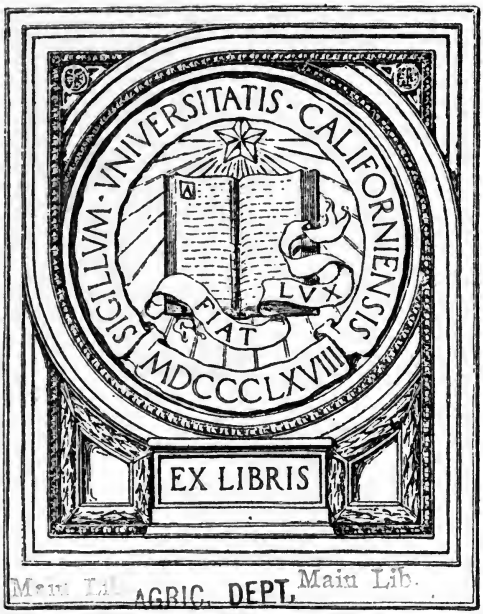


POTATO DEVELOPMENT WORK IN WISCONSIN

BULLETIN PREPARED BY THE

Wisconsin Potato Growers Association

The "Potato Special" Enroute Through the Commercial Potato Sections of Wisconsin

Thirty-four years ago the first car of potatoes was shipped out of Wisconsin. During 1913 the combined shipment of four railroads amounted to approximately 35,000 cars. This Association cannot attempt to relate the history of investment and development which has made this industry possible.

Today, however, the future promises a development of far greater significance than that of the past. The markets of the country demand attention to improved standards. This Association is confident that the plan of work presented in this bulletin will insure permanently a high standard for Wisconsin potato shipments in the markets of the country.

MADISON, WIS.
APRIL, 1914

Wisconsin Potato Growers Association

A Personal Letter to Wisconsin Potato Growers

There has never been a time in the history of commercial potato growing in Wisconsin when attention has been so well directed to the development of the industry as now. The single fact of a production of approximately 30,000,000 bushels indicates the magnitude of the potato industry in this state. However, there are problems of development concerning which averages of yields and acreage is of little value.

During the past ten years the Wisconsin Experiment Station has established and developed a plan of field extension work which has involved close co-operation with practical growers and affiliated commercial interests. The Wisconsin Potato Growers Association is an outgrowth of this movement. The work of the Association is affiliated in interest and method with all the agencies which are active in the agricultural development of the state.

The executive committee desires to say to Wisconsin growers that the subject matter here submitted has received careful attention. The plans of the Association have the endorsement of practical and successful men connected with all commercial phases of the industry.

Again the committee after careful investigation, desires to call attention to the fact that this work has assumed important national relationship. Many important commercial sections of the United States are concerned with problems which threaten the industry. Wisconsin may well feel fortunate in the extent of its available undeveloped resources.

The markets of the middle west demand attention to improved commercial standards. Wisconsin will be prepared to meet this demand through effective state leadership and the committee commends therefore to every progressive grower a consideration of the work of the Association accomplished during 1913, and attention to the work proposed for the coming year.

Respectfully submitted,

Madison, Wis., April, 1914.

J. W. Hicks.
President.

B. F. Faast
Treasurer.

J. G. Milward
Secretary.

EXECUTIVE COMMITTEE.

MEMBERSHIP.

Wisconsin Potato Growers Association.

ADAMS COUNTY

Douglas, G. P.	Big Flats

ASHLAND COUNTY

Sanborn, A. W.	Ashland
Beebe, R. H.	Ashland
Gingles, A.	Ashland

BARRON COUNTY

Johnson, J. H.	Chetek
Rauchenstein, J.	Rice Lake
Nelson, L. M.	Rice Lake
Nichols, W. J.	Chetek
Otis, F. D.	Barron

BAYFIELD COUNTY

Morgan, G. F.	Bayfield
Pease, L. D.	Cable
Flieth, W. H.	Cornucopia
Hauser, J. F.	Bayfield
Kern, F.	Bayfield
Black, J. M.	Bayfield

BURNETT COUNTY

Lind, Andrew E.	Siren
Peet, E. L.	Danbury
Roberts, L. R.	Webster

CHIPPEWA COUNTY

Barrett, W. E.	Thorp
Hart, J.	Chippewa Falls
Amundson, A. J.	New Auburn
Kienholz, Ralph	Stanley
Roe, Edwin	Stanley
Scott, L. E.	Stanley
Stelter, O. F.	Bloomer

CLARK COUNTY

Piper, Wm. J.	Thorp
Barrett, W. E.	Thorp
Sample, Floydell	Withee
Thompson, Ole	Curtiss

DANE COUNTY

Milward, J. G.	Madison
Olds, L. L.	Madison

DODGE COUNTY

Krueger, H. E.	Beaver Dam

DOOR COUNTY

Larkin, D. W.	Sturgeon Bay
Ellison Bay Company	Ellison Bay
Powers, W. C.	Ellison Bay

DOUGLAS COUNTY

Lucius, Jos.	Solon Springs
Webb, W. H.	Superior

DUNN COUNTY

Bartz, Paul	Downing

EAU CLAIRE COUNTY

Ingalls, G. R.	Eau Claire
Lufkin, G. W.	Eau Claire
Nelson, E. R.	Eau Claire
Wiesse, Wm.	Fall Creek
Faast, Ben. F.	Eau Claire
Calkins, C. C.	Fairchild

FLORENCE COUNTY

McGovern, Peter	Florence

FOND DU LAC COUNTY

Stack, J. M.	Eden
Sandquist, C. J.	Brandon

FOREST COUNTY

Anklam, A. R.	Hiles
Grandine, J. D.	North Crandon
Gruman, William	Laona
Marshall, C. H.	North Crandon
Petersen, L. W.	Wabeno
Roberts, T. J.	North Crandon

JACKSON COUNTY

Huseboe, Henry M.	Taylor

KEWAUNEE COUNTY

Gerhart, P. F.	Algoma

LAFAYETTE COUNTY

Gunderson, A. O.	Argyle

LANGLADE COUNTY

Beard, Chas.	Elcho
Beattie, H. C.	Antigo
Dewey, D. C.	Antigo
Filyes, L. W.	Bass Lake
Follstad, Anton	Elcho
Follstad, Carl	Elcho
Guptill, L. P.	Elcho
Kalowen, E.	Antigo
Moss & Lavis	Kempster
Stengl, Alois	Antigo
Sorenson, C. G.	Antigo
Stengl, Chas.	Antigo
Swoboda, F. G.	Antigo
McFarlan, L. K.	Bryant

LINCOLN COUNTY

Amelse, C.	Harrison
Atcheson and Larson	Tomahawk
Brooks, Hall L.	Tomahawk
Smith, F. J.	Merrill
Clark, Frank	Tomahawk
Clark, R. H.	Tomahawk
Froehlich, J. W.	Tomahawk
Gather, A.	Tomahawk
Gesell, E. G.	Tomahawk
Morse, A. H.	Tomahawk
Roesche, Wm.	Tomahawk
Swan, Peter	Harrison
Venske, A. G.	Tomahawk
Welty, Arthur	Merrill

MANITWOC COUNTY

Adelmann, Joseph	Manitowoc

MARATHON COUNTY

Hermanson, E.	Eldron
Knoller, C. G.	Dancy

MARINETTE COUNTY

Baker, H. C.	Marinette
George, O. B.	Marinette
Makovsky, A.	Athelstane
Parsons, H.	Crivitz
Lundgren, John	Pembine
Bogrand, George	Wausaukee
Redman, C.	Wausaukee
Enterprise Potato Farm	Wausaukee
Osborn, W. H.	Marinette
Ramsay, R. C.	Peshtigo
Welton, W. H.	Athelstane

MILWAUKEE COUNTY

Coe, N. M.	Whitefish Bay
Fisher, W. E.	Wauwatosa
MacGilfrey, C. D.	Milwaukee
Church, J. R.	

OCONTO COUNTY

Etheridge	Oconto
Coy, F. A.	Suring
Martineau, A	Gillett
Suring, Edward	Suring

ONEIDA COUNTY

Appleromp, A.	Pelican Lake
Baxter, H.	Rhinelander
Brann, Paul	Rhinelander
Beck, Otto	Bradley
Burkhart, Geo.	Rhinelander
Campbell, S. S.	Three Lakes
Clark, G. J.	Rhinelander
Crosby, C. P.	Rhinelander
Dawes, G. H.	Tomahawk Lake
Goodell, W. F.	Rhinelander
Gross, Chas.	Rhinelander
Hardell, W.	Rhinelander
Hess, John	Rhinelander
Jewell, W. P.	Rhinelander
Lamon, D. E.	Three Lakes
Luther, E. L.	Rhinelander
McLaughlin, O. H.	Rhinelander
McLaughlin, Frank	Rhinelander
Moran, B. M.	Rhinelander
Olson, W.	Rhinelander
Packard, C. D.	Rhinelander
Pazdernik, E.	Rhinelander
Smith, Ira E.	Cassian
Radke, Albert	Rhinelander
Rick, E. K.	Rhinelander
Sanders, Claude	Tomahawk Lake
Skochil, John	Monico
Scott, J. M.	Tripoli
Sorenson, James P.	Bradley
Swals, C. W.	Rhinelander
Taylor, Arthur	Rhinelander
Tomnson, J. P.	Cassian
Weideman, Henry	Rhinelander
Sparks, Wilbur	Pelican Lake
Kelley, T. J.	Bradley
Mikelson, C.	Hazelhurst

PEPIN COUNTY

Newcomb, H. L.	Pepin

PIERCE COUNTY

Blodgett, Harold E.	River Falls
Monness, O.	Beldenville

PORTAGE COUNTY

Frost, H. G.	Almond
Frost, E. D.	Almond
Gunderson, H. A.	Portage
Kollock, W. D.	Bancroft
Petersen, Peter	Amherst
Gibbs, R. C.	Stockton
Tobie, E. P.	Amherst Junction
Johnson, M. W.	Almond
Johnson, M. E.	Amherst
Crowell, O. A.	Almond

PRICE COUNTY

Griffith, R.	Phillips
Gruber, J. B.	Catawba
Hicks, J. W.	Prentice
Nelson, C. G.	Ogema
Peterson, C. August	Prentice
Remer, Edgar	Fifield
Hermanson, James	Prentice
Saunders, J. B.	Park Falls
Larson, L. J.	Ogema
Wagner, Lewis	Park Falls
Wollenberg, Carl P.	Phillips
Johnson, August	Spirit
Peterson, C. R.	Spirit
Marheine, W. J.	Ogema
Anderson, Otto	Spirit
Olson, Alfred	Ogema
Olson, Edwin	Spirit
Nelson, Nels A.	Spirit
Hammer, P. H.	Catawba
Young, E. A.	Phillips

ROCK COUNTY

De Groff, Fred	Clinton
Rood, L. P.	Milton

RUSK COUNTY

Apker, B. M.	Weyerhauser
Bates, R. W.	Bruce
Clarkson, M. R.	Conrath
Coon, C. P.	Bruce
Kuehl, E. G.	Conrath
Stahl, E. D.	Bruce

SAUK COUNTY

Paddock, F.	Baraboo
Carpenter, Geo.	Baraboo
Hinrichs, E.	Reedsburg
Toole, W. A.	Baraboo
Smith, W. E.	Reedsburg

SAWYER COUNTY

McClure, Edward	Hayward
Mossbak, Gunnar	Hayward
Rohlf, W. E.	Hayward
Uhrenholdt, S. J.	Hayward

SHAWANO COUNTY

Sorley, E. B.	Tigerton

TREMPEALEAU COUNTY

Imholdt, B. A.	Trempealeau

VERNON COUNTY

Olson, Alfred	Viroqua

VILAS COUNTY

Adams, W. H.	Eagle River
Evenson, H. O.	Minocqua
Bolgar, M. J.	Minocqua
Foelkner, Philip	Woodruff
Mayo, Jos.	Eagle River
Radcliffe, Amos	Eagle River
Ulrich, Francis	Eagle River
Foelkner, Christian	Woodruff

WALWORTH COUNTY

Hagerty, Thos.	Delavan

WAUKESHA COUNTY

Milham, Henry A.	Waukesha

WASHBURN COUNTY

Lyster, C. P.	Earl
Crocker, W. C.	Spooner
Stubfors, A. A.	Spooner
Thompson Co.	Spooner

WASHINGTON COUNTY

Opgenorth, John	Kewaskum
Schottler, C. J.	South Germantown

WINNEBAGO COUNTY

Rasmussen, N. A.	Oshkosh
Flaniken, P.	Oshkosh

WAUPACA COUNTY

Bailey, Ralph W.	Waupaca
Rowe, A.	Waupaca
Peter, Nels	Nicholson
Jensen, Soren	Waupaca
E. E. Brown	Waupaca
Jorgenson, F. T.	Waupaca
Christenson, C. N.	Waupaca
Constance, F. R.	Waupaca
Larson, L.	Iola
Anderson, Guy	Ogdensburg
Pinkerton, A. J.	Waupaca
Romon, F. E.	Weyauwega
Potts, A. R.	Waupaca
Holman, C. R.	Waupaca

Miller, C. J.	Waupaca
Hoy, Soren	Waupaca
Johnson, H. C.	Sheridan
Larsen, A. J.	Waupaca
Barnes, A. D.	Waupaca
Spencer, F. W.	Waupaca

WAUSHARA COUNTY

Bartel, Otto	Wautoma
Gunderson, J.	Wautoma
Brooks, John	Wild Rose
Johnson, J. B.	Wautoma
Byse, G. B.	Wautoma
Elickson, C.	Wautoma
Jacobs, A. F.	Coloma
Fairbanks, H. E.	Plainfield
Bartel, C. W.	Wautoma

WOOD COUNTY

Jackson, M. H.	Grand Rapids
Hansen, Ben	Grand Rapids
Huser Brothers	Grand Rapids

MEMBERS OUTSIDE WISCONSIN

Bernard, Frank	Norway, Mich.
Butler, Julia	Evanston, Ill.
Cheyney, H. C.	Chicago, Ill.
Denise, F.	Chicago, Ill.
Johnson, A. G.	Iron Mountain, Mich.
Lidbeck, J.	Iron Mountain, Mich.
Mess, F. J.	Orillia, Washington
Albert Miller and Co.	Chicago, Ill.
Osterberg, J. G.	Iron Mountain, Mich.
Smith, R. E.	Minneapolis, Minn.
Starks Co., L.	Chicago, Ill.

