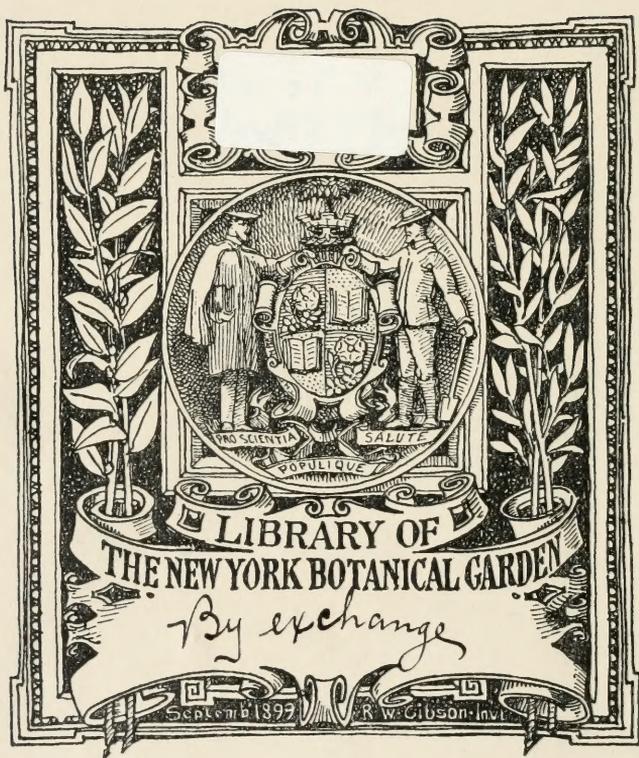


ANNUAL REPORT
of the
NEBRASKA
State Horticultural Society

1914

By J. R. Duncan

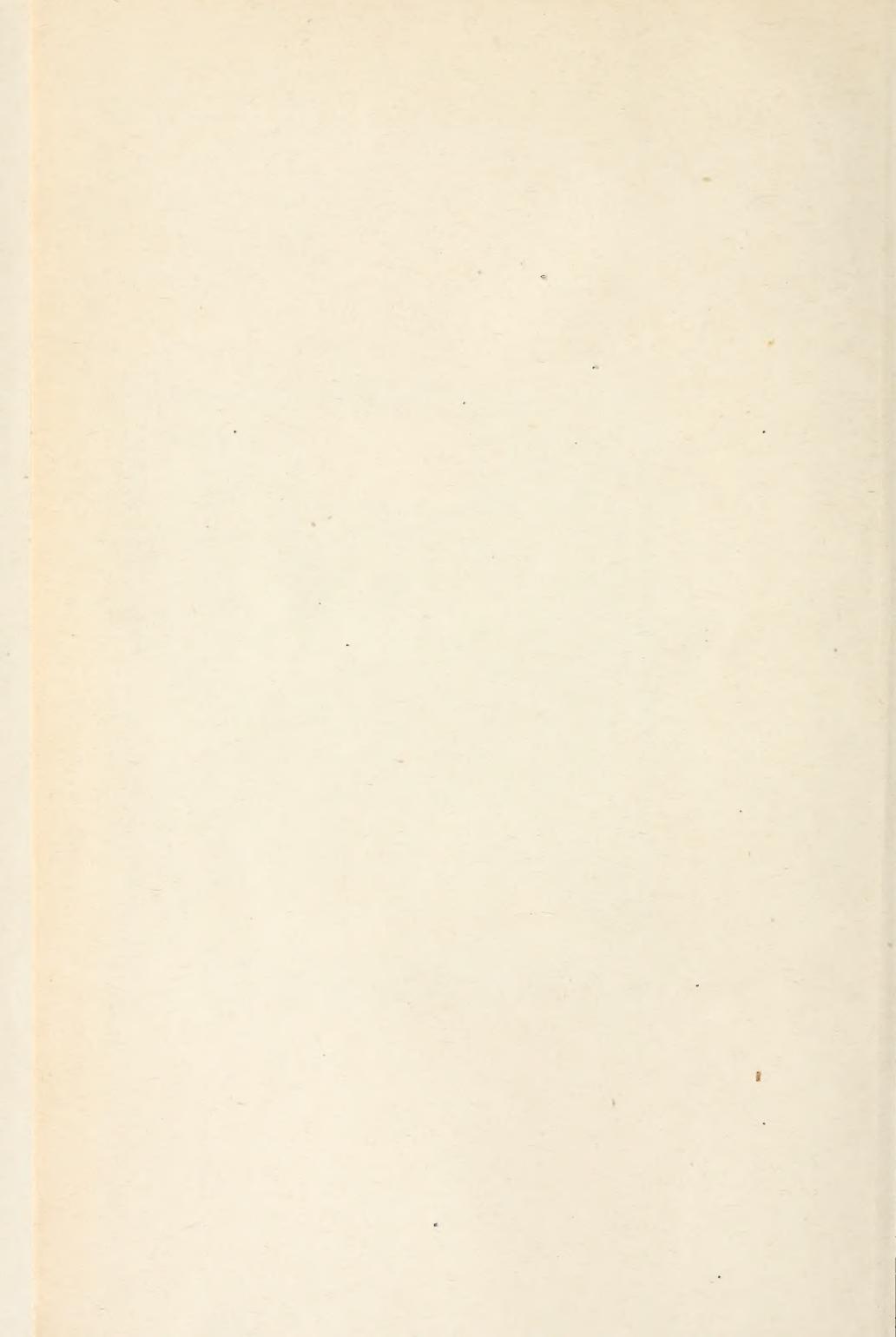


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FORTY-FIFTH ANNUAL REPORT
OF THE
NEBRASKA
State Horticultural Society

Containing all the Proceedings of the Annual Meeting held at the
Lindell Hotel, Lincoln, January 20, 21, and 22, 1914.

By J. R. DUNCAN, Secretary
LINCOLN, NEBRASKA

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YORK, NEBRASKA.

LETTER OF TRANSMITTAL

To His Excellency, John H. Morehead, Governor of Nebraska:

Sir:—In compliance with legal requisition, the annual report of the Nebraska State Horticultural Society for the year 1914 with accompanying papers, is respectfully submitted.

J. R. DUNCAN,

Secretary Nebraska State Horticultural Society.

Lincoln, Oct. 1, 1914.

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JUL 26 1915

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Second Vice-PresidentL. Henderson, Omaha
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SecretaryJ. R. Duncan, Lincoln

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Val Keyser Nebraska City

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A. J. Brown, Geneva.

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FLORICULTURE.

Jacob Hess, Omaha.

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Val Keyser, Nebraska City,

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J. R. Duncan, Lincoln.

MEMBERSHIP 1914

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Bowers, W. B.	Postoffice unknown
Boyd, Chas. J.	Ainsworth
Burns, R. A.	Geneva

*Deceased.

Brown, A. J.	Geneva
Brown, Frank P.	Florence
Brown, Guy, A.	Geneva
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Crawford, William	Postoffice unknown
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Damrow, Charles F.	Postoffice unknown
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Davidson, J. R.	Aurora
Davidson, W. E.	Holdridge
Davies, William	Kimball
Davis, W. H.	Fullerton
Davis, Ray A.	Gibbon
DeFrance, C. Q.	Postoffice unknown
Deweber, H. N.	Pawnee City
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Dovel, O. P.	Auburn
Dugan, John	Address unknown
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Dunlap, J. P.	Dwight
Dunlap, N. C.	Address unknown
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Edinborough, Philip	Lincoln
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Ernst, C. J.	1418 So. 10th St., Omaha
Ernst, William	Tecumseh
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Field, R. B.	Fremont

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Frey, C. H.	Lincoln
Frey, H. H.	Lincoln
Frey, Irvin	Lincoln
Frey, J. B.	Lincoln
Gage, J. A.	Fairbury
Gaiser, A.	Alliance
Galbraith, G. B.	Fairbury
Ganson, L. E.	Address unknown
Good, E. E.	Peru
Green, C. H.	Fremont
Green, C. H. Jr.	Fremont
Green, Jos. N.	Address unknown
Grennell, E. N.	Ft. Calhoun
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Girl, G. A.	Rockford
Hadkinson, J. H.	Postoffice unknown
Haney, Chas.	639 No. 14th St., Lincoln
Harris, J. F.	Aurora
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Harrison, C. S.	York
Harrison, Harry S.	York
Harrison, W. A.	York
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Hess, Jacob	Omaha
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Hornung, G. J.	College View
Howe, H. R.	Auburn
Hurlburt, C. M.	Fairbury
Jackson, T. C.	Purdum
Jessup, J. G.	Lindsay, California
Koenig, E. S.	Milford
Kaar, Theodore	910 So. 13th St., Lincoln

*Deceased.

Keyser, Val	Nebraska City
Koopman, W. J.	Blair
Kretsinger, E. O.	Beatrice
Koupal, Frank	Ord
Kuska, Val	Lincoln
Langdon, J. N.	Address unknown
Leonard, I. N.	Postoffice unknown
Lothrop, J. A.	Crete
*Loughry, James	Geneva
Lundeen, N. P.	Alliance
McGintee, H. L.	Neleigh
Mackley, W. H.	Arnold
Maiben, Ben	Palmyra
Marshall, A. C.	Arlington
Marshall, C. C.	Arlington
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Marshall, G. A.	Arlington
Marshall, H. W.	Arlington
Martin, Arnold	DuBois
Martin, F. R.	4622 Boulevard Ave., Omaha
Masters, J. W.	Postoffice unknown
McComb, H. A.	North Platte
McIntosh, H. F.	Alda
Melius, J. M.	Cozad
Meek, James,	Talmage
Meek, John	Hamburg
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Mergen, Philip	Omaha
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Moseman, Arthur	Oakland
Moberg, F. O.	Omaha
Mohler, Wm.	Springer, N. M.
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Mosher, D. C.	Eugene, Ore.
Mosher, P. C.	Wilber
Mott, Bert	Hastings
Murphy, P. A.	Exeter
Nation, J. W.	Fremont
Neff, J. G.	Davey
Nemechek, Paul	Humboldt
Packwood, J. M.	1345 A St., Lincoln
*Parker, C. P.	Brock
Paulson, Paul	Omaha

*Deceased.

Payne, Mrs. G. H.	Station D. Route 2, Omaha
Pearson, James	Moorefield
Perin, S. W.	Lincoln
Perry, T. H.	Elk Creek
Peters, R. C.	4822 Cass St., Omaha
Peterson, Frank	811 First St. E., Calgary, Alberta, Can.
Peterson, John	Postoffice unknown
Pollard, E. M.	Nehawka
Pollard, Isaac	Nehawka
Randall, J. C.	Exeter, California
Ream, J. D.	Broken Bow
Reed, Mrs. J. H.	Blue Springs
Reed, M. H.	Postoffice unknown
Riley, Alfred	Greeley, Colo.
Roberts, B. A.	Albion
Rosenbaum, H. J.	Kennard
Russell, D. L.,	Address unknown
Russell, J. D.	1446 G St., Lincoln
Russell, J. M.	Address unknown
Russell, L. M.	McMinnville, Ore.
Sandoz, Jules	Spade
Sanders, G. E. N.	Brownville
Saunders, Charles L.	211 So. 18th St., Omaha
Schamp, L. D.	Lincoln
Schumacher, A.	York
Shroyer, J. O.	Humboldt
Slayton, L. W.	Salem
Slayton, Geo. A.	192 Hillsdale St., Hillsdale, Mich.
Smith, E. E.	Lincoln
Smith, E. H.	York
Smith, H. L.	Geneva
Smith, O. F.	Blackfoot, Idaho
Stahl, J. L.	Puyallup, Wash.
Stenger, Albert	Columbus
Stephens, E. F.	Nampa, Idaho
Stevens, Frank G.	Nampa, Idaho
Stevenson, J. W.	North Bend
Stouffer, B. R.	Bellevue
Strand, G. A.	Minden
Swan, J. T.	Auburn
Swezey, Prof. G. D.	Lincoln
Tanahill, Wm.	Postoffice unknown
Taylor, F. W.	Address unknown
Tester, Harry S.	Blackfoot, Idaho
Titus, G. N.	Nemaha

VanMetre, C. M.	Valentine
Walker, J. W.	Nampa, Idaho
Ward, James	Address unknown
Warren, G. F.	Harvard
Watt, James	Lake, Miss.
Welch, G. L.	Fremont
Wileman, J. C.	Barada
Wheeler, D. H.	Omaha
Williams, Ed	Grand Island
Williams, John	Tecumseh
Williams, L. O.	University Place
Williams, O. A.	Neligh
Wilson, A. T.	Arcadia
Wilson, W. H.	Postoffice unknown
Woods, A. F.	Exp. Station, Minneapolis, Minn.
Wurtzel, John I.	Albion
Yager, J. A.	Fremont
Youngers, Peter	Geneva

HONORARY ANNUAL MEMBERS.

Bishop, Prof. E. C.	Ames, Ia.
Harrington, Prof. F. M.	Ames, Ia.
Maney, Prof. T. J.	Ames, Ia.
Reeves, Elmer M.	Waverly, Ia.
Spencer, F. P.	Randolph, Ia.
Grigsby, W. W.	Skidmore, Mo.
Rice, H. R.	Council Bluffs, Ia.
Merrill, Prof. F. S.	Manhattan, Kansas

ANNUAL MEMBERS.

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Anderson, Roy C.	North Bend
Auld, J. W.	Red Cloud
Bates, Frank	Pauline
Backes, John J.	Humphrey
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Bower, J. G.	Lincoln
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Bennet, John N.	Crete
Billerbeck, A. G.	Humphrey
Bohac, Frank	Huntley
Brown, Myron J.	Osceola

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Funke, Louise	Havelock
Hofman, Fred W.	Lincoln
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Heim, Joseph G.	Dawson
Hospidar, The	Omaha
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Johnson, J. Alfred	Ericson
Johnson, John P.	Newman Grove
Knapp, F. S.	Omaha
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Laukota, James	Friend
Lawson, J. W.	York
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Marshall, Roy E.	Lincoln
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Martin, Wade R.	Fremont
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Merrick, H. C.	Adams
McFarland, J. J.	Dodge
Montgomery, L. D.	Ewing
Newell, C. E.	Elgin
Nields, C. A.	Florence
Needham, L. S.	Norfolk
Olson, Niels	Leigh
Ress, Joseph Rev.	Steinauer

Salter, G. B.	Norfolk
Schram, Jacob	Brayton
Saiser, Chas. B.	Ewing
Shubert, L. W.	Shubert
Sheldon, Ansdel	Avoca
Sieber, Frank J.	Ohioa
Smith, N. L. D.	Red Cloud
Sprague, C. I.	Belgrade
Stauser, John B.	Red Cloud
Swanson, H. G.	Ong
Thompson, H. S.	Kearney
Trotter, H. E.	Plattsmouth
Troyer, J. D.	Callaway
Tulleys, P. A.	Bloomfield
Walvoord, J. C.	Holland
Weitzel, F. M.	Albion
Wetenkamp, H. W.	Eagle
West, Harvey	Unadilla
Wheeldon, Fred	Brownville
Whittaker, T. R.	Brownville
Zentner, H. P.	Brayton

CONSTITUTION

ARTICLE I.—**Name.**—This association shall be known as the Nebraska State Horticultural Society.

ARTICLE II.—**Object.**—This society shall have for its object the promotion of pomology, arboriculture, floriculture, and gardening.

ARTICLE III.—**Membership.**—The membership of this society shall consist of four classes, viz., active, associate, annual honorary, and life honorary. The active membership shall consist of persons practically engaged in fruit culture, forestry, floriculture, or gardening, who shall be admitted to life membership on the payment of a fee of \$5 at one time; to associate membership by the payment of a fee of \$1 annually. The honorary members shall consist of such persons as may be elected at any meeting of the society by a two-thirds vote of the members present, and shall have all the privileges and benefits of the society, except those of voting and holding office, which privileges shall belong exclusively to active members and to associate members who have been members of the society for twelve months and who shall have paid their second annual dues.

ARTICLE IV.—**Officers.**—The officers of this society shall be a president, first and second vice-presidents, secretary, treasurer, and board of directors of seven members, said board consisting of the officers enumerated in this article, excepting a secretary, and three additional members. The officers, with the exception of the secretary, shall be elected by ballot at the annual meeting of the society in January. The secretary shall be elected by the executive board. The term of office of these officers, with the exception of directors, shall be for a period of one year, commencing on the first day of June following. One director shall be elected at the January meeting, 1906, for one year, one for two years, and one for three years, and afterwards every year one director to serve three years.

ARTICLE V.—**Duties of President.**—It shall be the duty of the president to preside at all meetings of the society, appoint all committees not otherwise provided for, countersign all orders drawn on the treasurer by the secretary; in conjunction with the secretary he shall arrange all programs for the meetings of the society, and perform such other duties as the society or board of directors may require.

ARTICLE VI.—**Duties of Vice-President.**—The vice-presidents shall superintend all exhibits of the society, and in case of vacancy in the office of president at any meeting of the society or board

of directors, shall perform all the functions of that office in the order of their rank.

ARTICLE VII—Duties of Secretary.—The secretary shall keep an accurate record of the proceedings of all meetings of the society and board of directors, draw all warrants on the treasurer, and keep an accurate record of the same as countersigned by the president, prepare for publication and edit all reports of the society requiring publication by the statutes of the state; in conjunction with the president prepare all programs and make all other necessary arrangements for all meetings of the society.

ARTICLE VIII—Duties of Treasurer.—The treasurer shall be the custodian of all moneys belonging to the society, and shall pay from such funds all warrants drawn on him by the secretary and countersigned by the president.

ARTICLE IX—Duties of the Board of Directors.—The board of directors shall have general management of all the affairs of the society, for which no specific directors are otherwise provided in the constitution and by-laws.

ARTICLE X—Bonds of Officers.—The president and secretary shall each give a bond in the sum of \$5,000 and the treasurer in the sum of \$12,000 for the proper performance of his duties, which bond must be approved by the board of directors.

ARTICLE XI—Salaries of Officers.—The president, vice-president, treasurer, and members of the board of directors shall receive such per diem per day for their services in attendance upon the meetings of the society as the society or board of directors may from time to time determine. The board of directors shall pay the secretary an annual salary of \$1,000 if they deem best, in consideration of his keeping an open office and giving his whole time to the work, spending at least eight hours a day in his office. It shall be his duty to put out each year a creditable annual report, issue monthly bulletins to each member, prepare articles at least once a month for the leading papers, doing also his utmost to secure new members. This to be done with the advice and direction of the executive board.

ARTICLE XII—Reports of Officers.—The president, secretary and treasurer shall each present an annual report in writing at the January meeting of all the business matters pertaining to their respective offices during the annual term expiring at that time.

ARTICLE XIII.—Meetings.—The society shall hold two or more meetings each year. The annual meeting shall be held in Lincoln on the third Tuesday in January as provided by statute, and the other meetings shall be held at the same time and place as the annual exhibition of the Nebraska State Board of Agriculture.

ARTICLE XIV.—**By-Laws.**—By-laws not in conflict with the provisions of this constitution may be enacted by the society at any regular meeting.

ARTICLE XV.—**Amendments.**—The constitution may be amended at January meetings of the society by a two-thirds vote of the members present, such amendments having been presented in writing and read before the society at a session preceding the one in which the vote is taken.

BY-LAWS

1. All the officers of this society shall be elected at the January meeting, except the secretary, who shall be elected by the Board of Directors.

2. All officers of this society shall assume the duties of their respective offices on the first day of June following their election, and continue in office for the period of one year, or until their successors are elected and qualified.

3. The amount allowed the secretary for express, postage and stationery shall not exceed \$150 per annum, and it shall be the duty of the board of directors to employ a competent stenographer to report the proceedings of the meetings of the society, whose fee shall be paid by the society.

4. The first business of the society shall be on each morning the readings of the minutes of the previous day's proceedings, and submitting the same to the approval of the meeting.

5. There shall be appointed by the board of directors nineteen district directors, one from each horticultural district in the state.

Also a standing committee of three on synonyms.

Also a standing committee of one on each of the following:

Meteorology in its relation to Horticulture, Entomology, Ornithology, Geology, Forestry, Vegetable Culture and Ornamental Gardening.

6. These by-laws may be amended at any general meeting of the society by a majority of the members present.

PROCEEDINGS

Proceedings beginning January 20th, in the Banquet Room of The
Lindell Hotel, Lincoln, Nebraska, and continuing
January 21st, and 22nd, 1914.

This report is merely a record of the proceedings of the business meetings, and the different papers read, addresses given, and discussions upon the same, together with answers to questions found in the question boxes.

ANNUAL MEETING

January 20th, 1914.

Meeting called to order by the president, of the State Horticultural Society, Mr. Barnard.

Prayer by Father Harrison:

Mr. Barnard: In accordance with the custom of our society, Mr. Williams will take charge of this meeting, in as much as this morning is given over to the State Florists Society, and their program.

Presidents Address, State Florists Society.

Mr. Williams: Gentlemen of the Horticultural Society: As President of the State Florist's Society, I will endeavor to conduct this meeting, until we get through with our program. Then we will turn the meeting over to the State Horticultural Society. I have, however before we begin, a few words I would like to say to you:

I take great pleasure as president of this society to greet you all, and am much pleased to see your faces once more. I have looked forward with pleasure to this meeting, for it gives us a chance to talk over different things pertaining to our work; I said work, for that is in a sense what it is. There is something about our work that is more interesting than most other vocations. At the same time nobody realizes more than I do, that we have to take more chances of the uncertainty of success which can come from so many different points.

The past year, was a very trying one, and a failure as to outside stock. It was general throughout the state.

The Aster crop was a total failure with us. The carnations suffered as they did not make the growth; they should in the field, consequently the plants were small and the wood was hard. It took considerable coaxing to get them started after housing, but with care and a little common sense in the caring of them, they responded very readily, although the loss can not be made up.

As to new varieties, my experience has been limited, along that line. All other stock plants suffered more or less, which made it necessary to lift, and plant in the house so as to get stock from them.

In carnations we are growing for the first time the Herald, in red, white; Wonder in white; the Washington in pink; and find that the latter two are all we can ask for. They are very prolific bloomers

with good stems, non-bursting calyx. The Herald has stem rotted very bad with us, but the plants that are in good condition are producing the best red carnation I have had the pleasure to grow. I will give it another trial this coming season.

In roses, we planted a few of the double Killarneys and find that the flower is better as a keeper than the older variety, but not the producer.

I see by reports in the trade papers that with all the draw backs the country has had, the florist business the country over, reports increased trade. I can say for myself that last year was the best one we have ever had. And in the past year we did the largest business, since I have been located at Grand Island, although the increase was smaller in proportion than that of other years. This is quite gratifying in the face of the reports from the Merchantile Companys of the general depression in other lines. But to accomplish this, means hard and consistent work. You have to keep everlastingly at it, by letting people know what you have to offer them, and in holding your customers. To do that you have to give them the best you have. I also wish to say, after the cyclone which took place in Omaha at Easter time last year, that I went over the stricken district along with our secretary, Mr. Henderson. We came to Mr. Jensen's place for piece it was, all that was left was the real estate. After inquiring into his condition, Mr. Henderson and myself, deeming it advisable, took the liberty to send an appeal to the florists of the state, under the order of this society. This was responded to very freely.

Mr. Henderson can tell you the amount of the subscription. I have forgotten the figures but the amount was enough to give him a good boost towards getting on his feet again, and those of us that did send a check, have not missed it.

I have one more thing to mention, and one that touches all of us. That is uniformity of commission. I wish it was so that every florist in the state would agree on what in their opinion is the proper discount. In my estimation we are a little too generous along that line. We are cutting out the 25 per cent as fast as we can, and allowing 20 per cent which is a great plenty. I would favor that this society take up this question and work to the end, that we all allow the same discount. Other industries fix a penalty on their members when they overstep the bounds of propriety, why not us?

Raise the dues to \$1.00, which will give us more money to use in our work. Also appoint a committee to meet with the officers of the Horticultural Society, and if necessary go higher up, to get our Premium money raised, so that we can at least get expenses for exhibiting at the State Fair.

My suggestion is that we raise those dues so that the secretary can have more money to get out circulars during the year. I think

something should be done along that line. I suggest we appoint a committee of florists to meet with the officers of the Horticultural Society, in regard to the premium list for the coming summer. There was a misunderstanding last summer and I believe that we can avoid that for the coming year. If we appoint a committee and let them get together and have a heart to heart talk the thing can be adjusted somewhere along equitable lines. Heretofore we have always put up a show at the State Fair which has been second to none in any State in the Union. We have all been money out of pocket, when we have taken part in the State Fair, and I for one got tired of it. I could not afford to do it any longer. It was a little too expensive advertising for the returns I got out of it. I came to the conclusion unless there was more premium money put up I would have to stay home. I realized there was several of the other florists that felt the same as I did. I believe if we appoint a committee to meet with the officers of the Horticultural Society that some fair understanding can be reached. If not, they can take it up with the proper authorities and see if it can be arranged so that the exhibiter can break even. That is all I ask for, and then I believe that the florists will turn out and make a display that will be a credit to the Nebraska State Horticultural Society.

I thank you.

Election Officers, State Florists Society.

Mr. Williams: We will now listen to the secretary as he reads the minutes of the previous meeting. (Secretary reads).

Mr. Williams: If there is no objections, the minutes will stand approved as read.

The secretary: Then I have another little report. (Reads).

Mr. Williams: Gentlemen, under our regular form of business I believe the election of officers for the ensuing year will be in order. First will be the president for the ensuing year. Who will you have for your president?

Mr. Frey: I would like to place in nomination the name of Mr. Ed. Williams of Grand Island, who has been our president for the past year.

Mr. Green: Then if it would be in order, I move that the nominations be closed and the secretary be instructed to cast the ballot of the entire society for Mr. Williams as president for the ensuing year.

Mr. Williams: Gentlemen, I hardly feel you are doing right in putting me in for two years. If it is a good thing, it should be passed around a little. But I will adhere to your wish, and if it is the choice of the society, I will do the best I can.

(Mr. Williams elected by the motion to close the nominations, and cast the unanimous vote, being carried.)

Mr. Williams: Nominations for vice-president are now in order:

Mr. Dole. I nominate for vice-president Irvine Frey.

Mr. Green: The same motion in regard to Frey as to Mr. Williams.

(Carried: Mr. Frey elected vice-president.)

Mr. Williams: Nominations for secretary are now in order:

Mr. Simanton: I think we have a splendid secretary, and he has done lots of work for us, and good work, too. I would place Mr. Henderson's name in nomination and move that the society elect him by acclamation. Seconded. Carried.

Mr. Williams: Names for nominations for treasurer are now in order:

Mr. Frey: Mr. President, the treasurer of this society is one of the most important officers. I think there is going to be quite a good deal of financial affairs for him to look after. Therefore I place in nomination our present treasurer Mr. Atkinson.

Mr. Simanton: As our present treasurer has been very faithful, and has not expended any funds that have not been accounted for, I will second the nomination. Carried.

Mr. Williams: Nominations for trustees are now in order:

Mr. Atkinson: Would it be in order to say that the Treasurer is ready at any time to take membership fees and account for them. But he does not know all the persons who would like to become members.

Mr. Green: I move you, that the rules be suspended and that the present board of directors be elected by acclamation. Seconded, Carried.

Mr. Williams: The first paper will be by Charles H. Green, of Fremont on "Plants and Flowers Useful for the Home."

PLANTS AND FLOWERS, USEFUL FOR THE HOME.

By Chas. H. Green, of Fremont.

Mr. President, Gentlemen of the Florists Society, and State Horticultural Society.

I have prepared no formal paper for this occasion, but I have thought it possible just to give you a few ideas along this line in my own way. The list of plants which are desirable for the house, is quite large. From this list, I have selected a few varieties, which I will mention in a brief way. I will do so from the standpoint of the grower principally. It would be just about as hard for me to tell you the exact care and treatment that should be given to a plant in the house as it would be for the average nurseryman or fruit grower to come up here and tel you how to make your apple sauce, or can your fruit. They might do it, and they would probably have you guessing a good deal.

Now I have made a little list of plants here not in the order of

their desirability, or anything of that kind, but just as they occurred to me while walking through the green house and looking them over. The first are the azaleas. They are one of the nicest plants you can put into the house. They are very beautiful and easy of culture. The plants that are received by the average florist are grown either in Holland or Belgium, and imported. They are a small hard wooded shrub, in compact form. They are received from abroad along in the latter part of October, or early November. The florist will bring them into bloom before Christmas time for the early varieties, and for the later ones in time for Easter sales. Now we sell quite a number of these plants every year, and find them very satisfactory in the homes. They can be kept over from year to year by plunging the pots outside,—putting the pot right down in the ground,—and then keeping them watered and bring them in before the frost strikes them in the fall. These are often better, and have more growth than they do after being directly imported. The flowers, instead of giving one burst of bloom, all at once, come along gradually, and they seem to be better than they were the first year they are imported.

The next I would mention would be cyclamen. This is something, that will do well in any home where a plant will thrive. We always save our own seed. When the plants come into bloom in the early winter, probably along near the middle of December, we select the plants that appeal to us as to color and size of bloom and the shape of the foliage, and we set aside. It does not take many; we grow two or three thousand plants and we set aside five or six of a color. This year we have dark red and a bright red, and bright red orchid, flowered or butter-fly type, and pink shade. We selected half a dozen of one shade and put them off by themselves, in a carnation house. We find we get them more true to color than where we buy either the English or German seed. If you do buy your seed, we find the German seeds are the best. We sow our seed along in August, and the plants are now ready or nearly ready to go into two inch pots. We get all the plants we need in five or six inch pots, for Christmas sales.

In the home I do not think you will find that you will need hesitate to recommend the cyclamen for any and all conditions.

The primroses are also a good proposition. We prefer the *obconica*, to the *chinensis*, for the reason it is not so delicate. They both grow about the same way in the green house. If you have to handle them very much, unless they are potted exactly right, the *chinensis* varieties will get lippy. And they are more apt to drop their flowers and look ragged. There are some very nice colors and the size of the *obconica* is all you would want. The pure white *obconica* is very good for design work, and it is equally as free flowering as the other varieties. The *Kewensis*, the yellow variety, I could not recommend. It makes a very strong sturdy growth, but the blossoms are small and it is really not very desirable. The Baby

Primroses are good. And they are a free bloomer, but our experience with them is that in the home they soon get ragged. They come very rapidly, and fade rapidly, and unless you keep picking at them all the time, they are not very desirable.

Another thing we find very good is the old Geranium. You take a small geranium in the house, and it is not very desirable. But a plant in a five or six inch pot, that has been cut back, you can put into the house, and it is in bloom about all the time. It is always a bright spot. They will thrive where a great many other things will not do anything.

In the Ferns, the Boston, and the Whitmannii, and the Scholtzii are the varieties that we produce, and there are some other varieties that maybe just as good. But these we would recommend from our own experience. There is another plant that is somewhat neglected. Probably one reason is on account of the jokes that have been made about it by the funny writers. And that is the good rubber plant. Wherever you see a joke about a flat you will see a rubber plant mentioned. A man usually throwing a rubber plant out, or he kicks it over. It has large and glossy leaves and it is a very desirable plant.

Another thing is bulbs, and there is quite a list of bulbs that are very nice for the house. Some of them can be kept from year to year, as for instance the freezia, and calla. While the calla is not really a bulb yet it comes under that head. It is grown in the same way as the freezia bulb. The freezia bulb will always do well in the house. Buy the dry bulbs in the early fall or late summer. Just before Christmas they generally come into bloom, continuing on up to the first of February. We plant six bulbs in a five inch pot and by staking them up with a little wire trellis we find them very nice. The bulbs are good from year to year and in fact I have bulbs that I have had continually from year to year for the last 16 or 17 years. By weeding out the undesirable colors, the yellow ones, and those that are not so good in form, you can breed them up so that you get uniform type of large fairly white flowers. The bulbs are started in August, and we generally make two or three plantings. If they are required, you can use them for cut flower work. We generally grow the little bulbs in flats, that are used for that purpose.

The Amarillas are good bulbs for the house.

The Johnsonii is a variety of the amarillas we grow. It is a bright red with a small stripe. They bloom but once a year, but they can be kept over from year to year,—started up in the fall, and they are very good straight through. They will last for years, and the bulbs will increase right in the pots. So it is necessary to divide them and you can work up quite a stock if you want to. The dutch bulbs, while they are not permanent, you might say, they do very well from year to year. They are very nice for house plants. The daffodils can be grown well in the house. Pot them in the fall and let them stay out of doors until a few weeks before you want them, and then bring them in the

house. The earlier ones should be put into the cellar, until they make considerable top growth, or in a dark place where it is not too warm and kept well watered. As the season grows later, they will be more anxious to come into bloom. All you have to do is to bring them in and put them in a window. In a very short time you will have something that is not only fragrant, but of very bright color.

Now there are a great many other varieties that we might go on and mention that may be grown and treated in the same way. Some as good, possibly better than those mentioned of which I speak from personal experience. Do not try to have too many plants in your window. The more you have, the better, if they are nice, but a few nice plants are a great deal better than a large number that are not kept in good condition.

Discussion.

Mr. Williams: I believe that the list of house plants as named by Mr. Green, is a very good selection. There is one plant that came to my mind as he was speaking, which he left out, that is coming into good favor and prominence as a winter blooming plant. That is the winter blooming Begonia. It is a considerably easier plant to grow than the Lorraine, or the Cincinnatis, and it is called the Incarnata. Now there is a Begonia. If the florist can work them up into a five or six inch pots and get some good large plants, I think they will grow continually from Christmas time. It is a good shade of pink. It is a better house plant than the Lorraine or Cincinnatis. The dry air of the house does not seem to effect it the way it does the others. For the last few years we have been making prices on this plant for winter blooming plants, and at Christmas time we have sold them by the dozen.

Mr. Williams: The next paper will be by Mr. Charles Faulkner, of Omaha, on "Ornamental Flower Beds for the Home."

Mr. Faulkner: Having agreed to write a few lines on the beautifying of the home I will endeavor to describe conditions as I have found them.

The building of a new home is usually started in early spring, the building being completed in late spring, or sometimes mid-summer. This is the time the gardener's troubles begin for he is called on to cover or hide all defects of the place whether caused by the person making the original plans of the place, architects, or contractors. He will most times find the places have been utilized by the contractor as a dumping ground for refuse from the building. Or the ground has been tramped and milled during the wet season. The poor gardener is expected to transform such places into gorgeous flower gardens. If things don't come out as the owner expects them to,—which is almost an impossibility—the gardener is to blame. The following year it may be possible to persuade them to spend a few dollars in the conditioning

of the ground. Here is where I claim the gardener is lacking by his substituting a few loads of insect infested, decomposed manure for some of the prepared fertilizers on the market. These are more sanitary, more convenient to handle, and answer the same purpose.

Many mistakes are made in planting by scattering of small beds around the grounds, spoiling the beauty of the lawn, instead of massing the planting. The perennials if properly arranged in borders will give a continuation of flowers, through the season. And more so if intermingled with a few of the many annuals available. But the average florist will discourage the planting of such borders and recommend the planting of geraniums, cannas, calceolus, and so forth, in their stead. Many times with disregard to harmony of color. He does this purely for his own benefit. In making this assertion, I do not intimate that there is any flower that will take the place of the geraniums, and cannas, in this locality, yet if a stranger would pass by some places I have seen, they might come to the conclusion that these were the only flowers that grow in this climate.

The plant I have in mind is vinea selosia, and they are all lengths, and I think arranged in a place, are more desirable than the geraniums and cannas.

I thank you for your kind attention as I am not prepared to meet this occasion any better.

Mr. Williams: The next paper will be "Planting Window Boxes and Vases," by Mr. J. R. Simanton, of Falls City.

PLANTING WINDOW BOXES AND VASES.

By J. R. Simanton, of Falls City.

Mr. Simanton: I have been asked to write a paper on The Planting of Window Boxes and Vases. I accepted very willingly for it is a subject in which I am much interested. I don't know whether all the members find it true, but each year we are called on to fill more boxes, baskets and vases, and fewer flower beds.

Last summer I went down to Kansas City and spent some time among the fine apartments and residences there just to get some suggestions on this subject. The impression I received there was that it wasn't so much what was used in the planting, as the means used, and the care it received after planting, that gives the effect. In our opinion, the best effects in window or porch boxes are obtained by using trailing or drooping plants together with blooming or foliage plants. For the drooping plants we have found nothing equal to the asparagus sprengeri and trailing vinca. The ivy geranium is also most useful for this purpose as it can be had in so many shades. It can be made to harmonize with the other blooming plants in the box.

Boston ferns are also a grand plant for box planting particularly for shaded exposures where blooming plants do not thrive.

I saw a large building with boxes at every window filled with *sprengeri* and just occasional bright *coleus*. Quite simple yet the effect was very pretty. I saw *allipinum ageratum*, *coelia* used with success, corresponding to the care it received.

It seems to us that there is a scarcity of good trailing or drooping plants for box and basket planting. I would like to ask the members present for suggestions and a discussion of the subject. Mrs. Jones may think Mrs. Brown's window boxes and baskets perfectly lovely and she would like hers filled just as pretty and altogether different. The more taste and originality the florist shows, the more pleased customers. They are his best assets. Mr. Green: I would like to ask Mr. Simanton if there are any of the florists who have ever tried *coboea scandeus*?

Discussion.

Mr. Williams: I believe there are several plants that Mr. Simanton has not mentioned. Plants for flower boxes and vases, such as the geranium, German Ivy, and I would like to add the *acalpa*. I have used them for the last two or three years in vases and window boxes and they do fine. They stand the sun A number One, and they make a beautiful showing. I do not believe that any window box, where you use window boxes, or even a vase, is complete without a *lobelia*. It all depends upon the building itself. Possibly the color of the stone or brick, called for certain colors in plants. Did they use the red or yellow *coboea*?

A. Red.

Mr. Williams: Where a florist is given his own way to fill these porch boxes, window boxes, vases and so forth, I believe there is a lot of stuff we can use in them. Such plants as the *verbenas*, and *lobelias*, and variegated *coleus*. You can't get anything any better:

Mr. Green: Now while we are talking about window boxes and vases and so forth, there is one thing we should not forget, and that is the old S. A. Nutt, geraniums.

Mr. Henderson: For a large vase I would like to put in a fine phoenix palm in the center. They are very durable and they will stand the wind and sun and so forth. They make a nice elevation in the center of the vase. And you can use *Boganvilla*. They will stand the sun fine, and they make a nice trailing effect up against those things. They will stand our winds.

Mr. Williams: The phoenix *roebellenia* you mean?

A. Yes sir.

Mr. Williams: The phoenix *roebellenia* is the most graceful I have used.

Mr. Henderson: The roebellenia is a trifle expensive. The reclinata or canariensis are just as graceful and not so expensive.

Mr. Williams: The roebellenia is expensive, but it is the most graceful palm you can use for any purpose.

Mr. Williams: The next paper we have is "Perennial Flower Bed," by Mr. Ammet Hooge, Omaha, Nebraska.

The Secretary: It is impossible for him to be here, so Mr. Henderson says, and he sends the paper here to the meeting of the society.

Mr. Williams: The secretary will read the paper.

PERENNIAL FLOWER GARDEN.

By Ammet Hooge, of Omaha.

HARDY PERENNIAL PLANTS.

Hardy Perennial Plants.—Suitable for the State of Nebraska. The climatic conditions of Nebraska, and in fact the middle western states, are not as favorable as states along the Great Lakes, and especially along the coast where the moisture is greater than here. Still with careful selection of varieties and proper cultivation and, the proper preparation of the ground, whether you plant one or one thousand, the ground must first be put in condition so the plants will thrive, they will amply repay you for the work. I consider spring planting the best. I would prepare the ground in the fall by using a liberal supply of old manure, either horse or cow manure. Be sure that it is well rotted and pulverized. Dig up the soil good and deep. Go down two feet if you like, and pulverize well as you go along, mixing the manure in. So much for the preparation. Now a few words about the situation and space allowed each plant. Hardy plants are mostly used as a foreground for shrubs or fences. The said fence to be covered with hardy climbers, the names of which I will give later. The space allotted each plant must depend as a rule on the height the plant will attain during the season's growth. Plants growing up to two feet should be planted about 14 inches apart. Taller growing plants will require from 16 to 20 inches apart.

Then comes the care of the plants during the summer. If you have a long dry spell, as we so often have had in the last few years, a liberal amount of watering of course is needed. Then put the man behind the hoe to work with frequent stirring up of the ground around the plants. This is encouraging to the plants and discouraging to the weeds. Tall growing plants must be tied up to a neatly painted stick to keep the wind from breaking them down.

Remove all old flower stocks and decayed leaves. There is not much to be done for hardy perennials during the winter except when

the tops of the plants have been winter-killed. Cut the tops off and put a layer of not over three inches of leaves or stable manure over the ground, removing same again with the coming spring.

This list of names of perennials that I will now mention are plants that I have handled with success for the last twenty-five years in Nebraska. I will not give a long glowing description of each, but will just mention the height, and color of flowers which is necessary for the proper placing of the plants:

Achillea, white bachelor buttons, 18 inches high.

Anchusa Italica, blue, 5 feet high.

Aquilegias, all colors, 2 feet high.

Asters, hard, all colors, 2 feet high.

Bocconia Cordata, white, 6 feet high.

