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POTATOES, WILD AND CULTIVATED.

BULLETIN NO. 86
JANUARY, 1911

POTATOES
T. S. PARSONS, Agronomist.

Bulletins will be sent free upon request. Address: DIRECTOR
EXPERIMENT STATION, Laramie, Wyo.
Wyoming Agricultural Experiment Station

UNIVERSITY OF WYOMING

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POTATOES.

INTRODUCTION.

The potato (Solanum tuberosum Linn) commonly called Irish, round or white potato, to distinguish it from the Southern sweet potato, is a farm crop grown for its tubers, which are used largely for human food and for stock food and for the manufacture of starch and alcohol. The genus Solanum comprises about 1,000 species scattered throughout the world. Only about twenty of them are tuber bearing and only six of these are considered distinct species. Of these six only Solanum tuberosum is known agriculturally. Solanum tuberosum occurs as a native in the hill county of Chile and Peru and some forms occur in Mexico, and the specimens shown in the cut on the front page were found by the writer in southern Colorado.

The potato is perennial by means of its tubers. The tuber is an underground stem; it bears buds, which are commonly called eyes, and, when planted, tends to produce plants similar to its parent; hence tubers are used for perpetuating a variety, and such are generally designated “seed tubers” or “seed.”

HISTORY.

The potato is thought to have been cultivated in Peru for 2,000 years. Spanish explorers found the Peruvians cultivating it in 1542 and sent tubers to Europe, and it was introduced into Ireland in the year 1586. The Virginia colonists probably obtained their potatoes from the Spanish.

The potato did not become widely distributed in Europe until the latter part of the eighteenth century. Potato culture
spread slowly in Europe, but more rapidly in Ireland, because the peasants realized that the potato was a useful food and planted it everywhere. Two and a half centuries of reliance upon this crop led to the neglect of other crops, and when the blight occurred in Ireland in 1846 it was attended by one of the worst famines known in Europe. The potato has been more highly developed in Europe than in America and much higher yields are secured there than in this country.

**POTATOES AS FOOD.**

Next to rice, the potato is the most extensively grown and the most valuable crop in the world. The annual yield for the world is 5,000,000 bushels. One acre of potatoes frequently furnishes as much human food as ten acres of wheat, and wherever wheat is a precarious crop, as in northern Europe, potato-growing has been highly developed.

The potato is a staple article of diet in almost every household, and it is considered a wholesome and nutritious food. The assumption that potatoes are not a healthful, wholesome food because they contain so large a percentage of starch has not been proven. In exceptional cases there may be persons who for some reason cannot eat starchy foods, so that the eating of potatoes must also be foregone; but this is no reason why potatoes as a rule are not a useful and wholesome article of diet. A Department of Agriculture bulletin* makes the following statement: "The most important groups of constituents in foods are protein (nitrogenous matter), fats, and carbohydrates (starches, sugars, etc.). The potato is essentially a starchy food, and eaten alone it would furnish a very one-sided, badly balanced diet, but when eaten with meat, eggs, fish, etc., which are essentially nitrogenous foods, an evenly balanced diet, which is most conducive to health and vigor, is secured." The potato also contains a large percentage of water, although not as much as turnips, cabbage and some of

*Farmers' Bulletin No. 84.
the other vegetables. In experiments on the digestibility of potatoes by man carried on by the Minnesota Experiment Station, it was found that 71.9 per cent of protein and 93 per cent of the carbohydrates were digested or assimilated. In these experiments the potatoes were eaten with some eggs, milk and cream, so the conditions were about normal.

**EXPERIMENTS IN POTATO GROWING.**

The climate and soils of Wyoming are well adapted to potato growing, and under fairly average conditions good yields of potatoes will be obtained. The experiments described in this bulletin cover the years 1909 and 1910 and the experiments were mostly along variety comparison tests. The season of 1909 was an exceptionally good year as to length of season and amount of precipitation, while the season of 1910 was much below the average in these respects. A killing frost came on the 6th of June and a freeze came the 24th of August, at which time the mercury dropped to 20 degrees. The result was that the vines were all killed and the potatoes stopped growing. The tubers ripened, however, so that their keeping qualities were not injured to any great extent, but the potatoes were all small.