ASSOCIATION WORK IN OUTLINE.

The subject matter in this bulletin, submitted by a widely representative group of successful men, embodies essentially a discussion of every important phase of Association work. A summary outline upon important phases of potato improvement work in Wisconsin is given as a preface to this discussion.

I. Community Organization is the most important phase of Association work. As this bulletin goes to press the secretary is receiving constant reports from potato sections announcing complete organization in the interests of community improvement here stated.

II. Pure Seed Growing on a community basis is under steady development in Wisconsin and is receiving direction from this Association.

Potato Seed Dissemination has become organized on a systematic basis. One standard market variety will be adopted in commercial potato centers in 1914. The co-operation of growers and affiliated commercial interests has been completed in order to secure foundation stock.

Sorting and Grading on the field and at loading stations will be given better attention in communities where uniform stock is handled.

Potato Field Inspection to establish satisfaction and a guarantee that field stock is: 1. Pure. 2. Free from Disease will be inaugurated in 1914.

The Wisconsin Potato Seed Industry will develope rapidly as a result of a systematic effort to establish the above guarantee.

Restriction of Acreage in accordance with ability to maintain correct cultural conditions and practice will be recommended to growers. Good Seed,—Fertile Potato Soil,—Intensive Cultivation—are essential to Type, Quality—and Uniformity in potato shipments.

Organization. The constitution of the Wisconsin Potato Growers Association provides that the regular staff member of the Wisconsin College of Agriculture in charge of potato extension shall serve as the regular secretary of this Association. The work here reported is therefore affiliated in interest and organization with the Horticultural Department of the University.

Secretary.

THE "POTATO SPECIAL" IN WISCONSIN.

The public has become familiar with the general plan of running special exhibit cars in the interests of either live stock or crop improvement. However, the "Potato Specials" which were operated in 1912 and 1913 have proven of such valuable service to this Association, that a brief review of results is important. Two facts of special significance stand out prominently:

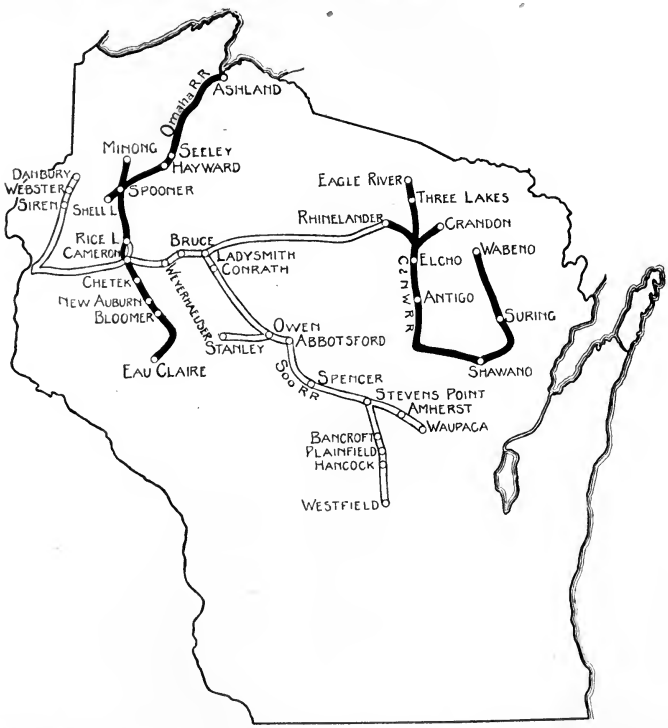
INTERIOR VIEW OF THE NORTH WESTERN LINE, "POTATO SPECIAL."

Equipped with Standard Market Potatoes: Exhibits of Potato Diseases and Other Commercial Potato Exhibits.

First. A large number of the best potato growers in Wisconsin have become members of the Wisconsin Potato Growers' Association through the agency of the "Potato Special."

Second. Some of the best potato seed stock which is now being used for community improvement work, was also located through the agency of the "Potato Special." These two results alone more than compensate the effort which was made to make the plan a success.

The special exhibit car is distinctly a feature of community interest. The work has received the co-operation of growers, buyers, railroad men, bankers, commercial clubs, schools; in fact every commercial and public spirited agency in the community has been interested in this movement.



MAP SHOWING THE TOUR OF THE 1912 "POTATO SPECIAL" OVER THE SOO LINE AND THE 1913 "POTATO SPECIAL" OVER THE NORTHWESTERN AND OMAHA LINES. APPROXIMATELY 3,000 PEOPLE INSPECTED EACH OF THESE CARS.

The "Potato Specials" have been operated in Wisconsin under the direction of the Horticultural Department of the University and the Wisconsin Potato Growers Association in co-operation with the railroads. These cars have been equipped with a wide range of commercial exhibits including standard potato seed, economic potato diseases, spray mixtures, spraying machinery, commercial fertilizers, potato soils, and many charts and photographs illustrating correct cultural practices.

The Association repeats here—A large amount of excellent seed stock is lost annually in Wisconsin for all purposes of seed improvement, simply because the value of this stock has not been appreciated but it has been mixed and sold with inferior

table stock. A large number of our growers do not realize that the stock needed for community improvement is now grown within the state.

Repeatedly on the tour of the "Potato Special," the above conditions were found. Measures were taken at once to remedy the difficulty. A large amount of excellent seed stock was reserved for 1914 planting. Many growers have realized for the first time that potato improvement is not merely an individual but a community effort.

The elimination of mixed stock has been promoted through the agency of the "Potato Special." Only standard market varieties were shown on these cars. At many stop-over points growers were surprised to discover that they were growing some such standard variety as Rural New Yorker or Green Mountain under a name which was introduced as a new variety or novelty. This confusion is rapidly being straightened out in Wisconsin.

Special meetings have been held in cooperation with growers and commercial interests at each stop over point. A practical discussion has been given on topics of special relation to local conditions. Growers have been urged to arrange local exhibits and this feature often has been the means of uniting upon a plan of seed improvement for the community.

At the close of the 1912 tour at Waupaca, representatives of the commercial potato sections of the state met in a two days' convention, under the direction of the Horticultural Department of the University and organized the Wisconsin Potato Growers Association.

T. A. HOVERSTAD.

Agricultural Commission—Soo Line Railroad.

THE COUNTY AGRICULTURAL REPRESENTATIVE AND COMMUNITY POTATO IMPROVEMENT.

The Association takes special pleasure in calling attention to the important relation of the county agricultural representative to potato improvement work in Wisconsin. It is of special interest that in each county where a representative has been secured the potato industry is of economic importance. These men are now in the field and are actively carrying out the policies of this association. That this work is practical and efficient can best be judged from the very brief statements we are able to publish from these men. No other part of this bulletin represents better the plan of work of this association.

At the time of the 1913 convention at Rhinelander Mr. Luther was county agricultural representative for Oneida County. Oneida County has been very active in potato improvement work. The Association desire to express appreciation of the work which was done in the Oneida County under the direction of Mr. Luther in the interest of the 1913 convention. In January Mr. Luther was appointed State Supervisor of County Agricultural Representatives. Referring to the work in Oneida County last year, Mr Luther says.

E. L. LUTHER

State Supervisor of County Agricultural Representatives.

"Upon my plots during the last two years I have used pure bred Green Mountain potatoes, of the Round White Family. The tubers run very regular in size and are smooth and white and of fine cooking quality. So far as yield is concerned they are fully equal to the mixed and scrub stock produced by farmers working under rather good cultural conditions and I think far superior to the yields ordinarily reported. The people who saw these potatoes desired to secure them for table use at a price above the local market price and I could have secured sales for a large production had I had the potatoes. My

seed stock selected from high producing hills is also in demand among the farmers but all that I have will be used to pay promised premiums and to get boys' and girls' potato clubs started.

"I might add that this fall and winter I could have placed several cars of pure potato seed of the Round White Family but I could not find varieties guaranteed pure in sufficient quantities to fill whole cars and so the opportunity to sell seed potatoes at fancy prices fell through.

"So far as I can do so I shall get the county men to urge whole communities to grow as their leader one variety of the Round White Family and make it the specialty."

On March 21, the potato growers of Langlade County met at Antigo and organized the Langlade County Potato Growers Association. Langlade County is therefore the first to perfect county organization in Wisconsin. Several other counties in the state will organize before the 1914 planting season. The officers of the Langlade County Association are: President, L. W. Filyes, Bass Lake; Vice President, W. L. Sparks, Parrish, Secretary, F. Swoboda, Antigo; Treasurer, C. C. Sorrenson, Antigo.

Referring to the work in Langlade County Mr. Swoboda says,

"Production of high class potatoes of uniform type for seed and consumption purposes will be the slogan in Langlade County for 1914. The newly organized Langlade County Potato Growers' Association containing in its membership many of the leading growers of the county will work great good in crystallizing the sentiment of farmers of the county in favor of the better type of tuber. Boys and girls will be interested in the movement through potato contests conducted under the supervision of the County Superintendent and the County Representative. A revised county fair premium list eliminating unimportant varieties and giving more substantial premiums to the varieties chosen will foster the movement.

F. SWOBODA.
County Agricultural Representative for Langlade Co.

The co-operation of every farmers' organization in the county is being enlisted in the campaign and before March 1st the Granges had already spoken for over a hundred bushels of a car load or more of seed stock to be brought in and disseminated.

County growers who participated successfully in the Rhine-

lander exhibit, long before spring opened began to taste of the first fruits of success, in orders of one hundred bushel and car load lots of seed stock far beyond their capacity to supply.

To enumerate some of the details to be undertaken. One of the banks has agreed to provide the seed for the boys' and girls' potato growing contests. The County Fair Association will appropriate $75 in prizes for these contests including two scholarships to the Boys and Girls Short Course at the College of Agriculture.

Prizes of $5, $4, $3 and $2 for a first, second, third and fourth prize respectively on leading varieties have been provided by the County Fair officers instead of the usual small premiums for a host of varieties.

Seed inspection and certification is called for in the constitution of the newly organized potato growers' association. Provisions for better marketing of the crop are also included."

At a recent meeting at Augusta in Eau Claire County a conference was held in the interests of uniting upon uniform commercial standards in Eau Claire County. Decisive action was taken by growers, buyers and other interests in uniting upon pure round white stock. Mr. Ingalls' statement indicates the plan of work adopted.

"With reference to local conditions governing the potato industry in Eau Claire County, I beg to state, that there is quite a general movement right in line with the subject of the Rhinelander convention, "Pure Seed of Standard Market Varieties For All Commercial Purposes." Rural New Yorker is being given precedence. The probabilities are that there is a large amount of pure seed now on hand among our various growers, but because we are not absolutely sure in every case, plans are now in the making for field inspection this coming season.

MR. INGALLS.
County Agricultural Representative for Eau Claire County.

A large number of growers co-operating with local buyers have ordered from one to fifty bushels of seed known to be pure. Also through the co-operation of the county superintendent of schools and the teachers of the rural schools, some 240 boys and girls from different parts of the county have accepted a peck of pure seed on the condition that it is to be given proper cul-

tural methods and not allowed to mix with other stock. Children will be encouraged to exhibit at the county fair and other centers. Liberal prizes will be offered.

The total orders for pure seed aggregate something over 1,000 bushels. With reasonable yields considerable uniformity should result so that in two years Eau Claire county will be a great center not only for choice eating stock, but also for select seed."

On March 27, representatives of the Price County Society of Equity met at the Court House in Phillips to consider means to improve the standard of the potato crop. Arrangements have been made to secure pure seed—the Price County growers will arrange to have a limited amount of pure seed grown on one or two farms—for general distribution next year.