Shasta Daisies, white, 1 foot high.

Coreopsis Grandifloras, yellow, 1½ feet high.

Delphiniums, blue and white, 4 feet high.

Dielytra, pink, 2 feet high.

Digitalis, all colors, 2 feet.

Gaillardias, yellow, 2 feet high.

Gysophila, white, 2 feet high.

Heliopsis, yellow, 3 feet high.

Hibiscus, hardy, all colors, 3 feet high.

Hollyhocks, all colors, 4 feet high.

Iris German, all colors, 2 feet high.

Iris Japanese, all colors, 2 feet high.

Lupinus, all colors, 36 inches high.

Lychnis, red and white, 24 inches high.

Myosotis, blue, 12 inches high.

Paeonies, all colors, 24 inches high.

Penstemon, all colors, 30 inches high.

Papaver, pink and red, 24 inches high.

Phloxes, all colors, 24 inches high.

Pinks, hardy, all colors, 12 inches high.

Platycodon, white and purple, 36 inches high.

Pyrethrum, red, pink, and white, 24 inches high.

Rudbeckia, yellow, 60 inches high.

Sweet Williams, pink scarlet and white, 12 inches high.

Tritoma, orange and scarlet, 36 inches high.

Vinca Minor, evergreen vine for shady places where grass won't grow.

Yucca Filamentosa, white.

Do not forget the grand hardy roses that you now can get in all colors and perfectly hardy here in Nebraska.

Ampelopsis Veitchi, climber for stone walls.

Ampelopsis Engelmanni, fences and trellis.

Begonia climbers, orange.

Clematis climbers, all colors.
 Honeysuckles, climbers, red yellow and white.
 Lathyrus climbers, red and white.
 Wistarias climbers, purple and white.
 Climbing roses, red pink and white.

Discussion.

Mr. Williams: I am sorry Mr. Hooge was not able to be with us today but I am certain unavoidable circumstances detained him. There is lots of information that is very profitable in that paper, for people that have the ground to plant perennials and so forth. Those that wish a copy of it, can procure the same from the secretary of this society at any time or any other paper that is read at this meeting.

Mr. Henderson: This list of hardy perennials is a very good list. Somebody has suggested to me that we as the State Florist's Society should put out a recommended list for the different sections of Nebraska. We thought the eastern, middle and western sections of Nebraska would be about right. Now there is a good many hardy perennials that will grow better in one part of the state than in the other. They thought that we should get together and have a committee make out a recommended list of these different hardy perennials that will do well. This information for the benefit of the public through our books here. This can be taken up later in the executive committee.

Mr. Green: I do not think that part of it requires any direct action of this society. It seems to me if the secretary thinks that it is a good thing, it would be his duty to correspond with the florists of the different parts of the state, and inquire from them what perennials do well in their section, and then compile that in a neat form.

Mr. Williams: Our next and last paper on our program is a paper by W. E. Davidson, Holdrege, Nebraska, on the subject, "Care and Repotting of House Plants:

Mr. Williams: Mr. Davidson not being present we will have "Life Among the Flowers" by Lewis Henderson, of Omaha.

LIFE AMONG THE FLOWERS.

By Lewis Henderson, of Omaha.

Mr. President, and fellow members of the Nebraska State Florist Society:

This subject, "Life Among the Flowers" is a subject that ought to have been assigned to Professor Bessey, or some scientific man, in order to do justice to the same. However I will try to say a few words from a florists standpoint.

Life in its different degrees, is after all, one. Plant life, and

animal life are very closely associated, in fact the one could scarcely exist without the other. Therefore the flowers that live and bloom for us every day are very dear and close to our attention. Every plant and flower has a life, and requires care and attention in order to be healthy, prolific and bloom whenever we so desire.

We plant the little seed because we know that there is a life concealed within its kernel. The seed germinates, sprouts and forms its roots. The larger ones to hold the plant to the soil from which it gets its nourishment and the smaller fibre roots to gather up the moisture and other nourishment as it may need.

It grows upward to a stem and foliage. The foliage or leaves are breathing lungs of the plant, they gather the oxygen from the air and send it downward to the roots. Therefore it is very essential that we have plenty of pure, fresh air in the rooms in which we grow plants.

The roots gather nourishment and moisture from the soil and send it upward along the stem of the plant to the leaves. These leaves are the living cells by which the plant breathes and evaporates, and throws out from the soil the used moisture, as well as inhales the various substances in the air through the thousands of pores or little openings; thousands to the square inch, located mostly on the under side of the leaves. Therefore it is very important that the foliage or leaves of the plants should be kept clean and free from various insects that are injurious to the foliage of the plants.

The roots should be furnished with sufficient moisture to supply the foliage, which if in healthy condition evaporates very rapidly. When we bear in mind that all plants consist of from seventy to ninety per cent of water, we realize how important water is to the life and well, being of the plant.

If there is lack of moisture in the soil the foliage will feel soft, and wilted, and if continued for some time, they will drop off. If too much moisture the foliage will turn pale and the roots become sick, and not able to perform their mission. And finally the plant becomes stunted and will die.

Therefore remember that your plants are living things and require care and attention. Now when the plants have reached their maturity they flower, and they are now in their glory. The glory that we all are after, the flowers that make the florist smile. Likewise the orchardist or the farmer when he sees the trees full of flowers, they fore-tell a bountiful fruit crop concealed beneath those beautiful petals.

The children are delighted, because they can have plenty of blossoms with which to fill their May baskets. Others with their eyes and ears ever ready to gather in nature's poetry see in these same flowers a promise of a new life. God Almighty first planted a garden and put a man in it, but of course later on had to put the lady in, in

order to make a success. And it is indeed after all the purest of all human pleasures.

Flowers are sociably inclined, and love the society of man. Under his care and attention they develop quicker than if left entirely to nature. As a consequence the flowers of today are far more perfect than centuries ago.

Every sense of our nature is gratified by the pursuit of floriculture and horticulture. The eye by the beauties displayed, and the ear by the musical sounds conveyed to it, for do we not say, we hear the corn singing in the field, the trees whispering in the forest? How often in passing a beautiful flower we stop as if spoken to, and as we look deep down into the heart of that silent friend our mind soars away to the Giver of all good; He who has given us the lovely lilies of the field and the roses of the plains, which are clad more beautifully than Solomon in all his glory.

Flowers live a very brief life, the average length is about ten days. This we may call the pollenization time, when the flowers pollenize and when this pollenization is ended these beautiful petals wither and die. However they are not dead, but only replenishing themselves to sprout again with still more vigor and beauty.

Therefore I say that there is a life among the flowers. The flowers of the field bud, bloom, and then in the sear and yellow leaf, they wither and are gone. Yet in dying abide they not alone, but sow themselves and bloom with each returning spring, as angel emblems of the resurrection, and of the life beyond the grave.

In conclusion I will say like the poet of the destiny or philosophy of life coming and going.

One ship travels East, while the other travels West,
While the self same breezes blow,
'Tis the set of the sails and not the gales,
That bids them where to go.

Like the winds of the air, are the wheres of the fates
As we journey along through life,
'Tis the set of the sail that decides the goal,
And not the storms and strifes.

Discussion.

Mr. Williams: I believe we all enjoyed that paper. Mr. Henderson is to be given considerable praise and credit for getting up a paper of that kind. It takes time and considerable thought, and I for one surely appreciate it. Ladies and gentlemen, that closes our program. As I stated, I wished to appoint a committee to confer with the officers of the Horticultural Society, as to different matters. On that committee, I would like to place Mr. C. H. Green, Mr. Frey, and

Lewis Henderson. Do not forget the banquet this evening at 6:30 at this hotel, we would like to see every florist present at that banquet.

Mr. Henderson: We have the pleasure of having with us today a member,—one of the board of managers of the Society of American Florists; I would like to hear a little from Mr. Hess.

Mr. Hess: Mr. President, Ladies and Gentlemen: It is a good many years since I have been here to attend a meeting of the Horticultural society, or Floral society, although I am a life member, and was, long years ago. When I went in business, I made perhaps as good a showing as anybody here at the State Fairs, but business improved to such a proportion that I could not do it any more. My sentiments were always with you. I was very much interested in the reports, and read them over carefully to see what you are doing. I notice that you are perhaps up with the time in everything, in Horticulture, Agriculture and everything else. A few years ago I was at the fair, and I thought it was as good as any in Minnesota, Illinois or any other shows I had seen. However, that is not what I want to see. I am a florist, and I want to give you a compliment on the display of your cut flowers. I am surprised to see such beautiful carnations, and roses, grown in the western part of Nebraska. For beginners, with 10,000, 15,000 or 20,000 feet of glass to turn out such goods, the 20th of January, is something remarkable. I was in New York last year at the National Flower Show, and I want to tell you that we didn't see any better flowers than we have seen here today. Except that the stems were better, because it was in April. Every florist knows that you can get better stems in April than any other time.

And the apple man is not any behind. When I was here 23 or 25 years ago, you could not get a barrel of apples together. If you did, perhaps 50 per cent were worm eaten, and would not keep, but now they are all clean, and they are using the latest methods of keeping the insects away.

Now they wanted me, as one of the directors of the Society of American Florists to make a talk to you. I would like to have you co-operate with me and become a member, and show them you appreciate a favor that they have shown us. Because this is a distinction that no other state west of Chicago, except Colorado ever had. I do not think I am such a fine florist, or anything else, but they wanted a man west of Chicago, and they selected me. And I will do the best I can, and that is all I can do. I can't do anything unless you co-operate with me and show them your good will. I would like to say that I would like to see all the florists in the west become members and attend the meetings and if you can, attend the conventions.

Now we had a nice meeting in Minneapolis last year, and I was

proud to see some of the Lincoln boys there, and Mr. Lawson and Mr. Dole.

Years ago, you could not get a man to go to a convention from Nebraska. But we had a very nice representation from Nebraska there. And another thing, I want to tell you that in regard to your floral exhibit here,—it is perhaps not in place here, but your premiums are entirely too small for a winter display of cut flowers, and you want to work to see that you get better premiums. And another thing, you want to see that you get at least two representatives from the Florists on the Board of Directors. Years ago we were a side issue of the Horticultural Society, but today you are almost as important as the apple man. The way you show the stuff, and a thing like last summer should never happen. A feeling should never exist between the apple man and the flower man, or any other section of the State Horticultural Society. As I understand, there was very small display last fall in the show, and I felt very sorry about it. Such things should not happen. They should work hand in hand which is a credit to the society, not only for the state, but for different sections of the state, at large.

You were speaking about raising your dues, to have more money in your treasury. Now is the time to bring it to a head, whether it shall be two or three or one dollar a year. Now is the time to do it. I would make a motion to the effect that each and every man should pay three dollars a year.

Mr. President: Our dues have been very nominal, and just to give the secretary a little for letter heads, postage, and so forth. It was 50 cents a year, and that was all.

Mr. Green: As suggested by Mr. Hess, I move you that the dues be increased to one dollar a year. Seconded. Carried.

It now being 5 o'clock p. m., January 20th, 1914, the meeting adjourned to meet or convene again at 9 a. m. the following day, January 21st, 1914, at which time the State Horticultural Society would take charge of the program.

9:00 o'clock p. m., January 21, 1914.

The society met, pursuant to adjournment, and the following proceedings were had and done.

Prayer by Father Harrison.

President's Address, by C. H. Barnard, Table Rock, Neb.

PRESIDENT'S ADDRESS.

Ladies and Gentlemen, Members of State Horticultural Society:

I wish, on behalf of the State Horticultural Society, first of all to extend to every one attending our meetings a very cordial welcome, and also invite every one to become a member of the society.

Not having been present at the last annual meeting I wish to

take this opportunity to thank the society for the honor conferred upon me by my election to the office of President of the society. And now, fellow members, we are reminded that another year has passed and whatever of success or failure of the fruit industry in our state, is a matter of history.

The fruit grower ever optimistic whether his lot be cast in the stony lands of the south, or the limited valleys of the North, or our own fertile hills, is always looking forward to a better time to come.

Thus we find the fruit growers forgetting the extreme drouth of the past season and making his preparations to cultivate, prune and spray, and try by all known methods for greater success, the coming year.

During the past five months it has been my privilege to visit many of the orchards of the West and South, and after hearing the praises sung of each locality, and viewing their conditions of climate, soil, and market conditions, I came back to Nebraska more than ever satisfied that in Nebraska we have the best conditions to grow and market a crop of fruit with profit to the grower.

In the South much of the land is very stony and making it hard to cultivate, and making all down apples worthless,—except for cider. A year like the past, this one feature would mean quite a loss, as many apples which fell on the ground were marketed at a much better price than cider stock.

In the West much of the orchard land has to be irrigated, and so in addition to the work, the Nebraska orchardist has to do, the process of watering the orchard has to be done, and as one man expressed it, "You have to move more soil with a shovel than you do with a plow."

In all localities the orchards have their pests, but right here at home, in Nebraska, we have nothing that the others do not have, and very many things we do not have that other localities do have.

Another important feature of the fruit growing proposition, and by no means one of small importance, is the marketing, and marketing takes in and embraces picking, packing, freight, and so forth, from the producer to the consumer.

Nebraska is naturally situated in the best place to utilize the markets of the East, West, North and South, by virtue of her geographic location, having a diversity of markets. When one is overcrowded we can send our surplus to some other place.

The only feature we lack, as I can see it, is to have the railroads give to the Nebraska fruit grower a similar rate, that they give to other localities, so as to enable our growers to secure more equitable division of business.

Still by constant working along this line, we may reasonably expect to gain the desired result in time.

In no place in all my travels, is there anything like the land lying adjacent to the Missouri river between Omaha, Nebraska, and St. Joseph, Missouri, with the possibilities of growing fruit, where land can be obtained so cheap, and so easy of preparation for planting as in this locality.

If the states bordering this territory would use a small amount of money, compared to what our Southern and Western States use in promoting fruit growing districts, we would soon see the greatest fruit district in the United States in the matter of production of fruit, and also in the quality of the same right at our borders, and instead of using our fruit lands for pasture at a very small return we would have vast orchards to supply fruit for the markets of the world, of the best quality the world produces.

So now, fellow members, in this new year of 1914, let us all push and strive that 1915 will see great advancement in the development of the fruit resources of Nebraska.

Stand up for Nebraska.

Discussion.

Mr. G. A. Marshall: I hate to start this right away, but I have a lot of committee work here that I want you to pass on. It will take about five minutes, and then either order us to quit or go ahead.

Mr. Barnard: There is no objection.

Mr. Marshall: This committee was appointed last year to revise the recommended fruit list this year. You know it has been 12 or 15 years since this was done, and the list is getting quite old and thread bare. The change should have been brought about 4 or 5 or 6 years ago. Now over the older part of the state the trees have been so weakened and injured that they are going to be shorter lived. The older trees especially of the apple were weakened by these adverse conditions, such as the dry years, and the extreme freezes. And we thought that the time had come that there would be a good many new trees put in, or that were ripening rapidly, and that we had better as a society get this list ready, as best we could. This committee composed of members from all over the state and myself as chairman of the committee, have started in to get them. I find it is a pretty hard job, and there are three or four districts that we haven't received any letter from. We would like to have somebody from those districts that knows something about it, to advise us, or make the list so that it amounts to something. We have worked on it for about a day since we have come down here. We were fortunate enough to get the extreme western districts together,—those members were here,—we have run out their parts of it. You remember the recommended list, the map of it was in every report, and then we have a list clear through of small fruits and so forth from each dis-

district. If we started to read it to you or discuss it, we could not get through with it this meeting or in a solid day's work, even if you accepted it. Now we looked up the lame places in the old one, which was made so long ago, and we attempted to remedy them. One of the lame places was in District Number Two (2), Sarpy, Washington, Douglas, Burt counties, and so forth. We recommended for general planting in this district, 15 years ago, the Wealthy, Snow, Ramsdel Sweet, The Plumb Cider, and so forth. There was nothing in the list to tell the planter that he should not plant just as many Plum Cider as he should Wealthy. So we wrote up a little something here that we will give to you and that will give you an idea of the changes we want to make, and that is this.

(Reads from the report.)

Now that is the varieties we have already put into the list. That tells you they will grow there, and would be desirable in a large number or a small number, and that is what we want to get at. We want to know if the society would approve of this plan, or whether or not we would have to get up something plainer if possible. We found in looking it over that there is a dozen, or 15 or 20 counties in the state where from 100 or 200 varieties of apples can be grown. But when we came to comparing them there was a great deal of difference in their value. And with the help of the parties in these sections we began reducing them to where the list should be. Our idea is to cut them down no matter how many they can grow, cut it down to the best for that territory. Now we have gone over 12 of those 19 districts, and I think we would be busy at it for a week. We ask that this committee be continued, and if you approve of this that you accept this report so that you can get it in this next years report. And then we will take a day or two's time and try and thresh this all out, according to the manner I have explained to you in my rambling way.

Mr. Henderson: I move this committee be continued, and their report up-to-date be adopted.

Mr. Brown: It seems to me that it would be a wise thing to probably adopt the report up as far as it goes, and to allow this committee to submit their report to the board.

Mr. Henderson: Certainly.

Motion as amended, carried.

Mr. Barnard: The next paper upon our list is by Prof. J. R. Cooper, of the University of Nebraska, upon "Spraying the Apple and Results Obtained in 1913."

(Professor Cooper not present at this time.)

Mr. Barnard: In as much as Professor Cooper is not present now, we will take up the next subject, which is "A Successful Fruit Growers Association and its Benefits to the Growers," by N. H. Nelson, Manager Omaha Fruit Growers Association, Omaha, Nebraska.

A SUCCESSFUL FRUIT GROWERS ASSOCIATION AND ITS BENEFITS TO THE GROWERS.

By N. H. NELSON, Omaha, Nebraska.

Mr. President, Ladies and Gentlemen: When the principals of successful distribution have been perfected and solved to the satisfaction of all so that a grower can, with perfect safety, plant out an orchard with the assurance that it will return to him a fair profit on his investment and labor, a great deal of the credit will be due to the work of the State Horticultural Societies.

Last week I had the pleasure of attending the annual meeting of the State Horticultural Association at Columbia, Mo., They have had experts all through the state taking the orchard census and they have a chart of each county and every orchard of any size tabulated showing that Missouri has something like 15,000 acres of unorganized, and most of which is unproductive, and badly neglected orchards. It is the task of reclaiming these orchards and putting them on a commercial basis that they have taken upon themselves.

When I was shown the enormous amount of work which had already been done and what they expected still to accomplish I could scarcely believe it, and I felt a good deal like the farmer when attending his first circus. He was admiring the animals and finally came to the giraffe, he stopped short, saw it move its head, shift its feet, switch its tail, and walking around it he finally remarked, "O H——, there ain't no such animal."

Today the question of distribution is being given more thought and study by the producing classes than any other subject; they have discovered that the question of producing is of no more importance, if as much, as that of distribution. Individual efforts are inadequate and do not meet the requirements of the times so where the growers are in sufficient numbers they are organizing themselves into co-operative associations and through this channel are handling perishable products very successfully. Co-operation is also being tried out by other lines of business with more or less success but the "big noise" which is developing and perfecting the principals of co-operation is the "fruit industry", while the apple occupies the center of the stage.

I have no theoretical ideas regarding co-operation but such theories and opinions as I may advance I have gained from practical experience covering a period of twenty-five years in the wholesale fruit business, and also as organizer and manager of the Omaha Fruit Growers Association. During that time I have represented, or sold, the products of every kind of fruit and vegetable association that has been organized.

Our first associations were crude affairs compared with those of today, but the weak and undesirable features have been eliminated while new and improved methods have been added from year to year

until today we have a scientific machine which is capable of spreading its protecting wings over every grower by assuring him a square deal and full market value for his products.

What has co-operation done for our growers?

Go back with me to the summer of 1906, the year before our association was organized, and let me briefly show you the condition of our growers at that time.

Our growers are located on the outskirts of our city, mostly north and west, all the way from five to ten miles from the market which is in the wholesale district. The growers worked late at night getting their loads ready and were forced to get up anywhere from two to three in the morning in order to be on the market to catch the early buyers between five thirty and six in the morning. So through the entire summer they worked early and late with insufficient rest, and were worried and under a continual mental strain.

The condition of growers where they depend on their own individual efforts to market their products is probably pretty much the same in one locality as it is in any other, taking local conditions into consideration, every grower is in competition with his neighbor, and while they are on speaking terms they are striving and planning to get the best of each other, and deep in their hearts they are envious when one of them succeeds in obtaining a better price than the others; if one discovers a method of producing a fruit of superior quality that will sell at higher prices he guards his secret with jealous care for fear his neighbor will profit by it.

Under these conditions our growers were never content; if they had a bumper crop they worried early and late marketing it the best they knew and often their returns were less than the cost of production; when their crops were more or less of a failure they worried because they had little or nothing to sell as prices then were generally good. So our growers had the nightmare regularly as the season rolled around, and they were never happy.

Our growers all depended on the Omaha market to take their products and owing to the great quantity offered when the crop was a bouniful one prices were ruinously low, the commission man and the retail grocer automatically evolved a great system in buying. There being so much to choose from they never were in a hurry to buy but would go from one grower to the other telling them they were too high, others were offering to sell cheaper, or their goods were too poor. Our growers had no idea as to the value of their products so it was a case of barter and taking the best offer they could get from day to day.

The growers became very much discouraged and many of them threatened to tear out their vineyards and put in corn or alfalfa as prices were being forced down so low that they could not earn fair wages, to say nothing of any interest on their investment.

There is perhaps no argument that will illustrate a point so forcibly as a practical example:

The year before we organized, blackberries sold at 75c to \$1.00 per 24-quart case; Concord grapes, 10c, 11c, 12c, and 13c per 7½ pound basket. The following year with a larger crop our association averaged \$2.10 per case on blackberries and 23c on grapes. In other words we took nearly all the worry and work from the shoulders of our growers and returned to them from fifty to one hundred percent more than they had been able to realize by their individual efforts.

You may ask how did we accomplish this. By system, education and co-operative all along the line:

FIRST: We began by educating our members how to pack their fruit for the market, planting only the best commercial varieties, applying up-to-date methods in cultivation and spraying, and striving always to improve the quality and quantity of the product.

This education must be kept up from year to year; we talk it at all our general meetings, and during the shipping season by circular letters, and when the case requires it, by special letters and personal calls.

Unless this is kept up you will have many backsliders who will grow slovenly and careless thinking now that they have an association all the ills that the flesh is heir to will be cured and cared for by the association.

Our market is now always in a healthy condition as we ship from fifty to seventy-five per cent of our receipts to outside markets with the result that our returns to the growers pay them for their labor and then fair returns on their investments, and what is better still, co-operation has created a genuine brotherly feeling, and the growers are all anxious to help each other, and no longer keep the good things to themselves but pass them on as they realize that every time they can help their neighbor to improve the quality of his products it means a direct benefit to himself in the higher averages the association is able to realize, so we are always striving to raise the standard of our products, and while we can never expect to reach perfection we are employing every human agency to grow stronger, better and larger.

The question which interests us today is what are the necessary elements that enter into co-operation which will make it more successful.

The first requisite is a competent manager who must have a wide knowledge of the business so that he will be able to inspire confidence and respect among the growers as well as among those to whom he sells; he must at all times have a thorough knowledge of the crop and market conditions so as to be ready at a moments notice to change his shipments from an overstocked market to one that is healthy and calling for his goods; he must in effect be in every market daily during the shipping season. To one who knows the game this is not a

difficult matter with our present facilities for telephoning and telegraphing. A competent manager spells success, and a poor one, failure.

The greatest enemies that co-operation has today are its own members, especially is this true where they are near a market, or there are outside buyers in the field, they use the association as a matter of convenience, and when the prices look good they sell to the other fellow, and when they cannot sell on account of bad markets they turn their stuff over to the association and then cuss the manager for not making better returns. Such members are an absolute detriment as they do not think of co-operation extending beyond themselves and their neighbors.

What we must have is cooperation all along the line beginning with the producer down to the ultimate consumer, and by system and education strive to create a vehicle that will protect us against our own dishonesty while protecting us against the dishonesty of others so as to assure us of a square deal, and also those we deal with.

The man who has something to sell should strive to gain the confidence and respect of those he deals with as the confidence of his customers is one of his greatest assets. With it he need fear no competition as when you have gained a customer's confidence by fair and honest treatment that customer will pay you the highest market price for your products before going to some one in whom he has not the same confidence. Keep your promises, fulfill your contracts as honest dealings like chickens will come home to roost.

Snide and sharp practice may seem to prosper for a time but while apparently sailing in calm and peaceful waters your ship will sooner or later strike some hidden rock and will be consigned to a dishonored grave.

The modus operandi of distribution as practiced by our most successful marketing Exchanges today is proving most successful; in many instances a single exchange is handling the output of hundreds of growers with very satisfactory results, and if we had no more serious problems to solve than those that confront us today we could with safety rest on our oars and glide along with the tide, but there booms up before us in the near future one that overshadows those of today; the brightest minds in the fruit industry are planning, scheming, and devising ways and means for handling the enormous increase in apples which will be upon us in a very few years.

Missouri with her 15,000 acres of apple orchards hardly causes a ripple on our markets today, but if the plans of men who have taken upon themselves to reclaim these orchards prove successful, and I believe they will meet with success as they are very earnest and capable men, it will mean that there will be thousands upon thousands of barrels of good commercial apples thrown upon our markets in the next few years. There is not a man who has given the subject thought and investigation but knows that only about 10% of planted orchards in the northwestern states, Washington, Oregon and Idaho, are pro-

ducing, and the trees are over six and seven years old. During the year 1912 it is estimated there was something like 24,000 cars shipped from the western states, it is estimated that after allowing liberal shrinkage of orchards falling into decay by neglect, and normal conditions prevailing the western states will have in excess of 100,000 cars to market in the year 1920.

It is the prospect of this enormous increase that is causing the large growers and distributors to sit up and take notice.

In analyzing the situation we must take into account supply and demand—who are the consumers of our apples today? The moneyed class are consuming about all they want, their appetites may be stimulated a little but not enough to make any impression on the prospective increase. The working people constitute the great majority of our population and they as a class look upon apples as a luxury; this is especially true in the winter months when they are usually high priced; while the mechanic and better paid laborer is hardly recognized as a factor in the consumption of apples today if he has had steady work he may on pay day treat his family to a dozen apples for which he pays from 25c to 50c a dozen, and it may be many paydays before he can afford to give them another treat.

We now have before us a concrete proposition; there is little doubt but what we are going to have apples in sufficient quantities to place them upon the table of every family as a daily diet.

The question is, how can this be done? It is my opinion one of the first things to be done is to transport the apples from the orchard to the consumer at least possible expense; this must be done through your association, then the grower must be satisfied to sell at a price which will give him fair returns on his investment and labor.

The next step will be to educate the consuming public the present methods of buying must be changed; they are now paying 50% to 100% profit on a dozen apples which the retailer is compelled to ask in order to cover shrinkage and cost of handling in small quantities, the consumer must be taught to buy in original packages whether they be in bushels, or barrels; if he can but start the public buying in this manner it would not take long to create competition among the retailers so that they would be advertising apples as leaders at prices that would soon place them in the same list with sugar which in most cases is sold at a minimum profit by most retailers for fear his competitor will undersell him as sugar seems to be the one article that the majority of the consumers will inquire the price of when buying.

Why not put the apple in the same class?

When we can show the laborer who earns from \$1.25 to \$2.00 per day, the clerk who gets from \$40.00 to \$60.00 per month, that he can, both from an economic standpoint and a healthful one, use the apple as a daily diet and thus transfer it from the list of luxuries to the list of daily necessity then the question of what we are going to

do with this enormous increase will be solved.

This will be no small task as we must deal with the individual and will have to combat established habits, ignorance and prejudice, but by embracing the true principals of co-operation the grower and distributor standing shoulder to shoulder can win this battle; the Missouri River Valley, the New England States nor the Northwestern growers alone can win the battle.

Remember that in unity there is strength, so if we stand together we must meet with success as we have yet to find the task so great that it cannot be solved by the American people.

If we, the producers and distributors of the fruits of Mother Earth, which she gives forth in such abundance with the minimum of labor, could but become a cog within a wheel to place the King of Fruits upon the table as a daily diet of the rich and poor, the high and the low, we will have contributed a boon to mankind whose luster will shine out in future history second to none, and while we are acquiring fame as benefactors of mankind we are placing the orchard of every grower upon a commercial basis which in many cases will convert it from a speculative to intrinsic value.

The Chairman: Are there any questions?

Mr. Nelson: I believe it was Mr. Marshall who just read the committee report?

The Chairman: Yes sir.

Discussion.

Mr. Nelson: The plan that he has in hand, is certainly a very good one. One of the great crimes, you might almost call it, of the day, is the great number of varieties that are planted, that are no good commercially. The least number you can reduce that to, the better it is. A great many varieties are planted because some agents have them for sale, or from sentiment. They are absolutely worthless from a commercial standpoint. If you want an apple for your own use, it is alright, to select the variety which appeals to your taste and plant a tree or two. When you plant out an orchard, study the requirements of the time and study the market and put into that orchard something that will put back into your pocket dollars and cents. As a distributor, I would strongly urge Mr. Marshall to reduce the varieties planted in this district, to the smallest number he can. Of course the very much abused Ben Davis, which is considered almost unfit to eat, is one of the biggest money makers we have, from the fact it is very prolific, and it will grow almost anywhere, and will keep as good as any. The Wine Sap, and Delicious,—and there are new varieties coming up that are recommended by nurserymen, and are beyond the experimental period, that have been grown all over the country, and if you adopt such varieties, you can not go astray, but the average farmer cannot afford to be experimenting with varieties that very little is known of.

A Member: As a commission man, and a fruit man, and a man who has had experience with the market, what do you think of the Jonathan?

Mr. Nelson: That will make him more money than any apple he can raise, if you have a crop from year to year.

Q. How about the Grimes Golden?

A. I would rather have a Grimes Golden than any apple that grows, but they are not such a money maker.

A Member: I wish to add a word to what Mr. Nelson has said. The great mistake in planting the commercial orchard in my observation is that men are governed by sentiment, instead of cold blooded business propositions. The nurseryman says, that is an awfully nice apple, and you should have a few of them, and the buyer takes them. I will leave it to any large buyer, and I think he will agree with me, that if he goes into an orchard, the least varieties you have, the better it is. But the only question in planting an orchard is, as I see it, and that is to extend the picking season from the earliest to the latest, and that can be done with a very few varieties.

A Member: I would like to ask you how large a district can be organized under one association for the marketing of fruit. How can you organize growers situated all over,—how large a district can be taken in?

Mr. Nelson: That is a rather hard question to answer, and it will depend entirely upon the nature of the fruit. Whether or not it is small or larger fruits. Our association is practically a small fruit association. Our biggest product is grapes, and we raise a great many strawberries, blackberries and raspberries, and we can only cover a very small district on that account. The reason is it requires personal application to hold our growers and make them put up their fruit properly, and to hold them in line. We are also at a disadvantage from the fact that we are at the gates of a very large market which is a great attraction to the growers to cut and break away and sell their own products.

But now the Southeastern Fruit Growers Association has practically done away with that I think. The plan that is used in the south and west particularly is this. They organize local associations, and then formulate them under one selling and marketing agency. They will have their headquarters at some central point where they can get in touch with all the markets of the country. These local agencies will report to the head office whenever they have a car to load and the minute they have the car loaded they start moving it in transit. That car is usually sold before it gets to its destination. I do not know whether or not you had reference to apples.

A Member: Yes sir, I had reference to apples, and small fruit, also. I am afraid it would be a little harder to handle the small fruit, proposition, like that. You would pretty nearly have to depend

on express shipments. Now when we have grapes or something like that to ship, we generally ship in car loads. We do not have as a rule any shipped except in car load lots. Local shipments are mostly unsatisfactory. From the time they are handled by the express company and if they have to go any distance, they are all badly abused and you have claims and rebates and kicks and everything and they,—after they go into a car and are properly packed in the car the system of refrigeration they have now, is so good, you can ship them to almost any point and they will arrive all right at their destination.

Mr. Barnard: The next address will be by Prof. J. R. Cooper, upon the subject, of "Spraying the Apple and Results obtained in 1913."

SPRAYING THE APPLE AND RESULTS OBTAINED IN 1913.

By Prof. J. R. Cooper, Lincoln, Nebr.

The results of the spraying experiments carried on by the Experiment Station during the season of 1913 have been very unsatisfactory, taken as a whole, although a great deal of valuable data has been secured from which a number of conclusions may be drawn. It must be remembered, however, that conclusions based on one year's work are not always to be relied upon, especially when the reason is the one just past. Unless a number of duplications are made. Therefor only when the same experiments have been carried on in a number of places during the past season will they be mentioned or any conclusions offered.

In order to duplicate experiments, as much as possible, and in order to note the effects of different soils on other conditions as well as varying amounts of soil moisture, orchards were secured in various parts of the state. This wide range of territory proved our undoing in many ways. Although the concentration of our spray mixtures was kept constant and the pressure under which it was delivered, was uniform, there was a wide difference in the amount of spray burn at the various stations. Due to the extreme drought in some localities, and an almost ample amount of rainfall in others. The difference in the amount of fungus disease present at these different places due to the same causes, was so great in some instances as to make the same treatments in different localities incomparable.

Certain combinations of sprays which proved most satisfactory under extremely dry conditions proved quite the reverse where the weather conditions were more favorable to the production of large crops.

In the orchard at Wymore where the entire season, after the date of the second spray, was hot and dry, bordeaux mixture gave better results for the latter sprayings than lime sulphur solution.

At Nemaha where the rainfall was greater, lime sulphur solution produced less spray burn during the latter applications than did bordeaux mixture, though the bordeaux was more effective in the control of apple scab and apple blotch.

At Brownville, the spray machine did not arrive in time, for the cluster cup spray, and we were unable to obtain water for the fourth, so that only the second and third or the petal-fall or the three-weeks-after spray were applied. For these two sprays bordeaux proved slightly more efficient than lime sulphur, but produced very much more spray injury.

In one of our orchards at Florence the apples were harvested before a record could be secured. While in another near the same place a hail storm occurred just before the application of the fourth spray, which did a great deal of damage to the fruit, and caused this spray to burn the fruit, much more severely than it would otherwise have done. Making it impossible to secure accurate records.

The spray mixtures were applied in such a manner that we were able to determine the relative efficiency of each ingredient (bordeaux, lime sulphur and arsenate of lead) at each application, so that we were able to determine very accurately which spray was giving the best results, or doing the most damage.

In our experiments certain trees were marked for record, and every apple examined. In all, one million, nine hundred and fifteen thousand, five hundred and thirty four. (1,915,534) apples were examined for insect, fungus and spray injury.

Bordeaux vs. Lime Sulphur.

Bordeaux still bears out its old reputation, of being the most effective fungicide we have, but it still has the same old propensities, to "burn" the fruit. Bordeaux has proved more effective as a fungicide than lime sulphur, especially when apple scab and apple blotch are present. At the same time bordeaux has caused more spray injury than lime sulphur; under ordinary weather conditions except for the first or cluster-cup spray. However where the rainfall has been light and the clear and hot weather during the latter part of the season, lime sulphur has produced more, and more serious burning than bordeaux mixture for the fourth application.

At Wymore, the latter conditions prevailed and the following results were secured:

Plat: I.

1st. spray bordeaux 4—6—2—50: 2nd, spray lime sulphur 1½—2—50. 3rd, spray, lime sulphur 1½—2—50, and 4th, spray bor-

deaux 3—4—2—50. Percentage spray injury, 2.7. Sound fruit, 86.25.

Plat: II.

All four sprays of lime sulphur, 1½—2—50. Percentage of spray injury 6.03. Percentage sound fruit, 83.25.

At Nemaha where the rainfall was almost normal and distributed over the whole season bordeaux produced some burning, more than the lime sulphur solution.

(1). 4 pounds blue vitriol, 6 pounds stone lime, 2 pounds arsenate of lead and water to make 50 gallons.

(2). 1½ gallons lime sulphur solution 2 pounds arsenate of lead and water to make 50 gallons

Sprays at Wymore.

Plat: I.

Percentage of spray injury 7.82. Percentage of sound fruit 77.12.

Plat: II.

Percentage of spray injury 1.59. Percentage of sound fruit 87.88.

In all cases, windfalls as well as sound fruit were considered. The windfall fruit in all cases showed about double the amount of insect injury shown by the picked fruit.

The varieties, Geneton, Ingram and Missouri Pippin are the least susceptible of our common apples to bordeaux injury. The Geneton is our most susceptible variety to apple scab, and the Missouri Pippin to apple blotch. This being the case, and since bordeaux mixture offers the best control for these diseases, bordeaux is preferable to lime sulphur for the above named varieties. However, since these varieties comprise a very small percentage of our apple crop, the material best adapted to the more extensively grown varieties, is recommended.

Under ordinary Nebraska conditions, bordeaux should be used for the first spray, and lime sulphur for the subsequent sprays. In case apple blotch is serious, a spray of bordeaux mixture should be applied four or five weeks after the petals fall. Should the summer be hot and dry as was the case over the greater portion of the state during the past season, bordeaux should be substituted for lime sulphur, for the last application if a fungicide is used.

There seems to be a direct correlation between the age of the

fruit and the amount of spray injury. The older and more mature the fruit, the less liability to bordeaux injury.

Penetration vs. Mist.

In the penetration system the mixture is delivered in rather course drops, under high pressure from the bordeaux type of nozzle. When the penetration system was compared with the mist spray for the second or petal-fall spray only, a difference of 9 per cent less codling moth infestation was found in the penetration block.

At each of three different stations in the state, one block was sprayed, using a mist spray for the first, third and fourth applications and the penetration spray for the second. Compared to this in each case was a block on which the penetration system was used on every application. The average results were as follows:

Penetration System.

Codling Moth.	Curculic	Scab	Spray Inj.	Sound Fruit
12 p. c.	.33 p. c.	.05 p. c.	33.73 p. c.	63.47 p. c.

Mist sprays for the first, third and fourth with penetration spray at petal-fall.

Codling Moth	Curculic	Scab	Spray Inj.	Sound Fruit
13.6	.02	.62	4.47	81.23

Efficiency of Each Spray for the Control of Insects.

The first, or cluster cup spray controls four per cent codling moth, and two per cent curculio:

The second or petal-fall spray controlled 83 per cent codling moth, and 45 per cent curculio.

The third spray controlled 8 per cent codling moth and 15 per cent curculio.

The fourth spray controlled 12 per cent codling moth.

These percentages total over 100 per cent, but are calculated on the results of a single lead application. With fungicide, at the stated time period. The figures are based on the results of the unsprayed blocks, in which 84.82 per cent of the apples show codling moth injury, and 2.92 per cent curculic injury.

Time of Application.

The best time for the application of the first spray as indicated by results, is just as the buds in the cluster are beginning to separate; for the second spray, when three fourths of all of the petals have fallen; for the third spray, three to four weeks after the second or if apple blotch is present, four to five weeks after the second or petal-fall spray, or it may be applied three weeks

after the petals fall, and another spray added two weeks later for control of apple blotch. The fourth spray should be applied when the second brood of codling moth begin to appear. This is usually from July 20th to August 15th, and can be determined by banding the trees and watching the development of the larvae which are found beneath the band. If a partial third brood appears, as was the case last season, another spray later in the season becomes necessary.

Recommended Spray Calendar.

First or cluster cup spray: Bordeaux mixture plus arsenate of lead, 4—6—2—50. (Four pounds blue vitrol, six pounds lime, two pounds arsenate of lead and water to make fifty gallons) applied as a coarse mist under 200 pounds pressure, just as the buds in the clusters are separating.

Second, or petal-fall spray: Lime sulphur (32 degrees beaume) plus arsenate of lead, 1½—2—50 (one and one half gallons of commercial lime sulphur solution, 2 pounds arsenate of lead and water to make 50 gallons) applied from above as a coarse driving spray, under 200 to 250 pounds pressure, when three fourths of all of the petals have fallen.

Third Spray: Three to four weeks after the second spray of the same composition and strength as the second spray. Delivered as a fine mist under high pressure. In case apple blotch is present, this spray should be applied about 5 weeks after the second, and should consist of bordeaux mixture plus arsenate of lead, 3—4—2—50, if the weather will permit. Bordeaux should not be used during prolonged wet rainy weather. In this case, lime sulphur should be used three weeks after the petals fall, and followed two weeks later with bordeaux.

Fourth Spray: Should be applied when the second brood of codling moth begin to appear. If no fungus diseases are present, this spray may consist of arsenate of lead alone 2—50. If a fungicide is needed, lime sulphur may be used of the same strength as for the second and third sprays, except in the case of extremely hot dry weather, when bordeaux should be substituted, (3—4—50). The spray should be applied by a sweeping or stroking motion of the rod, beginning at the end of the limbs, and following down to the trunk, with the spray directed in and down. This will insure the trunk and center of the tree being well covered by the time the outside and top is finished. Wormy fruit occurs more often from a poor application, than from poor or insufficient amount of poison.

Two pounds of arsenate of lead, to fifty gallons is as good as more, if the liquid is properly applied. Through not demonstrated by experiments, there is every reason to believe that a dormant

spray applied just as the leaf-buds are beginning to swell would prove very beneficial, not only in the control of any aphids or scale, which may be present, but to some extent in preventing the spread of Illinois cranker. Dormant spraying will not control this disease after it has once gained entrance into a tree. But should aid in preventing infection, through winter pruning, wounds and other injuries. The dormant spray will at least prove a good insurance for young orchards.