Some work in selection of hills was done during both years and the results show an increase in yield for the selected hills over the ordinary. In the variety tests only single rows were planted. In some varieties a quarter acre was planted so that average yields for an acre were obtained. The potatoes were planted with a horse planter from 4 to 6 inches deep and rows 3 feet apart and 12 to 16 inches apart in the row.

The following tables give the results for the two years, Table I giving the results of the variety tests and Table II giving the results for the larger areas in Fields “B” and “C.”
<table>
<thead>
<tr>
<th>NAME OF VARIETY</th>
<th>Amount Planted</th>
<th>Condition of Vines at Time of Frost</th>
<th>No. Cultivations</th>
<th>No. Irrigations</th>
<th>Date of Digging</th>
<th>Yields</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ordinary</td>
<td>Select</td>
<td>Ordinary</td>
<td>Select</td>
<td></td>
</tr>
<tr>
<td>Hamilton Early</td>
<td>2 rows</td>
<td></td>
<td></td>
<td>Poor</td>
<td>Fair</td>
<td>4</td>
</tr>
<tr>
<td>Early Strawberry</td>
<td>2 &quot;</td>
<td></td>
<td></td>
<td>Good</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Nortens Beauty</td>
<td>2 &quot;</td>
<td></td>
<td></td>
<td>Poor</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>White Victor</td>
<td>2 &quot;</td>
<td></td>
<td></td>
<td>Good</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Acme</td>
<td>2 &quot; 2 rows</td>
<td></td>
<td></td>
<td>Very good</td>
<td>Very good</td>
<td>4</td>
</tr>
<tr>
<td>Early Six Weeks</td>
<td>2 &quot; 2 rows</td>
<td></td>
<td></td>
<td>Fair</td>
<td>Good</td>
<td>4</td>
</tr>
<tr>
<td>Triumph</td>
<td>2 &quot;</td>
<td></td>
<td></td>
<td>Poor</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Algoma</td>
<td>2 &quot;</td>
<td></td>
<td></td>
<td>Fair</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Early Ohio</td>
<td>2 &quot; 2 rows</td>
<td></td>
<td></td>
<td>Good</td>
<td>Very good</td>
<td>4</td>
</tr>
<tr>
<td>Extras</td>
<td>1½ &quot;</td>
<td></td>
<td></td>
<td>Good</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Delmany Challenge</td>
<td>1½ &quot;</td>
<td></td>
<td></td>
<td>Good</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Pierce</td>
<td>2 &quot;</td>
<td></td>
<td></td>
<td>Fair</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Ohio Junior</td>
<td>2 &quot;</td>
<td></td>
<td></td>
<td>Fair</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>White Ohio</td>
<td>2 &quot; 2 rows</td>
<td></td>
<td></td>
<td>Very good</td>
<td>Very good</td>
<td>4</td>
</tr>
<tr>
<td>Early Six Weeks.</td>
<td>¼ acre</td>
<td></td>
<td></td>
<td>Good</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>White Ohio.</td>
<td>¼ acre</td>
<td></td>
<td></td>
<td>Good</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>
## TABLE II.—POTTAEOES IN FIELD C, 1909.