Calling attention to the work in Price County, Mr. Richards, County agricultural representative, says:

MR. G. RICHARDS.
County Agricultural Representative for Price County.

"Although dairy farming is the main interest of Price County farmers, the potato industry is of great importance here. The potato crop is a crop which fits in very nicely with the dairy system of farming.

"I am going to put forth every effort to stimulate the potato industry and develop it along proper lines. There is a great need of standardization of the varieties grown by the farmers here. Th county fair premium list was revised last year, so that prizes were offered on only 8 groups. This will aid in calling farmers' attention to the fact that too many varieties of potatoes are being grown.

There is also a great need for the production of pure seed. Every effort will be put forth to get as many farmers as possible to purchase small lots of pure seed this spring. A boys and girls potato growing contest will be conducted this coming season. The children will be furnished with a peck of pure seed potatoes and will be required to exhibit one peck at the county fair in competition with other children, for prizes. This will mean the pure seed potatoes will be introduced on at least 100 farms in Price County. Carefully prepared directions will be given the children telling them how to grow the potatoes and urging them to select their seed carefully and keep it pure."

MR. GUNDERSON.
County Agricultural Representative for Vilas County.

County agricultural representatives were appointed this year in Lincoln and Vilas Counties in addition to the counties above mentioned. Each of these counties has been active in the work of this association and the representatives appointed will find the work of potato improvement started and ready for definite organization. Through co-operation on the part of growers in each county a large exhibit was sent to the 1913 convention. Mr. A. H. Cole was in charge of the work in Lincoln County, Mr. Gunderson in Vilas County.

F. OTIS.
County Agricultural Representative for Barron County.

Barron County sent an exhibit to Rhinelander in charge of Mr. F. D. Otis, county representative. Barron County is an important center for the growing of varieties of long white or Burbank group. The county sent also excellent exhibits of Irish Cobbler and Rural New Yorker stock. Several towns in this county each handle from 400–800 cars of potatoes annually.

MR. A. H. COLE.
County Agricultural Representative for Lincoln County.

A center for the production of the Green Mountain variety will be established in Lincoln County. On Saturday, April 11, the farmers of the county met under the direction of the County Agricultural representative, Mr. Cole and organized the Lincoln County Order of the Wisconsin Experiment Association. Thirty-five charter members enrolled. Mr. A. H. Morse was elected president, Mr. Hall Brooks, vice president, and Mr. A. H. Cole, County Representative, was elected secretary.

R. A. KOLB.
County Agricultural Representative for Taylor County.

Mr. R. A. Kolb, County agricultural representative for Taylor County, took charge of the work in that county early this year. A farmers course was held at Medford on March 26–27. At this time a Taylor County Order of the Wisconsin Experiment Association was formed and arrangements were made to secure foundation seed stock for this year. Mr. Kolb is enthusiastic over the work in Taylor County and reports that the outlook is bright for a very successful season in field work.

POTATO DEVELOPMENT WORK AT STARKS, ONEIDA COUNTY, WIS.

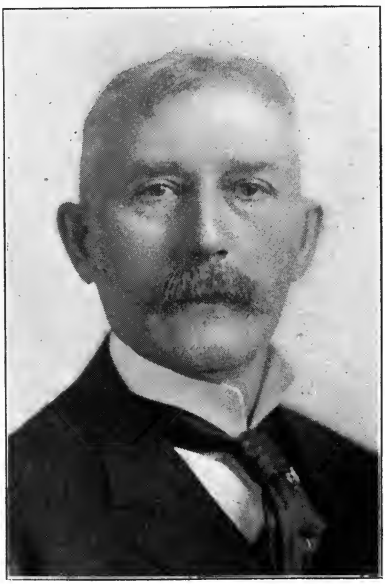
W. B. ANGELO, Stevens Point, Wis.

Mr. Angelo furnished the following article at the request of The Wisconsin Potato Growers Association. Starks, Wis., is located ten miles east of Rhinelander on the Soo Line Railroad.

The plans of the Starks Company probably involve the most extensive plan of development ever undertaken with the potato crop in the United States.

In a letter to the secretary, Mr. Angelo states that including operations in Oneida and Marinette counties, the company will in 1914 raise 750 acres of potatoes; between 400–500 acres of oats in addition to an extensive acreage of clover. The Company also plans to clear and break one thousand acres of land in 1914.

The L. Starks Co., of Chicago, Illinois, wholesalers in potatoes, having unlimited faith in the potato producing qualities of the soil in Northern Wisconsin, have acquired approximately twenty-five thousand acres of land in that section for the express purpose of developing the greater part of the same into agricultural lands for the raising of potatoes, grain and clover under the three year rotation plan. This company clears the land of brush and stumps and thoroughly plows, discs and pulverizes the same by the aid of the latest improved machinery including



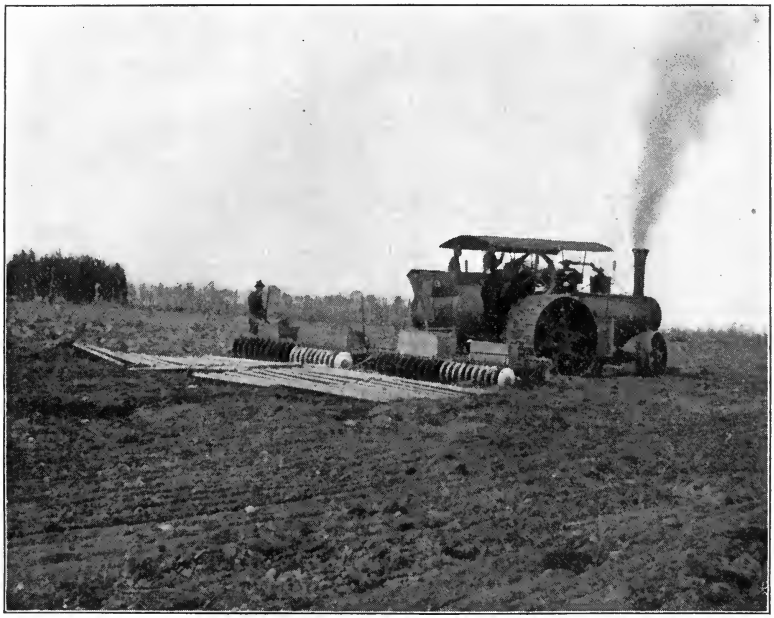
MR. L. STARKS.
President, L. Starks Co., Chicago.

heavy steam power, so that the soil is in perfect condition for the planting of the first year's crop. The proceeds of the first year's crop of potatoes raised on these lands will in the most instances pay the original cost of the land, the clearing of the same, and the total cost of producing the crop up to the time it is placed in the warehouse, and it is a certainty that in any event two years' operation will leave this high class improved land as a net profit of such operation.

PULLING AND PILING STUMPS BY STEAM POWER AT STARKS ONEIDA COUNTY.

This is a development, not a speculative proposition. The L. Starks Co. are not now offering any of these lands for sale, as they contemplate the clearing and development of the greater part of their holdings. When L. Starks, President of the L. Starks Co., first embarked in business, he realized the fact that an employee whose compensation was contingent upon the success or failure of the work delegated to him usually rendered more efficient and valuable service than where employed on a fixed salary. The L. Starks Co. have pursued that plan where possible down to the present time, believing that by putting the employee in a position where his compensation is de-

pendent upon the results of his work they will get far more satisfactory results than under any other system. The employee will get more money for his services, but he is also earning more money for his employer. Applying this principle where possible to the cultivation of their lands, the company selects their farmers, where possible, from the ranks of their employees engaged in the development work. By so doing they have the benefit of previous experience with them for the purpose of



FITTING NEW BREAKING WITH POWER MACHINERY AT STARKS ONEIDA COUNTY.

determining if the integrity, industry and ability of such employees is sufficient to enable them to successfully handle the work. These employees or tenants invest their savings in equipment. The Company aids them where they do not have enough means to equip themselves, and they farm the lands entrusted to them on shares for the Company. They are permitted and encouraged to work for the L. Starks Co. for cash on the development work whenever their services are not required to properly farm the lands entrusted to them, so that they may lose no time and may be earning something every day.

Such farm employees are under the constant supervision and direction of Mr. Hess, Farm Superintendent and expert farmer at Starks, Oneida County, Wisconsin, who exerts as much effort to make their work a success as any other branch of the company's work. By this method these employees will be developed into expert farmers, thoroughly familiar with all the conditions incident to the growing of these crops in Northern Wisconsin, and when their savings approximate an amount to warrant the actual purchase of lands for their own use, it is not a far drawn conclusion that the Company will permit them to purchase such lands as they may wish to buy. The actual value of the land has been determined by such employee by virtue of his years of experience in cultivating the same.

JOHN HESS.
Field Superintendent, Starks, Wis.

The company erects substantial farm buildings on the wild land to be cleared, which are used as a dwelling place for the men engaged in such work. The following year the buildings are ready for occupancy by the farmer who is to farm the lands; and during the winter time all the employees are engaged in getting out forest products from the lands of the company, thereby giving them all employment the year round. By the above plan of operation the land is cleared more rapidly and consequently more rapidly converted into productive farm lands, and the farmer with no capital except his intelligence and labor will earn sufficient money to buy an improved farm in less time than under any other system of operation.

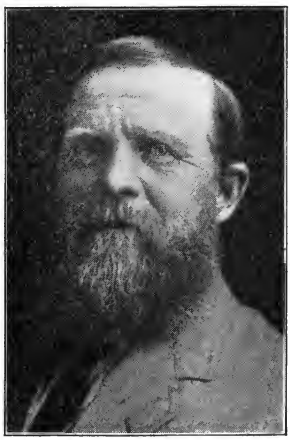
The company operates a general store, blacksmith and machine shop at Starks. A public hall is maintained for the free use of the residents at that place for religious or amusement purposes, a public school is maintained for their children, and with the aid of the L. Starks Co., the industry and thrift of its employees, Starks, Oneida County, Wisconsin, bids fair to be the leading potato producing section of the State.

COMMERCIAL POTATO GROWING IN NORTHERN WISCONSIN.

(The following statements by three successful men illustrates the importance of the potato crop as a factor in building homes in the commercial centers of upper Wisconsin. Potato extension work in Wisconsin has been organized on a plan which involves close co-operation with the men who are developing the newer sections of the state.)

This Association cannot attempt to give the proper credit which is due to all individuals and communities who were active in association work during 1913. It is important, however, to call attention at this point to the work of a few men who have been successful through following correct cultural practices and high commercial standards.

Mr. S. J. Uhrenholdt of Seeley is one of the most successful growers in the northwestern part of the state. Seeley is located on the Omaha Line about nine miles north of Hayward in Sawyer County. The prevailing type of soil is a sandy loam.



S. J. UHRENHOLDT.
Seeley, Douglas County.

On the occasion of the tour of the "Potato Special" over the Omaha Line, a stop was made at Seeley. The reader will appreciate better the brief statement made here by Mr. Uhrenholdt by knowing that fourteen years ago he arrived at Seeley with practically no financial resources. He has built a home modern in all respects as to lighting, heating and ventilation. Two very interesting features of his farm practice are not mentioned in his statement, namely—he has constructed a large cement pit for the conservation of barn yard manures and he has also adopted a practical plan for the preservation and renewal

of a fine tract of white pine and mixed hard wood timber. His statement follows:

"I have resided in Wisconsin for more than thirty-one years. I located at Waupaca in 1882 coming direct from Denmark. In the spring of 1900, I moved with a family of seven children to our present location at Seeley, which was at that time not yet established. Here we moved into a one-room house with an attic, a shed serving as a barn. We cleared and planted to crops 8 acres the first summer and 10 the second. We now have about 100 acres under cultivation. I plant as many potatoes as is consistent with our method of crop rotation. This is a four year rotation, exclusive of the breaking, planting first potatoes, then grain and seeding, leave the ground seeded for two years, after which I start the rotation over again. I have always avoided planting potatoes twice in succession on the same piece of ground. By way of cultivation, I like best to plow medium deep in the spring, applying the manure ahead of the plow so that it will be turned under as soon as possible after getting on the ground. I follow the plow with the drag immediately, marking and planting as soon as possible. I use the check row system and hand planters and plant the seed 3 to 4 inches deep. Deeper planting has not proven successful under the existing conditions here. I use the one horse cultivators, setting them deep and wide while plants are small, and gradually draw them in and cultivate shallower as plants get larger, and also hill slightly the last cultivations.

The seed I always select from my best matured fields, and use considerable care in throwing out any scabby or otherwise affected tubers. I cut potato seed in the field as needed for planting and use care not to expose any cut seed to the direct heat of the sun. During the past 4 years my potatoes have averaged 200 bushels marketable stock per acre."