Discussion.

Mr. Pollard: I notice in the opening of this latter discussion you state you made your first spray with bordeaux, and you followed,—the next two with lime sulphur, and then followed with bordeaux and vice-versa, do you have any place where you sprayed only with lime sulphur?

A. Yes sir, in every case we aimed to have one block in every orchard sprayed with bordeaux mixture straight, and one with lime sulphur straight, and then with different combinations of spraying. That being the case of the orchard at Wymore, which gives better results where we sprayed with lime sulphur than where we sprayed with bordeaux mixture; we got as good results as we did with the bordeaux, but the lime sulphur on account of the hot dry weather, seemed to cause very much more spray burning, and much more deeper burn than the bordeaux did. Now I think that was found to be the case in the Kansas experiments, a few years ago, that the lime sulphur was inclined to burn a great deal more severely than the bordeaux mixture.

A Member: Wouldn't it be practical to dilute this lime sulphur solution?

A. You might weaken the solution but the question is to get the solution to a point where it will destroy all of this fungus disease and at the same time not to injure the tree.

Mr. Pollard: In answer to Mr. Williams' question, I think that in the orchards where they used lime sulphur exclusively, where they used less than a gallon and a half of lime sulphur to 50 gallons of water, they didn't control the scab.

Prof. Cooper: Did you have as much burn though?

Mr. Pollard. We didn't care so much about the burn, if we controlled the scab, that is all we wanted. And in my own orchard at home, that I have charge of, we have practically no burn. We used a gallon and a half with subsequent sprays in my orchard. In the orchards where they used less than that, without a single exception, they did not control the scab.

Prof. Cooper: I would like to say gentlemen that while I have been through Mr. Pollard's orchard, several times, and while we didn't make any experiments on his orchard he seemed to have

about as clean an orchard as we found in the state this year.

Now on our experiments in orchards at Bracken, the lime sulphur showed correspondingly less burn under the same conditions. The same thing was true at Florence, where we had a great deal of rain during the season, that is compared to the rest of the state, the bordeaux mixture continued to give us more burns there than the lime sulphur, and of course the lime sulphur correspondingly less burn.

A Member: I was ten years in the Grand River Valley in Colorado, and there they use banded trees, and sprayed twice with the best results. And some sprayed with good results, where they have been careful for years, with two sprays, and have about 85 to 90 per cent. I would like to know if there is any man in Nebraska who has banded his trees, and got the moth from a band?

A. I don't know of anybody. I always banded a few of the trees when I found that the coddling moth was coming on. I found it was a good proposition.

A Member: I have been through Washington, Oregon, California, Idaho and all the valleys, and I have had experience in all of them, and I am willing to come back and take my chances in Nebraska. This year my apples,—if I wantel Jonathans, they cost me \$6.50 a barrel up at Kearney, raised down in the eastern part of the state here. You fellows didn't get any such big price as that. Did you? And I would like to know the cause of it. I had to pay out in Colorado, \$1.75 per box, and then paid the express of \$1.75 more. It is pretty hard to live in Nebraska without fruit.

Mr. Pollard: There is a question I would like to ask in regard to this spray burn. Did you make any observations as to whether or not you had a little burn on all the trees as you went down the row or whether they were in one or two trees together?

A. Well this is a fact. We had some spray burn on all the trees, but in certain places there were some trees that had more spray burn than others.

Q. (By a member): What do I understand you to mean, by an open spray, simply an enlargement of the disc of the nozzle?

A. I said the penetrating spray. Now in the penetrating spray we use the nozzle that turns the spray in a fan shape and with a great deal of force, and there is not much missed.

A Member: I wish you would review in brief and sum up all these combinations, between the bordeaux, and this other spray?

Professor Cooper: The bordeaux spray does not seem to injure the Genitan and the Missouri Pippin apple, to any extent, but the other varieties it burns a great deal more. So in order to control this, I would say to spray with bordeaux mixture for the first spray,

and lime sulphur for the second spray, and third spray, and bordeaux for the last. If there seemed to be a tendency for the weather to turn off hot and dry I would use bordeaux mixture for the last spray. Sometimes, you might use lime sulphur.

The Iowa Experiment Station has just put out a bulletin on lime sulphur and lead arsenate mixture. And from what that bulletin says, as near as I can understand it, there is no loss in the insecticide functions of the combination and there is no loss in the fungicide function of the combination.

Q. How much lead arsenate did you use?

A. Two pounds to fifty gallons. The Kansas experiment station made a very exhaustive investigation of that two years ago, and found out that over two pounds to fifty gallons was superfluous.

Mr. Barnard: The next order of business will be the Secretary's report. (Secretary reads his report.)

(Treasurer reads his report. Report read by Mr. Brown.)

SECRETARY'S REPORT.

The report for the year 1913 is the result of the partial labors of of three persons. Mr. C. G. Marshall, who was my predecessor, resigned as secretary August 1, 1913. He took the position as manager of the Eastern Nebraska Fruit Growers Association and which he is filling with credit to himself and the association. During the month of August our esteemed president, Mr. C. H. Barnard acted in the capacity of secretary. It was due to his untiring efforts that we had such a splendid display of fruit at the State Fair. Your humble servant was elected to fill the vacancy, September 1, 1913. During the past year the roll of members has not increased as rapidly as we would like to have seen it. We ought to have every person who is interested in any phase of horticulture a member and an earnest booster for this society. It is my purpose to do everything in my power to make the society as helpful as possible to every fruit, flower and vegetable grower in Nebraska. Nebraska needs horticultural development. Will you help to make the Nebraska State Horticultural Society one of the strongest factors in the development of this great branch of our resources.

J. R. DUNCAN, Secretary.

FINANCIAL STATEMENT.

The Nebraska State Horticultural Society.

In account with J. R. Duncan, Secretary.

CASH RECEIVED AND TURNED TO TREASURER.

September 5, 1913.

Fruit sold at State Fair.\$30.00

January 14, 1914.

Membership fees17.00

Total turned to treasurer.\$47.00

Membership fees collected and turned to treasurer

By C. G. Marshall, since January, 1913.....\$97.00

Total amount received in the secretary's office and turned to

treasurer from January, 1913 to January, 1914.....\$144.00

WARRANTS DRAWN DURING 1913.

No.	To Whom Drawn and For What.	Amount.
1.	Lincoln Sign Works, signs fruit show	\$ 8.55
2.	Marshall Bros., premiums	143.00
3.	Ed. Nunamaker, premiums .....	.50
4.	Ray W. Hesselstine, premiums	153.00
No.	To Whom Drawn and For What.	Amount.
5.	R. B. Duncan, premiums	8.50
6.	Keyser & Marshall, premiums	150.50
7.	Youngers and Burns, premiums	49.00
8.	Void	
9½.	C. H. Barnard, premiums	8.00
9.	Duncan-Hesselstine F. & N. Co., premiums	91.00
10.	Velvick & Whittaker, premiums	16.50
11.	G. S. Christy, premiums	79.00
12.	C. D. Hahn, premiums	6.00
13.	J. M. Packwood, premiums	1.00
14.	Earnest Hornung, premiums	1.00
15.	Russel Bros., premiums	32.00
16.	Floyd Roberts, labor	5.00
17.	J. R. Duncan, per diem.	24.00
18.	G. F. Tucker, labor, demonstrating, etc.	15.00
19.	Fred Grothe, decorating at show	42.00
20.	L. M. Russel, per diem and advance to J. W. Walker, \$10.....	34.00
21.	Russel Bros., apples and apple boxes	7.75
22.	Laurenze Green, expenses to judge fruit	16.15
23.	L. Bridenthal, fruit used in decorating	9.00
24.	J. H. Domingo, photos orchard scenes	1.30

No.	To Whom Drawn and For What.	Amount.
25.	C. S. Harrison, expenses as delegate Minn.	10.00
26.	Val Keyser, per diem	6.00
27.	J. A. Yager, per diem	24.00
28.	Wilbur D. Camp, signs used at show	13.00
22.	Am. Product Co., apple cartons.....	9.00
30.	Whitehead & Hoag Co., premium ribbons	6.27
31.	G. H. Van Houten, expenses, Ia. delegate	3.75
32.	S. A. Beach, expenses to give lecture	4.60
33.	Peter Youngers, per diem.	21.00
34.	A. J. Brown, per diem.	24.00
35.	G. A. Marshall, per diem	15.00
36.	Ray W. Hesseltine, per diem.	9.00
37.	C. H. Barnard, per diem. and bbl. apples,	33.50
38.	W. M. Benton, printing	25.50
39.	Curtis Towle Paine, saw dust shavings, show	3.00
40.	Lincoln Gas Co., gas used at fruit show	1.10
41.	Keyser & Marshall, apples used at fruit show	34.25
42.	Ray W. Hesseltine, apples used at fruit show	26.00
43.	G. S. Christy, apples used at fruit show	17.75
44.	C. G. Marshall, January salary	83.00
45.	C. G. Marshall, stamps, express, other bills paid	78.25
46.	L. Henderson, premiums	23.00
47.	C. H. Green, premiums	26.00
48.	Frey & Frey, premiums	16.00
49.	Simanton & Pence, premiums	17.00
50.	Dole Floral Co., premiums	17.00
51.	J. W. Lawson, premiums	8.00
52.	Davidson Floral Co., premiums	3.00
53.	L. Henderson, per diem.	9.00
54.	Mary Fairchild, office	6.00
55.	Roy Marshall, clerical work	6.00
56.	J. C. Morgan, pictures	17.50
57.	George Bros., printing names of apples.....	2.85
58.	Globe Delivery, drayage	20.45
59.	Roy Hindmarsh, photos fruit show	1.50
60.	J. North & Co., labels	5.35
61.	Capitol Grocery, groceries, cooking demonst.	6.10
62.	Beatrice Creamery, storage fruit	65.73
63.	W. J. Blystone, labor and supplies,	7.15
64.	C. G. Marshall, February salary	84.00
65.	L. Henderson, per diem.	6.00
66.	C. H. Barnard, per diem.	3.00
67.	A. J. Brown, per diem.	6.00
68.	J. R. Duncan, per diem.	6.00

No.	To Whom Drawn and For What.	Amount.
69.	G. A. Marshall, delegate to Wis. meeting	10.00
70.	J. A. Yager, per diem.	6.00
71.	Am. Express Co., express on reports	1.77
72.	C. G. Marshall, express, postage, expense	24.31
73.	Lincoln Tel. Co., tolls	2.60
74.	Claflin Ptg. Co., printing	71.11
75.	Gold & Co., bunting	8.63
76.	Grace Richards, demonstrating	15.00
77.	C. G. Marshall, March salary	83.00
78.	W. M. Benton, printing	3.50
79.	C. G. Marshall, April salary	84.00
80.	C. A. Emery, reporting winter meeting	95.50
81.	C. G. Marshall, May salary,	83.00
82.	C. H. Barnard, per diem.	6.00
83.	L. Henderson, per diem.	6.00
84.	J. R. Duncan, per diem.	6.00
85.	Peter Youngers, per diem	6.00
86.	W. A. Harrison, per diem.	6.00
87.	J. A. Yager, per diem.	6.00
88.	W. M. Benton, printing.....	32.50
89.	Claflin Ptg. Co., Ptg., March, April Hort.	46.80
90.	State Journal Co., engraving	3.25
91.	Keens & Sharp, painting miniature house	4.50
92.	Lincoln Paper Co., paper and plates.....	5.33
93.	E. R. Gross, building miniature house	10.00
94.	Miller & Paine, bunting	6.40
95.	C. G. Marshall, postage, express, drayage, etc	44.23
96.	Ed. Williams, judging floral exhibit	6.00
97.	C. G. Marshall, June salary	83.00
98.	Rapid Adding Machine Co., 10,700 envelopes	10.70
99.	J. North & Co., printing	12.00
100.	Claflin Ptg. Co., May, June Hort.	46.91
101.	C. G. Marshall, July salary	83.65
101½	J. A. Yager, per diem.	6.00
102.	C. H. Barnard, per diem.	6.00
103.	J. R. Duncan, per diem.	6.00
104.	L. Henderson, per diem.	6.00
105.	C. H. Barnard, express paid	3.85
106.	Wm. Benton, printing	15.00
107.	C. G. Marshall, postage and express	14.44
108.	C. G. Marshall, August salary	83.00
109.	Berlin and Son, premiums	6.00
110.	A. M. Bustard, premiums	3.00
111.	W. W. Bruce, premiums	2.00

No.	To Whom Drawn and For What.	Amount.
	Chapin Bros., premiums	133.00
113.	G. S. Christy, premiums	47.00
114.	Chas. B. Camp, premiums	63.50
115.	R. C. Chambers, premiums	29.50
116.	J. M. Cannon, premiums	1.00
117.	C. H. Barnard, premiums	14.00
118.	Duncan-Hesseltine F. & N. Co., premiums	21.00
119.	J. R. Davidson, premiums	2.00
120.	R. B. Duncan, premiums	5.50
121.	C. Grabenstein, premiums.....	2.00
122.	Ray W. Hesseltine, premiums.....	49.00
123.	J. R. Huffman, premiums	19.00
124.	Lewis Henderson, premiums	69.00
125.	Val Keyser, premiums	40.00
126.	Abe Lawrence, premiums	9.00
127.	Marshall Bros., premiums	134.50
128.	Arnold Martin, premiums	5.00
129.	Mrs. A. J. McClain, premiums .....	.75
130.	Peru Fruit Farms, premiums	31.50
131.	J. M. Packwood, premiums	2.00
132.	G. F. Rolafson, premiums	2.00
133.	Mrs. Rymér, premiums	1.50
134.	Clara Ruch, premiums	1.00
135.	W. Sibering, premiums	5.00
136.	M. A. Schmale, premiums.....	2.00
137.	A. G. Shubert, premiums	10.00
138.	W. F. Sidders, premiums	15.50
139.	Simanton & Pence, premiums	174.00
140.	Velvick & Whittaker, premiums	95.00
141.	Frank Williams, premiums	11.50
142.	Albert Wetenkamp, premiums	1.00
143.	W. H. Wetenkamp, premiums.....	2.00
144.	L. O. Williams, premiums,	5.00
145.	Hesseltine & Christy, premiums	30.00
146.	W. M. Benton, printing, cards, orders	9.50
147.	W. I. Killy, premium	2.00
148.	Chapin Bros., decorating hort. hall, fair	117.00
149.	Wilbur D. Camp, 2 dozen cards	2.40
150.	C. H. Barnard, stamps, decorations for hall	3.00
151.	J. North & Co., entry books	6.50
152.	Am. Express Co., express.....	1.23
153.	Lincoln Paper Co., paper, plates.....	4.36
154.	Peter Youngers, refused	
155.	C. H. Barnard, per diem.	24.00
156.	Val Keyser, per diem.	24.00

TREASURER'S REPORT

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No.	To Whom Drawn and For What.	Amount.
157.	W. A. Harrison, per diem.	24.00
158.	J. A. Yager, per diem.	27.00
159.	Lewis Henderson, per diem.	24.00
160.	Mrs. Mann, clerical work	25.00
161.	Isabella Johnson, labor state fair	12.00
162.	Raymond Andrews, labor at state fair	26.00
163.	T. B. Rodgers, labor	15.00
164.	Geo. Marshall, per diem.	24.00
165.	J. R. Duncan, per diem.	9.00
166.	Mrs. J. P. Sampson, premiums	5.00
167.	Mrs. J. P. Sampson, premiums	2.00
168.	Wade R. Martin, labor	8.00
169.	Beatrice Creamery, storage of fair fruit	7.45
170.	Peru Fruit Farms, grapes for fair use	2.75
171.	W. J. Blystone, labor and materials for fair	82.20
172.	Globe Delivery Co., hauling fruit to fair	3.50
173.	Sullivan-Schaberg, hauling flowers	5.00
174.	Claflin Ptg. Co., printing July & Aug. hort.	46.86
175.	Lincoln Paper Co., paper and plates	7.58
176.	Stacy Bros. Fruit Co., fruit for fair	4.30
177.	J. Grainger & Co., grapes for fair	2.70
178.	J. R. Duncan, part September salary	40.00
179.	J. Grainger & Co., grapes for fair	2.70
180.	J. R. Duncan, rest of September salary	23.00
181.	Ray W. Hesseltine, refused.	
182.	Globe Del. Co., hauling grapes to fair ground ....	.75
183.	J. R. Duncan, part Oct. salary	10.00
184.	J. R. Duncan, part Oct. salary	5.00
185.	Fred Schnitter, premium	1.00
186.	J. R. Duncan, part Oct. salary	10.00
187.	J. R. Duncan, part Oct. salary	5.00
188.	Lincoln Telephone Co., telephone at fair and tolls	7.20
189.	J. R. Duncan, rest Oct. salary	32.00
190.	W. M. Benton, letter heads and circulars	9.25
191.	J. P. Duncan, part Nov. salary	10.00
192.	Stacy Fruit Co., ten baskets grapes state fair	2.50
193.	J. R. Duncan, part Nov. salary	5.00
194.	J. R. Duncan, part Nov. salary	8.00
195.	Rudge & Guenzal Co., bunting	5.15
196.	J. R. Duncan, part Nov. salary	5.00
197.	J. R. Duncan, stamps, express, trip to Nebr. City	13.86
198.	W. M. Benton, printing	2.00
199.	Claflin Ptg. Co., printing Oct. and Sept. Hort.	51.86
200.	J. R. Duncan, part Nov. Salary	5.00
201.	Advance Ptg. Co., Nov. Hort. 3 half tones	23.25

No.	To Whom Drawn and For What.	Amount.
202.	J. R. Duncan, rest Nov. salary	40.00
203.	J. R. Duncan, part Dec. salary	5.00
204.	J. R. Duncan, part Dec. salary	10.00
205.	J. R. Duncan, part Dec. salary	15.00
206.	Advance Ptg. Co., Dec. Horticulture & 600 circulars.....	18.75
207.	J. R. Duncan, stamps for mailing out annual report	30.00
208.	Peter Youngers, per diem.	6.00
209.	J. A. Yager, per diem.	6.00
210.	W. A. Harrison, per diem.	6.00
211.	G. A. Marshall, per diem.	6.00
212.	Val Keyser, per diem.	6.00
213.	J. R. Duncan, rest Dec. salary	22.00
Total Amount of Warrants Drawn, 1913.....		\$4,822.68

TREASURER'S REPORT.

The Nebraska Horticultural Society,

In account with Peter Youngers, Treasurer:

1913.

Jan. 21st.	Balance on hand	\$2,164.65
June 2nd.	C. G. Marshall, Sec. membership fee	62.00
June 2nd.	State Appropriation	1,500.00
Sept. 5th.	State Appropriation	1,000.00
Sept. 5th.	State Board of Agriculture	1,200.00
Sept. 5th.	J. R. Duncan, fruit sold	30.00
Dec. 10th.	C. G. Marshall, membership fee	35.00

1914.

Jan. 14th.	J. R. Duncan, membership fee	17.00
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Total cash received

Total warrants paid

Balance on hand January 20th. 1914.

WARRANTS PAID.

1912.

No.	Name.	Amount
105.	John Furnas	\$4.50
107.	Henry Gillian	1.00
124.	Tom Pahlman	1.50
125.	Peru Fruit Farm	34.00
132.	Fred W. Wheeldon.....	18.00
192.	State Board of Agriculture	24.73

Total 1912 Warrants

1913.

No.	Name.	Amount
1.	Lincoln Sign Works	\$ 8.55
2.	Marshall Bros.	143.00
3.	Ed. Nunamaker	.50
4.	Ray W. Hesseltine	153.00
5.	R. B. Duncan	8.50
6.	Keyser & Marshall	150.50
7.	Youngers & Burns	49.00
9.	Duncan & Hesseltine	91.00
9½.	C. H. Barnard	8.00
10.	Velvick & Whittaker	16.50
11.	G. S. Christy	79.00
12.	C. H. Hahn	6.00
13.	J. M. Packwood	1.00
14.	Ernest Hornung	1.00
15.	Russel Bros.	32.00
16.	Floyd Roberts	5.00
17.	J. R. Duncan	24.00
18.	G. F. Tucker	15.00
19.	Fred Grothe	42.00
20.	L. M. Russell	34.00
21.	Russel Bros.	7.75
22.	Laurenze Greene	16.15
23.	L. Bridenthal	9.00
24.	Jesse H. Downing	1.30
25.	C. S. Harrison	10.00
26.	Val Keyser	6.00
27.	J. A. Yager	24.00
28.	Wilber D. Camp	13.00
29.	American Paper Products Co.	9.00
30.	Whitehead & Hoag	6.27
31.	G. H. Van Houten	3.75
32.	S. A. Beach	4.69
33.	Peter Youngers	21.00
34.	A. J. Brown	24.00
35.	G. A. Marshall	15.00
36.	Ray W. Hesseltine	9.00
37.	C. H. Barnard	33.50
38.	W. M. Benton	25.50
39.	Curtis, Towle & Paine	3.00
40.	Lincoln Gas & Electric Light Co.	1.10
41.	Keyser & Marshall	34.25
42.	Ray W. Hesseltine	26.00
43.	G. S. Christy	17.75
44.	C. G. Marshall	83.00

No.	Name.	Amount
45.	C. G. Marshall.....	78.25
46.	Lewis Henderson.....	23.00
47.	C. H. Green.....	26.00
48.	Frey & Frey.....	16.00
49.	Simonton & Pence.....	17.00
50.	Dole Floral Co.....	17.00
51.	J. W. Lawson.....	8.00
52.	Davidson Floral Co.....	3.00
53.	L. Henderson.....	9.00
54.	Mary Fairchild.....	6.00
55.	Roy E. Marshall.....	6.00
56.	J. C. Morgan.....	17.50
57.	George Bros.	2.85
58.	Globe Delivery Co.....	20.45
59.	Roy Hindmarsh.....	1.50
60.	Jacob North.....	5.35
61.	Capital Grocery Co.....	6.10
62.	Beatrice Creamery Co.....	65.73
63.	W. J. Blystone.....	7.15
64.	C. G. Marshall.....	84.00
65.	Lewis Henderson.....	6.00
66.	C. H. Barnard.....	3.00
67.	A. J. Brown.....	6.00
68.	J. R. Duncan.....	6.00
69.	G. A. Marshall.....	10.00
70.	J. A. Yager.....	6.00
71.	American Express Co.	1.77
72.	C. G. Marshall.....	24.31
73.	Lincoln Tel. & Tel. Co.....	2.60
74.	Claffin Printing Co.	71.11
75.	Gold & Co.....	8.63
76.	Grace Richards.....	15.00
77.	C. G. Marshall.....	83.00
78.	W. M. Benton.....	3.50
79.	C. G. Marshall.....	84.00
80.	C. A. Emery.....	95.50
81.	C. G. Marshall.....	83.00
82.	C. H. Barnard.....	6.00
83.	Lewis Henderson.....	6.00
84.	J. R. Duncan.....	6.00
85.	Peter Youngers.....	6.00
86.	W. A. Harrison.....	6.00
87.	J. A. Yager.....	6.00
88.	W. M. Benton.....	32.50
89.	Calfin Printing Co.	46.80

TREASURER'S REPORT

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No.	Name.	Amount
90.	State Journal Co.....	3.25
91.	Keens & Sharp.....	4.50
92.	Lincoln Paper Co.....	5.33
93.	E. R. Gross	10.00
94.	Miller & Paine.....	6.40
95.	C. G. Marshall.....	44.23
96.	Ed. Williams	6.00
97.	C. G. Marshall.....	83.00
98.	Rapid Addressing Machine Co.....	10.70
99.	Jacob North & Co.....	12.00
100.	The Claflin Printing Co.	46.91
101.	C. G. Marshall.....	83.65
101½	J. A. Yager.....	6.00
102.	C. H. Barnard.....	6.00
103.	J. R. Duncan.....	6.00
104.	Lewis Henderson.....	6.00
105.	C. H. Barnard.....	3.85
106.	W. M. Benton.....	15.00
107.	C. G. Marshall.....	14.44
108.	C. G. Marshall.....	83.00
109.	Berlin & Son.....	6.00
110.	F. M. Bustard.....	2.00
111.	W. W. Bruce.....	2.00
112.	Chapin Bros.	133.06
113.	G. S. Christy.....	47.90
114.	Chas B. Camp.....	63.50
115.	R. T. Chambers	29.50
116.	J. M. Cannon.....	1.00
117.	Clyde Barnard	14.00
118.	Duncan, Hesseltine F. & N. Co.....	21.00
119.	J. R. Davidson	2.00
120.	R. E. Duncan.....	5.50
121.	C. Grabenstein	2.00
122.	Rav W. Hesseltine.....	49.00
123.	J. R. Hoffman.....	19.00
124.	Lewis Henderson	69.00
125.	Vel Keyser	40.00
126.	Abe Lawrence	9.00
127.	Marshall Bros.	134.50
128.	Arnold Martin	5.00
129.	Mrs. A. J. McClain.....	.75
130.	Peru Fruit Farm.....	31.50
131.	J. M. Packwood.....	2.00
132.	G. L. Rolofson.....	2.00
133.	Mrs. Rymer	1.50

No.	Name.	Amount
134.	Clara Ruch	1.00
135.	W. Sibering	5.00
136.	M. A. Schmale	2.00
137.	A. G. Shubert	10.00
138.	W. F. Sidders	15.50
139.	Simonton & Pence	174.00
140.	Velvick & Whittaker	95.00
141.	Frank Williams	11.50
142.	Albert Wetenkamp	1.00
143.	W. H. Wetenkamp	2.00
144.	L. O. Williams	5.00
145.	Hesseltine & Christy	30.00
146.	W. M. Benton	9.50
147.	W. L. Killy	2.00
148.	Chapin Bros.	117.00
149.	Wilbur D. Camp	2.40
150.	C. H. Barnard	3.00
151.	Jacob North & Co.	6.50
152.	American Express Co.	1.23
153.	Lincoln Paper Co.	4.36
155.	C. H. Barnard	24.00
156.	Val Keyser	24.00
157.	W. A. Harrison	24.00
158.	J. A. Yager	27.00
159.	Lewis Henderson	24.00
160.	Mrs. Mann	25.00
161.	Isabella Johnson	12.00
162.	Ramond Andrew	26.00
163.	T. E. Rogers	15.00
164.	George Marshall	24.00
165.	J. R. Duncan	9.00
166.	Mrs. J. P. Samson	5.00
167.	J. P. Sampson	2.00
168.	Wade R. Martin	8.00
169.	Beatrice Creamery Co.	7.45
170.	Peru Fruit Farm	2.75
171.	W. J. Blystone	82.20
172.	Globe Delivery Co.,	3.50
173.	Sullivan Schaberg Transfer & Fuel Co.	5.00
174.	Claffin Printing Co.	46.86
175.	Lincoln Paper Co.	7.58
176.	Stacy Bros. Fruit Co.	4.30
177.	J. Granger & Co.	2.70
178.	J. R. Duncan	40.00
179.	J. Granger & Co.	2.70

TREASURER'S REPORT

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No.	Name	Amount
180.	J. R. Duncan.....	23.00
182.	Globe Delivery Co.....	.75
183.	J. R. Duncan.....	10.00
184.	J. R. Duncan.....	5.00
185.	Fred Schmitter	1.00
186.	J. R. Duncan.....	10.00
187.	J. R. Duncan.....	5.00
188.	Lincoln Tel. & Tel. Co.....	7.50
189.	J. R. Duncan.....	32.00
190.	W. M. Benton.....	9.25
191.	J. F. Duncan.....	10.00
192.	Stacy Fruit Co.	2.50
193.	J. R. Duncan	5.00
194.	J. R. Duncan	8.00
195.	Rudge & Guenzel Co.....	5.15
196.	J. P. Duncan	5.00
197.	J. R. Duncan	13.86
198.	W. M. Benton	2.00
199.	Claflin Printing Co.	51.86
200.	J. R. Duncan	5.00
201.	Advance Printing Co.	23.25
202.	J. R. Duncan	40.00
203.	J. R. Duncan	5.00
204.	J. R. Duncan	10.00
205.	J. R. Duncan	15.00
206.	Advance Printing Co.	18.75
207.	J. R. Duncan	30.00
208.	Peter Youngers	6.00
209.	J. A. Yager	6.00
210.	W. A. Harrison	6.00
211.	G. A. Marshall	6.00
212.	Val Keyser	6.00
213.	J. R. Duncan	22.00

\$4,906.41

Lincoln, Nebraska, September 4th, 1913.

This is to certify that I have this day received from Peter Youngers, treasurer of the Nebraska State Horticultural Society, the following list of warrants in exchange for state warrant D39280 in the sum of \$1,000.00.

No.	Name	Amount
2.	Marshall Bros.	\$143.00
4.	Ray W. Hesseltine	153.00
5.	R. B. Duncan	8.50
6.	Keyser & Marshall	150.50

No.	Name	Amount
7.	Youngers & Burns	49.00
9.	Duncan & Hesseltine F. & N. Co.	91.00
9½.	C. H. Barnard.....	8.00
10.	Velvick & Whittaker	16.50
11.	G. S. Christy	79.00
12.	C. D. Hahn.....	6.00
14.	Ernest Horning	1.00
15.	Russel Bros.	32.00
46.	Lewis Henderson	23.00
47.	C. H. Green	26.00
48.	Frey & Frey	16.00
49.	Simanton & Pence	17.00
50.	Dole Floral Co.	17.00
51.	J. W. Lawson	8.00
52.	Davidson Floral Co.	3.00
127.	Marshall Bros.	134.50
132.	Fred W. Wheeldon, 1912.....	18.00
		\$1,000.00

Witness my hand and seal this 5th day of September, 1913.

W. B. HOWARD,

Auditor.

W. L. MINOR,

Deputy Auditor Public Accounts.

Mr. Barnard: You have heard the reports and a motion will be in order to refer them to an auditing committee.

Motion made, seconded and carried.

Committee appointed as follows: C. G. Marshall, L. C. Chapin, and G. S. Christy.

ELECTION OF OFFICERS.

The Chairman: The next in order will be the election of officers. Nominations are in order for president of this society:

Mr. Pollard: Mr. President. I should like to place in nomination for president a man who has been connected with the society for a number of years. A man who has always been ready and willing to assume any burden of responsibility that the society might ask him to do. A man that I think has had as much to do perhaps as any other member of the society in helping to make it what it is. I take pleasure in placing in nomination the name of Mr. Yager, of Fremont. Seconded.

Mr. Brown: If there is no further nominations, I move the secretary be instructed to cast the ballot of this association for Mr. Yager, for president. Seconded. Carried.

Mr. Yager: Mr. Chairman, and members of this society: I thank the gentleman who nominated me, but I am sorry that he did not know me well enough to remember my name. I thank you very much for the honor. I hope to fill the bill in so far as I am able to do so.

The Chairman: Nominations for vice-president are in order.

Mr. Christy: I believe it will be necessary for our friend Pollard to get better acquainted with Mr. Yager the next year, and therefore I nominate him as first vice-president.

Mr. Marshall: I move that the rules be suspended, and the secretary be instructed to cast the unanimous ballot of this society for Mr. Pollard for first vice-president.

Seconded. Carried.

The Chairman: Nominations for second vice-president are in order.

Mr. Chapin: I desire to place in nomination a man that I have known for about thirty years. I do not want to take a poke at Mr. Pollard when I have to acknowledge I have forgotten his initials. Knowing him only as Jake Hess of Omaha. I want to place in nomination Mr. Hess. He has been a member of our society for a great many years, and one of the boys suggested his name as I know him, Jake, so you will have to look him up and get his initials on the record just right.

Mr. Yager: I move you that the rules be suspended and if there are no other nominations that the secretary be instructed to cast the unanimous ballot of this society for Mr. Hess for second vice-president.

Seconded. Carried.

Mr. Marshall: I wish to place in nomination Peter Youngers

of Geneva for treasurer of this society. He has been the treasurer for at least 25 years, and he has always handled the money of the society very satisfactorily. I wish to place in nomination the name of Mr. Youngers.

Mr. Yager: I ask, if there are no other nominations, that the secretary be instructed to cast the unanimous ballot of this society for Mr. Youngers, as treasurer.

Seconded. Carried.

Mr. Charman: I believe we have two members on the board of directors to elect; one for one year, and one for two,—no, a three year term.

Mr. Pollard: I would ask that we proceed to take a vote for these two members of the Board of Directors, and that as many candidates as there may be, have their names presented, and that the one having the highest number of votes be elected for the three year term, and the one receiving the next number of votes be elected for the one year term.

Seconded. Carried.

A Member: I nominate Mr. Val Keyser.

Mr. Christy: I wish to nominate Mr. George Marshall.

Mr. Pollard: Inasmuch as there are only two names, my former motion does not seem to be of any necessity. I move to suspend the rules of this society and that the secretary be instructed to cast the unanimous vote of this society for these two men, as members of the Board of Directors.

Seconded. Carried.

Mr. Pollard: In order to settle this matter, I move you that the name of Mr. Val Keyser, and the name of Mr. George Marshall be written on two slips of paper, and be placed in a hat, and the secretary be blind folded and draw out the names, the first one drawn out shall be the one for the three year term, and the other one for the one year term.

Seconded. Carried.

The secretary: Here is a resolution I received from W. S. Delano, Secretary of the Farmer's Congress.

Reads:

Mr. Chairman: Out of courtesy this resolution comes in here. It is up to this society to do what it sees fit to do with it. What is the pleasure of the society.

Mr. Keyser: In view of the fact that this agitation has been going on for some time, and perhaps is not working to the best interests of agriculture in all of its various phases and also that a member of the state board asked that the thing be settled in this way,—Senator Ollis, a member of the State Board, and president of the Live Stock Breeders Association, got the matter through the congress in this way, I would think it would be entirely proper that our society

appoint some committee to work with the other committees in helping quell the troubled waters if possible.

Mr. Brown: I understand that it is the wish entirely of the State Board of Agriculture that we here appoint a member of that committee. I do not think there is a member of the State Horticultural Society, but what has the utmost confidence in the officers and members of the State Board of Agriculture. We believe thoroughly that they are working in the very best interests of the state as they see it, and I think we should accede to their wishes and I place in nomination the name of Mr. Duncan our secretary, as a member of that committee. That committee will probably hold lengthy sessions here in the city of Lincoln, and Mr. Duncan has his office and residence in this city, and will be ready at all times to do that. I move therefore that this society accede to their wishes and appoint Mr. Duncan as a member of the committee.

Seconded. Carried.

Mr. Pollard: I have been looking over our constitution, and with particular reference to the duties of the vice-president, and it occurred to me that we should amend article six of our constitution, and I wish to give notice,—I believe under our constitution it was necessary to give notice,—at one meeting, or the meeting preceding the meeting in which action was taken, in amending the constitution.

Article six as it now stands, reads as follows: "The vice-president shall superintend all exhibits of the society and in case of vacancy in the office of president at any meeting of the society, the board of directors, shall perform all the functions of that office, in order of their rank." Now I know that a number of years ago, I served on the Executive Board of Directors of the Horticultural Society and I know at times it was impossible for one of the vice-presidents to be at the fair. And it was necessary for the board to appoint somebody. There is no provision made for that in the constitution at all. Now it occurred to me it would be better to leave that open. Now often it so happens that the vice-presidents are tied up in a business way, and for that reason somebody else should be appointed in their place, and it might be that someone else,—take in my own case,—I happen to be elected as one of the vice-presidents,—it might be that someone who has for a number of years acted as a superintendent of one of the buildings or halls, at the State Fair, and I could not be there all the week and he could be there all the week. And so I move to amend article six of the Constitution by striking out the following "The vice-president shall superintend all of the exhibits of the state fair."

The Chairman: This motion will come up at the next session. The by-laws call for submission at one session and that it lie over until the next session, so that the members will have notice of such a change in the laws.

The Chairman: If there is no objection we will call for Mr. Merrill's paper "Packing and Grading Apples" at this time, as he would like to be at the judging of the fruit at the auditorium this afternoon. I wish at this time to call to the attention of the members, that we should have a committee on resolutions. The chair will entertain a motion for a committee on resolutions. Some of our older members have passed away and we should give them notice any way.

Mr. Williams: I move that the chair appoint such a committee on resolutions. Seconded. Carried.

Committee appointed as follows: Mr. Williams, Mr. Yager, and Mr. Henderson.

PACKING AND GRADING APPLES.

By Prof. F. S. Merrill, Manhattan, Kansas.

The subject of packing and grading apples is one that should demand the interest and attention of nearly every fruit grower in the Middle West.

Through the activities of the State Experiment Stations and Horticultural Societies, a greater interest has been aroused in proper orchard management; careful and systematic pruning, thorough spraying and cultural methods. These have brought about the production of a better grade of fruit, which in itself is a sufficient return for the increased cost of production.

But these are only the beginning, for the fruit once raised must be sold. Other things being equal the article which is placed on the market in the most attractive package will demand the highest price, and the readiest sale.

This fact has long been realized, by the manufacturers of the staple articles of food and also by the Citrus fruit growers. The average consumer buys fruit more on its looks or attractiveness than because of its quality. He has come to associate the straight even rows and uniform layers with high quality, just as he also associates the less attractive package with slip shod cultural methods, and careless handling.

The apple box meets the needs of the growers of the best fruit. Its advantages over the barrel are many. First the barrel does not tend to careful grading, but does tend to encourage carelessness and dishonesty.

Second: The fruit ships better in boxes than in barrels, as the apples are more firmly packed, and the pressure is decreased and better distributed.

Third: The box is a more convenient article for sale, especially for the small family.

Fourth: The fruit will keep better in a box.

Fifth: The financial returns will be greater.

The question of "What shall be packed" is one that causes much discussion but I believe that only the best fruit should be packed in boxes, for the cost of boxes is a bar to the packing of low grade and imperfect fruit.

Three grades are usually made based on the quality of the fruit. First, extra Fancy, being composed of perfect specimens of high color; the second, or fancy, are perfect specimens, but under the standards in the point of color. Third, known as C grade, are composed of all merchantable apples not included in the other two.

However uniformity is of the greatest importance in the pack. The lack of uniformity and size makes it impossible to get perfect alignment and firmness in pack. And a poorly packed box is worse than no pack at all. Also uniformity in color is necessary if the highest price is sought for. A box composed of a mixture of extra fancy, and fancy apples will not command as high a price, as a straight box of fancy apples.

There are two styles, or better, sizes, of apple boxes in use at the present time. One the Oregon Special, ten and a half by eleven and a half, by eighteen. The other, Canadian Standard, ten by eleven by twenty.

In either case the box material should be composed of good material, and of the following sizes. Ends should be of three fourths inch stock, one piece and spruce if possible. Never use paneled ends as they pull apart.

The sides should be of three eighths inch stock; the tops and bottoms of one fourth inch stock, in two pieces. This is to allow for the bulge, and to give a firm but not bruising pressure.

The tops and bottoms should be reinforced by cleats to prevent splitting, and the cleats should be soaked in water.

As accessories to the packing, corrugated or cushioned sides and ends are used, especially for apples that are to be shipped a long distance. Of these the corrugated cushions are cheaper, and in a properly packed box give satisfactory resiliency.

Wrappers, or wrapping paper should always be used for shipping apples. The wrappers form a cushion which protects the skin from bruising; it absorbs the moisture of the apple in the storage, and separates the apple into individual compartments, and thus preventing contact and lessening the liability of communicating disease.

Lining papers, are also used to keep out the dust and odors that are liable to come through the cracks along the tops and sides. The use of individual box labels, is dependent largely upon the amount of fruit shipped. The big shipper should by all means have his own label. This should be attractive, not too gaudy, and distinctive. Having both the name and the address of the shipper. The label is an inexpensive means of advertising, and would yield good interest

on the investment. The consumer looks for the label, as he looks for the trade mark, or name on his clothing and implements. He will also be sure to avoid fruit bearing this label, if the fruit is of low quality, or has been dishonestly packed. Attractive and inexpensive labels, can be secured from the U. S. Printing Company, 817, Board of Trade Building, Boston, Mass.

Before the apple is packed, however, it should be graded. The two operations of grading and packing should never be carried on at the same time, as one, or generally both will be improperly done. For "hand grading," the best practice is to have a table of good size at which to work.

If you are packing boxes you can't use the old style table; that kind of a table is of no use. We have always had a large table on which we could classify the fruit before it was packed or picked over, and then we would have separate boxes to include the different qualities of the fruit, the fancies, the extra fancies, and the culls. Here the fruit is graded both for size and color. The apples of each kind being kept in separate containers. The grader, if he is inexperienced, will need to make use of a grading or sizing board. This consists of a board, in which holes are cut, according to the various sizes as two and a half, three, three and a fourth, three and a half. This device is necessary until the grader grows accustomed to the different sizes, though it is rarely used after the first day, except as a check, for the perfection comes with practice. A good grader can generally supply at least two packers, and can, if necessary, wipe the apples before packing. This operation is to be used only when apples are still covered with spray material, and should never be severe enough to remove the "bloom,"—as the bloom protects the apple from moisture and decay.

From the grader, the apples should go directly to the packer.—and the man, in packing apples should try to eliminate the excess movement and labor.