<table>
<thead>
<tr>
<th>VARIETY</th>
<th>Area, Sq. Ft.</th>
<th>Yield, Lbs.</th>
<th>Yield Lbs. per A.</th>
<th>Yield Bu. per A.</th>
<th>Avg. Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohio Junior, 1 and 2</td>
<td>505</td>
<td>105</td>
<td>9,068</td>
<td>150.9</td>
<td>136.7</td>
</tr>
<tr>
<td>Ohio Junior, 3 and 4</td>
<td>645</td>
<td>90</td>
<td>6,077</td>
<td>101</td>
<td>...</td>
</tr>
<tr>
<td>Ohio Junior, 5 and 6</td>
<td>600</td>
<td>134</td>
<td>9,297</td>
<td>154.4</td>
<td>...</td>
</tr>
<tr>
<td>Ohio Junior</td>
<td>900</td>
<td>170</td>
<td>8,228</td>
<td>137.1</td>
<td>...</td>
</tr>
<tr>
<td>White Victor</td>
<td>675</td>
<td>180</td>
<td>11,620</td>
<td>193.6</td>
<td>208.6</td>
</tr>
<tr>
<td>White Victor</td>
<td>675</td>
<td>200</td>
<td>12,910</td>
<td>215.1</td>
<td>...</td>
</tr>
<tr>
<td>White Victor</td>
<td>645</td>
<td>185</td>
<td>12,500</td>
<td>208.3</td>
<td>...</td>
</tr>
<tr>
<td>White Victor</td>
<td>885</td>
<td>265</td>
<td>13,650</td>
<td>217.5</td>
<td>...</td>
</tr>
<tr>
<td>White Ohio</td>
<td>885</td>
<td>177</td>
<td>9,285</td>
<td>153.9</td>
<td>153.0</td>
</tr>
<tr>
<td>Delmany Challenge</td>
<td>885</td>
<td>238</td>
<td>11,720</td>
<td>195</td>
<td>195</td>
</tr>
<tr>
<td>Pierce</td>
<td>685</td>
<td>263</td>
<td>16,730</td>
<td>278.8</td>
<td>269.4</td>
</tr>
<tr>
<td>Pierce</td>
<td>705</td>
<td>235</td>
<td>14,520</td>
<td>242</td>
<td>...</td>
</tr>
<tr>
<td>Six Weeks (select)</td>
<td>690</td>
<td>227</td>
<td>14,350</td>
<td>239</td>
<td>242.4</td>
</tr>
<tr>
<td>Six Weeks (early)</td>
<td>680</td>
<td>227</td>
<td>14,540</td>
<td>242.3</td>
<td>...</td>
</tr>
<tr>
<td>Noroton Beauty</td>
<td>710</td>
<td>237</td>
<td>14,540</td>
<td>242.3</td>
<td>...</td>
</tr>
<tr>
<td>Acme</td>
<td>680</td>
<td>232</td>
<td>14,860</td>
<td>247</td>
<td>...</td>
</tr>
<tr>
<td>Algoma</td>
<td>630</td>
<td>198</td>
<td>13,750</td>
<td>228.3</td>
<td>...</td>
</tr>
<tr>
<td>Algoma</td>
<td>630</td>
<td>728</td>
<td>15,460</td>
<td>258</td>
<td>...</td>
</tr>
<tr>
<td>Triumph</td>
<td>670</td>
<td>138</td>
<td>10,545</td>
<td>176</td>
<td>220.8</td>
</tr>
<tr>
<td>Hamiltons Early</td>
<td>690</td>
<td>228</td>
<td>13,030</td>
<td>250.5</td>
<td>239</td>
</tr>
<tr>
<td>Early Ohio Select</td>
<td>690</td>
<td>222</td>
<td>13,870</td>
<td>231.4</td>
<td>...</td>
</tr>
<tr>
<td>Early Ohio</td>
<td>390</td>
<td>77</td>
<td>12,600</td>
<td>215</td>
<td>215</td>
</tr>
</tbody>
</table>

### NOTES ON POTATOES, 1909.

Plowed alfalfa sod May 27, 7 inches.
Planked land for potatoes.
Harrowed both ways May 28.
Harrowed with weeder June 5.
Planted June 9.
Harrowed with weeder June 15.
Irrigated potatoes July 26.
Cultivated July 30.
Hoed and cultivated August 11.
Dug varieties September 16-18.
West section, beginning on north side:
Mixture varieties, 1 row.
Early Six Weeks No. 10, five rows.
Strawberry remainder of piece.
NOTES TAKEN SEPTEMBER 4.

Early Ohio—Medium size vine, early, compact form of top.

Hamilton's Early—Early vigor, good; blight, none.

Acme—Good vigor, some blight.

Morton Beauty—Very early, small vine.

Six Weeks—Good size to vine, vigor good, medium early; blight, medium.

Pilue—Excellent vigor and size.

Delmany Challenge—Good vigor.

White Ohio—Small vines, very early, light colored vines.

White Victor—Good-sized vines, medium vigor, medium early.

Ohio Junior—Scabby near surface, well grouped.

White Victor—Depth medium, scab medium, grouping somewhat spreading.

White Ohio—Few in hill, medium depth, well grouped.

Delmany Challenge—Many in hill, grouping, considerable spreading, depth medium to deep.