Langlade County is fortunate in having a large number of growers who have determined that the potato industry in that county shall develop according to the highest commercial standards. Mr. Anton Follstad of Elcho has been one of the most successful growers in the county. Mr. Follstad took first prize at the 1913 convention on Rural New Yorker stock, and during the present winter has furnished considerable seed for community development work in the state. In a letter to the secretary Mr. Follstad says, "I have always planted my potatoes in

drills 30 inches apart and the hills 14—16 inches apart in the row. I have practiced level cultivation largely but run the shovel plows between the rows to facilitate digging with the potato digger.

Yields have ranged between 200—400 bushels per acre. Three years ago I kept an accurate account of expenses and receipts on a four acre field of potatoes. I harvested 1,226 bushels from this four acre field and sold them at a local warehouse for 30c per bushel. This field netted above all expenses $60 per acre.

ANTON FOLLSTAD.

Elcho, Langlade County.

Mr. A. H. Morse of Tomahawk has made a success with the Green Mountain variety. Mr. Morse's field was inspected by the secretary of this association last fall and this field was undoubtedly one of the best grown in Wisconsin last year. Mr. Morse has made a success of seed selection for several years and his results are conclusive evidence of the benefits of field selection of seed and attention to detail relative to cultural practices. Mr. Morse sold his entire surplus of Green Mountain stock for seed and reports the following figures from 6¾ acres.

A. H. MORSE.

Tomahawk, Lincoln County.

Sold 170 bu. Kings at 55 cts	$93.50
Sold 246 bu. Green Mountain at 55c	135.30
500 bu. Green Mountain at $1.00	500.00
Reserved 35 bu. table stock	35.00
Reserved 90 bu. seed	90.00
Total	$853.80

Tomahawk is the center of the potato industry in Lincoln county. The Association of Commerce, the local banks, the business houses, the county agricultural representative and the local paper, edited by Mr. R. G. Lee, are all co-operating with the farmers in the development of the potato industry of Lincoln county.

ASSOCIATION WORK IN THE CENTRAL WISCONSIN POTATO BELT.

The combined yield of potatoes from Waupaca, Waushara and Portage counties approximates 9,000,000 bushels.

M. O'CONNOR.
Hancock, Wis.
The O'Connor Farm is operated by Mr. M. O'Connor and E. O'Connor.

As this bulletin goes to press the association is pleased to report that plans have been made for an active season's work in central Wisconsin in the interest of improved commercial standards. This work will take the form of definite organization among the growers in the interests of community improvement. Waupaca county has arranged to organize early in May.

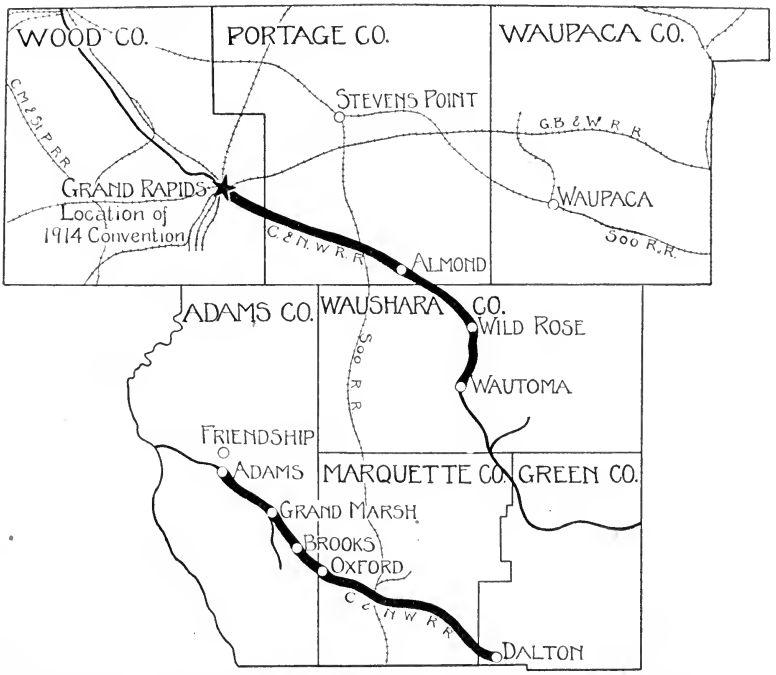
A special potato exhibit car will be run over the Northwestern Line this spring in the interests of pure potato seed for 1914 planting. The tour of the car will cover, Grand Rapids, Almond, Wild Rose, Wautoma and the following points on the new Northwestern Line through Adams county, Dalton, Grand Marsh, Adams, Friendship, Oxford and Brooks. The accompanying map shows the extensive potato terirtory tributary to this tour.

Farmers will be asked to bring in samples of the seed stock they will plant this year. Every possible effort will be made to aid in the dissemination of a limited amount of pure seed in each community—as foundation stock for future planting.

Referring to this work, the Association desires to call attention to the fact that important organized commercial and educational interests are affiliating in potato improvement work in central Wisconsin. The County Fair Associations will co-operate through the operation of special potato growing contests among school children. The distinct commercial phases of potato improvement will receive the attention of county and local potato growers associations, Commercial Clubs and Advancement Asso-

ciations, potato buyers and shippers. Many local editors in central Wisconsin are rendering efficient service in this work.

There are approximately 90,000 acres devoted to commercial potato growing in central Wisconsin. Although this is the most important crop industry of the section, the reader should understand that diversified and dairy farming is under active development.



THE TOUR OF THE "POTATO SPECIAL" THROUGH CENTRAL WISCONSIN, OVER THE NORTH WESTERN LINE, APRIL 18–25, 1914.

The Organization of Potato Improvement Work is now in Active Operation in this Section.

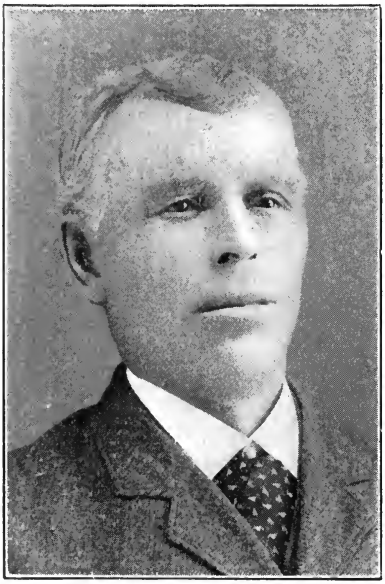
All the varying grades of fertile sandy loam and clay loam soils can be found in the so called "Central Potato Belt." A large number of fine stock farms are located in this section. These statements are made in correction of an opinion which sometimes becomes current, that the central potato section of Wisconsin is of a uniform light sandy type which has become depleted by constant cropping. This is not a fact.

It is a fact that in some sections a large amount of stock is raised on worn out soils, that coarse varieties have been introduced; that good and inferior stock often is mixed under present conditions of sorting and grading. This condition would natur-

ally be expected in the development of a cash crop like the potato and where neither local nor state organizations have existed to give a desirable commercial direction to the industry.

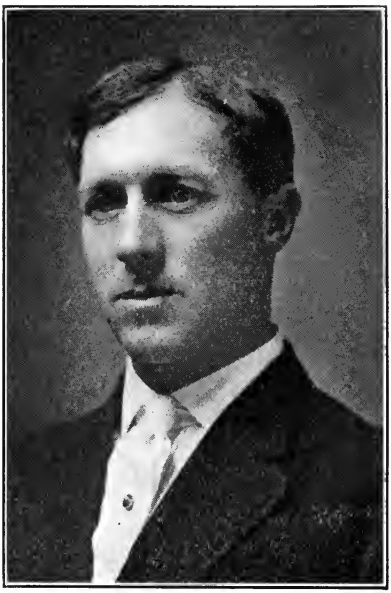
Growers and affiliated interests have been awakened to the fact that the industry in central Wisconsin must be safe guarded by,

1. Elimination of undesirable varieties.



S. S. CHANDLER.

A retired farmer now residing in Waupaca City is one of the pioneers of Waupaca County. Mr. Chandler for several seasons co-operated with the Wisconsin Experiment Station in field demonstration work upon the growing of standard potato seed and field spraying for the control of blight.



R. C. GIBBS.

Mr. R. C. Gibbs is a grower of the Peerless variety. Mr. Gibbs has for several seasons practiced careful selection with this variety. The town of Stockton in Portage County probably grows more Peerless than any other town in the state. Mr. Gibbs reports that this year special care will be taken by growers in his section to keep Peerless stock pure. On the irrigated sections of Colorado this variety is known as Pearl. Colorado growers are looking for a reliable source from which seed stock can be secured and the town of Stockton has sent a large amount of seed into Colorado in supply of this demand.

2. The adoption of a uniform commercial type.

3. Improved methods of sorting and grading at loading stations.

4. Restriction of acreage in accordance with ability to maintain fertility by proper rotation of crop and the use of manures.

5. Adoption of preventive measures against the introduction and spread of dangerous diseases, subject to spread by seed dissemination.

EARLY POTATO DEVELOPMENT AT WAUPACA.

(The following brief statement has been submitted by MR. JOHN JARDINE, Secretary A. M. Penney Co., Waupaca Wis.)

Probably no man now living in the State of Wisconsin has been more closely identified with the potato industry from its infancy and in its development than A. M. Penney of Waupaca, Wis. Mr. Penney was born in New York State in the Town of Henderson, Feb. 15th, 1851, and when four years of age, his parents settled on a farm near Waupaca.

A. M. PENNEY.
President of A. M. Penney Co., Waupaca, Wis.

In 1879, Mr. Penney saw the possibilities in the raising of potatoes in this section, and was instrumental with others in getting farmers interested in the planting of potatoes. He agreed to see that a market would be provided the potatoes. The result was that in 1880, Mr. Penney shipped from Waupaca sixty-six carloads of potatoes, all of which were loaded in bulk and shipped to Chicago. The facilities for handling these potatoes consisted of a small bin in an old warehouse with a capacity of a scant carload. In this crude way, Waupaca began to take its place as a factor in this industry. The extent of the industry is indicated by the fact that Waupaca in 1912 shipped nearly 2,200 cars.

From that time, Mr. Penney continued to enlarge the scope of his operations until at the present time, he is at the head of a company that operates warehouses at nearly all the principal potato shipping stations of this state, and markets their potatoes in nearly every state in the Union.

THE POTATO EXHIBIT

HELD AT

THE ANNUAL CONVENTION

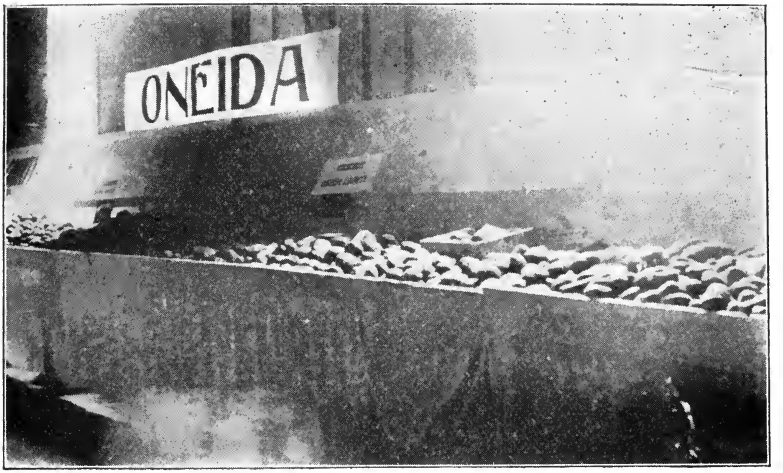
Wisconsin Potato Growers Association, Rhinelander, November 20-21, 1913.

Attention is called to the following important phases of the Association exhibit at Rhinelander.

Due to an accident several important photographs were destroyed and as a result it is impossible to show exhibits made by representatives from Bayfield, Sawyer, Waupaca and Washburn

LANGLADE COUNTY EXHIBIT.

This Exhibit was awarded first prize in County Competition.



ONEIDA COUNTY EXHIBIT.

Awarded Second Prize in County Competition.

LINCOLN COUNTY EXHIBIT.

Awarded Third Prize in County Competition.

counties. The exhibit made by the Horticultural Department of the State University is also not shown.

Special feature exhibits were made by the Armour Fertilizer Co., The Swift Fertilizer Co., German Kali Works of Chicago, and The Corona Chemical Co. of Milwaukee.

The Plant Pathology Department of the University equipped a complete booth with economic potato diseases and control methods. This booth was in charge of Mr. E. S. Schultz.

RUSK COUNTY EXHIBIT.

The exhibit at Rhinelander was arranged with a definite policy in mind. As far as this Association has been able to learn, this was the largest commercial potato exhibit ever assembled in the middle or north western states. The views which are shown here and the following brief statements will explain the distinctive character of the exhibit.

