	May 6	May 17	July 30	Aug. 6	1288 lbs.
6	4 in.	6 pecks	May 6	May 18	July 31	Aug. 6	1360 lbs.

1887.

6	1½ in.	6 pecks	April 29	May 7	July 22	July 22	782½ lbs.
7	2½ in.	6 pecks	April 29	May 8	July 22	July 22	895 lbs.
8	3½ in.	6 pecks	April 29	May 10	July 25	July 25	687 lbs.
9	4½ in.	6 pecks	April 29	May 10	July 28	July 28	937½ lbs.
10	5½ in.	6 pecks	April 29	May 12	July 30	July 30	1030 lbs.

EARLY AND LATE SEEDING.

1887.

11	2½ in.	6 pecks	May 12	May 20	Aug. 4	Aug. 4	870 lbs.
12	2½ in.	6 pecks	May 21	May 29	Plats 12, 13, 14 and 15 came up well, tillered finely, but were entirely destroyed by chinch bugs.		
13	2½ in.	6 pecks	June 1	June 7			
14	2½ in.	6 pecks	June 15	June 20			
15	2½ in.	6 pecks	June 30	July 3			

EXPERIMENTS IN POTATO CULTURE.

QUANTITY OF SEED, AND METHODS OF CUTTING.

These experiments were undertaken to determine the influence of quantity of seed and methods of cutting upon the time of ripening, and the productiveness of the crop. The ground used for the experiments has been under cultivation for twenty-four years, and was of moderate fertility; it had been deeply plowed in the fall of 1886, and again in April, 1887, and was in good mechanical condition.

The variety of potatoes planted was the Early Rose; all the tubers were large, well matured, and were cut as planted. The early part of the season was very favorable for vegetation, and all the plants made a vigorous growth, but the severe drought of midsummer, the persistent attack of "potato bugs," and a leaf blight, which made its appearance the first week in August, seriously reduced both the yield and quality of the crop. The details of the experiments will be found in the following table.

During the season of 1887 we have continued the experiments of four years past, in the test of varieties, and had three hundred and seventy under cultivation, and after five years' experience with these varieties, embracing all that are valuable in this country and Europe, I can but repeat the conclusions of my last report.

1. Out of the great number of varieties tested, but a few possess all the qualities desirable for a table or market potato in our state, however valuable they may be elsewhere. Among them I will mention as especially worthy of cultivation, Beauty of Hebron, Burbank Seedling, Chicago Market, Clark's No. 1, Dakota Red, Early Household, Early Sunrise, El Paso, Garfield, Mammoth Pearl, White Star, White Elephant and Snow Flake.

2. That change of climate, soil, and season will not restore the lost stamina of the favorites of the past, in which the diseases and defects of years of cultivation have accumulated.

3. That productiveness and quality of this tuber can only be secured by growing from the seed, and developing new varieties which by careful selection, cultivation and crossing, will be adapted to the peculiar conditions of the respective portions of our country.

No. of Plat.	Date of Planting.	Distance of Seed Apart.	Weight of Seed.	When Up.	When Matured for Table Use.	When Harvested.	YIELD PER PLAT, In Pounds.				Yield Per Acre, Pounds.	Weight of Seed Per Acre, Pounds.	Pounds of Yield to One Pound of Seed.	Yield Per Acre, Bushels.
							Large.	Med.	Small.	Total.				
1	April 26	18 in.	15.6 lbs.	May 15	July 8	Aug. 22	59	29	20½	108½	15732.5	2262	6.9	262
2	April 26	18 in.	14.4 lbs.	May 15	July 4	Aug. 22	57	21	17	95	13775	2088	6.6	229
3	April 26	15 in.	13.1 lbs.	May 17	July 10	Aug. 22	37	39½	23	99½	14427	1899	7.6	240
4	April 26	15 in.	11.2 lbs.	May 17	July 10	Aug. 22	46	25	20	91	13195	1624	8.1	220
5	April 26	15 in.	11 2 lbs.	May 16	July 10	Aug. 22	43	34	31	108	15660	1624	9.6	261
6	April 26	12 in.	5.6 lbs.	May 18	July 12	Aug. 22	58	26	14	98	14210	812	17.5	237
7	April 26	12 in.	5.6 lbs.	May 18	July 10	Aug. 22	68	36	20	124	17980	812	22.1	300
8	April 26	9 in.	3.8 lbs.	May 19	July 12	Aug. 22	74	21	18	113	16385	551	30	273

REMARKS.

Plat No. 1. Was planted with large, whole seed.

" 2. Whole seed, with all the eyes cut out but two.

" 3. Large seed, halved lengthwise.

" 4. Large seed, halved crosswise, butt ends.

" 5. Large seed, halved crosswise, seed ends.

" 6. Large seed, butt ends, cut in quarters.

" 7. Large seed, seed ends, cut in quarters.

" 8. Large seed, cut in pieces, containing two eyes each.

EXPERIMENTS IN THE PROPAGATION OF THE POTATO PLANT.

In the spring of 1887 we received from the department of agriculture, Washington, a package containing two small potatoes, averaging two ounces each, of the new variety called "Polaris;" and, wishing to secure as large a crop as possible for seed, the eyes were carefully cut from each, then again halved, and planted separately in two inch pots, and placed in a moderate hotbed on April 11th, and transferred to the open field June 11th. The plants were fully matured September 10th, when they were harvested and weighed; the sixty plants set out yielding twenty-six and one-half pounds.

The two potatoes left after the eyes were removed, as above, were also placed in the hotbed at the same date, and sixteen sprouts were thrown up; these were separated from the potato when about four inches in height, cut in two, and rooted in the manner employed for soft wood cuttings, and on June 11th were planted in the field by the side of the first lot. They were ripe August 20th, harvested September 10th, and the twenty-seven plants set out yielded seventeen and one-half pounds of potatoes, larger and much more even than those grown from the eyes. The first yielded seven and two-thirds ounces to the plant, and the second yielded ten and two-thirds ounces to the plant. The total yield was forty-four pounds, or one hundred and seventy-six ounces to one ounce of seed. This increase of yield could have been carried much further by the multiplication of plants from the successive growths of stems.