Pierce—Medium depth, medium spreading.

Early Six Weeks—Depth medium to shallow, compact in hill, medium free from scab.

Morton Beauty—Depth medium to shallow, very spreading, considerable scab.

Acme—Deep, compact in hill, medium free from scab.

Algoma—Spreading, medium deep.

During the years 1909 and 1910 experiments were carried on to note the effect of a different number of irrigations in potatoes, different plots being irrigated one, two, three and four times. The results for 1909 would denote that three times is the best number. The results in 1910 were hindered by the early frost, so no conclusions could be reached. It will be necessary to continue the experiment through another year to
Potatoes.

reach any definite conclusion. The results of the two years are given in Table III. The plat in 1909 was treated as follows on the dates given:

May 22. Plowed plat.
May 22. Harrowed with spike-tooth and floated.
May 28. Harrowed both ways.
May 29. Harrowed with weeder.
June 23. Harrowed with weeder.
July 8. Cultivated with horse cultivator.
July 28. Irrigated first time.
July 30. Cultivated.
Aug. 3. Hoed.
Aug. 11. Cultivated.

Treatment of potatoes in 1910 was as follows:

May 24. Planted.
July 5. Cultivated.
July 25. Irrigated first time.
Aug. 24. Hard frost, all tops killed.

The potatoes ripened after frost, but all growth was stopped, so potatoes were small.
TABLE III.—IRRIGATION TESTS ON POTATOES, 1909 AND 1910.

<table>
<thead>
<tr>
<th>PLOT OR VARIETY</th>
<th>Amount Planted</th>
<th>Times Irrigated</th>
<th>Yields</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1909</td>
<td>1910</td>
<td>1909</td>
</tr>
<tr>
<td>Plot 1</td>
<td>10 rows</td>
<td>1</td>
<td>825</td>
</tr>
<tr>
<td>Plot 2</td>
<td>10 &quot;</td>
<td>2</td>
<td>995</td>
</tr>
<tr>
<td>Plot 3</td>
<td>10 &quot;</td>
<td>3</td>
<td>1215</td>
</tr>
<tr>
<td>Plot 4</td>
<td>10 &quot;</td>
<td>4</td>
<td>1180</td>
</tr>
<tr>
<td>Plot 1 a</td>
<td>10 &quot;</td>
<td>1</td>
<td>895</td>
</tr>
<tr>
<td>Plot 2 a</td>
<td>10 &quot;</td>
<td>2</td>
<td>940</td>
</tr>
<tr>
<td>Plot 3 a</td>
<td>10 &quot;</td>
<td>3</td>
<td>1065</td>
</tr>
<tr>
<td>Plot 4 a</td>
<td>10 &quot;</td>
<td>4</td>
<td>920</td>
</tr>
<tr>
<td>Algoma</td>
<td>1/4 A.</td>
<td>1</td>
<td>300</td>
</tr>
<tr>
<td>Norten Beauty</td>
<td>1/4 A.</td>
<td>2</td>
<td>204</td>
</tr>
<tr>
<td>Acme</td>
<td>1/4 A.</td>
<td>3</td>
<td>440</td>
</tr>
<tr>
<td>Early Strawberry</td>
<td>1/4 A.</td>
<td>4</td>
<td>582</td>
</tr>
</tbody>
</table>

The early frost affected the 1910 yields.

CUT VS. WHOLE SEED.

Most authorities agree that cut seed is better than whole seed for planting. Cut seed was used in all the experiments in this bulletin. Medium-sized potatoes were quartered. The potatoes may be cut by hand or by various sorts of machines. A very simple cutter used on the Experiment Farm consists of a block of wood four inches thick with an opening about six inches in diameter cut through it. Across this opening two knives are fitted at right angles to each other. The cutter is laid over a pail or basket and a potato laid on the knives and struck a blow with a wooden mallet. The potato is cut into four equal parts and the pieces fall into the receptacle below. From ten to fifteen bushels per hour can be cut by one man in this way.

There has been some controversy as to whether freshly-cut seed was better than seed that has been cut some time. Observations here go to show that there is no difference in the growing power between seed that has been cut a week or more and freshly-cut seed.

TIME OF PLANTING.