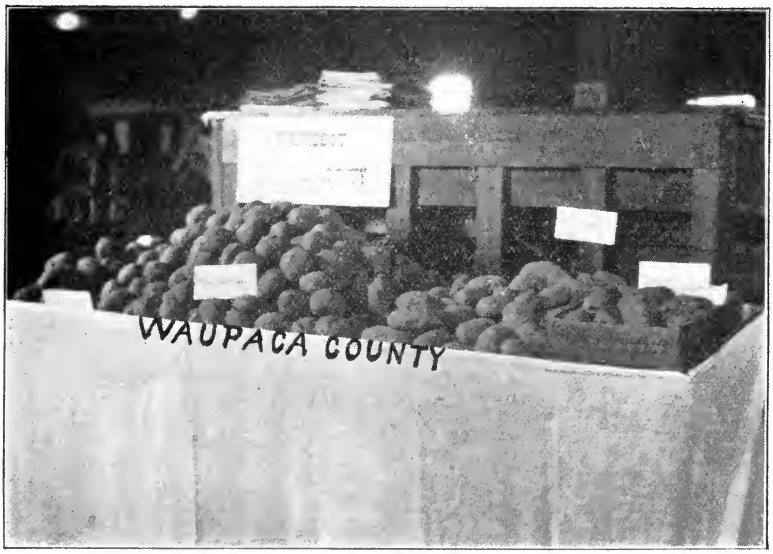
I. The exhibit was distinctively commercial. The Association discouraged the exhibition of non-standard varieties or a miscellaneous collection of varieties of doubtful identity. The result was that not over six varieties were shown in large quantities and of an exhibit of approximately 250 bushels, not one mixture was discovered.

II. The exhibit represented effective community organization. Growers in the different counties were advised by this Associa-

FOREST COUNTY EXHIBIT.

VIEW SHOWING MARINETTE AND VILAS COUNTY EXHIBIT.

BARRON COUNTY EXHIBIT.



WAUPACA COUNTY EXHIBIT.

tion to unite on an adaptable market variety and send this variety to the convention in large quantities. The exhibits show that these men responded.

III. An imporant fact about these exhibits does not show on the surface. The Association knew that a limited part of its membership grew comparatively pure stock in 1913. The men who were most successful at Rhinelander were able to guarantee that they could supply seed stock of high quality from their storage bins.

IV. The result has been that the Rhinelander exhibit and the work which was done in locating the stock previous to the convention, has resulted in reservation of a large amount of pure seed for community potato work in Wisconsin during 1914.

POTATO HARVEST ON FARM OF ANTON FOLLSTAD—ELCHO—LANGLADE COUNTY.

This View represents the kind of fields that furnished a large percentage of premium stock at Rhinelander. These fields were "spotted" by the Association before the convention and this fact explains why the Rhinelander Exhibit was distinctly commercial.

Representative Men In Attendance at The Association Convention at Rhinelander, November 20-21, 1913.

MR. A. D. CAMPBELL, Milwaukee, Manager Wisconsin Advancement Association. The potato crop is essentially a factor in land development and in building farm homes. The Wisconsin Advancement Association is receiving efficient management under Mr. Campbell and is giving support and co-operation to potato improvement work.

HALL BROOKS, Tomahawk, Lincoln County. Mr. Brooks rendered efficient service to Lincoln County in the collection and arranging of exhibits at the 1913 convention at Rhinelander.

PROF. E. J. DELWICHE, Ashland, Supt. Northern Sub-stations. Success with clover and other legumes and forage crops is essential in maintaining desirable soil conditions for potatoes. Prof. Delwiche connections with crop improvement in Northern Wisconsin has kept him in close touch with the problems of commercial potato growing.

MR. R. BEEBE, Ashland, Editor "Lake Superior Farmer." Mr. Beebe is giving special attention to the practical problems of development in upper Wisconsin.

MR. C. H. EVERETT, Racine, Editor Wisconsin Agriculturalist. Mr. Everett has been associated closely with early agricultural development in Wisconsin and his interest and support through the Agriculturalist is valued highly by the association.

GEORGE BOGRAND, Wausaukee, Marinette County. Mr. Bogrand is editor of the Wausaukee Independent and has been a leader in directing the development of agricultural work in Marinette County. This county was well represented at the 1913 convention.

A SUMMARY

OF

IMPORTANT ADDRESSES AND PAPERS

CONVENTION OF THE

WISCONSIN POTATO GROWERS ASSOCIATION

Rhinelander, November 20-21, 1913

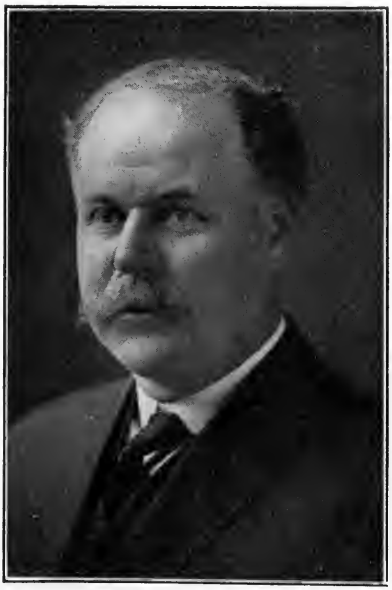
TOPIC OF THE CONVENTION

"Pure Seed of Standard Market Varieties for All Commercial Purposes"

SIGNIFICANCE OF PURE BRED SEED WORK IN WISCONSIN.

By Dean H. L. Russell, Wisconsin College of Agriculture.

The time is not far distant when inspection and certification of seed stock will be as prevalent and as popular as is the tuberculin test for tuberculosis in cattle among progressive dairymen. The application of the community center idea to growing potatoes, adherence to ideals with reference to quality of the product, and inspection and certification of the purity of the product as to type and freedom from disease, are bound to bring in time results which are commensurate in value to those which have been secured by the development of community ideals in dairying.



DEAN H. L. RUSSELL.
Wisconsin College of Agriculture
University of Wisconsin.

The work of the Wisconsin Experiment Association in the production and dissemination of pure bred seed grains which have been developed on the experimental farms at Madison and on the branch stations has accomplished wonders in the state. It has brought money, as well as renown, and the application of these same principles can without question be applied to potato culture. With this crop, possibly more than with cereal grains, the marketing product is most impor-

tant, and in these efforts to increase production, you may well give most careful attention to the problems of marketing and distribution, for without proper compensation and adequate demand, the grower will not be in position to profit permanently by increase in yields.

THE RELATION OF THE HORTICULTURAL DEPARTMENT TO POTATO SEED IMPROVEMENT.

By J. G. Moore, Professor of Horticulture, University of Wisconsin.

Since the organization of the Horticultural department more or less work has been carried on as regards potato problems. This work might well be grouped under three divisions. During its earlier history the department was concerned with such problems of culture as the depth of planting, variety trials to determine the best varieties for Wisconsin conditions, and the size of the part of the tuber to be used in planting. During this time about the only question as related to the improvement of seed was a long-time experiment to determine the relative value of large and small tubers in crop production.

J. G. MOORE.
Professor of Horticulture, University of Wisconsin.

The second period, covering a period of five to six years, was devoted largely to the matter of potato spraying for the control of blight. There were carried on inci-

dentally with this work endeavors to secure blight-resistant varieties.

The third era of potato work in the department might be designated as that concerned with the improvement of the character of the crop produced as it is particularly related to a question of pure seed, but at the same time recognizing the importance of cultural conditions as they affect the type of the variety. This work has been under way for about three or four years and has been directly under supervision of Professor Milward of the horticultural department. During this time a number of our standard varieties have been grown with the idea in mind of selecting those which were likely to prove most favorable for Wisconsin conditions. After the determination of what these varieties were, pure seed, typical of these varieties were secured by the department and grown in various sections of the state and later distributed to growers upon application.

In connection with this has developed the community plan of potato seed improvement and production of a higher quality in potatoes, which ultimately resulted in the department's being directly interested and to a large extent responsible for the organization of the Wisconsin potato growers' association, the objects of which are familiar to you all. The plans of the department contemplate a continuation of the organization of community centers and the establishment and operation, as soon as feasible, of a system of potato inspection and certification, looking toward the building up of a reputation for Wisconsin seed unsurpassed by that of any potato producing state in the country.

H. E. KRUEGER
Beaver Dam, Wis.

The Association secured Assemblyman H. E. Krueger, one of the successful members of the Wisconsin Experimental Association, to address the convention at Rhinelander on the development of the pure seed industry in Wisconsin. Mr. Krueger told the convention how the seed industry had developed in Wisconsin during the past ten years—especially in relation to pure bred seed grains. He outlined the possibilities open to Wisconsin potato growers in the development of a pure seed trade by following similar plans. In the discussion which arose, Mr. Krueger, by request, told the convention of the success he has had in raising seed grains.

SEED SELECTION AND IMPROVEMENT IN RELATION TO COMMERCIAL STANDARDS.

Prof. WM. STUART
United States Department of Agriculture, Washington, D. C.

When I was asked by your secretary to prepare a paper for this meeting on the subject of "*Seed selection and improvement in relation to commercial standards*" I hesitated to accept the invitation because I did not feel sufficiently familiar with your conditions here to offer advice. But as *advice* seems to be one of the commonest assets in life, and as the subject is a broad one involving methods that are applicable in any section of this great country of ours I decided to come, not so much with the idea of teaching you, but rather with the intention of learning what I might concerning your practices and kind of stock you grew. To say that I am surprised to find such an exhibit of potatoes as you have in this hall only mildly expresses my feelings. I do not hesitate to to say that some of the exhibits would be a credit to any section of our country indeed I am willing to go further and say that I have never seen their equal on as large a scale.

PROF. WM. STUART.
U. S. Department of Agriculture.
Washington, D. C.

The subject that I am expected to discuss to-day is one which has only recently begun to receive the attention of the grower. A

crop of such large magnitude and of such commercial importance as is the potato crop is well worthy of much attention. Before taking up the question of seed selection I wish to invite your attention by means of lantern slides to some of the work that is being done by the U. S. Department of Agriculture in an effort to develop improved varieties of potatoes through the growing of large numbers of seedlings. The picture which you now see upon the screen is of two well developed potato blossoms one of which has had its anthers removed, the flower so treated is said to be emasculated. The next two pictures represent a cyme of potato flowers before and after emasculation. The flower should be emasculated before the petals unfold. The application of pollen to the stigma of the flower is a comparatively simple process the picture at which you are now looking shows the method employed by the speaker. The corolla of the flower used for the pollen parent is pushed back and the anther held over the end of the thumb nail; in this position the pollen is easily jarred out upon the nail whence it is readily transferred to the stigma of the pistil to be fertilized. When the cross has proved successful the seedballs swell very rapidly. I have seen almost fully developed berries seven days after the pollen was applied.

The cross sectioned berries at which you are now looking shows the position of the seeds in the seedball. A well developed seedball may contain three hundred or more seeds but where the varieties crossed are not physiologically similar there may not be over twenty-five seeds. The seeds are most easily removed from the berries by crushing them into a pulp and throwing them into a vessel of water, in a few days sufficient fermentation will have developed to disintegrate the pulpy mass and release the seeds.

The difference in specific gravity of the seeds and pulp allows the former to settle to the bottom of the vessel while the pulp rises to the top. By pouring water into the vessel the pulp can be floated off and the seeds recovered. After drying, the seeds can be stored until wanted for sowing.

When planted in a loose friable soil and placed in a room temperature to say 60° F. at night the seeds germinate in from nine to fourteen days. The seedlings on the screen are six weeks old from the time of sowing the seed. We have frequently had them much larger in the same length of time. The grower of potato seedlings has many surprises in store for him owing to the infinite number of variations that occur. Some seedlings like the one

on the screen will produce a large number of shapely good sized tubers, while others like the one you now see produce a large number of small irregular tubers, and are absolutely worthless. Some tubers are white skinned, some flesh, some red, and some are a bluish black, with all intergrading shades of these colors. The seedlings of some parents produce nothing but white tubers; in other parents they will run from white to a deep red; while in still others the blues and bluish black appear. The latter color appears only when certain parents are used.

Few of us can afford to grow seedlings because it involves a good deal of work, and the chances of producing a really desirable variety are so few that it is hardly worth the effort. On the other hand none of us are too busy or should not be, that we cannot practise seed selection on the varieties we are growing.

SELECTION AND WHAT IT IMPLIES.

Our present day interpretation of plant breeding includes both the selectionist and the hybridist. While there is no particular objection to this interpretaion it has always seemed to me that the improvement of asexually propagated plants by selection alone does not necessarly constitute plant breeding. It would be preferable to restrict the term to the process of improvement by means of sexual reproduction. Intelligent plant breeding under this definition involves the selection and crossing of parent plants possessing certain desirable attributes which it is proposed to unite in a single individual. The resultant progeny from such a cross must be carefully studied and rigidly selected for the particular attributes desired. According to this definition it is seen that successful plant breeding is not independent of selection.

The selectionist on the other hand can carry on his work independent of sexual reproduction. The improvement which may result from selection alone is limited to natural variations which may occur within the variety that he is endeavoring to improve. Inasmuch however as considerable variation may be found in most of our cultivated varieties the limitations are by no means so restricted as one might expect. Our former concept that a variety was a fixed entity has now given away to an acknowledgment that it may possess one or more entities.