The packing is best done at a packing table, made to accommodate two or four packers, a very convenient height being three feet to the top of the table. The table should be three by four; on tables of larger size the packers cannot reach the fruit, without unnecessary straddling. The top is usually made of strong burlap, or better, canvas as this is more durable, made so as to hang rather loosely. The top of the table therefore should be sawed on a bevel to prevent tearing of the cover, or bruising of the fruit. Old hose pipe is generally nailed around the edges of the top of the table to prevent bruising and to protect the fruit. The legs should always be firmly braced as they have a considerable weight to support. Some packers make use of a strip of burlap, fastened at one end, and placed over the top of the table. This can be drawn back and clean the table of leaves and twigs.

The boxes are placed at opposite corners, and are supported by inclined shelves. These facilitate packing and allow the packer to see his work. A hopper should also be had to hold the wrapping papers. This should be constructed so that it can be attached to the side of the box; away from the table, thus placing the papers within easy reach of the packer, and still not interfering with the freedom of his movements.

One of the most important parts of the equipment, is the nailing press. A good strong press can be made for about six dollars, that will do effective and accurate work. The press should be of sufficient size to hold a pile of tops, and should be supplied with a shelf back of the box, on which to keep the cleats and nails. The clamps should be so constructed and arranged that they will place the strips true and hold the cleats for nailing. The iron regulating the clamps should be supplied with a ratchet,—so that the operator will not be forced to maintain the pressure with his foot.

The nails to be used, should be cement coated and preferably six penny. These will not pull out after once driven in. The boxes should have four nails at each end,—top and bottom, and two at each end, for each side board, if two are used, or four if a single strip is used.

A stencil for marking grade, number of apples, and variety, should be had.

The packing operation is started by first lining the box with the lining paper. But first of all be sure that the box is clean. The paper should be of such size as to permit a generous lapping at the top and bottom. For this lining paper we generally have a paper that is cut about twenty-six inches long, and generally comes cut about 19 and a half inches wide, and this will just barely fit into the box and allow a generous amount of over-lapping at the top and bottom. Before the paper is put in the box, it should be creased, which can be done by taking the paper at the bottom and making a fold and drawing it across the knee. The paper thus treated will fit into the corners and will not tear when the box is filled or bulges. This crease or fold should be made about six inches from the end, and can be easily done by catching the paper on the ends, thus making a fold, and then drawing it quickly over the knee, and creasing it. The style of pack to be used depends largely on the fancy of the packer and on the size and form of the apple to be packed.

Three styles are most generally used, straight, diagonal and off set. Though the latter is rapidly going out of favor, as there are too many open spaces, and this style packs fewer to the box.

In the straight pack, the rows run straight across the box, and parallel to the sides of the box. This pack includes all three, four and five tier apples, (Tier refers to the number of apples required to reach across the box, when laid side by side). In this style, each

apple touches four other apples in the same layer, except at the sides and ends, which touch only three and two respectively. The straight pack is very neat in appearance, but it is rather severe on the fruit, as each apple tends to be pressed firmly against surrounding apples, rather than into the spaces. They also press directly on the apples in the lower layers. We found the apples in the straight pack, as well as in the others, placed in various ways. Some pack the apple on the side, others pack with stems up; while some have the calyx up.

The best packs, however, should always have the bottom and top layers with stems outwards. In this way, the apples do not tend to bruise as badly and if they do bruise, are not so badly disfigured for sale at the fruit stands, where they are generally displayed with the calyx end up. The four tier is made up of four rows across and four rows deep, in which style we have 128, (8 tiers long), 112, (7 tiers long) and 96, (6 tiers long).

The five tier consists of five rows each way, 8 tiers long, used for 200 pack.

In the diagonal pack, the apples are placed so that the rows, run diagonally with the sides and bottoms of the box. This style should always be used, when possible, as the weight of the apple, is not borne wholly by the apple beneath, and the apples accommodate themselves more readily to the spaces.

These styles of packs meet every need of the fruit packer, and both styles are described, though wherever possible, we should do our packing with as few packs as we can.

Methods of Packing.

After lining the box, the head should be reinforced by means of a corrugated cushion. This prevents chafing of the apples in pressing, and nailing and also excludes dust. These cushions should be used in all cases where the fruit is to be shipped a long distance.

The use of individual wrappers also depends on the distance of shipping. For local markets, apples may be packed unwrapped, but all shipping apples should be wrapped, the layers on the top and bottom being wrapped in papers bearing the name and address of the grower. This printing should be small and compact, so that the whole stamp will show.

I will describe in detail the method of packing the three by two style of diagonal methods of packing, or diagonal pack. An apple is placed at each corner of one end of the box, and another midway between them. In this way, the apples form a broken row across the box, with spaces,—two spaces between them. Neither of these spaces is wide enough to permit an apple of the size that is being packed to slip in between them. They are however, wide enough to allow the

two apples of the next row to slip part way between them. They in turn have three open spaces or the next row, to partially fill. These alternate rows of three and two are carried on until the layer is completed.

The layer will end with two or three apples, depending on the size of apples used.

Between this layer and the next, a sheet of layer paper is used to reduce jarring and bruising and to absorb moisture. The second layer will start with two apples, so placed that they will fit over and down into the spaces below. The rest of the pack is like the first layer.

The third layer is started like the first, and the fourth like the second, and so on.

In the pack, the packer should seek to produce a bulge in the center of the box. This must be gradually secured, starting with the first layer, as the bulge cannot be forced into the last layer.

The practice has been to secure too great a bulge in some packs or in some parts of the country, but as this bulge is only used to secure firmness, a bulge of one quarter on the bottom and one half inch on the top is sufficient. This end is gained by using a slightly larger apple in the center than at the ends, keeping however within the size limit for the style used.

Things to be sought for in the pack, are, First, Attractiveness. This should include both the appearance of the fruit and the carefulness of pack. Irregular lines or arrangement will detract from the value of the package.

Second, Firmness: This is of the greatest importance. The fruit should be so packed that no single fruit has the least bit of play, for this rubbing and chafing, bruises the fruit. However the fruit should not be so firmly pressed into place that it is bruised or dented by so doing. Also too tight a pack will cause the apples to turn, thus throwing the pack into a jumble. However, if the fruit is properly graded, and packed, little difficulty should be met from this point.

Third: Evenness: This is easily secured in the first layer, but the apples should be so packed that when the cover is placed on the box, it will touch every apple. Evenness insures an equalization of pressure, and adds to the attractiveness of the pack.

Fourth, Alignment: Regularity in alignment, lends a finish to the pack, just as irregularity detracts from the attractiveness. The rows should be parallel to the sides and ends of the box, in the straight pack, and diagonal in the case of the offset, and diagonal packs.

Height of Ends: The apple should come flush with the box in the soft apples, and one fourth inch above the ends with the firmer apples. Apples packed below the ends are sure to slip and rattle,

and then become bruised. While apples placed too high are sure to bruise in heading.

Some very large apples however, cannot be packed in regular boxes, and in that case the cover must be raised by means of cleats placed below, as well as above the cover.

It now being 12 o'clock noon, the meeting of the society adjourned to meet again at 2 o'clock p. m. same day, January 21st, 1914.

2:00 o'clock p. m. January 21st, 1914.

The society met, pursuant to adjournment, and the following proceedings were had and done.

The President: The next subject for a paper or an address will be by Prof. G. W. Hood, of the University of Nebraska on "The Economic Importance of By-Products to Nebraska Horticulture."

THE ECONOMIC IMPORTANCE OF BY-PRODUCTS TO NEBRASKA HORTICULTURE.

Prof. G. H. Hood, University of Nebraska.

Mr. Hood: Mr. President, and members of the Horticultural society. In looking up references of data for this paper, I found material was very scarce; in fact as far as I could find material, it was a minus quantity in relation to by-products of horticultural crops. So for that reason I am going to confine this brief paper, probably to a little stimulus, I might say, in increasing the interest in by-products from Horticulture crops in order that we might properly increase our yield from by-products, we might say.

One of the most interesting phases of the world's development is the manner in which the people of the civilized nations are utilizing so many things which were only recently considered worthless. The increase in the population has been one of the reasons why this waste has been utilized in the form of by-products.

Few people realize the great importance of by-products, especially in agriculture and horticulture. This is not only true from the standpoint of financial gain, but also from the standpoint of supply and demand. When we stop and consider for a few minutes the vast fortunes, to say nothing of the great value, from an economic standpoint, to the people of the nation, that have been made, and are being made today from by-products of other commodities, it behooves us to think and think hard. Why is it that farmers and horticulturists are so slow to make use of the waste products. Why is it that the farmer must or at least does take second place in the betterment of his own conditions? Why is he not more constructive and more aggressive? Why not utilize waste products to increase the returns from the land? If commercial enterprises take into account every particle, that comes into the plant and see to it

that something goes out to replace that which entered, but in a different form with greater value, then why does the horticulturist permit so much waste to be removed from his factory without satisfactory returns.

Before proceeding with this discussion let us now turn our attention to the definition of a by-product and then see how we can fit into horticulture and make use of our waste products. Let us consider several definitions: First, a by-product is a secondary or additional product. A something that is produced in addition to the principal product. Again we define by-products as those materials which in the cultivation or manufacture of any given commodity remains over and which possess or can be made to possess market value.

In order to emphasize the importance and value of by-products I wish to briefly review two commercial industries, namely, the artificial gas and slaughtering house industries, in which by-products are the great source of income and at the same time produce commodities of great value to society.

Stop and think about artificial gas. This is common and known to all. Not long ago there were only two products utilized from the coal—the gas at one end and coke at the other. Today if it were not for the by-products between these two extremes artificial gas would be almost prohibitive. Why? Because there was too much waste in the manufacture to continue as prices in other commodities steadily increased. Only a few years ago the thick black viscid liquid which condenses in the pipes during distillation of the gas from coal was not only waste and useless, but its removal was a positive nuisance and a source of trouble and expense. Today the tar is farther distilled and yields a series of valuable by-products of which I wish to mention a few, such as parafine, naphtha, benzol, creosote, anthracene, carbolic acid, naphthaline, and pitch. The basic oils of coal tar are still farther utilized and they are the source of our aniline dyes, and the various hues of which are due to the oxidation of aniline by means of acids. The utilization of these products have brought into being new industries in the manufacture of dyes, perfumes, antiseptics, paving material and fuels. Perfumes, soaps and even confectionary, are now manufactures, which are flavored with what is called oil of bitter almond, but which is extracted from the tar which is the refuse of gas making plants.

To farther show the importance of by-products I wish now to mention the slaughter house. This can be no better illustrated than is seen in our great packing houses of the present day. Some one has said that only the squeal of a pig or the blat of a sheep is lost in the plant. Is this not true? Isn't every particle from the carcass of an animal utilized? It is also conceded that the by-products of

many of our commercial plants are what determines its profits. Stop and think what this means. How much profit are we making from our horticultural products.

Let us analyze farther the packing industry. Few indeed are the industries which have developed the utilization of by-products to such a state of perfection as has the slaughtering industry. From concrete example I wish to more firmly impress upon your mind the value of waste products. It goes without comment that the meat is the chief product. It is no exaggeration to say the animal killed is used from the tip of its horns to the hair at the end of its tail. The carcass as it hangs in the butcher shop represents only 58 per cent of the whole animal on foot. The remaining 42 per cent is waste products utilized by the conversion into by-products. What per cent of our horticultural crop is used and what per cent is waste? Let us look farther; there are as many as 175 different articles made from these waste products, and we might mention only a few as—fertilizer, glue, gelatine, hair, bristles, oil, bones, glands, or membranes, from which are obtained pepsin, thyroid, pan creatin, soap, glycerine, albumen, etc. To farther differentiate we find the hoofs of animals are utilized according to their color; e. i. white hoofs are exported to Japan to be made into various ornaments and imported back as Japanese art objects. From striped hoofs are made buttons, while black hoofs are used in the production of cyanide of potassium with which we fumigate our green houses. The hide goes to make leather which we wear on our shoes. The hair is bailed up and used for plaster on our houses. The blood is collected and made into blood meal which we feed our cattle, and also which is used as a high grade nitrogenous fertilizer. The excrement and dirt from the floor is scraped up and goes into fertilizer. The bones are all cooked and steamed and the resulting product is steamed bone, a fertilizer valued from reason of its high grade of organic phosphate. The fat and meat that accumulate when the bones are steamed is collected, dried and ground and we have tankage, another by-product of commercial importance. The horns are now made into ornamental pieces with commercial value, and so it goes and by a closer analysis of the situation we could still reduce the waste products to produce things of value which a few years ago were all loss.

We must not assume that a by-product is a constant factor in horticulture, for it is easily seen that it can and must change in some crops. In one case it might be a by-product and in another instance it might be the main product. So we cannot say that a given product is always a by-product especially in horticulture, but that the by-product is determined by the main product and crop in question. In whatever position the by-product finds itself it should never-the less form a greater source of income, not only from the financial

standpoint, but from the economical view point, of supply and demand.

I wish now by your permission to enter into a little discussion of some horticultural by-products, but this in no way attempts to complete the list but merely to give several concrete examples to better illustrate their importance as a source of income. I am going to select first the tomato crop, principally because I am interested in that plant, and also because it affords a condition to show how a by-product can be changed into a chief product determined by the individual.

We might consider three phases in the utilization of the tomato crop; first, canning; second, seed production; and third, catsup. Now it is pure folly to say that anyone or all three phases of the industry are chief products or by-products. To farther explain, let us take the canning industry. Here the tomato as a canned product is the chief commodity. But with the canned goods we have a great amount of juice which is either thrown away or used for the production of catsup. In this instance the canned commodity is the principal product while the catsup is the by-product. Let us go farther and interchange the process. Catsup will now become the chief product, and it is made in enormous quantities as a chief product. Now the seeds of the tomato are useless in the manufacture of catsup. In this case the seeds are removed and sold as a very valuable commercial product, and is probably equal in value to the catsup. Yet in many places they are wasted and a source of loss. Here the seeds are the by-product and catsup the main product. This case can still be farther analyzed. Suppose your business is the production of seeds. Now seeds become the principal product and the pulp and juice the waste products. This is exactly what happens in a commercial plant. The juice and pulp are saved, barreled up and shipped to a refining plant to be made into catsup, which is now the by-product. For this example I think it can plainly be seen that the by-product especially in some horticultural crops, is a variable factor and is interchangeable.

Another very interesting and economic commodity that came to my attention a few years ago as a by-product in horticulture, certainly bears mention at this time. This case illustrates one phase as a by-product which can never be anything else and is not interchangeable.

It is well known to all present, especially those of us who are interested in horticulture, from the standpoint of vegetable gardening, or truck farming, that at the close of the season, there are many crops such as cucumbers, peppers, tomatoes, beans, etc., that are killed by a slight frost, and a great amount of green fruit becomes worthless at that time. On a farm of any extent this is a waste, which should be saved and can be made into a commodity of commercial importance. By gathering the green fruit of all the crops such as previously mentioned and converting them into what is

known as mixed pickles the crops become equally as valuable as if they were permitted to ripen. In fact I have known of several instances in which the value of this by-product equalled the main crop, and only a few people even attempted to utilize this material. The mixed pickles composed of green fruit, of the tomato, cucumber, sweet peppers, string beans, and in fact any other crop of second grade, such as cauliflower, etc., are chopped up, cooked and prepared and with the addition of vinegar makes a commodity, that finds ready sale at very remunerative prices.

A well known crop that furnishes by-products of commercial value is the apple. I think perhaps the by-products of this crop are familiar to all, but a review of the subject may impress you with the great value of these commodities.

The apple probably is of greater importance than any other fruit we possess, and several times greater than many. Since I wish to talk about the by-products of this crop I will omit any mention of the fruit because this is all known to you present. Probably the greatest by-product of the apple is cider. I mention this first because this is the first product of the fruit and later I wish to speak of the fermentation of the cider. Cider is in practically every case, a by-product, since the value of good apples are always greater than the cider, so we utilize the windfalls and the third and fourth grade fruit, in its production. The cider has two avenues to the market. One in the form of prepared or treated cider which finds ready sale as a beverage and commands a good price. The other is in the form of vinegar. This is a stable product and a very important commodity. Few people realize the value of this article, but according to the last census report the value of cider and vinegar in the U. S. was almost \$11,000,000 and for Nebraska, \$156,613. According to the production of apples this output should be doubled, and who is losing. Not the consumer, but the horticulturist. If Nebraska horticulturists, do not attempt to supply the state, demand other sections of the country will, and the consumer will not lose anything. Another valuable by-product of the apple is apple butter. So far as I can learn there is but one firm attempting to make this in the state, and that on a very small scale. Now this is a valuable source of income, and is made of waste apples and cider, both by-products, and yet the people go to the other states to satisfy their wants. Why should this condition exist? Still another by-product of the apple is evaporated fruit. This has a ready sale and the demand is increasing. Yet Nebraska goes into the other states to supply her wants. Evaporated apples can be made from inferior stock, and should be a source of income to the orchardist. In addition I might call attention to the enormous waste that occurs in a small way from all our fruit and vegetables which should be utilized, and more profit made by installing a small canning outfit. These outfits vary in price from \$15 to

\$100 depending on the size. They can be utilized to preserve the over-supply at the time of maturity and which cannot be sold in a fresh state.

Few people realize how easy it is to can this material and what profits are obtained when this canned fruit is placed on the market, in a season after the fresh supply is exhausted.

It has been proven by experiment that exceptional perfumes and useful odors that are considered as being obtained from well-scented flowers are made from rotten fruit. The oils coming from waste fruit such as decayed pears, grapes and peaches can be substituted for some of the most costly floral odors after being treated with acids and other liquids which give a remarkable fragrance.

Summing up, I wish to still emphasize the great importance of by-products in horticulture and urge the orchardist and gardner to look about him and make use of the waste products in order to increase his profits and produce a commodity that will be of value to the community.

I thank you.

The Chairman: This paper is open for discussion.

No discussion.

The Chairman: If there is no question upon this paper we will take up the next subject, "Conserving Moisture in Nebraska Orchards," by E. M. Pollard, Nehawka, Nebraska.

"CONSERVING MOISTURE IN NEBRASKA ORCHARDS"

By E. M. Pollard, of Nehawka.

Mr. President, Ladies and Gentlemen: The question of the conservation of the moisture in our orchards is a very important one. I think perhaps there are two phases of the question that might be treated, which are very different in their scope. The first might be termed the proper tilling methods for a young orchard before it come into bearing. Second, the method of tillage that will not only conserve moisture for the use of the tree, but that will bring the tree into bearing at the proper time. The first part of the subject I have discussed, at former meetings of this society, so I will not give that any attention. I will confine my discussion this afternoon to that branch of the subject which relates to the bearing orchard; what cultural methods should be given a bearing orchard to get the best results in fruit. We have just passed through one of the most trying years, I think, in the experience of the oldest apple grower in Nebraska. I believe that a discussion at this time of this subject might be of value. It is in years like this, that proper tillage methods count. When we have a normal season with a normal amount of rain fall, it is not so important how you take care of your orchard. Whether you practice intensive cultivation or permit the grass to

grow is not so material. When you come to a year like the one we have just passed through where in the larger portion of the fruit belt in Nebraska, we went from the latter part of June to the middle of September, with practically no rain at all, and during this time we had over 40 days that the temperature reached 100 degrees fahrenheit or over, that proper methods of tillage in the orchard counts.

Perhaps I might begin my discussion by saying what should be done in order to conserve the moisture in our orchard? Or perhaps I should say what an orchardist should not do in the handling of his orchard. In the first place, and above everything else I would say that no orchardist should permit, under any circumstances, the growing of blue grass in his orchard. I think that is the worst thing that can possibly be permitted in an orchard. The blue grass forms a very compact solid sod, which not only is a great absorber of moisture, from the soil, but it forms a kind of a floor over the surface of the earth, and the rain fall that comes is carried off very much as though you had your orchard flooded. In a year like this, an orchard that is sodded with blue grass, even though it may be properly pruned, and sprayed, could not be expected to produce fruit of much value. So first I would say that we never should permit under any circumstances, the growing of blue grass in an orchard.

Second, I do not believe that any orchardist should permit timothy to grow in his orchard. Although timothy is not as bad as blue grass, yet it forms a sod and should be kept out of an orchard. I should eliminate them both. Whether we should sow in our orchards, clover or some other legume or whether we should follow careful cultivation is dependent largely upon the topography of the ground on which the orchard is located.

To illustrate: Last summer, I visited an orchard north of Omaha, owned by Edison Rich, the general Attorney of the Union Pacific Railway, in this state. This orchard was located right up in the bluffs along the Missouri River. The inclines are so steep that it would be utterly impossible to drive over some parts of it without upsetting an ordinary wagon. In an orchard like that I would not recommend cultivation. If you did, the soil would all wash away. Such an orchard as I have described, should be seeded to clover. Clover is different from any other grass. It does not form a sod. It leaves the soil porous and loose. It also feeds and fertilizes the soil. A bearing orchard that is cropping regularly needs some fertilization, and the clover supplies it. In an orchard located on a hill side where careful cultivation will cause severe washing of the soil clover should be planted. An orchard on level ground or ground that is gently rolling, where the washing from heavy rainfall will not be severe, then I think proper cultivation is preferable to clover. At home we have been cultivating our orchard for a number of years. We use two

different styles of discs. One is the common field disc such as we find on every farm. The other is what is known as an orchard disc. It is reversible. You can turn the disc either way, throwing the dirt to the tree, or away from it. This orchard disc has ten discs, five in each section, and is drawn by two horses. The two sections are separated by about six feet of space. When we drive along a row of trees with the team, the disc being extended you can run one section of it right up along the trunk of a tree without the necessity of driving under the tree with your horses. The limbs remain uninjured and the fruit is not scraped off. The next time we disc the orchard we reverse the disc and throw the dirt the other way, thus the ground is kept level. After making two rounds with the reversible disc we cut out the middle with a common field disc. One man with four horses will do twice as much work as one man with two horses with the orchard disc. By using the two discs we reduce the cost of labor. After we have gone over the ground, and thoroughly disced it with these two disc, keep down the weeds and retain a dust mulch with a harrow. We use the Forkner harrow. It is a spring-tooth harrow, and stands about 18 inches above the ground. It is made in four sections, and each section has a lever that you can raise to dump the weeds, or whatever trash may gather. If there is any trash on the ground, the harrow will act like a rake and gather it up. If you haven't some way to dump this trash, your harrow doesn't do any good at all. This harrow leaves a perfect dust mulch. By going over the ground about every ten days or two weeks, you can not only keep the soil in a perfect condition; but you keep down the weeds and form a dust mulch which conserves the moisture, and plant food for the use of the tree exclusively.

Now I might say right here, before I continue that branch of the discussion further, that, of course, in cultivating an orchard in Eastern Nebraska, we all have that difficulty, whether or not it is in clover or cultivated,—blue grass comes in. I remember while I was a boy my father tried to introduce blue grass. We had a good deal of timber land, rough land, along the Weeping Water creek. Nothing grew under the trees. I remember as a boy of helping my father sow blue grass under those trees, and along the road side. I suppose we sowed blue grass dozens of times, without result. Now it is just the other way. The blue grass comes in in spite of us. We now have to fight it to keep it out. If the blue grass gets a start in your orchard it is not necessary to take a plow and turn over the sod in order to kill the blue grass. I find that if we go into the orchard early in the spring, when the frost is just out, the disc will cut the blue grass loose. If you disc your orchard both ways, and then follow that up with a harrow such as I described, you will kill your blue grass. It may be necessary to repeat this operation in order to get all the sod. This is especially so should a heavy rain follow your first discing.

Now coming back to the question of the proper tillage of an orchard for the conservation of the moisture in the orchard. This year the method of orchard culture I have described was put to the severest test possible. In our home orchard we had a tremendous crop this last season. All of the varieties, with perhaps one or two exceptions were literally loaded with fruit. A great many trees had more apples than they should have carried. We considered thinning, but our orchard is so large, thinning seemed impossible. Consequently we let the orchard go. As far as the thinning was concerned. Now this year, it so happened that when the heat broke, the first of September, and the local showers began to fall in different sections and localities in the state, we were missed. I think the section where we live, was perhaps the last to receive one of those very welcome local showers that came along. But during the spring we had an abundance of rain, and the sub-soil was pretty well soaked down three or four feet, and in some instances more. The long period of drouth and the intense heat, seemed to have conserved all the moisture in orchards, that were not cultivated. Even orchards that were in clover, I am told the results were not as gratifying as they were where clean cultivation was practiced.

I have in mind an orchard in this state and it is one of the best.— It is a young orchard and is planted in clover. This year it had perhaps a half a crop. Last year it bore an enormous crop, and this year the trees were resting, although they had pretty close to half a crop. In our orchard at home, where we practiced this careful cultivation, and the trees were literally loaded down with fruit,—the manager of the F. G. association told me that our fruit run fully as large in size as this other orchard that was planted in clover, and bearing only a half a crop of apples.

Now it seems to me that if there is any advantage in cultivation over the growing of clover or vice versa, that this year, with adverse conditions throughout the growing season, we should be able to tell which plan is preferable. Now I believe that in our home orchard we will follow careful cultivation for a year or two more, then I believe we will seed it down to clover. I believe that an orchard should be permitted to lie in clover for three or four years, because the clover will help to build up and fertilize its soil. Taking into account the conservation of the moisture and the fertilization of the soil, this rotation gives the ideal system. By putting the ground in clover and leaving it there three or four years, you help to feed the tree with plant food, and you escape the necessity or advisability of cultivating the soil.

Now that to my mind is the ideal system of tillage for an orchard that is in bearing.

I do not think I have anything further to offer, unless someone has a question to ask.

Discussion.

A Member: Did you ever try barn yard manure, and note its action upon the orchard.

A. No sir, we haven't. Our orchard is planted on this rich loess soil, and it is very fertile and productive. We have never felt the need of it, although I am quite satisfied that in the oldest part of the orchard, where the trees are very large, it would be a good help.

Q. In the Grand Valley of Colorado, you can see the necessity of manure, for they are paying five dollars a load for it.

A. Well, if we handle our soil as we should handle it, I do not think we should have that necessity; by using the list of various crops that will build up the soil we escape the necessity of a fertilizer.

A Member: How deep would you disc?

A. Well, I think it would depend on the condition of the soil in the orchard. I do not think that the disc should go much below three inches.

Q. You do not think you should weight down the disc and let it go as deep as it could?

A. This year the rains were so heavy and we had so many, that the ground was packed, and we had to weight the disc very much. Or it would not stir the crop of weeds that had come there.

Q. You would prefer discing to plowing?

A. Yes sir.

Q. For what reason?

A. The plow cuts off the roots. The tendency, unless it is kept in ideal condition, is, if you send a man out in the orchard with a plow, he won't run it three inches, but he will run it five, because a plow will come out of the ground at three inches.

Q. In regard to the Forkner harrow, would you put it down as deep as you could, or run it over lightly?

A. I would put it down pretty well, but I would not care to go as deep as the disc runs. The idea I have is to make a dust mulch there. Now your disc stirs up the soil, and thoroughly pulverizes it. It is the best thing to do that I know of. Now when you follow that with the harrow, it is the best thing to get rid of trash and leaves and things of that kind, it is the best thing to preserve the dust mulch which conserves the moisture.

Q. I had a little experience last year. I harrowed and got a hard crust,—maybe that was because I did not get down deep enough with the disc, did you have that experience?

A. Yes sir, last year we had trouble getting down and we weighted our disc all the time. We had some pretty heavy rains

down in our section in the early spring, that packed the soil real hard, and we had to break that up.

Q. What is the name of that extension disc you were speaking of?

A. The Johnson disc, made at Rochester, New York.

Q. A round disc?

A. Yes sir.

Q. Have you ever used the cut-away disc?

A. Yes sir.

Q. How did you like it?

A. I did not like it at all.

A Member: There was just one point I would like to have you bring out a little more clearly. Now you recommended the discing of it to form the dust mulch, which we all know is good. Now on the farms and orchards we are unable to tell in the spring whether or not it is going to be a dry or a wet season, do you recommend this be done every year?

A. Yes sir, you can afford to take a chance, and you can't afford to take any chances not to.

Q. We know this applies to your dry year, but you figure that a fellow is saving in doing it every year?

A. Yes sir. You understand I recommend both systems of cultivation. The clean cultivation and also the clover system. Right on that line: Last spring there was a peculiar condition confronted the fruit growers. We had had a series of dry springs, when there was very little rainfall, and the fungus didn't develop. Orchardists who did not spray, at all, had no fungus. And neither did the orchardist, of course, who sprayed. Now that had gone on for three or four years, and I know of one orchardist in the state, and he is one of the largest, and I will say one of the very best orchardists in the state, that concluded that because he hadn't any fungus for three or four years, that the spray controlled it, and he had the scab all scared out of the orchard, and for that reason he omitted the spray. We had that wet weather come on, and we didn't know what was in store for us, and we had the ideal condition for the development of the fungus, and the result was he had his orchard full of scab. He did not know what was in store for him, and the spraying was an expensive proposition, and he thought he would simply save the expense of applying the fungicide spray. Now if we hadn't cultivated our orchard until the early part of the season, and waited until the drouth came on, we could not have conserved that moisture. I think that the farmer, whether or not he is growing fruit, or whether or not he is growing corn, or anything else, he had better not take the chances.

A Member: Another question, I would like to ask you, was in

regard to rainfall. How soon would you commence cultivation after rainfall?

A. Well, that depends entirely on your soil.

Q. Would you, as soon as the soil was packed, stir that top soil immediately. For instance say, there would come a rain and pack down that dust mulch, would you go in as soon as you could with your harrow?

A. Yes sir, it should be done after every rain.

Q. Do you think a weeder we have for corn would answer the purpose of that harrow?

A. I doubt whether or not it would be heavy enough. We have to stir that soil.

Q. In case of rolling ground, that is very rolling, and starting in with that dust mulch, along comes these heavy rains, and washes away all the soil. Would you try starting with the dust mulch, and running the chances?

A. I would keep the ground in clover if it was that rolling.

A Member: Just one word. I have been in the state almost 48 years. I haven't a large orchard, but I keep it almost exactly as you have recommended here. Whenever the ground is ready, I am into it, wet or dry, and I never lose a tree. Instead of your harrow, I use my common farm harrow, in two sections, and I keep it in a dust mulch. And my neighbors all around there, their orchards are dead. I have peaches, apricots and apples. They are all right. I had it in clover but the pocket gophers got into it, and since then I have cultivated it. I had trouble with blue grass at first, but now I do not allow anything to come in.

Mr. Pollard: I do not say you must use this Forkner harrow at all, but in the large commercial orchard, I think it would be preferable to the ordinary field harrow on account of its ability to get rid of the trash. There is always more or less trash in an orchard, and a common field harrow would simply load up with it, and the moment it loads up, it is no good. You must keep it clean, and the other is a little more satisfactory on that account.

A Member: There is one point I haven't heard brought out, and that is in connection with this subject. At what time in the season would you cease the cultivation?

A. At home our practice is to keep up the cultivation until along about the middle of July. Until we pass the period when the weeds grow so rapidly. This year I think it would have been better had we kept up the cultivation because it would have retained the moisture better. About that time our summer apples began to come in, and our hands were full with other matters and we dropped it.

A Member: I would like to ask the question, what would you substitute for clover in that section of the state where the clover

does not grow. Would alfalfa or sweet clover be all right?

A. Alfalfa would, but I haven't had experience with sweet clover. The main thing is to keep out of the orchard, any kind of grass that forms a sod.

A Member: I would state this, that what little I know of sweet clover, it has a good strong root, and I am afraid it would sponge up too much after you get it seeded all over, and be different from what alfalfa would be.

Mr. Marshall: I would like to say just a word about alfalfa. Now while I have never seen it tested out yet, I would hesitate to put alfalfa in an orchard. Alfalfa will take more moisture out of the ground than almost any crop we grow. Alfalfa will keep green and stay growing when the moisture content gets down to from 6 or 8 per cent, and clover will die when it gets down to 12 per cent. I believe that alfalfa would take the moisture out of the ground and leave your soil actually dryer than a stiff blue grass sod would. I do not believe I would recommend planting alfalfa in an orchard, because it is a deep rooted plant, and it is something that will keep sapping a soil all the time.

A Member: If I were asked what to substitute instead of clover in western Nebraska, I would say substitute cultivation. I do not believe in alfalfa, I am the same as Mr. Marshall. After all these rains we had in December, at the farm, now the ground is found to be saturated six feet deep in wheat fields. But in alfalfa ground, it is only saturated two feet. I do not like alfalfa at all in an orchard.

A Member: I think we, as a society, should be very careful about our recommendations. Everything should be well tried and gone over and known to be all right.

A Member: I would like to ask the gentleman how he would put fertilizer in the sod?

A. Where it is so dry you can't grow any crops like clover, and so forth, I suppose the only way is to put manure on.

A Member: This is the second time I have had the pleasure of meeting with parties who were interested in fruit. They say there is no fool like an old fool. As a boy my uncle was interested in fruit, and I became interested in fruit in that way. I never saw an orchard but what I admired it. I saw an orchard near Omaha of about 55 acres, and I thought that was just what I wanted. I bit off more than I could chew, and for the past four years it has been anything but a pleasure. Well, I would like to speak about something that may be old to all of you but it was new to me. In some of the reading I had understood that in the case of the alfalfa, which was a good plant, to get some of the soil of the sweet clover and spread it under the ground of the alfalfa where it wasn't doing well. In the past year there has been considerable said about sweet clover;

of how much better it was than the alfalfa for feeding, and that the animal would always take the sweet clover instead of the alfalfa. Now you are speaking about conserving of the moisture. Now this fall I thought I would do what I had intended to do before. I would get some of the soil from the sweet clover, and put on the alfalfa soil. And right across from my orchard was some sweet clover. I had the man go out there and dig off the grass or brush and I shoveled up that soil. It was a wonder to me, it was as mellow as ashes, and I could go down three inches and shovel it up as easily as anything. You go three inches from where that sweet clover was growing, and the ground was as hard as any ground you ever saw in your life. Now if the sweet clover, without any cultivating, or care, or attention, will leave the soil in the condition that this soil was for hree inches, isn't that a pretty good fertilizer, and wouldn't ha be a pretty good means of fertilizing your ground, without all of this work of plowing and all that. Now it may be old to everyone of you but I wish that anyone who is here, who never saw the condition of the soil, where that condemned sweet clover is growing, I wish you could see it. And when you go home, I wish you would notice it.

A Member: In Colorado where the sweet clover is growing, it gets very high. It is almost impossible to go in there with a team, and the soil is always loose and dry.

Mr. Benz: I dislike very much to have the professors remarks go on record, condemning that part of the state where clover does not grow. The gentleman made the remark that in that part of the state where clover would not naturally grow he doubted the reasonableness of planting a commercial orchard. I do not like to have that go into the record, because that is not correct. I challenge that statement. I will take him out and show him the land. The McCormick orchard and others. An orchard that is growing 25 miles east of Rapid City, South Dakota, and that is on a high elevated plain. They do not have a plant of clover yet, it is a fine orchard. Another orchard was put there at the time, before the clover was introduced into the country. This is one of the most successful orchards from the great lakes to the northwest. I will admit that clover is now grown in Turner county, South Dakota. I do not like to have the record show that we cannot grow apples where we cannot grow clover, because it is not true.

Prof. Emerson: I think I was misunderstood. I am well acquainted with the Hunter orchard. I have known it for three years, and I was saying nothing about sweet clover. What I said was, I was somewhat doubtful about the commercial orcharding proposition where it was too dry to grow clover unless irrigation can be applied.

The Chairman. I have taken the liberty to set one of our speakers ahead, or set him back, whichever way you might call it,—

Mr. Marshall: This clover question is worth about five dollars a minute, and I would like to continue it. Mr. Shubert here has got as fine, if not the finest orchard, (of course, present company excepted, —I see Pollard looking at me.) that I ever saw. It is down here in this portion of this barren part of the state, in Richardson county. He has got a young orchard there that is in clover now. I believe he cultivated it when it was put in, and sowed it to clover, when it was five or six years old. I want him to tell us about it.

Mr. Shubert: I would rather not. Mr. Pollard has stated his side of the question, and I would really have to take the other side. But from my point of view I would like to inquire of the professor, how much more water would run off from our rolling land, if it was covered by a dust mulch, than it would from our clover fields. If the professor will answer me that—if he has found that out he probably could tell. But I never have seen in our country, any washes, in our clover fields. Clover, I have never seen, even in our cultivated fields where it was in clover and probably half the rainfall, where the water would run off. I have never seen but very little rainfall run off from our orchard. I think that it is very important that the water should go into the soil to be stored up. In my opinion it is very much cheaper to have the clover on the ground than to try and keep it dust mulched.

Of course in some countries it is very important to have a dust mulch, to retain the moisture. But in our country, in eastern Nebraska, we believe it is much cheaper to keep our orchards in clover, since we can keep the sod out of clover. I believe that is about all I would say. But I would like to have the professor answer that question. I suppose our annual rainfall is somewhere between thirty-five to forty inches. How much of the water would run off our rolling country where it would not run off in the clover fields.

Prof. Emerson: I cannot say how much more water would run off from the bare ground than clover, or vice versa. I think it would depend on the lay of the land. I think there would be a bigger run off from bare land than clover. I cannot give you the definite amount, that would run off, but anyhow that is my opinion.

Mr. Shubert: I thought probably you had tested the ground where there were clover fields, and cultivated fields; the amount of moisture that would go into the soil from a certain number of inches of rainfall.

Prof. Emerson: I do not have any figures on that now.

The Chairman: I think we will have to hurry along with the program. I would like to continue this myself, but we have not

much more time. Father Harrison was on for tomorrow, and he asked that he be put on for today. We will now hear from Father Harrison, on "The ProceSSION of Flowers From Spring to Fall."

It is pretty hard to switch off from apples and give you nothing but flowers, but it has to be done once in a while.

THE PROCESSION OF FLOWERS FROM SPRING TO FALL.

By C. S. Harrison, York, Nebraska.

Flowers have become indispensable, both in life and death. The vegetable garden feeds the body, the flower garden feeds the soul. What a contrast in funerals between the present and the past. Sixty years ago a funeral was the most somber thing that we could imagine. The coffin was home made, filling the house with the sickening odor of paint and varnish. Everything black and somber. This month we laid away my beloved sister. The room was richly decorated with the gifts of friends. Flowers on the beautiful casket, flowers everywhere, emblems of the everlasting spring into which she has entered. At the grave was a mass of flowers, by the modern appliance of covering the coffin which is covered with beautiful blooms. It slowly recedes from view, and our last look at the loved one, is a vanishing among the choicest things earth affords, and that is the last. Death is robbed of the sting, and the grave of its terrors; instead of waiting for that awful thud of earth on the coffin, and the filling of the grave, the mourners retire with the memory of that beautiful exit.

Flowers work marvelous transformation in character. Years ago I saw in Chicago, a drunken Amazon being taken to prison. Six policemen had all they could do. She was the strongest woman I ever saw, she was making ribbons of some of those fine uniforms. Finally they landed her, and she was like a caged tiger in her cell. A quiet little woman saw it all and pitied wild Mag. She went to a florist and bought a beautiful bouquet of fragrant roses, and they were delicately done up in a nice box with tissue paper. She went to the jail and wanted to see Mag. They told her it was no use, that she would be torn in pieces, but she went in. The demon woman saw her, and with terrible oaths she said, "You get out of here, or I will throw you out." "No," said the visitor, "I love you Mag." "You lie" said Mag, "There don't anybody love me, the whole world hates me, and I hate back again. Now you get out." "Not yet" said the quiet little woman, "See what I have brought you first." Then she untied her package and when Mag breathed the sweet perfume and saw those lovely blooms, her woman's soul came to her, and she wept like a child. The beauty of the lord had con-

quered, and the visitor put her arm around her neck, and their mingled tears watered those flowers.

Interest the boy in the most beautiful things the world affords; don't expect him to get all his education in the barn yard, awaken his interest in the front yard, and you will have a gentleman and not a boor. Let the daughter associate with the most beautiful and charming and best dressed companions the world affords, and she will be pure and refined.

Every family should have their own flowers. There should be a succession of them; a procession of beauty from early spring, till the late frosts of autumn. First come the crocuses, tulips and hyacinths. These should be planted in October; if the ground is rich, you can leave them two or three years. The columbines are a numerous family, and they are very charming. They have a marvelous variety of color; some are early, others like the chrysanthemums are very late. The golden chrysantha is the latest of all, and for that reason it does not cross with others. There is a wide field for progress among these flowers, from a bed of mixed ones you can select one of rare beauty. You must isolate it, and in blooming time, cover it with netting, and carefully save the seeds, and after a while you can secure a new type. I love a mixed bed with a marvelous blend of color, for nature seldom makes a mistake in her picture.

The great oriental poppy is a splendor. It is a flame, and a large bed of them is like a miniature sea of fire, though not satisfactory as a cut flower, they are among the most showy for out of doors. It is difficult to raise them from seed. They must be planted very early under a screen. The seeds are very small and should be covered by netting. Keep the bed moist while they are maturing and leave the screen on all summer.

We come to the iris which is the coming flower. First: Because in the large collection of hundreds of varieties there is all the colors of the rainbow, and the widest range of beauty of any other flower family. Some of the newer sorts defy description. Their rich veining and tracing, those delicate tints; their brilliant reflex like that of the finest silk; the blending of these harmonious colors, make them peerless. Added to this many of them have a most delicious fragrance

Second: They are very reasonable in price, and increase about ten fold in two years.