The time to plant potatoes varies with climatic conditions and locality. For early potatoes the seed should be
planted as early in the spring as the ground can be worked and the danger of hard frosts is over. For late potatoes that are to be kept over winter the seed should be planted later so that the potatoes may remain in the ground until cold weather.

**PLANTING POTATOES WITH HORSE PLANTER.**

**THE PLACE OF THE POTATO IN CROP ROTATION.**

In the West a good rotation is to have potatoes follow alfalfa, or, if this is not feasible, have them follow field peas. Potatoes go well in the three-year rotation scheme—alfalfa, potatoes, grain. Mr. E. H. Grubb, a prominent potato grower of Colorado, says that nothing but legumes should be used as a foundation crop for potatoes. He grows either clover or alfalfa for three or four years previous to a potato crop. The soil is broken in the fall quite deep and in the spring the soil is worked over quite thoroughly with the disc until it is thor-
oughly fined. Only one field of potatoes was planted in the season of 1910 following alfalfa sod. The alfalfa sod was broken in the spring and the ground prepared for potatoes. Three varieties were planted, twelve rows of each, the rows about twenty rods long, and the yields were: Early Six Weeks, 208 pounds; Norton Beauty, 51 pounds, and White Ohio, 114 pounds of sorted potatoes. The small yield is accounted for by the early frost which stopped all growth. The potatoes on this ground were more uniform in size and
Potatoes.

PREPARATION OF THE SOIL.

In providing a suitable soil for potatoes the fertility should be conserved. Live stock is the real basis of fertility in any agricultural district. The feeding of grains and grasses on the farm replaces in the soil the vegetable matter which produces the humus and furnishes the nitrogen which keeps up the fertility of the soil. In the mountain country, where water is the prime requisite, there is no better storage for water in the soil than decayed vegetable matter, as this vegetable matter makes the soil porous. It is impossible to grow potatoes without an open, porous soil, and it is important that the soil is well pulverized and firmed in order that the root system of the young plant may be able to secure plant food as quickly as possible.
CULTIVATION OF POTATOES.

Cultivation should begin as soon as possible after the seed is planted. Frequently harrow with the spike-tooth both lengthwise and crosswise of the rows. The harrow may be followed by the weeder as shown in the cut. This practice gets rid of the weeds so thoroughly that the use of the hand hoe is unnecessary. As the vines get larger the cultivator is used. On the Experiment Farm a two-horse, four-shoveled and a one-horse walking cultivator were used. The writer would prefer a six-shoveled to a four-shoveled cultivator, as the narrower shovels stir up the soil better. Cultivation should not be too deep. Frequent shallow cultivation keeps the surface of the soil loose, conserves the moisture and gives a chance for the root system to spread.

IRRIGATION OF POTATOES.

If the seed-bed is well prepared and the potatoes thoroughly cultivated they will seldom need irrigation until July. Irrigation water is generally cold and it is important not to irrigate too frequently, for the water causes the soil to run together and lowers the temperature to a degree that is unfavorable to the young plants. Water should be applied only when the plants indicate that they are in need of it by the darker color of the foliage, or one may dig down into a hill and press a handful of soil in the hand. If it fails to retain its form, irrigation is needed. Care should be taken, however, that the ground does not get too dry, as the growth will be stopped. It has been the experience that if potatoes are grown as rapidly as possible so as to become strong and well established early in the season they will stand the maximum of unfavorable conditions later on in the season. Irrigation and irritation go well together. When ready to irrigate a V-shaped trench is run between alternate middles with a lister or double moldboard plow which throws the soil each way. In these furrows the irrigation water is run so as to keep the soil from
solidifying by flooding and to keep the water away from the plants. For the second irrigation furrows are opened in the middles that were not opened for the first irrigation. For succeeding irrigations this alternation is continued. Cultivation should be resumed as soon after irrigation as this soil will permit so that growth will not be checked. Do not irrigate after the middle of August, for the potatoes must be given sufficient time to ripen in dry earth. Irrigation affects to a great extent the uniformity and vitality of the potato crop.