The selectionist recognizing this fact proceeds to isolate certain races or types which seem to him to be an improvement over

the composite race from which it was derived. This improvement may be in the form of a more productive plant, or one whose tubers are more uniform in shape and size, or the eyes may be fewer and shallower, or any other characters which seems more desirable. In other words some of the fluctuating variations occurring within a variety may be heritable factors which have heretofore been assumed to be now heritable. A word of caution should be given to the selection with respect to the isolation of types which are apparent departures from the true type of the variety. In my opinion there can be but one excuse for the isolation and that is that it is decidedly superior to the parental type. It seems to me that in the long run much more can be accomplished by selecting strains which most uniformly conform to the varietal type. It is only by rigidly adhering to this principle that we can hope to make any progress in the standardization of our commercial varieties. To intelligently improve a variety it is necessary that one should have an intimate knowledge of its normal type.

SELECTION METHODS.

The improvement of the potato by selection may be accomplished in either of two ways viz. The "hill selection" and the "tuber unit" methods. They only differ in one respect and that is in the way in which the first selection is made.

HILL SELECTION METHOD.

The usual practise in making hill selections is to carefully examine the plants in the field when they are fully grown and mark all such as most nearly represent the ideal type of the variety and that are vigorous and healthy. Prior to harvesting, these hills should be dug by hand and the tubers carefully inspected. Reject the progeny of all plants which do not show a large proportion of marketable tubers closely adhering to the varietal type and of fairly uniform size. A number should be given to each selection and a record made of the number of marketable and unmarketable tubers after which the tubers from each selection should be stored in separate sacks or other receptacles. The following season plant your selections in such a way that each will occupy a separate row or portion of a row, and going still further, plant each tuber of the selection so that its plants may be readily identified from those of every other tuber of that number.

This is perhaps most easily accomplished by resorting to the tuber-unit method, that is dividing each tuber lengthwise into four equal parts. The four parts of each tuber are planted consecutively in the row and a slightly wider space left between each set of four plants. If the small tubers are planted split them in two but it will be necessary to note the number of tubers planted by both methods or else it may not be possible to identify the progeny of each tuber. A close study of the growing plants will very probably reveal quite striking differences between the progeny of the various selections. It is quite likely that some selections will be noted in which the plants are extremely variable in size and vigor such selections should be marked for rejection. Note all those which show uniformity in size and which most nearly conform to the varietal type. Harvest each selection by hand and retain only those for further trial which most nearly meet the ideal of the variety both in type, color, size and productiveness.

The further culture of these selections consists in planting them according to the most approved methods in the increase plot. If at the end of the second season you have a single strain left which has met your most exacting demands you have reason to rejoice over your success for I am convinced that there are relatively few strains within a variety which are markedly more productive than ordinarily well selected stock. The great value of selection according to my mind lies in the elimination of the weak, unproductive plants rather than in the isolation of high producing ones.

One of the best known experiments on hill selection is that reported by Waid in bulletin 174 of the Ohio Agricultural Experiment Station. The data given by Waid shows that the average weight of ten high yielding hills from the 1903 crop was 2.38 lbs. while that from ten low yielding hills was 0.72 lbs. The average of the progeny of these ten high and ten low yielding hills for the seasons of 1904, 1905, and 1906 are shown to be 1.38 lbs. and 0.73 lbs. respectively while that from unselected or the general run of seed stock was 1.10 lbs. Two deductions might be made from these results one that the high yielding hills had not transmitted this character, if compared with their initial production, for we have a falling off in yield of over 72%. If on the other hand we compare the behavior of the high yielding hills with un-selected stock we note a gain of over 25% in favor of the selections evidencing a distinct gain through selection. In some

studies undertaken by the Office of Horticulture U. S. Department of Agriculture in 1911 and 1912 rather more marked differences were obtained in a comparison between high and low yielding hills, or more strictly speaking between healthy and weak plants. The data obtained showed an average yield from twelve healthy tuber units of as many different varieties of 3.2 lbs. primes and 1.77 lbs. culls or a total of 4.97 and of .2 lbs. primes and .68 lbs. culls, a total of 0.88 lbs, from a similar number of weak units of the same varieties as the healthy. To recapitulate the data, the healthy plants averaged 3.2 lbs. of primes as against 0.2 lbs. from the weak plants; and a total production of 4.97 lbs. as against 0.88 lbs. or over five times as much total crop and 16 times as much weight of marketable sized tubers.

These two examples would seem to give ample justification for the statement which I have previously made that the greatest immediate gain secured by selection comes through the elimination of the weak and unproductive plants.

THE TUBER UNIT METHOD.

As previously stated the tuber unit method differs from hill selection in only one particular and that is in the method of making the original selection. The first step in this method is to select from the seed bin a considerable number of tubers of from to 6 to 9 oz. in weight, which most nearly approach the type of the variety to which they belong. These tubers are then planted at the proper time on the tuber unit plan as previously described under "hill selection." From this point on the process is identical to that outlined for hill selection. In taking notes upon the tubers, each set of fours is judged as an individual entity and dealt with accordingly. If the season has been a normal one it will be unnecessary to plant the tubers of the selection separately the second year as suggested for the hill selections. If however the season has been unfavorable I would advise planting the following season on the tuber unit basis. When a desirable strain has been secured proceed to increase it for field planting. Do not on any account relax your watchfulness over your selections. If weak plants appear they should be removed prior to harvesting the crop. The vigor and productiveness of a variety can only be maintained by eliminating all the weak and diseased plants. If you are growing seed pota-

toes there is all the more necessity, or shall I say incentive, to maintain the highest possible standard.

Varieties can only be standardized through some such method as that just outlined. It not only affords an easy means of eliminating diseased and unproductive plants but it also accomplishes at the same time the removal of all foreign varieties. In other words you have unconsciously purified your seed, through selection.

The beneficial effects accuring from selection is that you obtain a seed stock from which the progeny, or tubers, of all diseased and weak plants and all varietal mixtures have been removed. This insures a perfect stand of vigorous healthy plants, every one of which should be productive and if the weather and cultural conditions are favorable it is easy to predict what the harvest should be. If the crop is grown for seed purposes it possesses a much greater value than that from unselected seed. It should be remembered however that eternal vigilance is the price of success; the strictest attention should be given to the seed plot each season. One cannot rest on his oars and say I have a selected strain of potatoes that require no further attention. Your strain of seed will require the same vigilance each year in the removal of all weak and imperfect plants. It is true that with careful handling of your own seed there should be no further contaminations in the way of varietal mixtures, but you are almost sure to find some off type and weak or diseased plants in any season so be ever on the watch. If I were given to prophesying I would be tempted to predict that in the next five years this section of your State will be producing vast quantities of high grade seed potatoes which will have behind it a guarantee of purity both as to trueness to name and type, as well as freedom from diseased tubers.

If it were possible to plant the whole of the 1914 crop of the United States with such seed as I have just described I will venture to say that the average yield per acre would be increased at least 25 per cent. Can you realize what this would mean? Our present average acre production is less than 100 bushels and our total average production is about 350,000,000; multiply this by 25 per cent and we have increased our crop by 87½ million bushels. Think of it a gain well toward a hundred million bushels without the outlay of any more capital in its production outside of the extra labor involved in harvesting a larger crop.

The seed question is a large one; it is an important one; our

commercial varieties can be improved, largely it is true by elimination, but improved nevertheless; let us each constitute ourselves a committee of one to improve our seed stock. Your potato specialist, Prof. Milward, in advocating fewer varieties and the standardization of those that are best adapted to your locality is working along the right lines. The more you concentrate your efforts upon one or two varieties the more you will advertise your product and the more easily will sales be made. Let your motto be, good seed, true to name and type, free from varietal mixture, and from disease and all the other good things of life will be added unto you.

OFFICIAL INSPECTION AND CERTIFICATION OF POTATO SEED STOCKS.

By W. A. ORTON
Of the United States Department of Agriculture.

To the Members of the Wisconsin Potato Growers' Association:

It is gratifying to have this opportunity to express the appreciation felt in the United States Department of Agriculture of the movement for higher standards and better conditions in the potato industry which your association is guiding. The improvements which you are effecting here will not be limited by state boundaries but will benefit other communities in distant states. It is to point out some of the interrelations of your potato industry with that of other places, the extent to which southern and western districts are dependent on you, and the broad opportunities for progress that are open to you that this letter is written.

Wisconsin stands to-day in a position of exceptional potential advantage in its relation to the potato industry of the United States. Its northern location provides a climate suited to this crop, where its natural vigor is maintained. There are vast areas of new land that will produce potatoes of fine quality, since most of it is free from the diseases prevalent in other districts. Geo-

graphically and commercially you are in close touch with the east, and south and the west, and finally, you have the highest type of leadership at your command in the officers of your association and their colleagues at the University and Experiment Station.

W. A. ORTON.
Washington, D. C., U. S. Department of Agriculture.

Those who are watching this association from outside Wisconsin expect to see you succeed in your aims. It is expected of you that you will increase your yield per acre from its present low average of about 92 bushels to perhaps double that figure, that you will find the varieties best adapted to your conditions and keep them pure, eliminote mixtures of varieties from commercial shipments, through community efforts in establishing and enforcing standard grades, and develop closer relations between yourselves as producers, and the consumers of your potatoes, to your mutual benefit.

But in doing this, we hope that your efforts will be along lines that can be correlated in a practical way with the needs of other sections. When we said that other potato districts were dependent on you, it was with primary reference to their need for good seed stock, pure, vigorous and healthy. These things mean much to the southern and western grower. Prof. Stuart will tell you of the differences in vigor and productiveness between selected and run-out strains, of the losses due to admixtures of late with early varieties, and of the proper methods of developing and maintaining the best stocks. Plant diseases also, are more destructive in many other states than in Wisconsin. Many of the worst are carried in the seed potatoes from farm to farm and from state to state. There is need for special attention to the lessening of this danger, and we believe that a plan for inspection and certification can be worked out that will do as much to control

the spread of potato pests within our country as the National Plant Quarantine Act does toward keeping out foreign parasites.

There are great possibilities in the special seed trade as a profitable business for many of you, but there are many defects in the present system of growing and selling potatoes which is failing to meet our needs.

That southern growers must have northern seed is well known. Some of them and some dealers, even now, think that if their seed potatoes come from a northern source that is sufficient. It is not. The sale for planting purposes of mixed, ungraded, unselected potatoes, bought in car lots by city buyers, has already done much to injure the reputation of Wisconsin seed stock and to divert the demand to other sources of supply. Scab, blackleg, dry-rot, stem-blight, leaf-roll, wilt and other diseases are spread every year through infected seed and the distant purchaser has practically no means whereby he may be certain of obtaining a safe supply. Many go or send an agent to inspect the fields where the seed is being grown but this expensive precaution is not sufficient to detect all diseases or to prevent substitution.

An equally great bar to progress, inherent in our present system, is that the progressive seed grower, who has produced potatoes of the highest quality, has insufficient means of convincing the purchaser of the superior value of his stock, and fails to find that special demand and that bonus in price which should be his incentive for giving special care to seed-potato production.

We need a system developed that will enable a seed distributor or a grower's association in Colorado or Texas to order by the carload or by the hundred carloads with confidence that the potatoes delivered will not only conform to the standard grades of your association, but carry also an official certificate that they are true to varietal type, free from mixture with other sorts and free from disease.

We need this system developed so that the Wisconsin growers or local Associations that have specialized in the production of fine potatoes, may back their own guarantee with the statement of an expert whom no one can question, and thereby secure a better market price.

It is with especial reference to freedom from disease that this plan has been developed, and the relatively healthy conditions in Wisconsin offer many advantages for beginning the work here.

The losses from potato diseases in Wisconsin have been so slight that I expect many growers will have to be shown that a disease problem really exists. A few actual examples are therefore cited.

1. A carload of seed potatoes was brought to my attention in Virginia. It had been shipped from a point which might have been in Wisconsin, but we may assume for your comfort that it was in a neighboring state. The sacks near the car door were of good quality but the rest of the car was filled with some of the worst scabby tubers I have ever seen, and they had to be thrown away. Naturally, that town in Virginia now buys its seed potatoes elsewhere.

2. Not long ago we recommended Wisconsin potatoes to a Colorado grower, who responded that he had tried them and that the varieties were so badly mixed that the stock had to be discarded.

3. In the South Atlantic States the blackleg disease has become frequent, through the use of infected northern seed, I have seen fields, with 50% to 75% of the plants dead or decaying just before harvest, when a neighbor using healthy seed had none. This blackleg appears to come only from seed infection in this country. It takes a more virulent form in the south than in the north, and can be eliminated by the northern grower by seed selection and disinfection.

4. The powdery-scab, a new disease to America, though long prevalent in Europe, has been found in a few places in the United States and may develop elsewhere. It will be highly important to prevent its spread, and consequently whenever a few cases are found on one farm in Blank county, purchasers of seed potatoes from other farms in that county will require assurance of freedom from powdery-scab. The same would be true of the wart disease or any other new trouble that might crop out and we lack at present any definite means of giving this guarantee.