Third: There is always an unsupplied demand for flowers for decoration day, when the nation honors her dead, and all fall into line, to pay tribute to their own departed one. In all our north land these are ready to show their sympathy.

Fourth: By careful selection, the wife can go into her garden, and cut a bouquet, fresh with the morning dew for two, months in succession. First come the brave little primulas, then the crimeans, then the intermediates, or hybrids. There is a narrow gap here which

is being rapidly filled. We have already originated six new ones of these intermediates, which are of exquisite beauty varying in color from purest gold to royal purple. Fifth: It is the most heroic flower of all. For two years we have had fearful weather; last summer we had thirty days with the mercury soaring to 100 and up. The hot winds were blowing like the blast of death. Pansies wilted, phloxes fainted, but though we had but two inches of rain in five months, the brave iris never winched. We dig and ship in August. The ground was perfectly dry but the iris roots were fleshy and plump. They had the faculty of gathering the moisture and holding them. The Japanese are worthless in the west, let them alone. The German and closely allied group are fully as beautiful, and need no coddling either summer or winter. There is an increasing family of the Siberian type. There are thirty kinds in this group, and more to follow.

One great trouble in introducing them is they belong to the flag family. A woman bought some, and berated the florist because they were nothing but flags, just the kind that grew in the swamps back east, and in Minnesota marshes. A very wise woman says "I love flowers, but don't want to be imposed on. If an iris is a flag, I don't want it. You a horticulturist and can't see that they are nothing but flags." You show her the *Macraathas*, with glistening purple petals, three inches across, introduced from Asia-Minor; you tell her of the Grand Monsignor, which is a perfect marvel of splendor, with its combination of colors; you show her the Fairy, a queenly beauty and every bloom opening a vial of perfume, and loads all the air with a delicate odor of peach blossom. You show her the radiant Perfection, the marvelous Cypriana, and yet she says, "Can't you see?" "They are nothing but flags, they grow in swamps." Not all, only a few. Most of them would die in a week in water. In the Black Hills, I saw some beautiful ones, growing on stony hill tops, where the mercury often falls to forty below zero, and the hills swept bare of snow. But these flowers are bound to win. Their fascinations are resistless. I am a busy man, but when my iris are in bloom I go visiting them, drawn day by day by their matchless beauty and they seem glad to see me, and put on robes of splendor, fairer by far, than the raiment of princes. We keep 180 to 200 kinds, and know something about them.

The peony is the next. This flower was named from Dr. Faun, a famous physician, who ministered to the heroes at the siege of Troy. He first used the roots for medicine. There are about 30 native sorts. Our modern ones are mostly from the Chinese *alba flora* peony. I need not speak of this wonderful beauty. A field in full bloom is one of the finest spectacles the world affords. It is like a section of paradise let down to earth. Those glorious blooms seem to weave a carpet of splendor fit for the touch of angels feet, while over the

whole, there float billows of fragrance. Generally they are free from disease, but of late importations from France, have a mysterious plague which hampers their growth, and prevents their blooming. The last peony manual speaks of it. I have had specimens ten years and they never got well. They are the most uncanny looking affairs. Club footed with no fibrous roots, to feed the plant. Cut off all the roots first and just plant the bud, and you may dodge the difficulty.

Every effort has been made to cure them. One grower used barrels of lime to no purpose. I have planted them in slacked lime to no purpose. I have planted them in slack lime, and that didn't cure. In sheer desperation, I put about a tub full in strong lye. that killed the disease and killed all the plants. In buying never accept any of them, they are non-merchantable. People are sometimes alarmed by finding great nodules on the roots. These are called nematodes. They are perfectly harmless. You will find them growing on the most robust plant. They are much like alfalfa nodules, and I think rather help than hinder the plant. One great trouble with poenys is they will take their time to come to their best. Take Karl Rosenfield, for instance. This is probably the best of the deep reds. It bloomed gloriously at home where it was born, but it has been a sore disappointment when sent away. I lived one hundred miles from where it originated, and for six years never got a bloom. What was the trouble? When we get a valuable plant we want to multiply it as fast as possible. And so we cut up and divide and replant, as fast as it will bear, and faster. Now the more robust and grander the peony the more time it takes to bloom. This one should have 4 years to come to its best. The Baroness Schroden, one of the finest on earth will often bloom freely the first year. I saw a row of them in full blast among many others, that had hardly a bloom at the same age. The worst abuse I ever had was from a man who bought some high priced ones, and because they did not bloom the first year, he made the air thick with maledictions. Then he sent me some blighted buds. There had been a heavy late frost that nipped them, and he seemed to think I had done it. When there is a danger of a late frost, throw burlap over your plants, for some of them cannot stand the strain. There is a great call for peonies, we have to buy about a thousand dollars worth a year, besides all we can raise. Many eastern firms are strained to the limit to fill their orders. There is a great change of late years in the quality grown. Most leading growers are discarding the old sorts, and raising only the best. Too many kinds have been thrown on the market. Father Terry named 100 when he should have named only 10. Another prominent grower has placed several new ones on his list which should have remained in obscurity. We have originated about 30 new sorts. I never have seen finer ones, anywhere. But we dare

not put them on the market until more fully tested. Young peonies will lie like the mischief. They promise great things, and won't make good. I had one glorious variegated double one, which was a splendor, but ever after it bloomed, an insignificant single one, not worth ten cents. I had one that bloomed at first, prize gold, and then ever after it was a muddy pink. I had one immense radiant one, the finest by far among 1000 blooms. There, said I, is \$100, but it never kept its promise. There is dishonesty among peonies, and that is one trouble with propagators. They will have a fine new one, and without waiting to see whether it is honest or not they will go to propagating it. They multiply a lot of sore disappointments. There are 2500 named sorts—nine tenths should be eliminated, for we have now some splendors. Mons Jules Elie; Margaret Gerard, Livingston, and a large number of others are of exquisite beauty and fragrance. It costs to get them started. In multiplying, don't cut the roots too small. It discourages the plant, and it takes years to attain blooming size. You can propagate as fast, and get better results by not being in such a hurry yourself. For you will find out sooner or later you can't hurry a peony.

These radiant flowers have come to their own. Last June there was a notable wedding in Minneapolis. A daughter of one of your leading lawyers was married. The home was decorated with 2000 radiant and fragrant peonies.

PHLOX.

This is a very showy flower, for the wedding and so forth. If you use it as a cut flower, you must take the precaution to shake it well, and shatter off the loose flowers. The phlox loves cool moist weather. Minnesota is the ideal place for it. Take one of the larger sorts with single florets, the size of a dollar, and in hot dry weather they will be no larger than a quarter. They can be multiplied with great rapidity.

Save the seeds before the pods open. If they do this, the seeds will fly quite a distance. This is nature's provision for extending them. Keep the seeds dry, and crush the pods, and then you can plant them. If you wish to clean them, throw them in a tub of water. The seeds will sink like shot, and the chaff will rise on the top. Dry them immediately, if you are not ready to plant, or if you wish to sell them. Plant always in the fall. They will not grow if planted in the spring. Cover with about a half an inch of light earth, or sand, and see that they do not dry while germinating. They love the slush and slop of a wet spring, and glory in adversity. Keep saving seed of the best, and you will stand a chance to produce new ones better than you can import. Most of these coming from Europe, cannot stand our hot dry summers, and often they will blight out of existence in wet weather. They seldom reproduce themselves from

seed.

You can multiply rapidly from the roots; take a sharp spade, run it straight down half way, and then turn it square and cut off the roots. The roots you leave in the ground, will put a head on themselves, and there will be a great mass of them. Seedlings bloom the first year, these do not.

Take them up in the fall and plant them out, and next year you will have fine blooming plants. You separate the shoots you take up, and plant them out, and in a year, you will have fine showy plants. People have a wrong idea, they want either two or three year old clumps, or very large single plants, with a great mop of roots. Such a mass of roots are in each others way, and rob each other. A clump soon gets woody and eliminates the fibrous roots; we have early and late phloxes and the time of blooming reaches from June to November. The *Baltonia* is a very robust plant which should be placed in the back ground. It is a very late bloomer with an aster like flower of snowy white. It blooms when there are but few other flowers, and is in demand for funerals, and weddings. To supplement perennials, we have asters, gladiolas, dahlias, cannas, and I have not time to dwell on them. We have also one hundred and fifty kinds of lilacs which are hardy in the northwest; at least a dozen sorts of *Philadelphias*, or *syrngas*, and 18 kinds of *spireas*; a large family of *rhododendrons*. If you must have them, plant the pictures, and you will get about the same results, or hang them up where you can look at them. With such an immense family to select from; and with such a congenial climate as the northwest affords, you can surround yourselves with a splendor which will be prophetic of the "glory to be revealed."

The Chairman: I will have to tell you where my interest in horticultural matters took its rise. A good many years ago, I dropped into the Horticultural society, and I heard Father Harrison telling about flowers, and I think my interest in horticulture dated from that time, because I went home and told my wife and daughter that I had found a man who talked more interesting upon flowers than any other man I ever heard. We will now hear a paper from Mr. Spencer,—F. P. Spencer of Randolph, Ia., on the subject, "How We Can Get the Consumers to Eat More Apples."

HOW WE CAN GET THE CONSUMERS TO EAT MORE APPLES.

By F. P. Spencer, Randolph, Iowa.

Mr. Spencer: In our recent State Horticultural meeting held in Des Moines, in December, it was our high privilege to have with us, your secretary. I was under the impression we treated him very fair, but evidently he had a grudge against me, or he would not have assigned me such a subject as this. It is a subject of great interest,

to all, and of deep elucidation, and I do not hope to give you anything new upon it.

To the apple grower, it is a most pertinent question, and I may say, like a great many others, more easily asked than answered. Had this question been propounded to me, I would have answered it promptly by saying I didn't know. Given my choice, I would have selected this for the foundation of a short article, but like a good soldier, will obey the order of your secretary, as far as I may be able.

An apple grower in Washington once said he could grow and prepare for market, a box of choice apples for one dollar, but when the same box of apples cost the consumer in Chicago three dollars, he thought there was something radically wrong in the methods, used in reaching the ultimate consumer. When all is said, the final aim of the producer of any article for sale is to reach the consumer as directly and with the least expense possible. The up-to-date merchant who desires to stimulate a demand for his merchandise usually proceeds by skillful methods to make an attractive display, and also invoke the aid of the newspaper to help him in his undertaking. I would also call your attention to the great amount of money spent by the selling end of the orange growers contingent in advertising. I am not conscious of having my appetite for oranges quickened to any appreciable extent but it goes without the saying they felt the results obtained were at least partially commensurate with the expense, else they would have ceased.

The Italian street fruit vender clearly shows by his actions that he recognizes the utility of an attractive display; he also accentuates the natural attractiveness of the fruit, by proceeding with a deftness only acquired with long practice, to spit upon the apple and then vigorously polishing it upon the sleeve of his immaculate coat. But perhaps this is a digression.

I once heard a story wherein a "Down and Outer" tried to sell what he termed an insect exterminator promising his purchaser a full demonstration, showing its effectiveness. This remedy consisted of particles of decayed wood pulverized and put up in attractive packages and his instructions were first catch the bug, grasping it firmly by the throat, choking it until it opens its mouth, when a liberal dose of the specific crammed down its throat would effect the demise of the afore-mentioned insect. I do not wish to be understood as one who indorses the above method when trying to stimulate the consumption of apples in fact after studying the matter a little, I am inclined of the opinion, that it is fraught with more or less personal danger to the party applying the method, and would suggest when trying the plan, that good judgment should be used in the selection of the victim.

Mr. Lincoln, once said, "The Lord must have loved the common

people because he made so many of them," and the great body of the people in this country to which this title will apply are the ones we must depend upon to consume the greater part of our apples, and as price and quality are factors, effecting the sale, we must consider, how best they can be brought about.

In conversation with my friend Mr. C. G. Marshall, of your state, along this line, he advanced an idea tentatively as follows, "Establishing on the part of the fruit growers, association central selling points, such as Lincoln and Omaha, where the great common people could buy any quantity and I may add quality, they might desire from a nickle's worth to a car load." After having this conversation and after having this question assigned to me, the conversation came to my mind, and impressed me as one having the germ of the idea, I will add further that a somewhat extensive observation has convinced me that in every considerable town, can be found a live, wide awake merchant who by proper inducements might become a co-worker. Of course, it is apparent these plans are expected to eliminate the "Leak that sinks the ship," or the almost restrictive price asked the consumer, and one entirely out of proportion to the amount received by the producer. The question of the survival of the fittest, is daily becoming more paramount, and the growing and selling of apples is vitally affected by this question. The "fittest" will be those using care in the handling of their orchards, pruning and spraying, also attractive packing, but do not think I wish to appear as an advocate of the afore-mentioned Italian's methods.

In the December number of the American Magazine, is an article entitled, "A New Cure for Drink" the author of which was a saloon keeper for twenty years standing, who, although a tetotaler, as are also his two grown sons, attributes this fact to their practice of eating freely of all varieties of fruit, especially the apple, and says further as a general rule, with rare exceptions, a regular consumer of fruit was not a very good customer, while on the other hand, a typical booze fighter seldom touched fruit. My observation confirms the above theory to a considerable extent. Reasoning from this, why could not the Temperance advocate be made an efficient instrument to help solve the problem by adding a Grimes Golden or Jonathan apple to his other weapons and hurl them, figuratively of course, at the head of the—or perhaps I should say mouths of his hearers, thereby killing two birds with one stone, and that stone an apple.

In conclusion will say the necessity of producing good fruit and placing the same in hands of the consumer with a minimum of expense in general terms seems to me to partially answer the questions, and leaving the details to be worked out along practical lines, conscious of offering only a slight and at best a purely tentative solution of this much talked of and vexed question will bring these remarks to a close.

Discussion.

Mr. Pollard: I do not know that I have anything particularly to offer in regard to this subject at this time, excepting this. There are a number of the members of the horticultural society, who have formed within the last year, a marketing association for our fruit. All kinds of fruit. Now then, we have gone through one of these experiences, and passed through one season. We have found that right here at home, in Lincoln, in Omaha, and in the towns and cities along the river, and out in the state, the people, very largely are eating apples, but not Nebraska apples. Now it seems to me that this is a matter that probably might be taken up by the horticultural society. The function of the Horticultural Society, is educational in its character. It must necessarily be so. We are told as a commercial organization by the large buyers in the east who buy apples all over the United States, that apples in this section along the Missouri river, on either side,—say fifty miles east and west, and from Council Bluffs on the north to St. Joseph on the south, produce apples of finer texture and more delicious flavor, with a longer keeping quality than any other section in the United States. Now these men have reached that conclusion, not on account of any fancy, not because they live in this section, and have to brag about the fruit grown in this region, for they don't live here. Men who are looking at this question from a purely economic standpoint and men who are desirous of getting apples on account of their quality, to sell to people who demand quality. Those men are coming to this region to get apples to sell to people, because they themselves demand quality. It seems to me that as growers of fruit in this region, that we should wake up and say something ourselves about the superiority of the flavor and the texture of our own fruit, so that our own people, here at home may know something about it, and may consume Nebraska apples, and not permit outside apples to take their place, as has been done for the last five or six years. I believe that we growers are to blame for it more than anybody else. The facts are that we, with one or two possible exceptions, every single one of the growers of fruit in this state who are exercising care and patience in the handling of their orchards and packing of their fruit, have been shipping it to points outside of Nebraska, and our own people at home have been eating the culls, and windfalls, and now then it seems to me that we as members of this horticultural society, that this society might well afford to take up the question of advertising Nebraska apples, with the object of getting the Nebraska people to eat Nebraska apples, and point out the superiority of our fruit, and tell them why the people down east come to Nebraska to buy our apples, on account of its long keeping qualities and its fine flavor.

During the noon hour, I was over in the auditorium looking over the fruit, and I met an old friend of my college days. I had not seen him for 15 years, he is one of the professors of the University; and he says, "Pollard, is it true, as we are told by the retailers here, that Nebraska apples won't keep? I go in a grocery store and ask the groceryman for a Nebraska apple, and he says they won't keep. We go down to Washington and ship in apples from there, because they will keep." That is what my friend said, and yet the people in Chicago and the other cities in the east, come here to get our apples, because they will keep, and they hold our apples grown in this region until the last. Why? Because they are long keepers. Now then, I did not want to make a speech, but when I get started on this subject, I can't quit some way. I do think Mr. President, that this society might well afford to take up this matter. Now I have not any plan, but I just throw out this suggestion, and I am not sure but what it would be a very good idea if a committee was appointed to see whether some of the funds that are in the hands of this society might not be used in an educational campaign to advertise Nebraska apples, among the home people, instead of having our own fruit go to the eastern people and having our people at home receive our poorer apples.

Mr. Harrison: One reason why we do not eat Nebraska apples, is that we can't get them. I go to York, and can't find a Nebraska apple, and I say, "Don't you get them" and he says, "We can't." And so we go to Washington and ship them in. They keep just about like a door knob, and they are just as luscious too. We tried to use them last winter, and we doctored them up with lemon juice and everything we could get, and we could not use them then, and so we took them over to a poor family and because they were in that condition they used them anyway. Then by a sleight of hand trick, we managed to get a barrel of the Pollard apples, and we ate them up as fast as we could.

The Chairman: You will have to forgive our fellows over here on this side of the river, for indulging in so much oratory about our apples.

Mr. Spencer: I grow some apples, and I have them to sell. Now a man comes along, and he says, "Here, I want to buy a load of apples. "He looks at mine, they suit him, and the price and terms are arranged, and he buys the apples, and that is as far as it concerns me. I let him figure out the rest of it. That is what I raise apples for, is the money in it. I can't tell him to ship those out to York, Nebraska, or Sidney, Nebraska, it is the other fellows business to distribute them. The advertising of this Nebraska apple if it has all the merits that is claimed for it, and the same with the Iowa apple, if it can be advertised so as to get the producer and consumer closer

together, that will solve the problem, but I do not know, or pretend to say how it can be done.

Mr. Reeves: Now you know when these Iowa men come to talk, you must look out. There is one way you can help along this line, and that is by taking a lesson from some of the Western sections. I spent some time in the vicinity of one of the towns of a western section, and learned that instead of putting their poor apples on the local market, and shipping all the good ones, away, you could hardly buy poor ones from the growers; they were opposed to selling poor apples for consumption, even at home to their neighbors. Instead of doing that, they either gave them to their neighbors, or hauled them down to the cider mill, and had them changed into cider or vinegar. Now I know how it is in Nebraska, because I live in Iowa and it is just across the river. We try to get rid of our poor apples among our neighbors; you have been doing the same thing here. I know it, because a lady over here in the auditorium today said to me or in my hearing, "I wonder where these apples came from?" and I said, "These are all Nebraska apples." And she said, "you can't make me believe that. I have lived in Nebraska a great many years, and you can't make me believe that." She said, "we can't buy these from the orchardists, and if they grow them why don't they sell them?" Mr. Pollard perhaps grows a few of them, but the rest of them they get them from some other place." So do something else with your poor apples instead of giving them to your neighbors or selling them. Make all the fun you want to, of those western apples, but people do eat them, and like them, and they are good apples. I have heard remarks in Iowa that Iowa apples are the best apples in the country, and in Oregon they say the same thing there, and in New York, they think there is no apple in the world like the New York apple, and in Maine the same way, and then I was talking with some of those Mormons down in Utah and they knew that Utah apples were the best apples there were in the world. So my friend Spencer and I can overlook the matter of your saying you grow the best apple in the world. Nevertheless it is all right to declare it, and it is the truth that you grow just as good an apple as they do anyplace on earth. And you want to work up your home market, on that basis, and it will be to your profit and in that way you will eat more apples.

Mr. Pollard: Before we get away from this question I am going to make a motion. I will confess I am not familiar with the status of the treasury of our society, or just what we can do; or whether or not there is anything we can do in the way of advertisement. Of course that costs money. But we should do a little educational work along this line, and I am going to move that a committee of three be appointed to take up this matter, and confer with the executive

board of the society, and see what can be done along this line, that has been discussed here.

Seconded. Carried.

Mr. Marshall: As you all know, we have with us, several visitors from Iowa, and they are distinguished fruit growers and citizens of Iowa. I move you they be made honorary members of this society. Also the gentleman from Missouri, Mr. Grigsby.

Seconded. Carried.

Mr. Spencer, Mr. Reeves, Mr. H. R. Rice, Prof., C. E. Bishop, Prof. F. M. Harrington, Prof. F. J. Maney, Mr. Sorebar, and Mr. Grigsby elected to honorary membership of the society.

Mr. Marshall: Is anyone outside of the state eligible to active membership in this society?

The Chairman: There is nothing to prevent it that I know of. I will announce that committee a little later in the session. The next paper or subject before you, is by R. W. Dawson of the University of Nebraska, upon "Birds that Harm, and Birds that Benefit the Fruit Grower."

BIRDS THAT HARM AND BIRDS THAT BENEFIT THE FRUIT GROWER.

Prof. R. W. Dawson, University of Nebraska.

THE CHICKADEE.

From among the many species of birds which occur in the orchard, none are more worthy of our attention than the common chickadee. This little bird is at once recognized by the cheery and often repeated call-note, "chickadee - dee - dee," or by its clear musical whistle "pee - wee," with the second syllable whistled about a tone and a half lower than the first; this latter call-note being one uttered most frequently during the cold, stormy days of early spring.

In addition to its pleasing notes the chickadee possesses an attractive individuality. The throat and top of the head being lustrous black, in contrast to the sides of the face, which are pure white, while above the general color is a bluish gray or slate color, and below whitish strongly tinted with buff on the sides. The motto of his activities has been aptly described as "any old side up without care."

The chickadee is one of the comparatively few birds which remains common both summer and winter, and it is this fact considered in the light of its food habits which causes us to rate it as one of the most beneficial birds of the orchard. Even in winter, over half of the chickadee's food consists of insects, and their eggs, while in the spring and summer as high as 98 per cent of the contents of the chickadee's stomach have been found to consist of

insects. It is, however, in the fall and winter that the chickadee does its greatest service in the orchard. Careful analysis of the stomach contents at this season of the year, show that on an average 20 per cent of the food eaten consists of the eggs of plant-lice or aphids, as many as 450 of these eggs being found in a single stomach. The aphids are placed among the seriously destructive pests of the orchard. Their eggs are little molested by other birds or natural enemies, and the adults are not controlled by the arsenical sprays used in the orchard, hence the chickadee is rendering a peculiarly valuable service in the destruction of these insects. Scale-insects are also eaten to some extent. Four chickadee stomachs examined in Michigan showed a total of 77 specimens of the oyster-shell bark-louse, which is one of the common, destructive scale-insects of the orchard.

Some valuable data has been recorded on the food habits of the chickadee in Massachusetts. (Bailey, Annual Report of the Massachusetts State Board of Horticulture for 1895.) During the winter four chickadees were shot in an orchard badly infested with the fall canker-worm, and their stomachs examined for eggs of that pest. The first contained 273 cankerworm eggs, the second 261, the third 216, and the fourth 278, making a total of 1028 eggs. Later in the season after the cankerworms had become full grown and the moths were beginning to issue, four more chickadees were taken in the same orchard to determine the extent to which the chickadees were destroying the female moths. The four stomachs contained respectively 41, 13, 27 and 19 female moths. These moths were in turn examined to determine the number of eggs which they would have deposited, and their ovaries showed an average of 185 eggs per moth. Thus, on the average, each of the chickadees examined had destroyed the equivalent of about 5,000 eggs of this destructive orchard pest at a single meal.

Granting then, the useful nature of the chickadee, why not have your neighbor's chickadees work in your own orchard? This you may readily have with the expenditure of a minimum amount of time, energy and money. For if during the fall and winter unsalted bones with a little meat or fat still adhering, or with the marrow exposed are hung about in the orchard, out of the reach of curs and dogs, the chickadees will be attracted in numbers. Pieces of suet wired securely to the smaller limbs are also most excellent for this purpose. After the little chickadee has made a good, morning meal from the food thus provided, he will spend the remainder of the day in the orchard eating eggs of plant-lice, tent caterpillars, webworms, cankerworms and even scale-insects. When fed regularly the chickadees become exceedingly tame and with a little time and patience may readily be taught to come and eat from your hands. No more charming pet can be found for the children on the farm, not one that will

arouse a greater interest in nature study, than a pet chickadee. If fed throughout the winter, these same chickadees will probably remain and nest in the orchard. This is especially true, if suitable nesting places are provided for them.

In nature the chickadee nests in deserted holes of the downy rotten limb or old fence post for himself. However it readily accepts woodpecker and house wren, or occasionally digs a hole in some bird boxes, old varnish cans, etc., if placed in suitable places in the orchard. The best bird box which can be provided for the chickadee is made by cutting a section six to twelve inches long from a rotten limb and nailing a piece of old shingle or bark across the ends. A hole about an inch in diameter should be bored in the side and the "box" fastened to a limb by a wire. If the hole in the side does not exceed 1 or 1½ inches in diameter and the house is so fastened that it will swing just a little bit, the English sparrow will probably let it alone. Otherwise the chickadee will have to look elsewhere.

THE ENGLISH SPARROW.

The English Sparrow undoubtedly deserves to head the list of birds that do more harm than good; the points of evidence against this bird being numerous and convincing. While the English Sparrow is not primarily an orchard bird, yet it often does considerable injury to the orchards situated close to cities and towns.

In the spring when the seeds and grains upon which the sparrow commonly feeds become rather scarce, it frequently turns its attention to the buds of various trees and small fruits. The greatest injury being done to the following fruits, and usually in the order named: Peach, pear, grape, plum, cherry, apple and currant. Later in the season the fruit is also more or less seriously injured, this being especially true in the grape arbor. However, apples are sometimes picked extensively, thus rendering them worthless for the market. Mr. F. M. Webster of the U. S. Department of Agriculture records the fact that the sparrows practically ruined the apples in his own home garden where he had several trees representing three different varieties. He estimates that the sparrows ruined three-fourths of the crop.

English Sparrows undoubtedly eat a few insects, and also feed them to their young, but they also use a considerable amount of grain for this purpose. The writer recalls an occasion upon which he examined the contents of several stomachs of half-grown sparrows taken from the nest, and found nothing but wheat, and that in considerable quantity.

An idea of the number of insects eaten by the adult birds may be gained from the following figures taken from a report of the U. S. Department of Agriculture on the English Sparrow. (Bulletin No. 1, U. S. Dept. Agr. Div. Economic Ornithology and Mammology.) A tabulation of the results obtained by the analysis of 2,455 stomachs

taken from sparrows collected in Europe, the United States and Canada, during every month of the year shows that only 14 per cent of the stomachs contained insect remains. Some even more striking data has been given by Professor C. V. Riley, who examined 338 stomachs from sparrows taken in the city of Washington during a season when four different species of insects (the Tussock moth, Fall Web-worm, Bag-worm, and Elm-leaf beetle) were doing serious damage by defoliating the stand trees of that city. Only two specimens of one of these species, the Fall Web-worm, were found in all the stomachs examined, thus showing conclusively that the sparrow was doing nothing at all to control these pests. On the contrary by displacing other insectivorous species, the sparrow was in part directly responsible for the damage being done. From the 228 stomachs examined, 47 contained harmful insects of other species, 50 contained beneficial insects, and 31 contained insects of no economic value.

Perhaps the most serious charge made against the English Sparrow is that it displaces and drives away some of our most valuable insectivorous birds. Such birds as Wrens, Chickadees, Bluebirds, Purple Martins, and even Downy Woodpeckers and Flickers might readily be induced to nest in our towns and orchards in considerable numbers by providing suitable nest-boxes for them, were it not for the fact that the sparrows promptly appropriate the boxes and drive the other birds away. It is not surprising, then, that after an extended and exhaustive study of the sparrow problem, the U. S. Department of Agriculture in concluding its report condemns the sparrow in these words. "The English Sparrow is a curse of such virulence that it ought to be systematically attacked and destroyed — — — —."

The complete extermination of the sparrow is an utterly hopeless task, but its numbers may be greatly lessened locally on your own premises. If during the severe cold weather, when the ground is covered with snow, a small plot of ground is cleared and sprinkled with wheat for a day or two, the sparrows of the whole neighborhood will congregate there to feed. Then if a small feed of poisoned grain is given to them, the whole flock will be destroyed in an hour or two. A year ago this winter the writer tried this plan to rid himself of a flock of sparrows that congregated to feed in his chicken yard. A tablespoonful of poisoned wheat settled the problem for the remainder of the winter. About 80 dead sparrows were picked up an hour or so after the grain had been placed out for them, and those that were not killed gave the place such a bad reputation that it remained almost entirely free from birds for months afterwards.

Great care should be used in handling the poisoned grain, and all that remains on the ground should be at once destroyed. The best method for preparing grain for this purpose is as follows: Put one-eighth ounce of strychnia sulphate into three-fourths of a gill

of hot water and boil until dissolved. Moisten 1 1-2 teaspoonfuls of starch with a few drops of cold water, add it to the poison solution, and heat till the starch thickens. Pour the hot poisoned starch solution over one quart of wheat, and stir until every kernel is coated and after the moisture has all been taken up by the wheat, spread it out and let it dry thoroughly. It can then be placed in a mason jar and kept indefinitely.

THE MOURNING DOVE.

The Mourning dove is an abundant breeder and summer resident of the orchard. While in no sense an insect destroyer, yet it is an unusually valuable bird, and unfortunately one that is little understood or appreciated. Careful analysis of the stomach contents from a large number of birds shows that 99 per cent of the food consists of seeds, and 64 per cent of these are seeds of noxious weeds. The enormous number of weed seeds consumed, is well illustrated by the following figures taken from data obtained by the U. S. Department of Agriculture. Of three stomachs examined, the first contained 7,500 seeds of the yellow Wood-sorrel, and the second 5,400 seeds of the Fox-tail grass, and the third 9,200 seeds of noxious weeds representing seven different species in large numbers. At this rate a pair of Mourning Doves on the farm would, in a season, do work nearly equivalent to that of some hired men in destroying weeds.

The destruction of weeds in the orchard is considered one of the best cultural methods for fighting several destructive fruit pests. Both the Buffalo Tree hopper, which injures apple twigs by depositing eggs in them, and the Snowy Tree-cricket, which kills the canes of raspberries and other small fruits in the same way, are largely controlled by keeping the weeds down in the orchards and berry patches. The plum circulio which injures both plums and apples is also affected adversely by clean cultivation and bare ground in the orchard; the larvae being destroyed by the hot sun and exposure when seeking places for pupation after leaving the fruit. Since, then, the Mourning Dove has few, if any equals, as a weed destroyer in the orchard, and on the farm, it is an unfortunate mistake to consider it as a useless and even harmful bird, and to slaughter it in large numbers as a "game bird" as is so commonly done at the present time.

The Chairman: The next paper will be by Dr. Chas. E. Bessey, Uni. of Nebraska, on the subject:

"HOW I BEAT DANDELIONS AND CRAB GRASS ON MY LAWN."

Dr. Chas. E. Bessey, University of Nebraska.

For many years I had been troubled with dandelions on my lawn as had everybody else in Lincoln. I had hired boys again and again and paid out a good deal of money in having them dig out the pests.

I had also had the experience that is common in Lincoln of having my lawn largely composed of crab grass when the fall came. Crab grass as everybody knows is what some people call "water grass" and it comes on in increasing amounts toward the latter part of the season. It is an annual and so early in the season where it had occupied place the year before, the lawn is bare. This was the condition of my lawn. Now after several years of experimenting I have no dandelions and I have no crab grass. My lawn has a heavy sod of good blue grass, and last summer in spite of the intense heat and prolonged drouth my blue grass did not die out at any place. I may say that I watered my lawn as much as I could but this was very little because of the restrictions placed upon us by the city water department. I had to water my flower beds and fern beds and there was really very little time left for watering the lawn proper, and yet at the end of the season I had a good blue grass sod which had not been effected at all by the heat and drouth.

Now it may be well to stop a moment to inquire as to the matter of blue grass. In the first place, it has very tenacious but shallow running roots. In the second place, it has a number of under ground stems that creep through the ground a little distance below the surface. In the third place, as every one knows, it is not a grass which is particularly suited to endure prolonged drouth. Another peculiarity of blue grass is that it has a stem only at the time of flowering. Its leaves grow from near the root and may be called root leaves and these may grow all summer long. Another peculiarity of blue grass is that it is very tender at the crown, that is the point where the leaves emerge from near the ground. And lastly under this list of peculiarities is the fact that when blue grass is cut near to the crown, or, as is sometimes done, at the crown, the plant languishes. The hot sun strikes upon the tender crown cells and many times they are killed.

Knowing these facts with regard to the blue grass I came to the conclusion several years ago that it would be much better not to cut blue grass close to the ground as is commonly done, in order not to expose the crown. For the first season, which was three and a half years ago, I cut the grass certainly not more than twice during the season and then I cut very high. This allowed the blue grass to grow continually and to cover the ground with a good growth of leaves. This also avoided the damage that comes from cutting down close to the crown. At the end of the first season I found that most of the dandelion plants were spindling and poorly developed. I followed the same plan a second season, cutting once about the time that the blue grass sent up its flowering stalks but even then cutting very high. Then later in the season I cut once more but very high again. I have continued this practice for several years and I now

have, as I said at the beginning, a good solid, continuous sod, and the dandelions have given up the job of trying to crowd into it.

This shows that blue grass given a good chance is more than a match for dandelions and also for crab grass. Last fall I looked over my little lawn and tried to find some crab grass specimens. Here and there I found a weakly little plant which looked as though it was in the last stages of decline. I am sure that any one who is willing to treat his lawn in this way need not be troubled with either of these two pests.

The fact is that blue grass is itself a more tenacious plant than either the dandelion or the crab grass. The trouble is that we ordinarily cut our blue grass so near to the ground that it is almost killed out by the process. The dandelions on the other hand are not injured by the close cutting so our treatment is one that favors the pests and injures the blue grass itself. Crab grass is also favored by our close cuttings. Any one looking closely at a crab grass plant will notice that many of the leaves run out horizontally and are not touched by the mower, whereas, in the blue grass, all the leaves are cut away by close cutting.

Another thing which I wish to say is that we need a better lawn mower than we now have or rather one that is better for our climate than these that we now are able to buy. We need a mower which will cut as high as three or four inches if necessary while the common mowers that are for sale do not cut more than from a half to an inch above the ground. Many years ago on the University campus Mr. Hadkinson, whom many of you know, tried to modify some of the ordinary lawn mowers so as to make them cut higher, but he found very great difficulty in doing so and had to give it up. We need a mower that will cut as high as we want. I should like to have one that would cut evenly at a height of four inches if I desired to do so at any particular time. It might then be made to cut lower but nobody in this climate ought to think of cutting his lawn as close to the ground as we commonly do. It is a botanical and horticultural sin to treat decent blue grass plants in this way.

There is one lawn mower offered for sale which does cut high but the thing runs so heavily that it is difficult to get anybody to willingly run the machine. We had one on the University campus and tried to give it a fair trial, but the workman found that it ran so heavily that really one wished to have a mule to pull it. I have one of my own, and I started in very enthusiastically to use it, but I find that it is nearly as hard to push around as a common field mowing machine. We need to urge the makers of lawn mowers to have some made which will cut high as I have said.

Before I stop I wish to add one more statement and that is, that in addition to all this that I have said as to the treatment of my lawn, I do not rake off the leaves when they fall from the trees. If they pile

up too high at any place I scatter them somewhat and during the winter they rot down and add their richness to the soil which feeds the roots of my blue grass plants. Probably this has something to do with the success that I have had in beating out the dandelions and crab grass on my lawn.

5 o'clock, p. m., January 21st, 1914.

Meeting adjourned to meet again at 9 o'clock a. m., January 22nd, 1914.

9:00 a. m., January 22nd, 1914.

Horticultural society met, pursuant to adjournment, and the following proceedings were had and done.

The Chairman: The next paper or address upon our program will be by Mr. C. G. Marshall, Mgr. Eastern Nebraska Fruit Growers Association, upon the subject: "One Season's Experience of a Co-operative Fruit Growers Association, in Eastern Nebraska."

ONE SEASON'S EXPERIENCE OF A CO-OPERATIVE FRUIT GROWERS ASSOCIATION IN EASTERN NEBRASKA.

C. G. Marshall, Nebraska City.

Mr. Marshall: Mr. Chairman, Ladies and Gentlemen: I don't see very many people in the audience who are ordinarily much interested in co-operation, but I guess we will have to go ahead with the subject. I was in hopes that many more of the growers of eastern Nebraska would be here, and we could get this subject discussed thoroughly. I intended to only open up the subject, and give them what little experience we had, and then I hoped to have a discussion that would bring out all the good points of co-operation. Yesterday morning we had a paper on co-operation by Mr. Nelson of Omaha, and he covered the principles, purposes and objects. What I shall say this morning will be more to give you the experience of the Eastern Nebraska Fruit Growers association for the past season.

A little more than a year ago, a meeting was called to organize a Fruit Growers Association for Eastern Nebraska. After a number of meetings, at which committees were appointed to work on a plan of organization, an organization was perfected and the constitution and by-laws were adopted. This organization was composed of 25 growers of eastern Nebraska. The growers were all men who had considerable courage. The twenty-five growers represented almost two thousand acres of apple orchard. They were scattered quite a little, notwithstanding; from up to the Platte River down to the state line, but most of them were in the eastern tier of counties. Now our idea in organizing this association were that it was for the benefit of the individual and the industry in the eastern part of the state. The growers have come to realize that more can be done by co-operation than they can do individually.

They have seen that very thing in the northwest, and other parts of the United States, that have put their fruits on the markets and have become recognized as a section producing a quantity of of good fruit. They have done this through co-operation. We know that the apples of the northwest, would not be sold at the present time in all parts of the world, and on every market in the United States, or they would not be on the markets here, taking the place of the Nebraska fruit, which used to be sold here, if it wasn't for their plan of packing and distributing this fruit. They have done this through co-operation. Now the growers of our state began to realize if they wanted to get the most out of the fruit grown in eastern Nebraska, that they would have to come together, and they could not do it individually.

In the first place, they are competing with one another, when they come to sell the fruit. Most of the fruit in this section, has been sold in the fall of the year, to buyers who come in here from eastern markets. These buyers come in here and get the different growers to competing one against the other. That has been especially true when we had a heavy crop, and so we wanted to do away with this heavy competition among ourselves. Then we wanted to establish a brand and standardize our product so that when we put it upon the market, we would have something to gain favor upon the larger markets of the country. Then we went ahead and organized, and established our grading rules, and made them quite strict, so that they would insure a good quality of fruit, and a good pack, and then we established a brand and had labels made that would represent the different grades of fruit. We got organized and started doing business the first day of August. To simplify matters, the first year we sold our fruit, or the great bulk of it, to one house in Chicago, and we shipped all that fruit,—practically all of it, direct to this house, or their storages, where they are storing in transit. Now there is very little of this fruit that has gone on the market so far, most of it being in storage yet. Still during the past month, I have been receiving letters from a number of eastern buyers whom I have never heard of before, asking for our association brand, which is our number one fruit. So even with our short existence, and before the first season is over, we have gotten the benefits from our standardized pack. Now we realized when we organized that it would be necessary to have a rigid system of inspection for this fruit. We realized that on the uniformity and quality of the pack, would depend largely, the success or failure of the association. So it was arranged that the manager should have full charge of the packing of the fruit. Of course, the grades were established by the association, and the printed rules were given to the manager, and he was to be the man who was to decide and interpret those rules. In order to do that, in the large territory that we had, it was necessary to travel pretty fast. Espec-

ially the first year, we desired to get the growers all lined up, and to watch the fruit carefully, so that we felt sure there was nothing going out that was going to work against the reputation of the association. We wanted to be particularly careful the first year, so that the fruit that went onto the market would please the purchasers and they would come back for more. Well, this fall, inasmuch as we had sold the great bulk of our fruit to one house, and the selling end was not crowding us very much I took the matter of inspection myself, With the aid of a Ford automobile, I got around from one orchard to another, and I think I averaged reaching each orchard about every day and a half during the entire packing season.

I traveled from 150 to 200 miles a day and visited from 8 to 10 to 15 orchards. In inspecting this pack during the packing season we drove that Ford automobile between seven and eight thousand miles. Some growers thought it was not necessary that we have such a rigid inspection. I believed it was, and I found there was very few times that I got to an orchard but what there was something there that needed attention.