**SELECTION OF SEED POTATOES.**

When the potatoes are ripe enough to keep, but before they are dug and when the vines are still green and in good condition, is the time to select potatoes to be saved for seed. Go into the potato field and look for strong, healthy-looking tops. A strong, healthy top is evidence of good potatoes. When a hill has been selected, dig into it. If the potatoes are uniform in size and smooth and true to type, mark the hill to save for seed. A strong, healthy hill containing ten or twelve medium-sized potatoes, uniform and smooth, is a better hill for seed than one containing only five or six very large potatoes. Potatoes selected from the bin are not as good for seed, as they will not be uniform and will not produce as uniform a crop. There is not much extra work involved in this method of selection, as a man can pass through a field and examine and mark the selected hills very rapidly; then when the potatoes are dug these hills can be kept by themselves. There is no other way to get true breed characteristics in potatoes except by selecting seed from the perfect hill, and seed should be selected only from hills producing first-class marketable potatoes in the growing of which there is no waste of plant food.

The number of bushels of seed required per acre depends on whether the potatoes are planted in hills or drills and on the size or number of pieces into which the potatoes are cut. A government bulletin* gives the following estimate of the

*Farmers' Bulletin No. 35.
number of bushels of seed required per acre. A bushel of seed potatoes (sixty pounds) makes 240 quarter-pound tubers. When the seed pieces are planted a foot apart in three-foot rows, an acre requires 14,520 sets. When the tubers averaging four ounces are employed an acre requires at these distances sixty bushels for planting whole potatoes, thirty bushels when halves are used and fifteen bushels when quarters are used, as was the case on the Experiment Farm and with the horse planter the amount planted ranged from thirteen to sixteen bushels per acre, depending on the size of the potatoes. Seed cut to single eyes will require from five to seven bushels of seed per acre. Small whole potatoes may be utilized for seed without detriment to the succeeding crop, but the choice of small seed year after year will result in degeneration.

**HARVESTING AND STORING.**

The death of the vines is the signal for digging the main crop. For the early market potato growers do not wait for this, but are governed by the size of the tubers. As long as any portion of the vine is green the tubers can continue to grow, and the longer the vines can be kept green and free from blight the better the crop will be. Experiments have shown that more than one-third of the merchantable crop is made during the last month of growth.

In harvesting a large area the horse-power potato digger is generally used, and sometimes the potatoes are plowed out. On smaller areas the potato hoe or fork is used. In harvesting as well as in storage, potatoes should be exposed to light as little as possible. In storing potatoes a low temperature is required. The potato is uninjured by a temperature of 33° F. and one authority gives the freezing point of potatoes 30.2° F., and Mr. F. H. Grubb of Colorado says that potatoes will not freeze until the temperature falls below 28° F. Warmth favors sprouting, which injures potatoes both for planting and eating.

If the weather is not severely cold the potatoes can be:
Potted in the field. Smooth off a place in the field and pile the potatoes in as steep a pile as possible and cover with vines or straw and over this place a layer of earth, leaving a small opening at the top for the escape of the heat. As the weather grows colder a thicker layer of earth is put on. For the winter storage the outdoor cellar is the best. It should be dry and kept as cold as possible without freezing. The form of potato cellar used in the potato districts of Colorado is the best form. A dead air-space is constructed at each end and ventilators every few feet in the roof. If it is desired to lower the temperature the doors and ventilators are opened and a draft of air allowed to pass through. The cellar is always built in a line with the prevailing air currents. Mr. Grubb mentions an instance where potatoes were kept fresh in an old mine tunnel for two years where there was a current of air passing through and the temperature always remained at about 40°F. Potatoes should never be stored in sacks if it can be avoided. An important point in the storage of potatoes is to reduce the temperature as low as possible directly after the product is stored. The best plan is to put a layer of potatoes over the cellar floor about a foot deep, then wait a few days until the heat of these is carried off by the air currents, then another layer is added and so on until they are piled five or six feet deep if necessary.

POTATOES ON THE DRY FARM.

In the spring of 1909 one-half acre of potatoes was planted on the Frank Holliday farm, one and one-half miles west of the Experiment Farm, where experiments in dry farming were being carried on. These were given special cultivation to conserve the moisture, and owing to a greater amount of precipitation than usual during the fall months they matured a fair crop for dry land, the yield being ninety-one bushels per acre. In the spring of 1910 an area of 114 square rods was planted to potatoes. This area was spring-plowed and the ground being very hard could only be plowed to a depth of about four inches, consequently the crop suffered from drought
and were caught by the early frosts so that the yield for the area was but 500 pounds of sorted potatoes.