5. The Fusarium Wilt is one of the big factors in reducing yields in our warmer districts, particularly in the west. This is carried in the tubers from diseased hills, and has already been widely scattered in this way. Such infected tubers are not fit for seed, and many districts are looking for a source of healthy seed stock.

6. The potato ell-worm, a dangerous pest in the irrigated valleys of Nevada and California, in Australia and other warm countries, is spread wholesale by planting affected tubers.

7. Silver-scurf, a European parasite which disfigures the skin

of potatoes, was brought over and scattered throughout the United States before it was detected. It is carried over by planting infected tubers, and as it does not seem to be killed by disinfection, a certificate that a given lot of potatoes was free from silver-scurf would add materially to their value.

8. Powdery-dry rot is a disease of stored potatoes that has caused great losses from Wisconsin westward. It is carried over in the soil where diseased potatoes are planted and the evidence shows that whole new sections of Idaho have been thus infected, and unnecessarily, but will now have to practice preventive measures, perhaps as long as potatoes are grown.

9. The common late-blight dry-rot, carried south on seed potatoes, results in defective stands where the infected tubers fail to grow, and not infrequently an outbreak of the blight itself is charged to this use of infected seed.

10. Curly-dwarf, a physiological trouble, and allied weaknesses, often classed as "running out," occur on some farms, much more than others. Farmers have lost thousands of dollars through buying unaware, such weak strains.

11. Finally, leaf-roll, the new disease which has already cost Colorado growers millions of dollars, is transmitted through seed from diseased plants, and the best advice we can give is to get healthy seed. To insure this, there has been successfully practiced in Germany a seed certification plan similar to the one we are recommending.

I have now given you a few examples to show why potato growers in other sections need certified seed. If there were any such seed in existence a demand for it could readily be aroused.

Will not Wisconsin take the leadership and inaugurate the plan to build up selected strains and maintain a high standard? We can assure you that the U. S. Department of Agriculture will heartily support the University at Madison and your association in this important work, particularly in those phases which involve trials in other states.

A PLAN OF POTATO SEED INSPECTION FOR WISCONSIN IN 1914.

Referring to the field inspection of potatoes as discussed by Mr. Orton in the accompanying article, the state association feels that it should offer every possible advantage to its membership.

The purpose of inspection this year in Wisconsin will be to provide a means to enable members of the association to determine whether the stock they are growing is pure. The value of this guarantee will be of special service in the development of community potato work.

The plan to be followed will be entirely voluntary and will be pursued in relation to the development of association work in the state. With the understanding that the association will be compelled this year to limit the work in accordance with available time and resources the following plan is submitted.

I. Arrangements will be made if possible to provide inspection in those centers where community potato work has been organized. Judging from conditions in Wisconsin this work will be especially adaptable to counties where an agricultural representative has been secured.

II. Inspection will be made relative to, 1. Variety purity, 2. Freedom from disease. This will involve an inspection of the growing fields and the stock at harvest time.

III. A certificate will be furnished the grower upon which will be stated the condition of the stock in relation to the objects of inspection named in paragraph II.

IV. All expenses incidental to this work shall be borne by the grower or community for whom inspection is provided.

V. This plan of inspection will be made uniform and it is expressly understood by all local Associations and Counties involved that all recommendations of policy or organization of the work shall be vested in the Agricultural College—University of Wisconsin.

THE MARKET DEMAND FOR IMPROVED STANDARDS.

E. P. MILLER
Of the Albert Miller & Co., Chicago, Ill.

Markets like individuals are, we might say, peculiar in their likes and dislikes. One market prefers a long, white potato; another a round white; another is quite partial to a red variety; one wants a medium sized potato; and the other an extra large potato—none of them are very partial to very small ones, and of course, all want clean, smooth, bright stock of good cooking quality.

E. P. MILLER.
Of Albert Miller & Co., Chicago, Ill.

The territory to which Wisconsin may look for its outlet, of course, varies with each season, but, in a measure, is governed by freight rates, and by quality. On the West we must compete with the irrigated districts, and on the East with New York and Maine.

The present season we have been able to secure very little business in the Missouri River Territory. Our rates from Wisconsin to what is known as "Missouri River Territory" are 15c per bushel. The rate from Greeley, Colorado, district is 21c per bushel. From the Idaho sections is 30c per bushel, from Montana 24c per bushel. Now if we were selling at, say, 60c sacked

Wisconsin loading stations this would mean that our price would be 75c delivered Kansas City or other Missouri River points, and one might at first thought conclude that if Idaho was quoting at a basis of 45c f. o. b. or 75c delivered that we might secure a fair share of the business in competition with them, yet this is not the case, for the Idaho potatoes, will, at present, command a premium of from five to eight, or even ten cents per bushel.

To-day our price delivered New York City based on 60c Wisconsin would be 82c per bushel and to-day the market in New York City is in such shape that if we had a bright, medium sized round white potato, which the New York market requires, we might secure considerable business there, yet, because of the fact that New York City does not like the potatoes that we can ship, and will not pay as much for them as she will for Maine potatoes, we are kept out of that territory except at such times as our prices are under Maine goods; and these same conditions prevail always in sections with which we must compete with either of the two above mentioned districts.

Now there are numerous samples on exhibition here to-day which would find a ready sale both West and East. If the average production of Wisconsin quality was represented by these samples it would mean a territory 15% to 20% larger for the sale of Wisconsin potatoes and that we can easily do this is clearly shown by these samples. What must be done is to show the growers generally the great improvement it is possible for them to make in both yield as well as quality by the careful selection of seed, and I feel that the work which your Agricultural Station is doing will practically insure a growing demand from a wider territory for potatoes grown in this State.

I feel that we shippers are in a measure to blame for the quality of potatoes that we ship from Wisconsin. As a rule we do not sort them carefully enough; competition is so strong that our men at loading stations will tell us that if they sort closely the grower will sell to some one else. On the other hand I have been asked why it is that if a farmer does grow better potatoes than his neighbor he cannot get more money for them. This is in the main because there have not been enough potatoes of superior quality grown to enable the shipper to reach out and secure some customer who is willing to pay a premium for them, for the reason that if we furnish him with one car exceptionally choice, he expects another like it, and the chances are we are unable to fur-

nish it. When the time comes that we as shippers can buy a reasonable amount of really choice potatoes there will be a difference in the price paid for them as compared to inferior stock; and in this improvement in quality both the grower and the shipper are equally interested. As a matter of fact, the growers' and shippers' interests are in a great measure identical. The grower must have a price that will enable him to profitably grow potatoes, and the shipper must secure a margin that will profitably enable him to reach out for new and wider territory and I hope the time may come when there will be less feeling between growers and shippers. In this connection I feel that the newspapers, in some instances, are responsible for stirring up prejudice against the middleman. If he is an evil, which I cannot admit, he is certainly a necessary evil, for the grower is not in a position to go out and secure trade in cities from one end of the country to the other, for if he should secure customers this year in Oklahoma, who might use all of his crop, it is quite possible that the next year Oklahoma would be entirely supplied by potatoes from some other section and that the grower would have to look to some point in Pennsylvania, North Carolina, Georgia, Alabama. An outlet can not be found near at hand for all of Wisconsin's potatoes; and the more aggressive and energetic the shipper, who is handling Wisconsin potatoes, the more benefit is he to the Wisconsin grower. I think that we all owe a debt of gratitude to the Agricultural Experiment Station of this State for it has been doing a great work and I am deeply gratified to note the interest which has been awakened. I feel sure that the time is coming when our customers in competitive territory will be willing to pay us as much if not more for Wisconsin potatoes than for those from any other section. It's simply up to the Wisconsin grower to improve his quality and to the Wisconsin shipper to get out and get the business, and I can see from this meeting that we all feel sufficiently enthusiastic about this to make its accomplishment certain.

VINE AND TUBER CHARACTERISTICS OF STANDARD MARKET VARIETIES OF POTATOES.

PROF. WM. STUART,
Of the United States Department of Agriculture.

I was somewhat surprised when I looked over a copy of the program of this meeting, which I received a few days before leaving Washington, to see that I was expected to lead a discussion on the vine and tuber characteristics of standard market varieties. The subject looks innocent enough, but like many innocent looking things there are troubled waters below the surface. For the past few years I have had the privilege of being able to study a considerable collection of the standard varieties of potatoes, and have endeavored to classify them into groups according to well defined varietal characters of foliage or of tuber. The majority of our varieties fall very naturally into one or other of these groups, but there are still quite a few which we have not succeeded in classifying.

We have found, for example, that it is a very easy matter to distinguish between varieties belonging to the Green Mountain and Rural New Yorker groups of potatoes. There are three distinct varietal characteristics in these groups on which no one can err. Neglecting for a moment the shape and color of the tubers, let us consider the color of the sprouts, preferably of those which have germinated in the dark. You will find that the sprouts of all varieties of the Rural New Yorker group are short and enlarged at the base, of a dirty white color with tips and leaf scales of a violet blue shade; the Green Mountain group will all have white sprouts which are not appreciably enlarged at the base and which do not have any color in any portion of it. The stems of the growing plants have a purplish hue in the Rural New Yorker and light green in the case of the Green Mountain. The flowers of Green Mountain are white, while those of Rural New Yorker vary from a dark violet blue toward the center of an entire absence of color in the five points of the corolla. The intensity of

the color may vary quite considerably, depending upon the age of the flower and the climatic conditions. If the weather is hot and dry the color will be much less intense. The vine growth of the two groups is also quite distinct. The Green Mountain makes a dense bushy plant, while the Rural New Yorker is long jointed, sparingly branched at first, but gradually getting denser as the season advances.

To those who are more familiar with these two groups of potatoes, there are certain tuber characteristics, such as color of skin, shape of tuber, arrangement of eyes, etc. The skin of the tubers of the Rural New Yorker group is a light creamy white, while that of the Green Mountain group has a light russet appearance.

While the shape of the tubers of each of these groups varies very much in different localities, the prevailing type of the Rural New Yorker is round to broadly oblong flattened, and that of the Green Mountain has a tendency to become distinctly flattened.

In the Early Rose and Early Ohio groups the relationship is much closer and the distinguishing characters are fewer. The color of the sprouts, stems and flowers is similar. The sprouts are suffused with pink, the stems are a dark green and the flowers are white. The differences in the habit of growth and color of foliage are not sufficiently marked to be easily described. They are differences that are apparent to the eye rather than in descriptive language. Both contain the same blood, the Early Ohio being a seedling from a naturally fertilized seed ball of the Early Rose. When we come to study the tubers of the two varieties, differences are at once apparent. Gregory in his 1875 catalogue describes the Early Ohio as follows:

"This is one of the numerous seedlings of the Early Rose, but while almost all of the seedlings are so like their parent as to be indistinguishable from it, the Early Ohio while in color like the Early Rose, is, in shape, quite distinct, being round-oblong instead of oval-oblong, so that side by side is readily distinguishable. Eyes about as numerous as those of the parent, while the brows are rather more prominent."

The present strain of Early Rose is generally a deeper pink than that of the Early Ohio. Two other points of difference should be noted, the first being a more or less distinct flattening of the tubers of the Early Rose, and the second, the distinct small cork-like dots in the skin of the Early Ohio. This latter characteristic is in evidence in several varieties which have been introduced under other names, but which to all intents and

purposes are Early Ohio. There is still one other difference which so far as I know, has never been mentioned, though it is more than likely that it has been observed, and that is with respect to the character of the sprouts. The Early Ohio sprouts are short, thick, and stubby, while those of the Early Rose are longer and more slender and devoid of the thick bulbous base of the Early Ohio.

The Irish Cobbler group of potatoes is not easily confused with any other. The vine growth is short jointed and stocked with abundant foliage. Under favorable conditions the leaves are large flat, more or less glossy, and of a rich green color. The plants bloom freely, the flowers being borne in large clusters or cymes. The color of the flowers is a delicate shade of purple or rose lilac. If the weather is cool the color is deeper than if high temperature prevails. If subjected to extreme high temperatures the color may almost entirely disappear.

The tubers are round to a short, oblong, some are distinctly shouldered, while others are only slightly so or not at all. The eyes are, as a rule, rather deep, particularly the bud-eye cluster, and the skin is a clear creamy white. The members of this group mature early. The Early Petosky, Early Victor, Early Eureka and several others belong to this group, if, indeed, they are not identical with the Irish Cobbler.

The Burbank group is characterized by having white skinned, long cylindrical or slightly flattened tubers having many eyes. The sprouts have a fruit tinge of pink and the stems are possibly a shade darker than the Green Mountain group. The flowers are white, the plants are bushy and of fair size. White Chief, Knowle's Big Cropper and White Star are simply varietal strains of Burbank.

The Triumph is such a distinct variety, particularly in its tuber characteristics, that it needs no description.