Now we know there is no two men,—they may be ever so honest or honorable,—who have the same idea of what a number one apple is. You give one man a set of rules, defining or describing what a number one apple is, and go over here and give the some set of rules to another man, and they can be ever so conscientious, and yet this man will not put up the same pack of fruit as the other one. For that reason, we found it necessary to place the interpretation of those rules in the hands of one man, so that we would get a uniform pack, over the entire section, and that was delegated to the manager. As the association grows, of course we will have to have more inspectors, and we have worked out the plans for that. Now we have started really to build a skeleton in the organizing of our association, and from that we expect to spread out. In other sections of the country they have started in different ways in many cases. They have formed local associations, and community associations, and when a number of those were organized, then they were united or federated under one general head, but we thought that if we waited for the community association to be organized in Nebraska, that it would be sometime before we would have a co-operative association of any size in eastern Nebraska. And so we picked the best growers in the state,—we did not get them all,—there are a few of the good growers who are not yet in the association, but we took most of the best growers in eastern Nebraska, and we got those men together. They were men who had had some business experience, more than the average farmer has had, and they could see the importance of sticking together, and sacrificing the first year, for the benefits they were going to get in the future. Now I do not think there was any of the members of the association that expected to get very much more

this year for their fruit, through the association than if they had sold independent. And maybe some of them would have gotten more if they had sold independently. We had a gradually increasing price offered us from the first of August, until the fruit was packed. This was due, of course, to the unfavorable weather conditions all over the country, which cut the crop down, and yet those same men feel satisfied, and know we have gotten a good start. We have organized and established our grades, and standardized our pack and put about 40,000 barrels of those apples upon the principle markets of the country. The houses that we sold these apples to are distributors. They put about 15,000 barrels of those apples in cold storage in South Omaha, but they will move soon to Chicago, Minneapolis, and Indianapolis. A buyer told me who was here yesterday that those apples would move through the south, down to Tennessee, and Chattanooga. In fact, we feel confident that the buyers who got those apples this year, will come back next year and want more of the same kind of fruit. After we have been organized long enough and get our association strong enough, so that we pack this standard pack, and keep it uniform, we will certainly be offered a premium for this fruit over the ordinary fruit, which does not bear this brand.

Now that is what we are working for, and I believe we can do it. If we can get an output of fifty to one hundred or one hundred and fifty thousand barrels a year, bearing the brand of the association, and if the inspection is carefully looked after so that the fruit is uniform, it seems to me that it won't be but a few years until we will be getting offers that will be above the average market price, for the fruit that does not have something to guarantee it.

We have gone a little further. When we organized as I said, we simply had a skeleton. And now we have provided to take in local associations, or community units and treat those as one individual, as we have treated one individual up to this time. For instance, there may be a community over here, where they have one or two small growers, and they are so far away that the association could not do those individuals much good. They would not be very much benefit to the association, but as there are two or three of those growers for this particular point, they can organize together, and become an auxiliary association to the central body, and by taking one share of stock, or one membership, the same as the individual, they can get the same benefit as the individual. The head association will treat this body of men, and deal with them through its manager or agent, just the same as it is dealing itself through the individual who is a member. In that way we hope in a few years to have the whole commercial fruit growing territory of Nebraska organized, and working together to improve the quantity, and quality of our fruit.

Now I have given you a brief outline of the working plans of the eastern Nebraska fruit growers' association, and what we did this year. If there are people here who are interested in co-operation, I would be glad to have it discussed by asking questions or bringing out the discussion in that way. Of course, if there is no one here who is particularly interested, it would be useless for me to go on and go much more into detail.

Discussion.

A Member: I would like to ask what you do with your culls?

A. This year our home market out in the state took cider apples, and were glad to get them at very good prices. The fruit this year that ordinarily went to the cider mill, much of it, went out into the state, and was sold at fairly good prices. The association handled some of that for the growers, and some of it the grower sold himself. That is optional with the grower, if he wants to handle his own cull fruit, he has the privilege to do so. Of course, that is a privilege that he has also, to sell his own fruit, so far as that goes, but if he sells his fruit independently, he pays only one half of the commission to the association, as he does if the association sells it for him. You see the member gets benefits aside from the selling of the fruit. The plan of the association is to have an expert who knows about growing, spraying and pruning and cultivation of the fruit, to work with the members. His business, during the growing season, is to go from one to another grower, and carry ideas where he can suggest to the different members how they can better their methods of handling the fruit. That is his business, to help them in that way. So they are getting benefits from the association, aside from having their fruit sold. It was thought that where a man sold his fruit independently, if he should receive an offer that was a little better than the association could get for it, he should have that privilege, but he should pay the association a commission of one-half of what he would have, if the association sold it. The buyers came down into the territory and we sold most of the culls on the track, in car load lots. Our members would load a car and there would be buyers to take it as fast as it was loaded. The association sold all the cull fruit for the members when the members desired the association to sell it.

Q. Did you barrel two grades?

A. Yes sir, in some orchards we barreled three grades. The first grade we call the association brand. That is the extra fancy apple. Each apple in that grade must be perfect. That is, free from insects and fungus, and it must be free from physical defects, and bruises, and it must have a good per cent of color, so that it must be extra fancy for that brand. Then we have another brand or grade which is also a cold storage grade and that we call our commercial grade, and that takes a smaller apple, and an apple with less color.

It will take an apple with the calyx worm but no side worms, and it really makes a good storage grade of apples, and yet does not require so fancy an apple as the other grade. Then our third grade, we call the C grade. This one, the rules say, shall include all merchantable apples not included in the other two grades. We don't put our stamp on that one, so that it is sold on its merits, and on inspection. This grade will vary considerably. There are a great many big fine apples with a side worm or some other defect, that will be thrown out of the other two grades, that will go into this grade. But most of the apples that go out of the first two grades would be thrown out on account of size, and that fruit might run quite even and sound. So it would be impossible for the association to guarantee that fruit to comply with any set of rules. It is simply sold on its merits or under inspection, and the association sold practically all of that. It was put in barrels, but some of the growers sold the C grade in bulk, and some of them in barrels. That was a matter for them to decide. It happened we sold the C grade this year from \$2 to \$2.50 a barrel, F. O. B. the cars. Ordinarily, that is a good price for number one apples.

Q. Would you mind telling us what you got for your first and second?

A. Well, I got from \$2.50 to \$4.25 a barrel F. O. B. the cars. The first sale we made, as I told you, was that sold early, and while we got a good price at that time, yet the price came up after that. There was some good fruit that sold later at \$4.25 and \$4.50 for Jonathan, and \$3.75 for Ben Davis, F. O. B.

Q. What grade of apple sold best for you, what is your best seller, what variety?

A. Of course, the Jonathan is one of the big favorites. You take the eastern buyer, and most of them are quite partial to the old Ben Davis, one of the very best commercial apples. It seems they so consider it that way because of its being a long keeping apple. When they want something to put into storage and hold till next spring, something they do not need to worry about during the winter months, they find that the Ben Davis fills that requirement. And the buyers that came out from the east, and we had as many as a dozen at headquarters at one time trying to buy our apples, preferred the Jonathan, Ben Davis, Winesap or Grimes Golden. Those four varieties were what the buyers were after.

Q. How about the Gano?

A. They class that right with the Ben Davis, there are very few of them that are willing to pay more for the Gano than the Ben Davis.

Q. What would you plant?

A. That is a question. I hardly know how to answer that, but I do know I would stick pretty close to the old Ben Davis. If I was

planting heavily, I believe I would just as soon have the Ben Davis, instead of the Gano. It does not have such an open calyx as the Gano. And you will find that less worms will enter the calyx of the Ben Davis than in the open calyx of the Gano. I think there is something to that.

A Lady: We think the Ben Davis is a better apple than the Gano. I never buy a Gano if a man comes to the door with a Gano.

A. I do not know about that. I have tried to tell the difference between them after the peeling was taken off, and I confess they can fool me.

Q. What price do you sell the Ben Davis at?

A. From \$2.00 up, to \$3.75 a barrel, F. O. B. the car. We did not have many that sold at \$3.75 a barrel, but that was along the latter part of the season.

Q. I would like to ask Mr. Marshall about the division of the spoils. Does each grower get the same for his variety, just so they come up to the standard of the grade. For instance Mr. Pollard may have a car load of Jonathan, and do they have to come into competition with the Ben Davis, or does each variety sell on its merits?

A. Each variety sells on its merits. We provided that where stuff is being sold on the track on the same day, each amount for that variety is pooled for the same day. The returns for the same variety, if they go to different markets on the same day. Those returns are pooled and the members get the average so that one member does not feel that the manager is favoring one grower by putting his fruit on a better market than he put the other man's on.

Q. What grades do you say you have?

A. The first grade is the association brand, the second grade is the commercial grade, and the third is C grade. Those are the names of the grades of apples.

Q. What grade of apples does the apple barrel that is on exhibition represent?

A. There are several barrels of association brands being shown over there. There are one or two barrels there that are a mixture. I think they were made up after they came up here from the apples that were left from the apple show. They were to show the style of pack more than anything else. They were fixed up that way just to show the style of pack at the head of the barrel.

The Chairman: The next paper or subject for an address will be by G. S. Christy, Johnson, Neb., on the subject, "My Methods of Planting Grape Vines, Raspberries, Blackberries and Other Small Fruits."

MY METHODS OF PLANTING GRAPE VINES, RASPBERRIES BLACKBERRIES AND OTHER SMALL FRUITS.

G. S. Christy, Johnson. Nebraska.

Mr. Christy: Mr. President, Ladies, and Gentlemen: I had another meeting that I should have attended at this time, but I will talk to you a little while on the planting of small fruit. I believe it would be well to take up the grapes first, from the fact that grapes will grow in almost any part of the state. Now there are only a few varieties that I would advise planting. We plant the Concord, Moores Early, and I always like to have a few Woodruff red, although further north they will not ripen up quickly. However, I think that is one of the finest grapes, especially for canning. The Woodruff red is the one I like best in the winter. The Niagara is the best for white.

The red and white grapes are more subject to diseases than the blacks, and should not be planted unless you expect to spray and care for them. The blacks will come nearer taking care of themselves. There is one mistake in planting grapes that a great many people make. That is, in planting them they do not plant deep enough. More mistakes are made in planting the grape than almost any other fruit. If the root system is shallow they are liable to winter kill, and the roots will not grow deep unless planted deep. Rows should be eight feet apart and vines five to six feet in the row. With a fourteen inch plow make a double furrow plowing as deep as possible by going a couple of rounds. It will then be easy to make a hole eighteen inches deep. With good two-year old plants you should be able to plant to that depth. Tamp the dirt firmly around the roots and then with a common corn cultivator, plow the vines every ten days, and in a short time you will have your rows all leveled up. Be sure to allow only one cane to grow the first year. They should bear the third year. Just so you leave a few buds sticking out on a good two-year-old vine it will do the rest.

There is one thing, and I do not know where the trouble comes in, with grape vines. Often the roots get so near the surface that a hard winter will sometimes kill the vine. That is one objection and the greatest objection to mulching grapes. You mulch grapes a few years and you will find that the roots come so near the surface that a hard winter is liable to kill them. Never mulch grape vines. Keep them well cultivated all through the season and you will have good grapes.

Now as to pruning. All varieties except Moores Early should be pruned according to the ancient custom of two buds, but if you are an old fogy you cannot leave four or five buds. Do not plant Moore's Early. Whenever you prune Moore's Early tot two buds you will make a mistake. The first two buds I think are very seldom fruit buds, but the third, fourth and fifth are generally fruit buds. You can tell the

difference if you study it a little. Because where the fruit buds come, you will find that joint to be a little off shape, and sometimes a little protuberance there, like it were going to start a horn. I remember one time about ten years ago, in speaking of our Moore's Early, that we were getting some six to ten baskets off from a single vine, I received letters from fellows in Wisconsin, Illinois, and Michigan, wanting to know how to get the Moore's Early to bear. I found that quite often people could not get their Moore's Early to bear. They will if you treat them according to their nature. Soil should not be too rich in nitrogen for the grapes.

Raspberries do very well all over the state. Of course, much better in the eastern and northern part. Just the opposite of what you have with the grape is true with the planting of the raspberry. This is a plant we took out of the ground the other day, (indicating a plant on the table). The roots should have been there, but they are not. The best way to plant a raspberry is not to be so particular. Lay it down and kick a little dirt over it with your foot, and it is liable to come up better than if you took more pains. You must not pack the ground over the crown of the plant. Grapes die because they are planted too shallow; raspberries, because they are planted too deep. Never plant them more than three inches deep, or any deeper than they were in the nursery row.

The little cane you receive with a raspberry tip dies before snow flies, so it is only valuable to mark the spot where the plant is set. You must depend on the new shoot from the crown to perpetuate the life of the plant. Raspberries start from a bud on the crown beneath the surface and if the soil is packed firm, the tender shoot can not break through, the original cane endures but for a season and the entire plant is dead. Where you can, the best way to do is to go to the nursery and take up the plants with a small shovelful of dirt and transplant. They can be successfully planted in this way, even after six inches of growth has started.

Now as to varieties. I like the Plum Farmer better than anything I have and the Cumberland comes next. The former is really the best of anything, I can get hold of now, but the berries are small. Then the Cardinals do well in some parts of the state, but in others they are a failure. Father Harrison told me it was impossible for him to have a Cardinal at York, and that they never did any good at all. But I have a Cardinal bed that has been out 14 years and it has always been good. Up in the northwest, near Hay Springs, they say that the Cardinal is the best thing they can get hold of, and that none of the blacks do any good up there. Those varieties, the Cardinal, the Plum Farmer, and the Cumberlands are the best varieties.

If you are close to a nursery and can do it, I would advise you to go to the nursery and get the plants, and wait until they are up nicely. In doing that, take up a good bunch of dirt and take home with you, and you will be almost sure to get a good plant. Of course,

when they have to be shipped you cannot do that. A few years ago, when I was trying to get a good variety, I sent to a place in Maryland and got 100 plants, and he charged me \$2.00. He left on a good bit of good old Maryland earth on all of them, and when the plants came here, I paid \$2.75 express on them. They all grew, so I never objected to that \$2.75 express. Two years ago a gentleman came to my place and got about 300. It was in June, and some of those plants were about a foot high, and it was pretty hot at that time. I did not think that he would save any of them. But he did, and I think it was because I sold him some good soil along with them.

If you are going to send for them, get them just as early as possible, before they start. If you let them get started, and then shake all the dirt off the roots, then take them out, you stand a very poor show of getting any raspberries at all.

Discussion.

Q. Have you had any experience with the St. Regis raspberry?

A. I got that last spring. It is having quite a run just now, and I sent and got some of the plants a year ago. Of course, they didn't do anything for me this year, although I got some of them to grow. I had a few berries from the plant I got last spring and they are a nice berry. I am going to try them, but at the same time, from my limited experience, at the present time, I would not advise going into it very heavy. I would, however, advise everybody to try a few of them. I haven't any of the plants to sell,—do you have them in the nursery Mr. Brown?

Mr. Brown: I planted a lot of them last spring, and they are just like yours, only more so.

Mr. Christy: Well, I planted 100 and I got 99 per cent to grow in the spring. In the fall I think I had 18 left out of the hundred. But the plants were all right.

There is a little difference in where Cardinal is grown. The people at Brownville tell me they have trouble with it all the time. I have shipped it all over this state and I haven't had a bit of trouble. I think I know where the trouble is. Those Brownville people get up a little earlier in the morning than I do. They pick the berries as soon as it is light in the morning, and put them in the crates with the dew on them, and by night they are beginning to mold. I never allow anybody to pick a berry for me, unless I am sure that the dew is off. We can ship you a case today, and there will be no mouldy ones tomorrow at all, but if you pick them early in the morning, by the next morning, you will find mouldy berries. You can't carry them over that night. A berry picked at 10 o'clock today, it will be possible to carry it over two nights, but a berry picked at 5 o'clock today, you can't carry it over one night. So I think that is the greatest trouble about shipping the raspberry. You take the

black ones and they will do the same thing,—they should not be picked with the dew on the plant.

Now there are only a few varieties of blackberries I would recommend.

Snyder and the Mercereau. The Snyder, as you all know, is only a small berry, but it is a hardy berry. I believe it is hardier than the Mercereau, although my Mercereau have stood very well. I would put the rows about 8 feet apart, and then you can plant them just as close as you care to in a row. That does not make much difference. After the first year you should allow them to grow pretty thick in a row about two feet wide. This leaves six feet to cultivate, and be sure you cultivate it well, allowing neither weeds or canes to come up in the cultivated part. Never allow canes in the row to grow more than three feet high, and if the new canes do get taller, cut them out or back in July to three feet, and you will seldom fail to have a good crop of fine berries. The blackberry will stand a deeper planting and should be planted deeper than the raspberry. They are a little easier to plant than the raspberry but you must get good plants. You take a sucker plant with a good long root to it, and be sure to cut off all the cane, just leaving enough to show. Take the sucker plant if it has quite a long root to it, and there is enough of the cane left above the ground, so that the moisture goes off from that cane. The best way to do is to plant it, so that it does not leave very much above the ground for evaporation. You can best realize how much exaporation there is to a plant by going over to the auditorium and examining that stalk of corn.

I have the Blowers too. I received that from Crawford just after he got it. I have had it several years now, but I do not think as much of it as I do of the Mercereau or the Snyder, either one. Although Mr. Crawford wrote me afterwards that when he went to get the original plants he got them mixed a little bit. It might be possible that I have a mixture. I do not know for sure whether or not I got the real Blowers or whether I got some of the other plants he had mixed up with them.

Q. What did you get from your Snyder's this year?

A. Nothing much this year.—14 years without a failure and the entire bed dead, root and branch.

A Member: In response to what you said about the blackberries, we have a patch of five or six acres, and they are just in full bearing now. Mercereau did so much better than anything else this year, I think it is worthy of special mention. I figure we averaged seven or eight times as much as we got from the Snyder. The Snyder bore well but dried up on the bushes, for want of ability to mature its fruit. The dry weather was responsible for that. The Blowers and the Mercereau, standing side by side I see very little difference in them, except the Mercereau out yielded everything else.

Q. How high did you leave your berries when you cut them back?

A. Keep them back to two and a half or three feet high. And if they make excessive growth cut them back a little bit in the spring. I suppose we should mention in reference to the blackberry the following: I tested it quite thoroughly with the blackberries. I left a row of canes right along through one of my rows where it was cultivated and hoed, and everything done just exactly as the rest of it. The others were cut off to two and a half feet high and this row I left all by itself to run up to big canes. In the spring it looked as though I was going to have a wonderful crop of berries here, because it was just one solid mass of blossoms. There was so many berries there that they never ripened, because it was impossible to get moisture enough for them.

I have had good success with root cuttings by getting the ground in fine tilth, then use a couple of 2x4x8 feet apart to mark off the rows, dropping the root cuttings eight inches apart, and covering three inches deep. Keep the row well cultivated and in two years you should have a fine blackberry patch.

Now the gooseberries and currants are very easily propagated. Every farmer could very easily have them. You can take and cut off last years growth, and stick the cuttings in the ground in the spring, and if you take good care of them they will grow. It would be well to cut them off in the fall and bury the cuttings. Then plant them out in the spring, they will be sure to grow, if you get them well calloused before you put them out. Plant them in rows six to eight feet apart, and four feet in the row. Then in planting them, it is best to plant them a little deeper than they grew in the row. Plant them about three to five inches deep owing to what they were in the nursery row. What you want in a gooseberry is to get it in a cool place if possible.

Gooseberries belong to a cool climate and like a cool spot in which to grow. August breezes are more disastrous to the gooseberry than January blizzards. The north slope of the hill, the north side of a grove, or the best place is on the north side of a worm fence, if you can find a worm fence in Nebraska; or on the north side of a house or barn. The heat is what makes the trouble with the gooseberries and currants. The western part of the state, up on the Platte river, the currants and gooseberries do much better than they do here in this part of the state. That is the trouble, we have too much heat here for the gooseberries, and you must get as cool a place for them as possible. Any of the Nebraska ground is rich enough to grow gooseberries. A great many people hate to pick gooseberries, but if you get at them ripe, the way to pick gooseberries. You know a gooseberry bush bears its fruit on a three-year-old cane. If you will get them started right, when your three-year-old cane is full of gooseberries, and ready to pick, just go out and cut it off. Take it

to the shade and pick it. The other canes coming on will make a good crop and so forth, right along. So pick your gooseberries in the shade, whether or not they are in the shade themselves as they grow.

Plant in rich well-prepared soil either deep or shallow. You can not kill them if you will cultivate well after planting.

The Houghton gooseberry although it is small will produce more berries and better berries than any other variety. In England where the large varieties are very successful, the best authorities recommend planting the small varieties for what you gain in size, you loose in quality. I have had good crops from Downing, Red Jacket, Smiths and others but consider the Houghton the best all around berry.

A Member: The Smith is not very large?

A. The Smith I got was larger than the Downing. But I do not know of anything better than the Houghton.

Q. What variety of currant did you have?

A. Fay's prolific is a good berry, but it is or has not been very good with me. I haven't raised the Perfection, but is there anyone here who has grown it?

A Member: The Perfection is the best currant I have ever tried. It is very large, but it is of good quantity, although it is not of as good quality as the Victoria. The Victoria is the best currant I ever grew. As a standard I took the Victoria.

A Member. I will say this, in regard to the varieties. Victoria has always been my favorite but I found a variety this year for the first time, called Wilder. It comes from New York and the growers there recommend it very highly. This year, I was more than well pleased with the way that behaved. I think it was worth the trial, and I think it would be a good substitute for the Victoria.

Mr. Yager: The Wilder and the North Star up in Dodge County, we think are better than Fay's Prolific. With us, the Fays is not prolific. We have the Wilder and the North Star and think they are the best.

Mr. Christy: I believe that the reason that people get skinned so much and accuse the nurseryman of being wicked fellows, is that if they would stop to think one minute, they would know that the claims of the catalogues are impossible. Now I always make a rule not to send to any catalogue house, or order from a nurseryman that I know is a 50 per cent liar. Because if he will lie that much, I find it will be easy for him to go the full 100 per cent.

In planting the strawberries, April is the month to plant them, and it is very essential that you plant the same depth they were in the nursery row.

They should be planted early before spring growth starts. The plant stores sufficient plant food in the crown to start spring growth and if this plant food has been exhausted your chance of getting a perfect stand is seriously interfered with.

I find many buyers want plants that have started considerable growth as they look so thrifty, but it is a mistake to plant them. If your plants have a large leaf growth, pinch off all except two or three small leaves before planting.

I use the matted row, and always make rows four feet apart, plants 18 inches to two feet apart in the row. I have had the Dunlaps, Warfield and Everbearer Progressive fill the rows when planted four feet each way. Be sure you get the strawberry plant just the right depth so that the crown is just even with the top of the ground.

Never plant berries on new land or an old orchard where white grubs are liable to ruin your plants. A potato field plowed in the fall and then worked up in the spring makes an excellent berry bed. Dunlaps and Bederwood do not require as rich soil as Warfield and Gandy.

Some people use a dibble, but I think a dibble takes too much time. We take a tiling spade, and one of my boys who has good eyes and knows just where to drop the plant. We can go out this way and plant several hundred in a day. The ground should be raked immediately after planting in this way. To plant with the spade sink a narrow spade about eight to ten inches in the ground, push the handle forward, and as the boy drops the plant, just back of the spade at the right depth, remove the spade and press the soil with your foot.

Most any good ground is good enough, although you can get it much too rich for the most of the varieties, but you can't for Senator Dunlap. Some of the fancy berry growers, that are growing your big berries, I believe Mr. Beaver has grown berries nine inches in circumference. For those he used to get an old cattle yard and then go off into the timber and get some leaf mold, but left the ground underneath perfectly solid. Then when the spring came he went to work and gave them liquid manure almost every day, and those berries were certainly fine. Those things cost him at least a dollar a quart to grow, but he got a nice little bit of advertising out of it. You never can buy strawberries and have them as nice as when you go out and pick them from your own home patch.

Here is one of the plants of the Everbearer, the way it turns up this fall. Now on that, there are some fellows who are trying to make you believe you can get rich quick off from it. It is my opinion that you are not going to make a fortune and be able to retire in one year off from the Everbearer.

Q. Was that plant put out last spring?

A. Yes sir.

Q. I would like to ask Mr. Christy if that is the usual custom of planting strawberries and raspberries with your foot. I have noticed all the feet, and I do not believe there is anybody here has feet big enough for that. (Laughter)

Mr. Christy: Well, I will tell you; those that have not, can get some of those old German wooden shoes and then you will have a shoe big enough.

Mr. Williams: I would rather take a dibble, a hand dibble, made to order, and I put them out three to five hundred an hour, and I don't work hard either.

Mr. Christy: I have seen you planting them, and I believe I can plant two to your one.

Q. What would you do with the strawberries where it was sunny and windy for a week or two,—about planting them.

Mr. Christy: I do not know, unless you could go on a north slope and you can get them where the wind won't strike them. You might do like I did with the Everbearer the first year I received them. I built a frame and put a covering over them so that I would have them sure. I was going to be very careful so that I would not loose them. Of course you can't do that with a big bed. Yet where the wind blows out west, you must get them where it won't strike. I think it would be well in a place like that to have them where you could irrigate them and mulch them. Now the finest berries that are grown down in our country, are by one fellow there who usually puts from four to six inches of manure over his berries and leaves it there. He takes just enough off from the row so that the plants can get through; the plants will bear for a long time.

Q. You mean as soon as the plants are put in,—in the spring?

A. No sir, but on in the fall after growth has stopped.

Mr. Brown: If you have to plant the strawberry plants in the summer time,—of course, if you can possibly wait, why wait, but if you must plant them, nine times out of ten, if you take your knife and take off the foliage, you will save your plants.

Mr. Christy: The strawberry stores enough material in the crown of the plant in the fall to start growth, and if you will put them out that way, there is enough strength in the plant to start it in the spring. Now do not wait until that growth is started, get the plant early.

Q. Do you consider that when plants are received by a planter that to put them in a cool place, and cover them with some brush would be a good thing?

A. No sir, plant them right at once.

The Chairman: The next paper will be by Professor F. M. Harrington, of Ames, Ia., on "Horticultural Practices in Oregon."

HORTICULTURAL PRACTICES IN OREGON

Prof. F. M. Harrington, Ames, Ia.

Mr. Chairman, Ladies and Gentlemen: It is perhaps the idea of many of central and eastern United States, that the fine, perfect, highly colored apples which may be and are grown, in sections of the Pacific Northwest, are the results of climatic and soil conditions which could not result in anything but fine fruit—that is, a natural result which could not be otherwise. However, I wish to show in this paper that the

Oregon fruit is not the results of sticking in a tree and then sitting back and watching the tree bear. The fine fruit is not the result of such. It is not an accident. It is the result, though, of carefully planned orchard practice—a carefully followed plan which orchardists know they must follow if they are to have fruit which will be accepted as No. 1 fruit, a working knowledge of such things as the trees themselves, the insect pests, fungus diseases, pruning, spraying, harvesting, etc.

Possibly many people believe that there is nothing to do as concerns an orchard after the planting until that orchard is in bearing, and I believe that that is too often the practice. The Northwest orchard's care and treatment starts from the planting of the trees and goes through a careful course of treatment the rest of its life. And, of course, too, the common methods of handling differs from conditions here from the first. Oregon orchardists, believe, and in believing, practice as well, that the one year old whips are the best kind of stock to use in planting. We will say there are three advantages.

1st. That of cost.

2nd. The orchardist starting with a one-year-old whip, can prune as he will, and so produce the shape tree he desires.

3rd. An older tree received a more serious shock when transplanted and so would not be ahead of a yearling whip. You can perhaps give weighty reasons as to why one-year-old whips should not be used here.

Continuing with the handling of these trees and first consider pruning. An unpruned tree tends to go to terminal growth, throwing out comparatively few laterals. Long continued terminal growth results in long, slender, weak branches. Good up-to-date orchardists of the Northwest, are of that opinion, and prune severely the first three or four years, in order to thicken up the growth and gain a stronger tree. He prunes yearly and when his tree comes into bearing, it also has the desired shape. Then the type of pruning changes and he prunes for fruit and to keep his tree within bounds. A high tree is not a desirable tree from the westerner's point of view. A twenty foot orchard tree is a high tree in Oregon. Also figures show that if the trees exceed that height, the cost of pruning, spraying and harvesting increases very materially. I might add to that the open center tree has been the favorite type of the Pacific Coast. Some are now going towards a modification between that type and a leader type however.

Also young trees receive their spraying, not for coddling moth, but for aphid, slugs and other pests which would strip the foliage and injure them. And on the mature trees it continues—a careful, systematic method in order to control the coddling moth, scale, scab, anthracnose and others. I am firmly of the opinion that the Northwest states must wage a more careful war against pests than must this section. Climatic conditions, I believe, are more favorable for them

there. The fact that a great section of Oregon and the Northwest states are subject to wet winters and dry summers makes it necessary to so cultivate as to conserve this moisture for summer use. A fair estimate as to the number of cultivations necessary is about ten, if an orchard is to be kept to the best of condition. Observation of two orchards side by side, clearly shows up the value of this cultivation. I had occasion to observe it this last summer. The fact also that in the one case too, the pruning had been neglected, emphasized the point more plainly. I do not believe it necessary to tell you how they go about it to obtain the dust mulch necessary to prevent excessive evaporation. You perhaps, know the tools better than I do. Cover crops are employed extensively and also quite a bit of intercropping—berries and small fruits being put in, particularly the loganberry and strawberry. When it comes to harvesting of the fruit, the orchardist would have his pickers get the idea that every individual apple is alive, that it must be handled in that light and that rough handling is going to shorten the life of that apple. The results of their system of harvesting is shown in some of the light-colored apples, as the Artley, Winter Banana, and apples of that type upon which the slightest bruise shows. When you go through a box of Ortleys and find every one without a mark, you can then see that they try to hold to the idea I have mentioned. The orchardist as a rule still holds to the 10 to 12 quart galvanized pail as being the best type of picking receptacle. Perhaps the picking sacks or some other type of patent picker is used in some cases. With these, however, it is quite possible to obtain just the opposite results than expected. The tripod ladder also is becoming a favorite, being top heavy above twelve feet. Most fruit can be reached from that height of ladder however. Careful grading and packing must follow careful picking. The last two are now quite frequently taken care of by the associations. To a person who grades and packs his own apples, an injury may look awfully small, so small that he hates to throw it out, especially since the apple is his own. This idea alone has led to much of the association grading and packing in order to keep the grades up to standard. I do not mean that the orchardists haul their fruit to the association packing houses, and that it is there graded and packed. At Hood river, for example, the grading and packing is done by men who are licensed by the association to do such work. These men usually work in squads of four and it is in the orchardists own packing house that they do their work. Each box is marked by the packer—the marks showing the number of apples, the grade and the name or number of the packer. Thus they may have a line on every packer and should he fail to pack or follow the association rulings, his license to pack in that association is withdrawn. Better packages are without doubt the result. Community interest and co-operation has benefitted greatly the fruit interests of the Northwest. For instance consider the Rogue River valley in southern Oregon—pear growing

section. You know the pear blight and are acquainted with the fact that it is the limiting factor in many places in pear production. In that valley the blight is under almost absolute control. The whole community has entered into the fight to control it and success has been the result and the Rogue River Valley is going to continue in the business of pear production. Hood River again, as a whole—every one being in hearty co-operation with the movement, went out to eliminate the San Jose Scale from that section. And here the pest was about completely eradicated. This is just a sample of the way in which community interest and co-operation has acted to the advantage of whole sections.

But consider co-operation still further. A great many of the smaller towns even of Oregon and Washington have their associations. These associations are for the purpose of handling the products of the place and as a result better returns have been made to the parties producing the fruit, vegetables or whatever they may be. All persons do not produce in car load lots and it is recognized that assignments of that size are likely to bring better returns than would smaller consignments. Thus the like products of the whole community go in together.

During the past year a still greater organization was completed—the Central Selling Agency of the N. W. with headquarters at Spokane. This means still greater co-operation there, and that the growers of that whole section are to act as a unit in the marketing end of the game. The Hood River associations and others instead of bucking one another as they did in the fall of 1912, will now be acting together and the fruit from the entire Northwest, will merely enter into competition with that of other parts of this country and other countries.

Advertising, as has been demonstrated by the west is a big factor in increasing the consumption of fruit and so increasing the demands. The Hood River Association alone has done much to advertise and create a demand for Hood River Grown Fruit. And during the past two years, apple days have been observed upon which a specialty has been made of apples and a special effort made by all handlers of fruit. The past year in Portland alone, the number of boxes sold by retailers amounted to 20,000—almost thirty-five cars of fruit.

Great consternation was caused both among grocers and nurserymen in parts of Oregon this past season. At Eugene the fruit inspector caused the arrest of a number of grocers for selling diseased fruit—fruit which was badly scabbed or otherwise infected with disease and insect injuries. In several instances, large assignments of nursery stock—amounting to several thousand trees have been seized and destroyed by the inspectors because of crown gall or some other orchard disease or pest. And again whole orchards have been ordered cut down because the owner had not sprayed and cared for his trees. An uncared for orchard is a menace to other orchards and appearances now point to the fact that if a man is to try to grow fruit in Oregon.

he must go about it right, care for his trees, properly and produce a quality of fruit that is marketable, if he would produce any at all.

We know that it is not the disease and worms found in the fruit, which sells that fruit. Soundness and attractiveness are big points in this consideration. During the recent short course at Ames, this fact was emphasized strongly. Apples were on sale—some of them fine large, perfect and well colored apples. Others were there of an inferior grade—poor in size, color and in condition. The most attractive fruit, which also possessed good flavor, went as fast as it was put up and the people repeatedly came for more of the same kind. Others, a highly colored apple but very hard, not yet being in season, were next in order of demand—but the return call for these was not so great. And last, the poorer colored apples of the inferior condition was taken when the other grades could not be obtained. It merely went to show what appearance and condition combined, with quality will do. If fruit is going to be produced it pays to produce a good grade, either in appearance or quality.

Oregon horticulturists are handicapped a matter of some fifty cents a box when it comes to putting their fruit on the markets of the central and eastern sections of the United States. There is that handicap of freight charges to overcome. And yet they do put in their fruit and pull down the top prices. There is a demand for that kind of fruit. Hood River has probably done most to create that demand and the demand up-to-date has come about because the fruit was put up as Number One, Choice, or Fancy fruit, and lived up to specifications. Of course, there has been a few exceptions as in cases where the owners packed their own fruit.

It would be impossible to take up all the points connected with fruit production in Oregon. Each point as spraying, pruning, cultivation, harvesting, and so forth, is enough in itself for a long discussion. Sections of Oregon have won reputations for good fruit. Other sections of our country have won reputations for other products—corn for instance. But no crop is going to do the best in every respect unless it receives the care necessary. You cultivate and care for your other crops, and expect big returns perhaps. With your fruit trees, in many cases, you expect returns without giving the trees even a very small proportion of the care you give other crops and then decide that yours is not a fruit section. The Hood River grower has cared for his trees and has produced fruit in proportion. His orchard has required his attention perhaps, every month of the year. He has planted, pruned, sprayed, harvested, graded and packed in a thorough and systematic manner. He has had practically all the pests which we have in this country and if anything, they are harder to combat there. He has had the added disadvantages of dry summers—making irrigation necessary in many fruit regions or tillage methods which would end toward the conservation of moisture. His region has no

out and out marked advantage over this region in the fruit line. This section can produce good fruit.

It also can produce some varieties of fruit which surpass western varieties of like nature. I believe it is merely a case of following the west in one respect at least—giving your orchard crop its proportion of care—and then perhaps a little closer co-operation though Nebraska has a good start in that direction—for the Missouri Valley to gain a reputation for its fruit as well as for its corn and corn fed hogs.

The Chairman: The next paper will be by J. H. Steinhart, of Nebraska City, upon: "Canning and Preserving Apples, Peaches and other Fruits."

CANNING AND PRESERVING APPLES, PEACHES AND OTHER FRUITS.

J. H. Steinhart, Nebraska City

Co-operation as between the fruit grower and the canner is needed before much progress can be shown in this industry in our state. All is not sunshine for the canner. The developing of the line is Pioneer work and against the keen competition of the eastern grown fruit and canners. The average western fruit grower regards the canner as an element outside of his special interest or to his advantage and does business with him on lines that makes it very hard for the canner.

He always talks and acts as though the canner were robbing him, also feels that the canner should take "any old thing" in the way of fruit and pay a good price for the same.

Some years the grower will be anxious indeed to supply the canner with his fruit and the next, with slightly changed conditions, as regards ability to sell, turn the canner down cold, in his request that he deliver him his fruit. There should be no conflict, there should be co-operation, the grower should regard the canner as part of his business, and link the chain of the disposing of his crop and one of the most important. The canner is or can be on hand to relieve the "glut" in the market. Take this surplus and by canning the same, save to a degree the value of this excess load, and greater still enable the grower to maintain a market price that will bring to him profits as against loss.

The spirit actuating the fruit grower in his attitude to the canner should be one that will establish him firmly in his community and also establish him in the selling territory for canned fruit products.

To be firmly established in the fruit growers community means that the grower must have faith in his canner and see that he has fruit in the seasons at such a price and in such quantities as will render his business attractive in the way of profits and business returns.

To be firmly established in the territory consuming canned fruit products means that the canner must have a fairly regular supply of

fruit, so that the trade one season secured, can be supplied the coming and other seasons ahead.

To have a regular supply of fruit from season to season brings home a moral obligation to the fruit grower. He must be big enough to see this obligation and realize that the canner must each season receive his proportionate supply of the fruit raised, even at a loss for that season in the way of returns for his crop.

There is no future for the canning of fruits in our section, unless the growers realize the above conditions and work with the canner in a co-operative manner to establish an industry that will be one of the various avenues for the disposing of his fruit products.

Many fruit growers refuse to deliver apples to the canner if they see only about labor returned in making such delivery. This is wrong. The canner is entitled to his supply every season and the grower should never neglect any product that can be consumed, that brings returns to labor in the factory, even though only wages is returned to the grower.

There is a big consuming demand for canned apples and small fruits in the surrounding territory and further west? This trade can be taken over by our fruit growers if they will work with the cannery and furnish them a sure and steady supply of good fruit, that will enable the canner to develop a trade based on quality and an assured supply from season to season. The supplying of this trade will bring assurance and safety to the grower. Assurance that his annual fruit crop will find a ready market at its maturity. Safety for his labor and his investment, for the reason that disaster from an over supply or heavy crop cannot occur as the canner is on hand to absorb this over supply. Is not this proposition big enough to warrant serious consideration from the grower and support and consideration to the canner so as to create a condition as outlined.

The Chairman: The next paper or subject for an address will be by Prof. Laurence Green, Ames, Ia., upon the subject: "Cold Storage Investigations."

COLD STORAGE INVESTIGATIONS

Prof. Laurence Green, Ames, Ia.

Throughout the middle west a greater or less amount of summer apples is grown. In the main these apples are almost entirely a total loss to the producers. Our summer markets are glutted, the price is so low as to make their handling unprofitable. Cold storage offers an opportunity of holding this fruit for a short time, often not more than a week or ten days, until the markets are cleared when good profits could be realized. During the time for apple harvest in the fall of the year there are large quantities of fruit thrown upon the markets by growers, dealers and others which is low in quality. This fruit makes it extremely difficult to realize a profit on well-grown, well-graded fruit. Were it not for the cold storage facilities at hand it would often

mean the sale of good fruit at a sacrifice. Whereas the fruit may be held until late in the winter and sold when there is but little competition. Cold storage in other words lengthens the selling season both during the summer months and for the entire year. Cold storage of fruit as well as on other articles of food not only lengthens the season at which these commodities may be sold but it also lengthens the season in which they may be consumed thus giving the consumer a regular supply over a long period of time instead of glutted markets for a short time and unsupplied markets for the rest of the year.

Owing to the fact that contracting fruit prior to picking season usually results in the grower being dissatisfied, either because of too close grading if prices drop or only too apparent loss if they advance, this means of securing just what the market will justify should be investigated by the commercial apple man.

Maturity.

In selecting fruit for cold storage or in determining the proper time for picking for cold storage purposes certain well established facts are of importance. Only well ripened, well colored fruits should be used if best results are to be obtained. What are known as "hard-ripe" well colored fruits will keep much better and will scald less than those that are less mature. Over-ripe specimens will decay much quicker in storage than in the proper condition of ripeness.

In the cold storage investigations carried on in Iowa during the past several years it has been demonstrated repeatedly that the above facts are beyond question. Duplicate and even triplicate pickings of the same varieties from the same orchards have been made. Maturity apparently has a large influence upon scald and this question will be discussed under that head.

Immediate Storage.

After an apple is picked from the tree it ripens much more rapidly than it did before being picked. If the fruit is to be kept for any length of time its ripening process must be checked. Cooling checks these ripening processes, therefore, the cooling should begin as soon after picking as possible. Immediate storage of well ripened fruit will always give best results. Providing it becomes desirable to pick fruit before it is well colored, as may be the case with varieties like Grimes Golden which drop before properly coloring.

During some seasons, or in cases like the past year when it becomes necessary to pick before a freeze and also before the fruit is well colored, a delay in storage may prove beneficial in that it allows the fruit to reach the optimum degree of maturity before being stored. In this connection it is well to remember that the early varieties ripen much more rapidly when picked from the trees than do the later varieties due to the warmer weather. They should therefore be rushed

to storage as fast as possible. Oftentimes the later harvest season is so cool as to make the delays in storage of very little importance.

Size.

The size of the fruit has a direct bearing upon its keeping qualities. In placing fruit in cold storage do not select the overgrown specimens. The medium sized fruit keeps much longer.

The advantage of grading to accurate size before packing, whether in barrels or in boxes, is readily apparent when this fact is considered, as it offers opportunity to sell the larger sizes before they would naturally deteriorate while the smaller sizes may be held for later sales. Mixing sizes in boxes or barrels does not offer this opportunity.

In our experiments during the season of 1912 and 1913 a box of Rome Beauty apples containing 111 specimens showed 82.8 per cent in good condition and 17.2 per cent decayed on May 27th, while a box of 74 apples of the same variety contained only 45 per cent in good condition and 54 per cent decayed on the same date.