It has been demonstrated, however, that potatoes can be grown successfully by dry-farming methods; that is, by deep fall plowing and thorough cultivation, and dry-grown potatoes have proven superior in quality to irrigated potatoes. Dry-grown potatoes make the best seed for an irrigated crop.

This bulletin does not take up the subject of diseases and their treatments, as this subject is fully covered in Bulletin No. 71 of this station. The climatic conditions of Wyoming are such that potatoes are not so much troubled with the common diseases as they are in other regions. The crop of 1910 showed very little tendency to blight, but scab was somewhat prevalent and seemed to be aggravated by the addition of com-
Potatoes.

One-quarter acre of the crop of 1910 was given an application of ammonium sulphate and these potatoes showed a larger percentage of scab than any of the others. The experiment, however, is not a sufficient proof that the scabbing was caused by the fertilizer. The potatoes were also free from the attacks of the potato beetle, or potato bug, as it is commonly called. The altitude of this section of the state seems to be unfavorable to the development of the pest. The beetle may be kept off the vines by the application of paris green. The scab is treated by corrosive sublimate or formalin solutions and blight by spraying with Bordeaux mixture. Formulae for each of these treatments are given in Bulletin No. 71 of this station.

SUMMARY AND RECOMMENDATIONS.

1. A rich sandy loam, well drained and well supplied with vegetable matter, is the best soil for potatoes. Stiffer land may be improved as a potato soil by green-manuring and drainage, and lighter soils can be made sufficiently rich by the addition of green manures and fertilizers.

2. Potatoes should not as a rule be grown continuously on the same land, but should be alternated with other crops.

3. Never use poor seed. Plant only tubers that are sound, firm and unsprouted. If the seed is at all scabby, treat it with formalin before planting by soaking it two hours in a solution of one-half pint of formalin in fifteen gallons of water.

4. Plant medium-sized seed pieces, about one-quarter tubers, twelve or fourteen inches apart in the rows and rows far enough apart to cultivate with horse cultivator, three or three and one-half feet. Fifteen bushels is the minimum amount of seed that should be used per acre under irrigation. Plant less on dry farm.

5. Prepare the land thoroughly. Plow land in the fall. Disc and harrow well in the spring. Keep weeds out of potato rows by harrowing before potatoes are up. After plants are up use weeder often. Irrigate when ground needs it and cultivate again as soon as ground is fit after irrigating. Keep
surface soil stirred thoroughly and as often as necessary to keep weeds from starting. On dry farm keep the surface soil loose by shallow cultivation to conserve the moisture.

6. The time of planting depends on the climate of each locality. Potatoes that get a good start early in the season are better able to withstand adverse conditions later in the season.

7. Small potatoes may be used for seed one year, but no longer. Leading potato growers select for seed medium to large tubers of good shape. This is a good example to follow.

8. In harvesting the crop it pays to handle the potatoes carefully, as any injury affects their keeping qualities.

9. Pitting in the field until the potatoes have lost most of their heat is recommended.

10. Darkness and low temperature are primary requisites in the successful storing of potatoes.

11. There are about 10,000 hills on an acre of potatoes planted in rows three and one-half feet apart and fourteen inches apart in the row.

12. One eight-ounce potato in each hill will produce a yield of eighty-eight bushels per acre.

13. Many times one hill will produce six eight-ounce potatoes, which is at the rate of 520 bushels per acre.

14. The low yields secured on the average must be due to the failure of a large number of hills to produce.

15. Some of the things that cause the failure of hills are poor soil, improper preparation, poor seed, irregular planting, poor cultivation, bugs, diseases and unfavorable weather. Many of these conditions are controllable. All of them may be influenced by proper methods of culture.

16. The varieties of potatoes that have given the best yields at this station are Early Strawberry, Early Six Weeks, Early Ohio and White Ohio.

17. The following varieties are recommended for Wyoming: Early Strawberry, Early Six Weeks, White Ohio, Early Ohio, Blue Victor, Rural New Yorker, White Pearl and Peach Blow or Red McClure.