The Pearl seems to belong to a class by itself. It is said to be a white sport of the Blue Victor, but thus far we have failed to find any literature to corroborate the statement. It is a strong grower with well branched short jointed stems. The stems are medium green and the flowers are white. The tubers are round flattened to more or less peltate or heart-shaped. The stem is strongly recessed and the eyes have a faint purplish tinge when freshly dug.

There are other varieties that might be mentioned but they are of so relatively little importance to this locality that I shall omit them.

HIGHER STANDARDS IN RELATION TO THE WISCONSIN POTATO INDUSTRY.

H. C. CHEYNEY

Assistant General Freight Agent Chicago & Northwestern Railroad.

The potato, now a staple food for man, was cultivatd before the discovery of America, but it was not until the 18th century that it commenced to grow in popularity as a food product, but the potato now is coming to its own, brought about by an exacting public who demand quality and the time is opportune for the Wisconsin potato.

H. C. CHEYNEY.
Chicago, Ill.

In my boyhood days the potato was used largely as a filler, considered a necessity, never a delicacy, but today when the special baked in any hotel or cafe, costs about the same as the baked apple, including sugar and cream, quality is not only demanded but must be provided.

This reminds me of a conversation I overheard in a dining car up State a few days ago. A gentleman, evidently a grower ordered a special baked potato. When he received his check he remarked to the waiter, "It was fine, George, but it costs too much. I can only get 45 cents a bushel for mine and they are just as good." This remark is only one of many that we hear about how really well adapted to raising

potatoes Wisconsin is, but the fact is not well enough known to bring about higher market prices.

The cutover land in conjunction with the climate seems to just breed quality into them. All that is needed to give them individuality is advertising and proper packing for market. Do you every stop to think that Rocky Ford melons were once unknown? Oregon and Washington apples considered no better than those of New York State? Why is it they command such a premium in every market? Simply because they have been constantly advertised and are put up in a neat and attractive manner. I think it is possible for the Wisconsin potato to reach the same sphere of popularity. I see no reason why the potato industry of Wisconsin cannot, before many years, supersede lumber as its possibilities are unlimited. Chicago alone consumes approximately 12,000 cars of potatoes each year in bushels, over six million. The Northwestern Road last year handled approximately 12,000 cars of potatoes out of Wisconsin, to which add as much again of the other roads, and you can gain an approximate idea of the magnitude of this industry to-day. In Chicago it is estimated that 1,900,000 people or about 80% of its great population live in apartment or flat buildings, provided with neither cellars nor other vegetable storage. The potato is supplied through the family grocer without regard to quality or uniformity in size and the bottom of the sack is now always a disappointment to every housewife and this is true of every large city. The housewife in the apartments wants her potatoes in a neat and attractive package that can be placed on the pantry shelf. It must have a distinctive label which guarantees quality and uniformity in size for which she will be glad to pay a higher price. The hotel, cafe, and dining cars demand the same. The family grocer wants the attractive and distinctive package which sells itself, pleases his customers and avoids him loss. Is not this a field for the high quality Wisconsin potato? It costs to transfer a bushel of potatoes from Rhinelander to Milwaukee, Wis., approximately 7½ cents, to Chicago 9 cents, to St. Louis, 13 cents, Kansas City, 15 cents, Pittsburgh 15 cents, Philadelphia 21 cents, New York 22 cents. The freight on the selected potato is no higher than on the indifferent or ordinary. The attractive package, guarantee label, double value, quality and uniform size will place the Wisconsin potato not only in these cities but in hundreds of new markets.

Prior to the present extension work the promotion of the Wisconsin potato was the work of a few men, pioneers in the build-

ing of suitable warehouses for the storing and shipping of the growers' crop, establishing a cash home market. While these same pioneers have for years advocated better seed, uniformity in size and good quality, they have met with many discouragements and limited success. The present extension work of the Horticultural Department of the University of Wisconsin in conjunction with the Wisconsin Potato Growers Association, under State auspices is removing all prejudice on the part of most growers who in the past have been sceptical as to advance methods, bringing better returns, but are now convinced. The slogan from now on of the Wisconsin potato grower is yield, quality and uniformity, and means to them substantial financial returns.

Following the present extension work, the Wisconsin Potato Growers' Association must give the Wisconsin potato individuality. It must be promoted, advertised and packed for market in a manner attractive to both the consumer and trade. This is a growers, not a dealers proposition. The promotion of the Wisconsin potato means much hard work, the expenditure of money, possibly some State aid, but with its individuality once established, the demands will be always great and at the highest market price. To create the right demand for the advanced Wisconsin potato we believe that a standard package of 10, 20 and 30 pounds must be promoted.

This package must be attractive in appearance, bearing a distinctive label which guarantees double value, uniformity in size and quality and with this once done the Wisconsin potato will occupy a place of its own. With the demand once created for the selected Wisconsin potato, the large handlers and shippers who now furnish the growers storage and shipping facilities and a home cash market will pay higher prices for selected potatoes which will be placed in attractive packages and go forth to the great family markets where they will be displayed in the grocer's window, attracting the attention of all.

In conclusion let me prophesy that it won't be many years before the perfect Wisconsin potato will be selected in the field, placed in crates and not distributed until it reaches the centralization plant, similar to the manner in which milk under modern methods is handled to-day They will then be washed and packed in the attractive package ready for market with but one handling from soil to consumer. Then the special heated potato car will place these perfect potatoes in every large consuming market regardless of weather conditions.

POTATO DISEASES IN RELATION TO THE WISCONSIN SEED TRADE.

BY L. R. JONES

Professor of Plant Pathology, University of Wisconsin.

Professor Jones was born and raised on a farm in Fond du Lac County, Wisconsin. In 1889 he went to Vermont and remained there in charge of the Department of Botany, until 1910 when he resigned to take charge of the Department of Plant Pathology in the University of Wisconsin.

Prof. Jones, relations to the study of plant diseases has kept him in close touch with potato disease conditions in this country and in Europe. He has had the advantage of observation and study in both countries in relation to these problems. At this time, when potato disease dissemination has given rise to important economic and interstate relations, the Wisconsin Potato Growers' Association is fortunate in having the constant co-operation and counsel of Professor Jones.

L. R. JONES.

Professor of Plant Pathology, University of Wisconsin.

In growing potatoes for table stock, we are principally concerned with those diseases which reduce the yield. These are the leaf diseases—tip burn, early and late blight. For the seed trade we are concerned rather with the tuber disease. This is not merely

*A chart with three color reproductions illustrating the tuber diseases of the potato is now in preparation under the direction of Prof. Jones. This chart will be issued by the Department of Plant Pathology of the University during the fall of 1914 and will be available to Wisconsin potato growers.

because of their effect upon the appearance of the tubers,—indeed, the consideration would affect table and seed stock alike,—but also chiefly, because of the fact that the germs of these diseases are carried on or with the tubers from crop to crop. Thus one of the most important considerations with the purchaser of seed stock is that it be free from disease. Herein lies the peculiar opportunity for Wisconsin seed potato growers.

There are large areas of practically virgin soil in northern Wisconsin especially suited to potatoes. These soils are at present free from disease germs. The responsibility rests with the potato growers to keep them free. This means to begin with the use of disease-free seed in planting them. Especial caution should be used in importing seed from the Eastern States and under no condition should foreign potatoes be used for seed. But in spite of any precautions likely to be taken diseases will gradually come in. As this happens, the important thing is to recognize them promptly and by proper measures hold them in check.

In order to make these matters more definite, I will list the diseases which are likely thus to be introduced or borne on potato tubers with such brief characterization as will help in guarding against them.

SCAB DISEASES

Common scab. This is familiar to every potato grower. In the older sections it has been so widely introduced that seed potatoes secured from any such source are almost sure to bear the germs. Once introduced, it may persist for years in the soil. Fortunately, the germs are on the surface and easily killed by disinfecting. There are various methods of doing this, but the simplest and best is to soak the seed for two hours in a solution of 1 pound of formaldehyde (or formalin) in 30 gallons of water.

Powdery scab is a European disease, similar to the common scab in general appearance and effect, but unfortunately the germs are not so easily killed. Since this does not occur in Wisconsin as yet, every care should be taken to guard against its introduction.

Black wart, somtimes called Black Scab, is another European disease even more to be dreaded. It attacks the eyes and young

sprouts of the potato which as a result develop into repulsive, black warty growths which ruin the potato for any purpose. This too is a germ disease, but no effectual method has as yet been found of ridding either soil or tubers of the germs. The danger from this disease is so great that the United States has declared a strict quarantine against potato importations from all infested countries including Great Britain, North Central Europe and the Canadian island of Newfoundland. The Government should be encouraged to maintain and if need be, extend this precautionary measure.

Scurf Diseases

These are entirely superficial or affect only the outer layers of the "skin" of the potato tuber, hence are less serious than the "scab" diseases. They mar the appearance of the tuber, however, and the fungi which cause them may, under some circumstances, pass to the stem of the young plant and cause more injury. Hence these diseases are objectionable especially on seed that is to go south or west. There are two kinds, the *black scurf* or Rhizoctonia disease, and the *silver scurf*. Disinfection tends to hold these in check. The use of corrosive sublimate solution (1:1000; 2 hrs. immersion) has recently been proved to be more effective than formalin against black scurf and may be resorted to where needed.

Potato Rot Diseases

There are two types of rot occurring in Wisconsin which are serious enough to deserve attention. One is the bacterial *black leg,* the other the fungus *late blight* and *rot.*

Black leg. This causes a soft rot of the base of the stem and may rot the tuber. The bacteria causing this disease overwinter on such diseased tubers. Apparently they do not persist in the soil. If sound potatoes are selected for seed, and are disinfected by either method previously outlined, the disease is eliminated. It is important for seed growers to keep absolutely free from this trouble since the use of infected seed from the North has been known to cause serious loss in the southern crop.

Late blight is a fungus disease primarily of the foliage, but the germs washed from the leaves into the soil cause the tubers to rot. Usually there is not enough of this trouble in Wiscon-

sin fields to be a serious factor. In bad outbreaks, such as occurred about ten years ago, it may, however, sweep off the entire crop. The fungus overwinters in the *interior* of infected tubers. Of course, if these are sufficiently diseased to show as dry rot, no one would think of using them for seed. Since, however, there may be cases of infection which do not show on the surface, the only safe rule is to avoid the use of seed tubers taken from fields which show the late blight. This disease should not, however, be confused with the early blight and tip burn the leaves, which are more common in Wisconsin fields, but which do not attack the tubers, hence have no importance in relation to the seed trade.

CONCLUSION

If each Wisconsin seed potato grower will learn to recognize these troubles and use precautions as an individual to keep free from them, Northern Wisconsin can continue indefinitely to supply potatoes of a higher degree of purity from disease than any other state in the north. In order to secure the full benefit of this condition, this Association should cooperate in the plan of potato seed inspection and certification outlined by Messrs. Orton and Stuart of the U. S. Department of Agriculture. With this combination of individual and Association effort, I believe Wisconsin may maintain her place, unrivalled, in the seed potato trade of the country.

As this bulletin goes to press a letter has been received from North Crandon in Forest County, announcing the organization of the North Crandon Potato Growers Association. Thirty-three charter members were enrolled. The Association will unite upon round white stock and have taken steps to secure foundation stock of the Rural New Yorker and Green Mountain varieties.

The officers of the Association are: A. R. Anklam—President; J. D. Grandine—Secy-Treasurer.

ANNOUNCEMENT

OF THE

CONVENTION AND EXHIBIT

TO BE HELD AT

GRAND RAPIDS, WIS., NOVEMBER, 1914.

(Watch Local Press Notice For Exact Dates.)

The State Association considers it very important that plans for the annual convention should be made at potato planting time. Every county or local association where definite community work has been organized this spring (1914) will be represented at Grand Rapids. This will be a united gathering of the commercial potato interests of the state.

THE LARGE PAVILION AT GRAND RAPIDS, WIS.

The 1914 Convention and Exhibit of the Wisconsin Potato Growers Association will be held in this Building in November.

Every commercial potato center in the state has not been reached. Attention is called to the fact that it is not too late now to make improvement this year.

The Wisconsin Potato Growers Association will co-operate with any individual or community who desires to secure good seed stock. When you receive this bulletin, write the secretary Madison, Wis.

THE TWO FUNDAMENTAL OBJECTS

OF THE

Wisconsin Potato Growers Association

I. TO GUARANTEE PURE POTATO SEED SHIPMENTS.

The two essentials are, A. Variety purity. B. Freedom from disease.

Wisconsin seed stock is apparently free from those dangers which menace the potato industry in many commercial centers.

This advantage must be maintained by a careful system of inspection in co-operation with this Association.

THIS TRADE MARK WILL BE STAMPED ON

ASSOCIATION POTATO SEED SHIPMENTS

II. TO GUARANTEE STRAIGHT CAR LOTS OF COMMERCIAL TABLE STOCK--SORTED AND GRADED.

This standard can be maintained only through community effort--organization--co-operation.

The work of this Association will be judged by the standard of Wisconsin potato shipments on the markets of the Middle West.