Jonathan, 200 apples to the box, contained an average of about 1 per cent decayed fruit when inspected on May 27th, while the same variety with 120 apples to the box showed an average of nearly 10 per cent decayed on the same date.

Wrappers.

The fruit wrapper is of use in cold storage in several ways. It prevents, to quite an extent, the bruising which usually results from handling and shipping to the storage plant. Oftentimes bruises from poor packing may be offset by the wrapper. Where fruit is wrapped, if one apple decays, the fruits surrounding it are protected from the disease and are thus prevented from decay. By preventing the escape of moisture from the surface of the apple, the wrapper will, to a limited extent, prevent the shriveling of the fruit. In our experience for several years we have found that the wrapper will delay the appearance of scald on varieties that show this trouble, for quite a period of time, depending somewhat upon the ripeness of the fruit and the variety. It has been stated that scald may be hastened by the wrapper in that it prevents respiration or breathing, leaving the fruit surrounded by a layer of poisonous gas, carbon dioxide. While we have no definite data upon this point, our experience, as has been stated, would indicate that the wrapper delays scald rather than hastens it.

Scald.

"Apple Scald" is the name applied to a trouble which develops on apples in cold storage especially, and sometimes in common cellar storage. It is a brown discoloration of the skin which does not injure the flesh of the apple, though rendering it unfit for marketing

purposes. The cause of apple scald is not well understood. Of the many theories which have been advanced, there are two which it seems have a more direct bearing upon the cause of the trouble. These two are temperature and maturity. From the experience of the past four years we are led to believe that maturity has more to do with scald than does temperature, except as temperature may have a bearing upon maturity. A well matured, well colored apple will not scald in cold storage. At least not as early as will poorly colored or immature fruits. I have never seen a fully colored red apple scald. The scald also follows the uncolored portions of the red varieties and does not appear on the red portions. During the fall of 1912 we had boxes of Grimes Golden, Sheriff, Mammoth Black Twig and Wine-sap, which were held in the packing shed for some time before being sent to the cold storage plant. This fruit showed very much less scald than that which was stored immediately. Other boxes of these same varieties were placed in a common cellar storage. These apples showed much less scald than either those delayed stored fruits and the cold storage fruits. In addition to these boxes, some fruit of the Mammoth Black Twig variety was sold to neighbors. Some of these apples were kept in the cellars without having been in cold storage. These apples showed no scald by April 1st, while the cold stored fruit was unfit for market at that time. It is my opinion that all of this fruit, whether delayed or cellar stored, had an opportunity to properly mature so that scald did not appear. While the cold stored fruit was not sufficiently matured to prevent scald. Some maintain that these varieties which show scald should be held at higher temperatures in order to prevent scald. Such may possibly be the case, but I am inclined to think that the only effect of higher temperatures is as it affects maturity.

Shriveling.

Shriveling is caused by the loss of moisture within the apple. There are several things that may cause the fruit to shrivel. One which has often been overlooked is skin-breaks, such as cracks, limb bruises, spray burn, etc. Probably the spray burn has seldom been thought to cause the fruit to shrivel by allowing the juices of the fruit or cell sap to evaporate, but such is the case. In selecting fruit for cold storage, especially for late spring storage, all skin breaks of any sort should be rejected. Such varieties as Ralls Genet, or Salome, which have a tendency to crack should not be stored for late consumption in seasons when this trouble is prevalent.

The question of shriveling must necessarily be closely related to the percentage of moisture in the atmosphere, or in other words to the relative humidity. Storing apples in a dry atmosphere will cause them to shrivel. Too moist an atmosphere, especially if the temperature is relatively high, is detrimental. The optimum humidity with a given temperature has never been determined so far as I am aware. Definite

plans for experiments looking toward a solution of this problem have been formulated by the Experiment Station at Ames.

Sod vs. Cultivated Fruit.

It has been our experience that the method of cultivation has had less to do with the keeping qualities of fruit than the maturity. The sodded orchards will ripen their fruit earlier than cultivated soils. Given the same degree of ripeness and the fruit will keep practically the same. Sod orchards will color the fruit better and therefore will tend to decrease the amount to scald on varieties susceptible to scald.

Packages.

The package tests have not given any very reliable results that would lead us to believe that one package was very much better than another for keeping apples. The smaller packages, such as boxes, will tend to reduce the amount of bruising from handling and will tend to cool down to storage temperatures quicker than the larger packages, like the barrel. If the fruit can be stored within a reasonable length of time, however, the package is not so important as the methods of handling. The old method of storing apples in loose lath crates is to be discouraged, however, as this kind of package will allow a greater loss of moisture than the closed package, thus causing greater shriveling.

Rate of Cooling of Apples in Storage.

It may be of interest to know how long it takes an apple to cool down to storage temperature when taken from the orchard to the storage plant. During the season of 1913, on August 29th, two boxes of Wealthy apples were placed in storage at 5 p. m. A thermometer was placed in each box with the bulb at the core of the center apple. The following table will show the rate of cooling:

8/29		8/30		8/30		8/31		9/1	
6:00 P. M.		11:00 A. M.		4:30 P. M.		4:30 P. M.		11:00 A. M.	
No. 1	66	58		55		44		40	
No. 2	73	62		58		44		39	
No. 1		Time	Drop	Time	Drop	Time	Drop	Time	Drop
No. 2		hours	8	hours	3	hours	11	hours	4
		17	11	5½	4	24	14	18½	5

It will be noted that box No. 1 was cooler than box No. 2. This is accounted for by the fact that No. 1 was picked the morning of the 29th while box No. 2 was picked the afternoon of the 28th, both were packed the forenoon of the 29th. It will also be noted that box No. 2 cooled more rapidly than No. 1. This was due to the fact the fruit was much smaller in No. 1.

Further evidence upon the rate of cooling in cold storage may be found below. It is of interest to note that the apples which were

picked in the morning were cooler by 7 degrees when they went into cold storage than were the apples which were picked the afternoon before and allowed to remain in the shed over night. This indicates the importance of picking early summer varieties, especially, early in the morning before they have become very warm. With the later varieties the weather is usually cool enough to prevent the fruit from becoming overheated even when picked while warm.

The rate of cooling indicates that it is wise to hasten the fruit to storage as soon as possible after packing, as it will take several days for it to cool to storage temperatures. If pre-cooling can be resorted to before storage, this will take the place of immediate storage.

Effect of Freezing on the Keeping Qualities of Apples.

Our cold storage men are often called upon to pay for damaged fruit. The usual claim is that the fruit has been frozen in cold storage. The storage men have usually tried to show that their temperatures have not been low enough to injure fruit. In all probability very little actual loss of fruit in our commercial storage houses could be traced directly to low temperatures. It is not uncommon that fruit is frozen upon the trees in the fall. When this fruit is gradually thawed out it makes good storage stock, but if the sun comes out hot the morning after a freeze and thaws the fruit rapidly, total loss is apt to result. Fruit picked before and after the freeze of 1909 on the 12th and 13th day of October showed but little difference in keeping quality. That picked after the freeze kept the better, probably due to the fact that it had been off the trees for a short time when it was placed in cold storage, and was also more nearly at the proper stage of ripeness for storage purposes.

Apples frozen in the lower layers of boxes which were next the floor immediately over a room known as a "sharp freezer" during the winter of 1909 and 1910 were uninjured except in the case of Wealthy. In the case of Stayman Winesap, which were frozen in this manner, the fruits were frozen twice, having been frozen on the trees in October. Nevertheless they were uninjured by this double freezing.

Apples in the center of the boxes subjected to 3 degrees below zero for over forty hours were cooled to 13 degrees with unwrapped apples and 20 degrees with wrapped apples. In both cases they were ruined. They were thawed out in a room temperature of 32 degrees. Apples kept in a room at 28 degrees and lowered to a temperature of 24 degrees were uninjured when thawed out.

The following table will show the rate of cooling of apples in cold storage in another experiment testing the effect of freezing temperatures:

Date	Time	Temp of room	Temp. of top of boxes	Temp. Jonathan not wrapped	Temp. Jonathan Wrapped	Temp. Ben Davis not wrapped
Jan 4	11:45 A. M.	19°	21½°	25.0	29.0	29.0
	1:45 P. M.	19	21½	28.5	28.1	29
	4:45 P. M.	19	—	28.1	28.1	28.1
Jan 5	8:45 A. M.	19	22	*	*	28.1
	11:45 A. M.	19	—	27.2	28.1	28.1
	5:00 P. M.	19	—	26.7	28.1	28.1
Jan 6	A. M.	19	20	26.3	27.2	26.3
	P. M.	19	**	21.8	25.4	22.7
Total	About 55 hrs.	Drop 0°	Drop 9°	Drop 7.5°	Drop 4.6°	Drop 6.2°

*Thermometers had been removed from apples so that no reading was possible.

**Outside apple at the core and temperature of the room was 19 degrees.

This fruit showed no effect of these low temperatures when thawed out at temperatures below the freezing temperature of water. Where thawed out gradually and at low temperatures, comparatively, there is little doubt but that apples will stand many degrees of freezing.

When apples are frozen on the trees they should not be picked or handled in any way until they are entirely thawed out. If they thaw slowly on the trees but little loss if any will result. Should the sun come out hot, total loss is almost certain. If picked when frozen finger marks are easily visible as are also all bruises from the box or handling. These latter cause decay as will any bruise. They completely ruin the appearance of the fruit for sale.

Cellar vs. Cold Storage.

With cellars properly built to facilitate a complete change of air on cold nights in the early fall, it would seem that certain varieties of apples might be kept to advantage at a less cost than in cold storage. Such varieties as Winesap and Mammoth Black Twig and similar varieties which scald badly in cold storage, can probably be kept to better advantage in such cellars. One great difficulty with cellar storage is that the fruit shrivels badly. This can be overcome in part by regulating the relative humidity in the cellar or cave. For early consumption varieties like Jonathan and Grimes Golden can also be kept in these cellars.

Another advantage of the cellar properly built is that it offers storage space for fruit removed from cold storage after the warm days of fall are passed. By paying two months storage fruit may then be removed with but little loss in keeping qualities to the cellar, which by that time should be cooled to a sufficiently low temperature. But for the long storage season, greatly for extending the marketing period, cold storage is necessary with most varieties of apples.

MISCELLANEOUS PAPERS AND REPORTS.

The papers found in the remaining pages of the report have appeared in "Nebraska Horticulture" during the past year. As they all have a bearing on some phase of horticulture work in Nebraska during 1914, it has been thought best to preserve them in permanent form.

Secretary.

RECOMMENDED LIST OF HARDY FRUITS, FLOWERS, AND PLANTS INCLUDING SHRUBBERY, SHADE AND ORNAMENTAL TREES, EVERGREENS, ETC.

Report of Committee:

We, your committee on revision of the recommended list for the fruit districts of Nebraska, wish to submit the following report prefaced by a few words of information.

A large part of the state, especially the older parts including the eastern and southeastern, can grow many times the number of varieties that we have placed in this recommended list. We find that hundreds of varieties of apples can be quite successfully grown in many sections and in considering all these varieties, we have picked out the ones in the following list.

As a guide to the planter in selecting the varieties of trees for his district we have marked the varieties that should be planted in the largest numbers with two stars (**) and those desired in lesser numbers with one star (*) and those not starred at all should be planted in still lesser numbers.

Guide in Using Recommended List.

We have prepared a list of apples for home apple orchard in District No. 2 about as we would plant it; and have chosen the varieties according to the starred and unstarred varieties as found in the recommended list for that district.

Summer.

- Two Yellow Transparent (one star.)
- Three Duchess (two stars).
- Two Chenango Strawberry (one star).

Autumn.

- One Warfield (not starred).
- Five Wealthy (two stars).
- Two Utters Red (one star).
- Two Maiden Blush (one star).
- One Ramsdell Sweet (no star).

Winter.

- Four Grimes Golden (one star).
- Six Jonathon (two stars).
- Five Windsor (one star).
- Six Winesap (two stars).

Four Ben Davis (one star).
Two Black Twig (no stars).
Three Janet (no star).
Two Delicious (no stars).

Crab Apples.

Two Whitney (one star).
Two Florence (one star).
Hyslop (no star).

Care of Young Orchard.

In order to care for an orchard economically it is advisable to make use of the land between the trees.

The family garden can be grown in the orchard and furnish a liberal supply of all kinds of vegetables for summer and winter use.

In those portions of the state where rainfall is sufficient or irrigation is practiced and small fruits thrive; enough strawberries, raspberries, gooseberries and currants can be grown between the trees to supply the family needs and in favorable seasons have a surplus for market.

Corn (either sweet corn or any field variety) is one of the best crops to grow in the young orchard.

We must cultivate the vegetables, small fruits or corn and in so doing we are cultivating the trees.

An example of intercropping is cited that has come to our notice and shows what can be done along this line.

One orchard in Cass county has been cropped to corn as above advocated. The rows of trees are 33 feet apart and at the seventh year the owner was still raising five rows of corn in each of the strips between the rows of trees. This little orchard of 150 trees which occupied about 4 acres of land produced in 1911 the seventh year from planting 200 bushels of Jonathan and Gano apples and 80 bushels of corn.

CAUTION: We must not forget that we are growing an orchard and the crops grown between the trees are to utilize the land until the trees are large enough to take the entire area. Be careful in planting the crop in the young orchard to allow ample space along the row of trees so that they may be carefully cultivated and yet not be injured by having limbs or bark on the trunk broken by cultivator or horses.

LIST OF FRUITS SUITABLE FOR NEBRASKA.

ARRANGED ACCORDING TO THE HORTICULTURAL DISTRICTS OF THE STATE.*

For District No. 1.—Comprising Richardson, Nemaha, Otoe, Johnson, and Pawnee, we recommend the following for general planting:

APPLES: Summer—**Duchess, Cooper's Early White, Cole's Quince, Early Harvest, Lowell, *Yellow Transparent. *Chenango Strawberry, American Summer Pearmain.

Fall—**Wealthy, *Maiden Blush, Fameuse, Dyer, Ramsdell Sweet, Fulton Strawberry, Warfield, Porter Fulton.

Winter—**Winesap, **Jonathan, *Grimes Golden, Pippin, **Gano, *Ben Davis, Rome Beauty, Missouri Pippin, Virginia Beauty, Black Twig, York Imperial, Arkansas Black.

For Trial—Delicious, Senator.

CRAB APPLE: *Florence, Hyslop, Siberian, *Whitney No. 20, Yellow Siberian.

PEARS: Standard or Dwarf, Kieffer, Bartlett, Sheldon, Seckel, Garber, Beurre Hardy, Clapp's Favorite. For Trial—Lincoln.

CHERRIES: Early Richmond, Montmorency. For Trial—The Dukes.

PLUMS: American—Forest Garden, Wild Goose, Wyant, Wolf, and Stoddard. Jaanese—Burbank. For Trial—Burwood, Admiral Schley, America.

PEACHES: Alexander, Early Rivers, Triumph, Hale's Early, Russel, Champion, Crosby, Hill's Chilli, Heath Cling, Salway and Wright.

GRAPES: Concord, Worden, Moore's Early, Niagara, Moore's Diamond, Woodruff Red and Brighton. For Trial—Campbell's Early.

BLACKBERRIES: Snyder, Early Harvest, Mersereau.

RASPBERRIES: *Cumberland, Kansas, Gregg, *Plum Farmer, Cardinal (Purple), Turner (Red).

STRAWBERRIES: *Senator Dunlap, Warfield, Bederwood, Crescent, Gandy. For Trial—Progressive.

CURRENTS: Victoria, White Grape and Cherry.

GOOSEBERRIES: Downing and Houghton.

COMPASS-CHERRY PLUM: For jells and jams.

For District No. 2.—Comprising Cass, Sarpy, Douglas, Washington, Burt, Dodge, Saunders counties, we recommend the following for general planting:

APPLES: Summer—**Duchess, *Yellow Transparent, Cole's

*See map for horticultural districts.

Quince, Dyer, Red Astrachan, *Chenango Strawberry, American Summer Pearmain, Benoni.

Autumn—**Wealthy, *Utter's Red, *Maiden Blush, Ramsdell Sweet, Flora Belle, Famuese, Warfield, Porter.

Winter—*Ben Davis, *Gano, **Winesap, *Windsor, **Jonathan, *Grimes Golden, Janet, N. W. Greening, Salome, *Black Twig, Isham Sweet and Missouri Pippin. For trial—Delicious, Stayman Winesap.

CRAB APPLES: *Whitney No. 20, Hyslop, Florence, Golden Beauty.

PEARS: Standard or Dwarf, Kieffer, Flemish Beauty, Sheldon, Burkett, Duchess, L. B. DeJersey.

CHERRIES: Early Richmond, Montmorency, English Morello. For Trial—The Dukes, Terry.

APRICOTS: Russians, Moorpark.

PEACHES: Alexander, Triumph, Russel, Champion, Crosby, Matthews' Beauty and Wright for general planting in Cass and Sarpy counties and for trial in balance of district.

PLUMS: American—Wild Goose, Wyant, Wolf, Stoddard, Hawkeye, Desota, Forest Garden. European—Lombard, Shipper's Pride, Imperial Gage and Damson. For Trial—Burwood, Admiral Schley, America.

GRAPES: *Concord, Worden, Moore's Early, Agawam, Brighton, Pocklington, Moore's Diamond and Woodruff. For Trial—Campbell's Early.

BLACKBERRIES: Snyder.

RASPBERRIES: Nemaha, Palmer, Cumberland, and Cardinal.

STRAWBERRIES: *Senator Dunlap, Bederwood, Crescent and Warfield. For Trial—Progressive.

GOOSEBERRIES: Downing, Houghton.

CURRENTS: Victoria, Cherry, White Grape, North Star, Perfection.

COMPASS-CHERRY PLUM: For jells and jams.

For District No. 3.—Comprising Stanton, Thurston, Wayne, Dakota, Dixon and Cedar counties, we recommend the following for general planting.

APPLES: Summer—*Yellow Transparent, **Duchess, Red Astrachan and Sweet June.

Autumn—**Wealthy, *Utter's Red, Flora Belle, Famuese, *Ramsdell Sweet, *Maiden Blush and Plum Cider.

Winter—*N. W. Greening, *Salome, *Janet, Ben Davis, Gano and Winesap, Black Twig, Iowa Blush, Jonathan, Windsor. For Trial—Delicious.

CRAB APPLES: *Whitney No. 20, Hyslop, Florence and Shields.

PEARS: Standard or Dwarf, Kieffer, Flemish Beauty, Sheldon, Duchess, Burkett, L. B. DeJersey for trial only.

CHERRIES: Early Richmond, *Montmorency, English Morello. For Trial—Terry and the Dukes.

PEACHES: Alexander, Triumph, Crosby and Wright for trial only.

PLUMS: American—Wyant, Wolf, Wild Goose, Forest Garden and Stoddard. European—Lombard and Imperial Gage. For Trial—Larson, Burwood and Admiral Schley.

GRAPES: Concord, Worden, Moore's Early, Moore's Diamond. For Trial—Campbell's Early.

BLACKBERRIES: Snyder.

RASPBERRIES: Nemaha, Palmer, Cumberland and Cardinal.

STRAWBERRIES: Senator Dunlap, Bederwood, Crescent and Warfield. For Trial—Progressive.

CURRANTS: Victoria, White Grape, Cherry, Perfection and North Star.

GOOSEBERRIES: Downing, Houghton.

COMPASS-CHERRY PLUM—For jells and jams.

For District No. 4.—Comprising Gage, Jefferson, Saline, and Lancaster counties, we recommend the following for general planting:

APPLES: Summer—*Yellow Transparent, **Duchess, Cooper's Early White, Chenango Strawberry, Early Harvest, Red June and Sweet June.

Autumn—**Wealthy, *Maidens Blush, Famuese and Utter's Red.

Winter—**Ben Davis, **Gano, **Winesap, **Jonathan, *Grimes Golden, Missouri Pippin, N. W. Greening and Salome. For Trial—Delicious and Windsor.

CRAB APPLES: *Whitney No. 20, Hyslop, *Florence, Red and Yellow Siberian.

PEARS: Duchess, Flemish Beauty, Seckel, Kieffer and Sheldon.

CHERRIES: *Early Richmond, *Montmorency and English Morello.

PEACHES: Alexander, Early Rivers, Triumph, Russel, Champion, Crosby, Hill's Chilli, Heath's Cling, Salway and Wright.

PLUMS: American—Wyant, Hawkeye, Wild Goose and Forest Garden. For Trial—Burwood, Admiral Schley.

GRAPES: Concord, Worden, Moore's Early, Moore's Diamond and Woodruff Red. For Trial—Campbell's Early.

BLACKBERRIES: Snyder, Early Harvest.

RASPBERRIES: Kansas, Palmer, Gregg, Turner, Cumberland and Cardinal.

STRAWBERRIES: Senator Dunlap, Bederwood, Crescent, Warfield. For Trial—Progressive.

GOOSEBERRIES: Downing, Houghton. For Trial—Industry.

CURRANTS: Cherry, Victoria, White Grape and North Star.

COMPASS-CHERRY PLUM: For jells and jams.

For District No. 5.—Comprising Thayer, Nuckolls, Fillmore and Clay counties, we recommend the following for general planting:

APPLES: Summer—**Duchess, Cooper's Early White, Cole's Quince, Sweet June, *Yellow Transparent.

Autumn—Maiden's Blush, **Wealthy, Famuese and Warfield.

Winter—**Ben Davis, **Gano, **Winesap, *Jonathan; *Grimes Golden, Janet, Missouri Pippin, N. W. Greening. For Trial—Delicious, Stayman Winesap.

PEARS: Standard or Dwarf, Flemish Beauty, Kieffer and Duchess.

CRAB APPLES: **Whitney No. 20, Hyslop, **Florence, Golden Beauty.

CHERRIES: *Early Richmond, *Montmorency, English Morello.

PEACHES: Alexander, Hale's Early, Early Rivers, *Russel, *Champion, Triumph, Heath's Cling, Wright and *Crosby.

PLUMS: American—Wild Goose, Forest Garden, Wolf, Stoddard, Wyant. European—Lombard, Imperial Gage.

GRAPES: *Concord, Worden, Moore's Early, Agawam and Niagara. For Trial—Campbell's Early.

BLACKBERRIES: Snyder.

RASPBERRIES: Nemaha Cumberland and Cardinal.

STRAWBERRIES: Senator Dunlap, Bederwood, Crescent and Warfield.

DEWBERRIES: Lucretia.

GOOSEBERRIES: Downing and Houghton.

CURRENTS: Cherry, Victoria, White Grape and North Star.

COMPASS-CHERRY PLUM. For jells and jams.

For District No. 6—APPLES: comprising Seward, Butler, Polk, York, and Hamilton counties, we recommend the following for general planting:

Summer—**Yellow Transparent, Early Harvest, Cooper's Early White, Red June, Sweet June, Estelle, *Chenango, Strawberry and **Duchess.

Autumn—**Wealthy, *Maiden Blush, Wolf River, Peerless, Snow and Warfield.

Winter—**Winesap, *Missouri Pippin, *Ben Davis, North Western Greening, Janet, Salome, Walbridge, Ingram, M. B. Twig, *Gano, Jonathan, *Grimes Golden, York Imperial, Staymen Winesap, Arkansas Black, Senator, Windsor. For Trial—Delicious.

CRAB APPLE: *Whitney No. 20, *Florence, *Golden Beauty, Hyslop.

PEARS: Standard or Dwarf, *Flemish Beauty, Seckel, *Duchess, Garber and Kieffer.

CHERRIES: *Early Richmond, English Morello, *Large Montmorency. For Trial—May Duke, Late Duke and Windsor.

COMPASS-CHERRY PLUM: For jells and jams.

PLUMS: American—Wyant, Wolf, Weaver, DeSota, Forest Garden, Stoddard, Hawkeye, Admiral Schley, Burwood, America. European—Lombard, German Prune, Shipper's Pride and Imperial.

APRICOTS: Russian varieties.

PEACHES. Alexander, Early River, Triumph, Hale's Early, Russel, Champion, Crosby, Hill's Chilli, Wright, Bokara and Elberta.

GRAPES: *Concord, Worden, Moore's Early, Campbell's Early, Elvira, Niagara, Wyoming Red, Woodruff, Agawam and Pocklington.

DEWBERRIES: Lucretia.

BLACKBERRIES: Snyder.

RASPBERRIES: Gregg, *Cumberland, Ohio, Cardinal.

CURRENTS: Victoria, North Star, Cherry, White Grape, Pomona, Wilder and Perfection.

GOOSEBERRIES: Downing and Houghton.

STRAWBERRIES: Senator Dunlap, Warfield, Sample, Aroma and Haverland.

District No. 7.—Comprising Colfax, Platte, Boone, Nance and Merrick counties, we recommend for general planting the following:

APPLES: Summer—*Yellow Transparent and **Duchess.

Autumn—**Wealthy, *Utter's Red, *Ramsdell Sweet, Plum Cider, Flora Belle, Famuese, Maiden Blush and Warfield.

Winter—*Ben Davis, *Gano, Winesap, Janet, *N. W. Greening, Iowa Blush and Missouri Pippin, *Salome, *Black Twig and Windsor. For Trial—Delicious and Stayman Winesap.

CRAB APPLES: *Whitney No. 20, Hyslop, *Florence.

PEARS: Standard or Dwarf, Kieffer, Sheldon, Flemish Beauty, L. B. DeJersey and Birkett.

CHERRIES: *Early Richmond, Montmorency, English Morello. For Trial—Terry and the Dukes.

PEACHES: For Trial Only—Alexander, Triumph, Champion, Russel and Wright.

APRICOTS: Fully as hardy as the hardiest peaches.

PLUMS: American—Wild Goose, Wyant, Forest Garden, Stoddard. European—Lombard, Imperial Gage. For Trial—Burwood and Admiral Schley.

GRAPES: Concord, Worden, Moore's Early, Elvira and Moore's Diamond.

BLACKBERRIES: Successful in favored localities—Snyder.

RASPBERRIES: Nemaha, Cumberland and Palmer, Cardinal, successful in favored localities.

STRAWBERRIES: *Senator Dunlap, *Warfield, Crescent and Bederwood. For Trial—Progressive.

CURRENTS: Victoria, White Grape, North Star.

GOOSEBERRIES: Downing and Houghton.

COMPASS-CHERRY PLUM: For jells and jams.

For District No. 8.—Comprising Madison, Pierce, Antelope and Knox counties, we recommend the following for general planting.

• APPLES: Summer—**Duchess, *Yellow Transparent, Red Astrachan.

Autumn—**Wealthy, *Utter's Red, Plumb's Cider, Flora Belle,

Snow, Ramsdell Sweet, Maiden Blush and Warfield.

Winter—*N. W. Greening, Ben Davis, Gano, Winesap, Black Twig, Iowa Blush, Walbridge, *Janet, *Salome, Windsor.

CRAB APPLES: *Whitney No. 20, Hyslop, *Florence, Golden Beauty.

PEARS: Standard or Dwarf. For Trial Only—Kieffer, Sheldon, Flemish Beauty, L. B. DeJersey and Birkett.

CHERRIES: *Early Richmond, *Montmorency and English Morello.

PEACHES: For Trial Only—Alexander, Wright and Crosby.

PLUMS: American—*Wyant, *Wolf, DeSota, Forest Garden, Stoddard and Wild Goose. For Trial—Lombard, Imperial Gage, Admiral Schley, Burwood.

GRAPES: Concord, Worden, Moore's Early, Moore's Diamond. Grapes should be covered in winter to insure success.

BLACKBERRIES: Snyder.

RASPBERRIES: First choice for river counties and for trial in balance of district, Nemaha, Palmer, Cumberland and Cardinal.

STRAWBERRIES: *Senator Dunlap, *Warfield, Bederwood and Crescent.

GOOSEBERRIES: Downing and Houghton.

CURRENTS: Victoria, White Grape and North Star.

For District No. 9.—Comprising Holt, Boyd, Keya Paha, Brown and Rock counties, we recommend the following for general planting:

APPLES: Summer—*Duchess, *Yellow Transparent, Red Astrachan.

Autumn—*Wealthy, *Utter's Red, Maiden Blush and Plumb's Cider.

Winter—*Salome, **N. W. Grening, *Janet, Iowa Blush, *Winesap, *Walbridge, Ben Davis and Gano.

CRAB APPLES: *Whitney No. 20, Hyslop and *Florence, Golden Beauty.

PEARS: Dwarf and Standard. For Trial Only—Kieffer, Flemish Beauty and Birkett.

CHERRIES: Early Richmond, Montmorency and English Morello.

PEACHES: For Trial Only—Alexander, Wright and Crosby.

PLUMS: American—Wyant, Wolf, Stoddard, DeSota and Forest Garden.

COMPASS-CHERRY PLUM: For jells and jams.

GRAPES: Concord, Worden, Moore's Early, Beta, Moore's Diamond. Grapes should be covered in winter to insure success.

BLACKBERRIES: For Trial Only—Snyder.

RASPBERRIES: Cumberland, Nemaha and Sunbeam.

STRAWBERRIES: *Senator Dunlap, Bederwood, Crescent and *Warfield. For trial—Progressive.

CURRENTS: Victoria, White Grape, North Star.

GOOSEBERRIES: Downing and Houghton.

For District No. 10.—Comprising Howard, Greeley, Wheeler, Garfield, Valley, Sherman, Custer, Loup and Blaine counties, we recommend the following for general planting:

APPLES: Summer—*Yellow Transparent, **Duchess.

Autumn—**Wealthy, Maiden Blush, *Utter's Red and Patton Greening.

Winter—Missouri Pippin, *Ben Davis, **N. W. Greening, Salome, Walbridge, Janet, *Gano, Iowa Blush and *Winesap.

CRAB APPLES: *Whitney No. 20, *Florence, Golden Beauty and Hyslop.

PEARS: Dwarf or Standard. For Trial Only—Flemish Beauty, Kieffer and Birkett.

CHERRIES: Early Richmond, Montmorency and English Morello.

PEACHES: Alexander, Triumph, Russel, Crosby and Wright.

APRICOTS: Russian varieties.

PLUMS: American—Wyant, Wolf, DeSota, Forest Garden, Standard. For Trial—Admiral Schley and Burwood.

GRAPES: Concord, Worden, Moore's Early, Elvira, Moore's Diamond. Grapes should be covered in winter.

BLACKBERRIES. Snyder in favored places.

RASPBERRIES: Cumberland, Nemaha. Trial—Sunbeam and Cardinal.

STRAWBERRIES: *Senator Dunlap, *Warfield, Crescent and Bederwood. For Trial—Progressive.

CURRENTS: Victoria, White Grape and North Star.

GOOSEBERRIES: Downing and Houghton.

COMPASS-CHERRY PLUM: For jells and jams.

For District No. 11.—Comprising Hall and Buffalo counties, we recommend the following for general planting:

Apples: Summer—*Yellow Transparent, Early Harvest, Cooper's Early White and Duchess.

Autumn—**Wealthy, *Maiden Blush, Wolf River and Snow.

Winter—**Winesap, *Missouri Pippin, *Ben Davis, N. W. Greening, Janet, Walbridge, M. B. Twig, *Gano, Jonathan, Grimes Golden. For Trial—Salome, Stayman Winesap.

APRICOTS: Russian varieties.

CRAB APPLES: *Whitney No. 20, *Florence, Golden Beauty and Hyslop.

PEARS: Dwarf or Standard, Flemish Beauty, Kieffer, Garber, Louise B. De Jersey.

CHERRIES: Early Richmond, Montmorency, English Morrello.

PEACHES: Early Rivers, Triumph, Hale's Early, Russel, Champion, *Crosby, Wright, Elberta.

PLUMS: American—Wolf, DeSota, Forest Garden, Stoddard, Wyant. European—Lombard, German Prune, Bradshaw. For Trial—Burwood and Admiral Schley.

GRAPES: Concord, Worden, Moore's Early and Elvira.

BLACKBERRIES: Snyder in favored places.

RASPBERRIES: Cumberland and Nemaha.

STRAWBERRIES: Senator Dunlap, Warfield, Bederwood and Crescent. Grape and North Star.

CURRANTS: Victoria, Cherry, White Grape and North Star.

GOOSEBERRIES: Downing and Houghton.

For District No. 12.—Comprising Adams, Webster, Franklin, Kearney, Phelps, and Harlan counties, we recommend the following for general planting:

APPLES: Summer—Yellow Transparent, Early Harvest, Cooper's Early White and **Duchess.

Autumn—**Wealthy, Maiden Blush, Wolf River.

Winter—*Winesap, *Missouri Pippin, **Ben Davis, N. W. Greening, Salome, **Gano, Jonathan, *Janet. For Trial—Stayman Winesap, Cole's Quince and Walbridge.

CRAB APPLES: *Whitney No. 20, *Florence, Golden Beauty.

Pears: Dwarf or Standard, Flemish Beauty and Kieffer. For Trial—Garber.

CHERRIES: Early Richmond, Montmorency, English Morello.

APRICOTS: Russian varieties.

PEACHES: Early Rivers, Triumph, Hale's Early, Champion, Crosby, Elberta, Wright, Russel.

PLUMS: American—Wyant, Wolf, DeSota, Forest Garden and Stoddard, Hawkeye. European—Lombard, German Prune and Bradshaw.

GRAPES: Concord, Worden, Moore's Early, Elvira.

BLACKBERRIES: Snyder in favored places.

RASPBERRIES: Cumberland, Kansas and Nemaha. For Trial—Cardinal.

STRAWBERRIES: *Senator Dunlap, *Warfield, Crescent and Bederwood. For Trial—Progressive.

CURRANTS: Victoria, Cherry, White Grape and North Star.

GOOSEBERRIES: Downing and Houghton.

For District No. 13.—Comprising Furnas, Gosper, Frontier and Red Willow counties, we recommend the following for general planting:

APPLES: Summer—**Duchess, *Yellow Transparent, Cooper's Early White.

Autumn—**Wealthy, *Maiden Blush, Wolf River.

Winter—*Winesap, *Missouri Pippin, *Janet, **Ben Davis, **Gano, Grimes Golden, Jonathan, N. W. Greening. For Trial—Delicious and Stayman Winesap.

CRAB APPLES: *Whitney No. 20, *Florence, Hyslop, Golden Beauty.

PEARS: Dwarf or Standard. For Trial Only—Wilder, Sheldon, Flemish Beauty and Kieffer.

CHERRIES: Early Richmond, Montmorency and English Morello.

PEACHES: Early Rivers, Hale's Early, Triumph, Russel, Champion, *Wright, *Crosby and Elberta.

PLUMS: American—Forest Garden, Hawkeye, Wyant and DeSota and Minor.

APRICOTS: Russian varieties.

GRAPES: Concord, Elvira, Moore's Early, Worden, Wyoming Red, Moore's Diamond.

STRAWBERRIES: Warfield, Bederwood, Crescent and *Senator Dunlap.

GOOSEBERRIES: Downing and Houghton.

CURRANTS: Victoria, Cherry, White Grape and North Star.

For District No. 14.—Comprising Dawson, Lincoln and Keith counties, we recommend the following for general planting:

APPLES: Summer—**Duchess, Early Harvest and **Yellow Transparent.

Autumn—*Wealthy.

Winter—**Ben Davis, **Winesap, *Janet, *Missouri Pippin, Jonathan and N. W. Greening.

CRAB APPLES: **Whitney No. 20, *Hyslop, **Florence, Golden Beauty.

CHERRIES: Early Richmond, English Morello and Montmorency.

PEACHES: Alexander, Early Rivers, Champion, Crosby, Wright, Hill's Chili, Elberta, Russel.

PLUMS: American—Wyant, DeSota, Forest Garden, Hawkeye and Wolf. For Trial—Burwood, Admiral Schley, America.

GRAPES: Moore's Early, Worden, Elvira, *Concord, Woodruff Red, Niagara.

BLACKBERRIES: Snyder.

RASPBERRIES: Cumberland, Cardinal and Kansas.

STRAWBERRIES: *Senator Dunlap, Bederwood, Crescent and Warfield.

CURRANTS: Victoria, White Grape, Wilder, North Star, Crandall, Currant.

GOOSEBERRIES: Downing and Houghton.

For District No. 15.—Comprising Hitchcock, Hayes, Perkins, Chase and Dundy counties, we recommend the following for general planting:

(This district same as No. 14.)

For District No. 16.—Comprising Logan, Thomas, Hooker, McPherson, Arthur and Grant counties, we recommend the following for

general planting:

APPLES: Summer—**Duchess, *Yellow Transparent.

Autumn—Wealthy.

Winter—Walbridge, **N. W. Greening, Iowa Blush.

In favorable locations varieties named for District No. 15 may be planted.

CRAB APPLES: *Whitney, Hyslop, *Florence, Golden Beauty.

CHERRIES: Early Richmond, Montmorency and English Morello.

PLUMS: American—Stoddard, DeSota, Forest Garden, Wolf and Wyant.

RASPBERRIES and BLACKBERRIES: Same as District 15, in favored locations.

STRAWBERRIES: Senator Dunlap, Warfield, Bederwood, Crescent, in favored locations.

For District No. 17.—Cherry county, we recommend the following for general planting on dry land with good care:

DUPLICATE LIST FOR DISTRICT NO. 9.

For District No. 18.—Comprising Box Butte, Dawes, Sioux and Sheridan counties we recommend the following:

APPLES: Summer—**Duchess, Estelle, Red June, Astrachan and **Yellow Transparent.

Autumn—**Wealthy, Charlemhoff, Hibernial, Summer Queen.

Winter—Janet, Longfield. For Trial—Black Ben Davis, Gano, Ben Davis.

Any varieties recommended for districts 3, 8 and 9 will do well most places under irrigation.

CRAB APPLES: *Whitney No. 20, **Florence, Transcendent, and Golden Beauty.

PEARS. Flemish Beauty, Birkett, B. Anjou.

CHERRIES: Early Richmond, Montmorency, English Morello and Wragg.

COMPASS-CHERRY PLUM: For jells and jams.

PLUMS: American—Wyant, Klondyke, DeSota, Larson, Stoddard, Wolf. For Trial—Burwood, Admiral Schley.

PEACHES: For Trial—Alexander and Wright.

GRAPES: Concord, Elvira, Beta, Worden, Moore's Early. Protection in winter.

BLACKBERRIES: Snyder.

RASPBERRIES: Cumberland, Kansas and Cardinal.

CURRANTS: Victoria, Cherry, North Star, Red Dutch, White Grape, Wilder and Perfection.

GOOSEBERRIES: Downing and Houghton.

STRAWBERRIES: Senator Dunlap, Warfield, Bederwood and Crescent.

For District No. 19.—Comprising Duel, Garden, Morrill, Cheyenne, Scotts Bluff, Banner and Kimball counties we recommend the following for general planting:

APPLES: Summer—**Duchess, *Yellow Transparent and Cooper's Early White.

Autumn—**Wealthy.

Winter—Ben Davis, Gano, **Janet, Grimes Golden, Iowa Blush, *N. W. Greening, Patton's Greening and *Missouri Pippin. For Trial—Salome and Delicious.

CRAB APPLES: *Whitney No. 20, Hyslop, *Florence, Golden Beauty.

PEARS: Dwarf or Standard, Flemish Beauty and Kieffer.

CHERRIES: Early Richmond, Montmorency and English Morello.

PLUMS: American—Forest Garden, Wolf, DeSota, Stoddard and Wyant.

GRAPES: Concord, Moore's Early, *Beta.

RASPBERRIES: Cumberland, Kansas. For Trial—Sunbeam.

STRAWBERRIES: *Warfield, *Senator Dunlap, Crescent and Bederwood. For Trial—Progressive.

GOOSEBERRIES. Downing and Houghton.

CURRENTS: Red Dutch, *Victoria, *White Grape and *North Star.

BLACKBERRIES: For Trial—Dwarf Juneberry and Dewberries.

LIST OF ORNAMENTALS FOR GENERAL PLANTING.

Including shrubs, roses, vines, bulbs, etc., which applies to the entire state except where otherwise specified.

Hardy Shrubs.

Flowering Almond (Pink and White.)
Purple Berberry.
Buckthorn.
Caragana.
Bush Honeysuckle (Lonicera.)
Flowering Currant.
Deutzia.
Dogwood, Flowering.
Elaeagnus (Wild Olive.)
Elder, Golden Leaf.
Exochorda.
Flowering Crab, Bechtols'.
Forsythia.
Fringe Tree.
Hydrangeas.
High Bush Cranberry.
Japan Quince.
Lilacs.
Privet.
Rosa Rugosa.
Snowball.
Snowberry.
Sumach.
Spireas.
 Arguta.
 Ash Leaved.
 Billardi.
 Bridal Wreath.
 Bumaldi.
 Anthony Waterer.
 Douglas.
 Golden Leaved.
 Nine Bark.
 Thunbergii.
 Van Houtti.
Philadelphus. Mock Orange or Syringa.
Tamarix Amurensis.

Wahoo.
 Weigelia.
 Viburnum opules (var. Sterilis) Snowball tree.
 Viburnum (Arrowwood.)
 Viburnum Lantana (Wayfaring tree.)
 Viburnum Lentago (Sheepberry.)
 Viburnum Opules (High Bush Cranberry.)

Evergreen Shrubs.

Yucca Filamentosa.

Bulbs and Tubers.

Peonies.
 Tulips.
 Lilies.
 Dahlias.
 Gladioli.
 Tuberoses.
 Crocus.
 Jonquils.
 Caladium, Elephant's Ear.
 Cannas.

Perennials.

Asters.
 Boltonia.
 Bleeding Heart.
 Campanula.
 Coreopsis.
 Columbine.
 Chrysanthemums.
 Daisy, Shasta.
 Dianthus, Sweet William.
 Funkia, Day Lily.
 Fox Glove.
 Hibiscus.
 Hollyhocks.
 Iberis Sempervieens, Candytuft.
 Iris.
 Gaillardia, Blanket Flower.
 Golden Glow.
 Gypsophila.
 Larkspur.
 Oriental Poppy.
 Phlox, Assorted.
 Platycodon, Chinese Bell Flower.
 Tritoma, Red Hot Poker.

Climbing Vines.

American Ivy (Englemanni.)
 Honeysuckles.

Wistaria.
 Trumpet Vine.
 Clematis.
 Bitter Sweet.

Climbing Roses.

Crimson Rambler.
 White Rambler.
 Wichurania Creeper.
 Prairie Queen.
 Baltimore Belle.
 Dorothy Perkins.

June Roses.

Harrison's Yellow.
 Persian Yellow.
 Madam Plantier.

Moss Roses.

Luxembourg.
 Crested Moss.
 Glory of Mosses.
 White Moss.

Hybrid Perpetuals.

Frau Karl Druschki.
 Alfred Colomb.
 Anne De Diesbach.
 Margaret Dickson.
 Baron De Bonstetton.
 Prince Camille De Rohn.
 Marshall P. Wilder.
 Tom Wood.
 Coquette Des Alps.
 General Jaquemot.
 John Hopper.
 Ulrich Bruner.
 Paul Neyron.
 Magna Charta.
 Fisher Holmes.
 Jules Margotten.
 Mrs. John Lang.
 Gen. Washington.
 Soliel D'Orr.

Polyantha.

Clotilde Soupert.
 Pink Soupert.
 White Baby Rambler.
 Pink Baby Rambler.
 Red Baby Rambler.
 Baby Dorothy Perkins.

Hybrid Teas.

Gruss an Teplitz.
 Kaiserin Augusta Victoria.
 Killarney (Pink and White.)
 La France (Pink and White.)
 MaMan Cochet.

**FOREST TREES, ORNAMENTAL TREES AND
 HEDGES FOR NEBRASKA.**

Weeping Trees.

Niota Weeping Willow.
 Teas' Weeping Mulberry.
 Weeping Mountain Ash.
 Camperdown Weeping Elm.
 Cut Leaf Weeping Birch.
 Wisconsin Weeping Willow (East part State.)

Ornamental Hedge.

Buckthorn.
 Berberry.
 Japan Quince.
 Spirea.
 Amurensis Privet.
 Tamarix Amurensis.

Common Hedge.

Osage Orange.
 Honey Locust.
 Russian Mulberry.
 Russian Olive.

Ornamental Shade Trees.

Golden Poplar (For Trial.)
 Hackberry.
 Sycamore (S. E. part of state.)
 Mt. Ash.
 Black Walnut.
 Butternut.
 Ash.
 Soft Maple.
 American Elm.
 English Elm.
 Purple Leaf Elm (English.)
 European Larch (East part.)
 Kentucky Coffee Tree.
 Red Bud.
 Tulip Tree (East part.)
 Magnolia Ocuminata.

Wild Black Cherry.
 American Linden.
 White Birch.
 Horse Chestnut (East part of state.)
 Sweet Chestnut (East part of state.)
 Russian Olive.
 Oaks.
 Hard Maple (East part of state.)
 Hard Maple (Norway.)
 Hard Maple Schwederlii (Purple leaf.)
 Hard Maple (American.)
 Wier's Cut Leaf Maple.
 Catalpa Speciosa (East part of state.)
 Catalpa Bungei (East part of State.)

Forest Trees.

Black Locust (Extreme West.)
 **Elm.
 *Ash.
 *Soft Maple.
 Catalpa Speciosa (East half.)
 Walnut, Black.
 Carolina Poplar.
 Honey Locust (Hardy anywhere.)
 Russian Mulberry (Except extreme west.)
 Osage Orange.
 Box Elder.
 Cotton Wood.
 Norway Poplar.

Evergreens.

**Black Hills Spruce.
 *Pungens.
 *Englemon Spruce.
 Douglas Spruce (Extreme Eastern part.)
 Concolor.
 **Jack Pine (Wind breaks and groves.)
 **Ponderosa Pine.
 *Scotch Pine.
 White Pine (Extreme East part.)
 Balsam Fir (Extreme East part.)
 Norway Spruce (East part.)
 **Austrian Pine.

Committee of Final Revision.

G. A. Marshall.	Peter Youngers.
G. S. Christy.	W. A. Harrison.
D. C. Bliss.	W. H. Dunman.



WM. HESSER AND GRANDDAUGHTER ARAH HESSER
IN MEMORIAM.

Wm. J. Hesser was born November 22, 1834 in Washington, Fayette Co., Ohio, and died December 13, 1913 at his home in Pasadena, Cal., after an illness of ten days.

The funeral services were conducted by the Rev. Matt. S. Hughe of the First M. E. Church of Pasadena and Rev. Tidball of Santa

Anna who was at one time his pastor at Murray, Nebr., and conducted the funeral services for his beloved wife who died April 1, 1900.

Rev. John B. Hillis sang two beautiful songs, "Lead Kindly Light" and "Face to Face."

Three of the pall bearers were old Plattsmouth friends and two from Red Key, Ind. All the children were at home for the funeral except Mrs. Gapen.

When Wm. J. Hesser was four years of age he moved with his parents from Ohio to a farm in Jay County, Ind., on what is now part of Red Key. He grew to manhood here and December 24, 1853 was united in marriage to Miss Matilda A. Current of New Castle. From this union there are now living seven children: Mrs. Emma Van Cleave (who kept house for him for the past seven years), S. C. Hesser, Elwood, Neb.; Mrs. J. S. Gapen, Hyettville, Wyo.; E. L. Hesser, Los Angeles, Cal., Mrs. A. P. Churchill, Strathmore, Cal.; Wm. Hesser, Lamanda, Cal., Mrs. R. R. Davis, Fullerton, Cal.

On November 1, 1863, he landed with his family at Nebraska City. From there he went to Mt. Pleasant, Cass County, and lived on his brother-in-law's (S. B. Hobson) farm for one year. He then bought a sixty-five acre farm, then known as the Bonner Homestead six miles Southwest of Plattsmouth. He at once started into the market gardening business and the next year built a little green house. People for twenty miles around would come to see and buy his plants. He enlarged his green houses each year. As his business grew larger he finally went into the wholesale and retail Palm business. He had, when he closed out his business, six green houses 135 feet long.

In 1872 he planted 35 acres to fruit trees getting most of the trees from his good friend, R. W. Furnas, of Brownville. A severe hail storm on July 13, 1883 damaged the trees so badly that he never received but one good crop of fruit from them.

In 1904 he closed out his business at Plattsmouth and moved to Pasadena, Cal., to spend the rest of his days among the beautiful flowers and Palms he loved so well. During the last few years he has been in business, having a small greenhouse and some nursery stock. He was making a specialty of the Burbank Spineless Cactus for which there is a great demand.

He never forgot his old Nebraska friends especially his Horticultural Brothers. It was his one desire that he might see them all at the Nebraska State Fair once more. He had planned to attend during the fall of 1913, but his health would not permit such a long journey. Many of his old time friends had the pleasure of visiting him here in his beautiful little home and none will forget their cordial welcome and his happy face. He made hundreds of friends here and was known as the "happy old man."

He celebrated his 79th birthday just three weeks before his death. Twenty-three took dinner with him. His face was radiant

and his cup of happiness seemed full when they all sat down to dinner. He seemed to grow happier each day and it was only a step into a brighter and happier world. Our loss is heavens gain and some we must all be called to meet our loved one.

Written by request.

MRS. EMMA VAN CLEAVE,
2265 San Pasqual St., Pasadena, Cal.

REPORT OF RESOLUTION COMMITTEE.

Since our last annual meeting of this Society, the grim reaper has invaded the ranks of our membership, and removed from us one of our most worthy members.

We recall with kindest feelings of appreciation the valuable services rendered this society by W. J. Hesser. In the pioneer days he was ever ready to assist in upbuilding and for many years his unselfish work and valuable council added much to the success of this organization. In his removal we feel that this society has suffered an irreparable loss.

Resolved: That the sincere sympathy of this association be extended the sons and daughters of our departed friend, in their bereavement, and for lasting solace and comfort we commend them to Him who doeth all things well

Respectfully submitted,

J. A. Yager,
Lewis Henderson,
L. O. Williams.

FRUIT CROP REPORTS AS ISSUED BY SECRETARY DURING YEAR 1914.

"FRUIT CONDITIONS."

April.

Postal cards were sent to every member and to numerous other persons throughout the state and the following is a synopsis of the reports received.

Reports on prospects for bloom of apples are good from practically all parts of the state. A few report only fair prospects owing to the extreme drouth of last season when the trees failed to set fruit buds. A good deal of canker injury is reported which will tend to decrease the total prospects.

CHERRIES.

Some winter killing of buds has been reported. Light setting of buds has also been reported. However the major part of the reports show an excellent prospect for a good bloom.

PLUMS.

American sorts are reported in good condition. Japanese and Hybrids are reported in poor shape. A good per cent of buds are dead

and in some cases a light setting of buds indicating a light bloom. However the major part of the reports indicate a prospect for a good bloom on American sorts and light bloom on foreign sorts.

PEARS.

The prospect for pear bloom is excellent. Some report injury due to blight and light setting of buds, owing to the excessive drouth of last summer.

RASPBERRIES.

Raspberries are in bad shape. A good many reports state that canes are entirely killed and others from one-third to one-half dead. Part of this trouble is due no doubt to anthracnose and the extreme drouth of last season. Prospects are on an average poor.

STRAWBERRIES.

The strawberry prospects are anything but encouraging for bumper crop this year. The major part of the reports indicate patches are in poor condition. The drouth of last summer is responsible. Old beds were badly injured and spring set beds did not make the usual number of plants. A few report excellent prospects.

Blackberries are generally reported in good shape.

Grapes are reported in good shape and prospects excellent for a crop.

Peach buds are reported injured from nearly all parts of the state, where grown. Some reports state that nearly all the buds are dead and others 90 per cent alive. Averaging all reports received an average of 33 1-3 per cent are alive. The buds still alive may have vitality enough to bloom and set fruit so that a fair crop may be assured.—“April Horticulture.”

FRUIT PROSPECTS IN NEBRASKA.

July.

Reports from over Nebraska received by the secretary up to July 7th are not as encouraging as prospects earlier in the season had indicated they would be. The effects of the extreme drouth of last season are becoming more apparent as the season advances. In all uncared for and only partially cared for orchards some trees died last year, others went into winter with the promise of living, but did not leaf out this spring; others partially leaved out and still others came out in leaf and blossomed full, but didn't have vitality enough to carry the fruit through the season and a heavy June drop was the result. In those orchards where up-to-date care has been practiced the trees are in good shape and prospects are good for a crop this year after producing a crop last season. These orchards have from 20 to 30 per cent better prospects than the unsprayed and uncared for orchards. A good object lesson is to be drawn from the drouth of last season. A fruit tree cannot be set out and left to shift for itself with the expectation that it will continue in a vigorous, healthy condition, producing

crops of fruit year after year. It must have the best of care and be kept in a healthy, vigorous condition by practicing up-to-date methods. Whenever a tree becomes weakened by adverse conditions then disease can more easily obtain a foothold. Canker, together with the dry weather, has been an important factor in destroying the apple trees. We can grow as fine apple orchards in Nebraska as anywhere, and the quality of our fruit is surpassed by none, but we must give the trees the care they deserve.

SUMMARY OF REPORTS RECEIVED FROM OVER THE STATE.

EAST ONE-THIRD OF NEBRASKA. Comprising horticultural districts Nos. 1 to 8, inclusive. All east of line drawn north and south between Webster and Nuckolls at south side and Holt and Knox counties on north.

In the east and southeast part of this territory adjacent to the Missouri river the prospects are much better than in other parts of the territory. June drop was generally heavy in the apple orchards throughout the territory. Weather conditions have generally been good. A good deal of rain in parts of the territory has caused the development of a great deal of scab and other fungous diseases. Several severe hail and wind storms have been reported which did considerable damage in some localities. Estimates for fruit are based on the maximum amount of fruit that the tree is capable of bringing to maturity.

Apples, 44 per cent crop.

Pears, 40 per cent crop (mostly in southeast and east part of territory).

Peaches, 14 per cent crop (mostly in southeast part).

Plums, 25 per cent.

Grapes, 75 per cent.

NORTH-CENTRAL PART OF STATE. Comprising horticultural districts Nos. 9, 10, 16 and 17.

There are only a few commercial orchards in this section, mostly home orchards. Trees are young, some just coming into bearing. There was only a moderate June drop in this territory. Windstorms and hailstorms were reported doing some damage.

Apples, 35 per cent.

Pears, 15 per cent.

Plums, 25 per cent.

Grapes, 60 per cent.

SOUTH-CENTRAL PART. Comprising horticultural districts 11, 12, 13, 14 and 15.

There are several commercial orchards in this territory which are under irrigation. Some are being grown with the annual rainfall. Irrigated orchards are in good shape. Average reduced by non-irrigated orchards:

Apples, 34 per cent.

Pears, 10 per cent.

Plums, 25 per cent.

Grapes, 55 per cent.

EXTREME NORTHWESTERN PART. Comprising districts 18 and 19.

Orchards almost all young. Mostly grown under irrigation. Only hardy fruits are grown in this territory.

Apples, 65 per cent.

Plums, 20 per cent.

SUMMARY OF CONDITION IN OTHER STATES AND CANADA.

KANSAS—June drop of apples light. Weather favorable. Condition July 1 about the same as last year. Apples, 46 per cent; pears, 45 per cent; peaches, 37 per cent; plums, 42 per cent; grapes, 79 per cent.

MISSOURI—Heavy June drop. Weather generally favorable. Conditions better than last year at this time. Apples, 67 per cent; peaches, 17 per cent; plums, 67 per cent; grapes, 90 per cent.

MICHIGAN—June drop has been heavy. Weather fair to good. Good deal of scab reported. Condition about same as July 1, 1913. Apples, 62 per cent; pears, 28 per cent; peaches, 60 per cent; plums, 40 per cent; grapes, 100 per cent.

OHIO—June drop heavy. Apple scab very bad and blight has damaged crop. Apples, 50 per cent; peaches, 75 per cent.

WISCONSIN—June drop heavy. Weather unfavorable. Apples, 50 per cent; plums, 80 per cent; grapes, 90 per cent.

NEW YORK—Apples. June drop light. Excellent weather. Western New York varies from 20 to 200 per cent greater than July 1, 1913, according to section. Hudson river section from 75 per cent to about the same on winter fruit. Fall fruit heavier. New York state as whole about 4 points higher than ten-year average. Apples, 72 per cent; pears, 36 per cent; peaches, 8 per cent; grapes 87 per cent.

ARKANSAS—Apples 90 per cent. June drop light. Weather favorable. Increase over last year.

DELAWARE—Weather conditions have been favorable. June drop heavy. Apples, 75 per cent; peaches, 50 per cent; pears, 15 per cent; grapes, 100 per cent.

PENNSYLVANIA—Fairly heavy June drop. Weather largely favorable. Very dry in some parts. Condition 10 per cent better than July 1, 1913. Apples, 75 per cent; pears, 60 per cent; peaches, 60 per cent; grapes, 75 per cent.

KENTUCKY—Medium June drop. Apples, 35 per cent. pears, 20 per cent; peaches, 85 per cent; plums, 15 per cent; grapes, 85 per cent.

WEST VIRGINIA—June drop medium. Weather very dry. Crop much better than last year. Apples, 75 per cent; peaches, 65 per cent.

VIRGINIA—Medium June drop. Severe drouth from May 1 to June 29. Apples, 75 per cent; peaches, 80 per cent.

MASSACHUSETTS—Good bloom, but apples not set well. Weather good. Pears poor.

MAINE—Average June drop. Weather favorable. Apples, 75 per cent.

MINNESOTA—Apples, 29 per cent; plums, 71 per cent; grapes, 71 per cent.

NORTH CAROLINA—Apples, 75 per cent; pears, 50 per cent; plums, 85 per cent; peaches, 80 per cent; grapes, 75 percent. June drop heavy. Weather unfavorable. Not as good as last year.

NEW JERSEY—Apples, 90 per cent; pears, 60 per cent; peaches, plums, grapes, 100 per cent.

BRITISH COLUMBIA—Apples, 60 per cent. Medium June drop. Thirty per cent better than last year. Pears, 40 per cent; peaches, 70 per cent; grapes, 90 per cent.

PROVINCE OF QUEBEC—Apples, 75 per cent. June drop light. Weather good.

NOVA SCOTIA—Apples, 75 per cent, same as last year. Weather good. Pears, 25 per cent; plums, 25 per cent.

IOWA—Apples, 28 per cent. Sprayed orchards from 15 to 25 per cent better than unsprayed orchards. Weather has generally been good. Pears, 38 per cent; plums, 29 per cent; peaches, 49 per cent; grapes, 80 per cent.

WASHINGTON—Apples, 60 per cent. June drop heavy; 20 per cent more than last year. Weather good. Pears, 75 per cent; peaches, 35 per cent; plums, 40 per cent; grapes, 65 per cent.

IDAHO—Apples, 65 per cent. June drop heavy. A little better than July 1, 1913. Pears, 50 per cent; peaches, 50 per cent; plums, 50 per cent; grapes, 95 per cent.

UTAH—Apples, 90 per cent. June drop medium to heavy. Very favorable weather. Pears, 90 per cent; peaches 93 per cent; plums, 75 per cent; grapes, 75 per cent.

COLORADO—Apples, 83 per cent. June drop medium. Eighty per cent crop compared with July 1, 1913. Pears, 85 per cent; plums, 77 per cent; grapes, 90 per cent.

MONTANA—Apples, 50 per cent. Heavy June drop of apples. Weather unfavorable. Pears, 40 per cent; peaches, 25 per cent; plums, 80 per cent.

WYOMING—Apples, 100 per cent. Light June drop.

SCUTHERN ILLINOIS—Apples crop light. Severe drouth. Peaches medium crop. Pears good.

We expect to make the August report complete summary of the apple situation, probable yield and prices. We ask your hearty cooperation in furnishing data.—July "Horticulture".

CROP OUTLOOK.**August.**

Reports received at the office of the Secretary of Nebraska State Horticultural Society indicate that the apple crop in Nebraska for 1914 is far from being a bumper crop such as has been produced in the past. Illinois canker, the drouth of last year and the general neglect of the orchards are the things responsible for the decreased production of last year and this. This condition will become worse instead of better until the owners of orchards give their trees, that still have a chance to be redeemed, the care they deserve and new orchards come into bearing. The trees being neglected were weakened by the series of dry years which we have had, and Illinois canker having attacked them they could not overcome its effects. Some trees were killed outright by the drouth and others weakened. This condition prevails in the uncared for orchard to a great extent. In the well cared for orchards some injury has resulted but they are mostly in good shape. In computing the apple production for the state all apple trees whether grown on a farm, where care has been lacking or in a well cared for commercial orchard, have been averaged together. This will have to be the basis of computation as long as the crop from the unsprayed, uncared for orchard is placed on the market in competition with the crop of the well cared for orchards. When the consumer ceases to buy this wormy and scabby fruit then the grower will give his orchard the care it deserves and the average production raised to higher figures. The major part of the apple crop in Nebraska this year will be produced in Horticultural Districts Nos. 1 and 2. These districts comprise the following counties: Pawnee, Richardson, Johnson, Otoe, Nemaha, Cass, Sarpy, Douglas, Dodge, Washington, Burt, Saunders. Commercial orchards, and those which have had good care, in other parts of the state will produce nearly the same percentage of fruit as those in Districts Nos. 1 and 2.

The following estimate is made from reports from growers, members of the State Horticultural Society and others interested in horticultural matters.

East one-third of the state comprising Horticultural districts Nos. 1 to 8. Territory east of line drawn north and south between Webster and Nuckolls on south and Knox and Holt counties on the north.

Average of all orchards; both uncared for and well cared for orchards, 20 per cent full crop.

Well cared for orchards, 35 per cent full crop.

North central part. Territory north of Platte river, west of eastern district and east of line between Keith and Deuel on south and Sheridan and Cherry on the north.

17 per cent of a crop. Some commercial and well cared for orchards in this territory but mainly farm orchards.

South central and south western part of state. Territory south

of Platte river, west of eastern district.

Average of all orchards, both cared for and uncared for orchards. 15 per cent crop. Some commercial and well cared for orchards but mainly farm orchards.

Northwestern part of state. Mostly home orchards. Few commercial orchards. Orchards nearly all young.

Taking the state as a whole the only fruit of any consequence will be produced in those orchards which have had at least a semblance of care.

According to figures compiled by the Nebraska State Board of Agriculture from the assessors books, the apple crop in Districts Nos. 1 and 2 for the year 1913 was 409,270 bushels. From report of State Labor Bureau for year 1912, the estimated crop for that year for these districts was 3,605,907 bushels. From same source the crop of 1911 was estimated at 5,108,036 bushels. Taking the figures for the crop of 1912 as a full crop, the crop in this district for 1914 will be in round numbers 790,000 bushels, of all grades of apples. Reports received indicate this a fair estimate of this year's crop.

CONDITIONS IN OTHER STATES.

In our neighboring states of Iowa, Kansas and Missouri the same general condition holds good as is found in eastern Nebraska. The middle western states and central states reports show a light crop generally, Michigan moderately good crop, New York heavy crop, Virginia moderately good, New England states good. In the western states reports indicate good crops but not any larger than two years ago. Taking the reports as a whole the apple crop of the United States while much larger than last year will still be under the crop of 1912. The largest apple crop that the United States has produced was in the year 1896 when over 63 million barrels were produced. In 1912 approximately 40 million barrels were produced and the early reports would indicate that the total production this year would be four or five million barrels short of 1912 crop. There is a heavy decrease in the great producing centers in the middle west and central United States and the only other section that promises heavier than in 1912 is New York. This would indicate that if proper methods of distribution are followed, the barrel grades of apples will be sold to the consumer for a good deal less money than last year and that the grower in Nebraska and the middle west will get a good living price for his marketable apples. Last year the crop was very short all over the country and prices uncommonly high. In 1912, the crop was called large but methods of distribution were poor and prices ruled low for the grower and high to the consumer. Better methods of distribution have been put into effect since then and if the consumer will do his part in consuming the apples they can be well supplied at moderate prices. Some talk of the effect the European war will have on the apple market has been indulged in. The opinion among leading exporters is that if proper facilities are afforded that a good export trade will result, not only to

the warring nations but to other parts of the world as well. The export trade consumes around three to five million barrels annually and this amount placed on the American markets might in some cases cause a low price to the grower, but generally speaking it would not make a great deal of difference to the general apple market.—August, 1914.

THE APPLE CROP IN NEBRASKA.

September.

The figures as given out by the government bureau of crop estimates Sept. 1 was that the crop of apples in Nebraska this fall would be 1,690,000 bushels. The Burlington weekly crop report for last week says the apple crop will be above the average.

From all information received at this office from leading fruit growers, farmers and others who are in actual touch with orchard conditions throughout the state only the well cared for orchards are going to produce any fruit. These orchards are not going to produce over 40 per cent of a crop. Thousands and thousands of trees throughout the state which were left alive by the drouth and canker will not produce a bushel of fruit. Reports received at this office indicate the government figures are nearly 50 per cent too high. In making up the figures for crop estimates they must of necessity be based on total number of bearing trees in the state. The government bases its figures on count of trees made at last census. The last twelve months has caused an enormous loss of trees in the orchards of the state, and it is impossible to get an accurate count on the remaining trees. The State Board of Agriculture through the assessors last spring gathered figures on the apple crop of 1913. The total number of bushels produced in Burt, Dodge, Washington, Douglas, Sarpy, Saunders, Cass, Otoe, Johnson, Nemaha, Pawnee, and Richardson counties last year were in round numbers 409,000 bushels. Those counties produced the bulk of the crop last year and will do so again this year. The most careful estimate indicates that this district will not produce over 600,000 bushels of fruit this year. The rest of the state will not produce over half the number produced in this district. Thus giving ample allowance for the average farm orchards there will be less than 900,000 bushels of apples harvested in Nebraska this fall. The same condition holds true as to the crop to be harvested in all the apple producing states of the Missouri and Mississippi river valleys. The only place where an extra large crop is in sight is in parts of New York, and parts of the New England states. Bear reports have been sent out by apple operators to the effect that the biggest crop of apples was in sight in the United States which has ever been grown. These reports together with tying up of the export trade to Europe will be used by the operators to force the growers to sell their apples for less money than the cost of production. The reports received at this office from growers, associations, state boards of

horticulture, experiment stations, etc., in every apple producing state in the United States and Canada indicate that the apple crop this year will be several million barrels short of the crop of 1912. The crop of 1912 was in round numbers 40 million barrels and the biggest crop that the United States has produced was in 1896 when over 63 million barrels was the production. The crop of 1896 was disposed of at good prices to the grower and the consumer paid only a reasonable price for the fruit. The crop of 1912 in Nebraska was estimated at about three and one-half million bushels of apples, and the crop this year will not exceed one-fourth the crop of that year. It is doing the grower an injustice for reports of large crops to go out when in reality the crop is small. Not only is the grower being done an injustice but the consumer is wronged as well. The grower must take what he can get for his fruit in competition with other growers. If the reports indicate a big crop he may be forced to take a price less than the cost of production. If this low price could be passed on to the consumer the grower would not feel so bad about his loss after he finds the reports of big crops have been inflated. But no, the consumer is asked to pay as much as if the crop was exceedingly scarce. Consumption of apples must be increased if the orchardist of the future is to stay in the business. The grower must get a price for his apple that will bring him a legitimate return for his labor and investment. On the other hand apples must be sold to the consumer at a price that will put apples within the reach of the working man as well as the wealthy.

This fall the crop of apples in the United States will not be as large as 1912 but a good deal larger than in 1913. As a consequence here in Nebraska and the middle west where the crop is light and there is a large home market to supply, the grower may expect to receive a good price for his fruit. The consumer can expect to buy his apples at a reasonable price. However, much depends on the middle men. If the dealer is satisfied with a reasonable profit there is no reason why he can not sell ten barrels of apples as against one barrel with an exorbitant profit. If all work together the grower can get a better price, the dealer can have a reasonable rate of profit and the consumer get his fruit for a good deal less money. Information received at this office indicates that practically all the apples which will be harvested in the state this fall will be marketed in Nebraska towns this fall and winter. As apples are one of the best medicines procurable every home should be supplied with a plentiful supply. Every consumer should insist that they be supplied as far as possible with Nebraska apples. Apples grown in Nebraska have the reputation in the best markets of the country as being the best keeping, highest quality and finest in texture of any apples grown in the United States. Encourage your dealer to handle more of them by buying liberally. Thus you encourage more apples to be grown and better care to be given the orchards. Only the well cared for orchards have produced any fruit

this year and these are the ones which will produce the fruit in the future.—September, 1914.

SELLING THE APPLE CROP OF 1914.

J. R. Duncan.

What to do with the crop may be a pertinent question to some grower. On another page will be found a summary of the condition in Nebraska and the U. S. Nebraska growers have a splendid market here at home to handle all the fruit they will harvest this year. This is a year when only the best grades should be packed in barrels and the rest sold in bulk. Owing to the curtailment of the foreign trade as an excuse buyers will be exceedingly slow to buy in large quantities. The buyer figures that he may have to change some of his methods of distribution and work through new channels. This will take some time and will be an uncertain quantity until after the most of the crop is picked. Hence he will be cautious about loading up heavily on barreled or boxed fruit. It would seem that the best thing for the grower to do under the circumstances would be to either sell the entire crop in bulk; or barrel the best grade, put it in cold storage, and sell the rest in bulk at picking time. After the packed apples get to moving later in the winter and conditions become settled barrel stock if it is good fruit will bring a good price. The Nebraska grower has several conditions in his favor. The crop is light both here and in the surrounding states. In other years these states have been able to ship in what was lacking of our own crop. Our growers have a reasonable freight rate and they can ship any where in the state for a reasonable price. By selling fruit in bulk the cost of packing and packages is eliminated. If the fruit is handled carefully and the cars are padded with straw and paper the apples will go through to the destination in good condition. In shipping bulk apples care should be taken in grading the same as in packing the fruit in barrels. Only good sound fruit should be shipped. The inferior and wormy fruit should be made into cider. A grower or association of growers should be as careful of the kind of fruit that is shipped in the bulk as the ones that go into the barrels. Conditions this year are abnormal. Light crop in middle west and indications for prices ruling medium to low for barreled stock during harvest time. In summing up the situation it would seem that the best grade fruit should be packed and stored and the rest disposed of as bulk stock or as cider stock. In either event where good fruit is grown and care taken in grading a good price will prevail. Now is the time to convince Nebraska people of the superiority of Nebraska fruit. In order to do this, good sound fruit must be sold instead of knotty, gnarly, wormy apples. Don't kill the goose that laid the golden egg. Furnish Nebraska consumers with the best apples grown, namely well graded and well grown Nebraska apples.—September "Horticulture."

APPLES AND OTHER TREE FRUITS.

GROWING APPLES COMMERCIALY IN NEBRASKA.

J. R. Duncan.

In the following article will be found a brief description of a few of the leading commercial orchards in Nebraska which have been a profitable investment to their owners and have demonstrated what proper methods will accomplish in Nebraska:

Shubert Bros. of Shubert, Nebr., have been producing annually from 200 acres of orchard some ten to twenty thousand barrels of apples of high quality. These orchards are located near Shubert, Nebr., in Richardson county, and are on rolling land back from the Missouri river from six to ten miles. Their methods are those which any one can follow and they have orchards of which they can well be proud. In regard to their methods, Mr. A. M. Shubert, treasurer Eastern Nebraska Fruit Growers' Association, says: "We can grow a commercial orchard in Nebraska eight years of age for \$1.00 per tree, by the following method: Set the trees in well prepared soil, two rods apart each way which will make forty to the acre. Grow corn between the trees for first five or six years and then seed the orchard down to red clover. Clover is a good fertilizer and cutting the hay and letting it lie it makes a good mulch. This is important when the trees are fruiting heavily and the clover is cut and left to decay on the ground thereby preventing washing of soil and loss of rain by running off. This is necessary for growing large fruit and to get a full set of fruit buds for the next year. We prune so that all limbs will have sun and proper ventilation which is necessary to grow consecutive crops. Any old orchard will fruit once in a while even if nothing is done. I have a twelve acre orchard on one of the best farms in Richardson county that has paid me as much money as the rest of this farm of 148 acres that I get half of all the crops in rent from for the past eight years. The orchard is eighteen years old. No one expects to have good apples without spraying. This is not the same as it was a few years ago. A good power sprayer will cover ten acres a day at a cost of \$2.50 per acre for work and spraying materials, using arsenate of lead for worms and lime-sulphur for fungus diseases. This is not expensive. We think three sprayers all that is necessary for our orchards."

Among the leading orchardists of the state who have achieved an enviable reputation for their fruit in the leading markets are Weaver Bros. of Falls City. They have about 250 acres of orchard averaging about nineteen years in age. This orchard receives the best of care, being pruned a little every year, the aim being to maintain rather an open headed tree with the surplus wood removed. They are very careful to treat all wounds made in pruning and if any sign of canker is found it is immediately attended to. Their orchards are carefully sprayed three times under high pressure. First cluster bud, second calyx

spray and again two or three weeks later. They use both Bordeaux and lime-sulphur as fungicides and arsenate of lead as insecticide. Six sprayers are used in the 250 acres of orchard.

Clean cultivation is practiced, double discing early in spring and harrowing after every rain until the middle of July and then allow weeds and grass to grow. They haul lots of manure to spread in the orchard which is worked into the ground during the summer. The crop of apples are carefully picked and packed in barrels, packing only the best apples and disposing of inferior grades in bulk or to cider mill. That their pack is good is evidenced by the fact that they have sold their fruit to the large firms in Minneapolis, Minn., for the past seven years without any solicitation on Mr. Weaver's part. They have proven that a reputation for honest, careful packing is one of the strongest assets of a fruit grower.

One of the orchards of the late Henry C. Smith of Falls City which is located some seven miles from the railroad, under the able management of Mr. J. C. Wileman, has proven remarkably profitable. This orchard is planted on land that twenty-five years ago was covered with hazelbrush and thought only fit for pasture land. It has been producing large annual crops of fruit which has been sold for good prices. This orchard is about seven miles east of Shubert and the fruit has to be hauled over a hilly road to market. Mr. Wileman is a firm believer in thorough spraying, pruning and cultivation where practicable. He is very careful of the apples which he packs, to see that they are fully up to the standard. His apples command a good price on the market during seasons of heavy crops.

Mr. J. T. Swan of Auburn is another firm believer in the future of the Nebraska apple. He has 200 acres in different orchards which are bringing in a good income to him. Mr. Swan sprays his orchards thoroughly, using power machines and makes at least three applications. He practices clean cultivation and has found that in harvesting his crop that it paid to pack his apples in boxes.

Mr. C. F. Beck, of Peru, a director of Eastern Nebraska Fruit Growers' Association, has a twenty-five acre orchard which has brought in to him over \$4,000 in three years without his turning his hand in picking or packing the crop. Mr. Beck gives his orchard good care as evidenced by the returns he has received.

Another director of the Eastern Nebraska Fruit Growers' Association is G. S. Christy, of Johnson, who has been growing apples in a commercial way for a good many years. Mr. Christy handles his orchard in much the same way as Mr. Shubert and has been getting good crops and good prices for his fruit.

When a crop of apples from fifty acres will bring in over \$9,000 in one year the methods employed by the owner of the orchard are worthy of study. Read Mr. H. R. Howe's article on how he cares for his orchard.

Perhaps the largest orchard in Nebraska lying in one body belongs to Mr. E. M. Pollard of Nehawka, president of the Eastern Nebraska Fruit Growers' Association. Mr. Pollard from 160 acres of orchard harvested some 40,000 bushels of apples. Mr. Pollard believes in thorough care being given an orchard for best results. Mr. Pollard handled his entire crop of apples this year through the Eastern Nebraska Fruit Growers' Association with excellent results. Mr. Pollard gives a brief outline of his methods in which he says:

"We have 160 acres of apple orchard. We cultivate the whole orchard, giving it about the same cultivation you would give a crop of corn. We try to keep the whole orchard trimmed, going over it every second year. We pick the apples in a sack, place them carefully in a bushel and a half basket. The basket is placed on a low wheel wagon with a flat rack over springs to prevent bruising of the fruit. The wagons carry forty-five baskets. The apples are hauled to our packing house which is built along side a spur of the railroad. Here the apples are run over a slanting table. We have one man at the head of the table and one on each side. We also have a man to face the barrels putting in a double face and tale the bottom of the barrel. It usually takes two men to face and tale. One man will head for three tables. We run over these tables about 225 barrels per day. As the barrels are headed they are loaded right into a car and shipped out as fast as a car is filled. Our culls or apples that are not saleable are ground into cider. Our cider is in great favor in the markets of the state as well as in Iowa and Minnesota and the Dakotas. This year we made sixteen cars of cider that was sold as sweet juice. We never sell any sour or hard cider."

Among the pioneers in growing apples, according to the best up-to-date methods, is Mr. G. A. Marshall, of Arlington, a description of whose methods of handling his crop was printed in the November Horticulture. He believes in thorough cultivation, spraying and pruning of his orchard and packing of his crop in the best manner possible. He has made orcharding pay and demonstrated that up-to-date methods pay.

Leaving the eastern part of the state and going west of North Platte we find a small orchard of twenty-six acres belonging to David Hunter of Sutherland which produced 15,000 bushels of apples this year. Mr. Hunter practices clean cultivation and sprays four times. This orchard was set out in 1897 and has produced in the last four years over 50,000 bushels.

Mr. R. A. Burns, manager of the Youngers & Burns' orchard of Geneva, comprising twenty acres, by applying practical business methods to his work and doing a thorough job of spraying and pruning, was able to harvest a crop in 1912 that netted over and above all expenses \$173 per acre. This is as much as the major part of land in eastern and central Nebraska is selling for per acre. Mr. Burns' orchard being in the center of the drouth stricken country had a small crop this year. The returns Mr. Burns received during a year when there was a large crop of fruit are strong enough evidence that the best methods will win out.

Numerous orchards in different parts of the state might be cited that are receiving good care and that are bringing in a good income for their owners. In every instance thorough methods are employed in growing the crop and the crop is packed and handled so that the buyer of the fruit is getting value received for every dollar he invests in that fruit. These men have made apple orcharding a success and paved the way for others to follow. Success is certain to those who have a liking for the work and will put the necessary brain and brawn into their work in growing apples commercially in the eastern part of the state and the favored portions of central and western Nebraska. What we need is better methods and closer cooperation among the growers in raising the standard of the pack that goes out from every Nebraska orchard and bringing the consumer to realize that when they buy Nebraska apples they are buying the best.

COMMERCIAL ORCHARDING IN NEMAHA COUNTY.

H. R. Howe, Auburn.

Can't something be done to encourage the planting of more trees in Nebraska, especially apple trees in the eastern part of our state? So much has been written about planting, pruning, cultivation, then when they begin to bear what a terrible fight one must wage against borers, codling moth, canker worms, etc., that I can not blame a young man for not going into commercial orcharding.

I never like to blow my own horn, but perhaps a short description of my personal experience might take a little sting out of the business. In the first place one must have a love for the business and personally inspect each tree at least once each year. For myself I love trees and it does my soul good to see them grow and it makes my heart sick to see the wanton destruction of all kinds of trees in Nebraska today. Take a trip over this state in any direction and just see how they are being slaughtered and what few are being planted. That old saying, "He who plants a tree, planteth not for self alone," is a good one and more young men should keep that in mind.

In the spring of 1893 I planted fifty acres of apple trees, 500 each of Ben Davis, Jonathan, Winesap and Missouri Pippins. To my mind even today that is a good selection, but I hear some one say, "Why, Ben Davis, why I'd just as soon eat a pumpkin." We forget that the Ben Davis apple and the cottonwood tree were our great friends in the early days of Nebraska, and they are both just as good and useful today as then; it's too bad no more cottonwood groves are being planted. Take one year with another the Ben Davis for a commercial orchard is the money maker and from my experience, always a ready seller.

The fifty acres I selected was the highest land in Bedford precinct, Nehama county, Nebraska, (highest in altitude I mean), and the old timers said it would never do as the high winds would play havoc with the trees but they were mistaken for apple trees need lots of fresh air and the late frosts don't catch them like those on the lowlands along the creeks. I marked this ground off both ways with a plow, thirty-three feet apart. This gives forty trees to the acre. The holes were dug with a common drag scraper by going down each row twice. This puts the best black soil on one side of the hole and the sub-soil on the other; then the bottom of these holes were loosened up with spades. The holes looked awfully big and deep for such small trees, two-year-olds, but large holes are needed. They were then partially filled with some of the black soil so that the tree would stand about three inches deeper than in the nursery. Trees were placed in a large tank containing water, same being set on a low wagon, and were not taken out until ready to plant as tree roots should never become dry from wind or sun. Each tree root was carefully looked over and damaged ones removed. Placed the tree in the center of the hole, the plow marks both ways making it easy to get them straight, roots spread out carefully and black soil sifted among them. Here, to my mind, is the important part in planting an apple tree.

Take the tree between the legs, lean to the southwest at an angle say 45 degrees, this to prevent sunscald while young, then thoroughly tramp the dirt as it is shoveled in until the hole is filled up. This makes it just as solid as though it had grown there. Two sets of planters can be worked this way, one on each side of the wagon, more trees can be planted and better work done in a day by this method than any I have ever seen or heard of.

Plant the balance of the ground to corn for the next five years, then smooth the ground down nicely, keep down the weeds by mowing for the next five years, then commence to cultivate with a disc, harrow or plow very shallow. I notice the roots of my trees intermingle if they are thirty-three feet apart and deep plowing would injure them. If I were going to plant another orchard I would put them forty feet apart each way.

I am not going into detail as to income, etc., but I will say that my fifty acre orchard is the best investment I have. Its been a money

maker since six years old. In 1912 it produced over 31,000 bushels and this year, 1913, over 18,000.

A little pruning each year, keep free from weeds, especially around the trees, cultivate and harrow and when they begin to bear spray three times and you will get your reward. Don't forget that apples raised in Missouri Valley have the nest flavor of any, can be raised for less money than anywhere and being in the center of population have an immense advantage in freight rates.

In short, to the one who likes it, an apple orchard of twenty-five to one hundred acres if located right is the best investment a young man can make.

SIZE OF NEBRASKA APPLES BEST.

J. R. Duncan.

"Portland, Oregon. Everyday's trade in the apple market reflects the change in conditions from what has existed for Pacific Northwest fruit during recent years. There is no discount in the fact that the demand for large sized apples is on the ebb and that medium sized fruit is taking its place.

While this condition might possibly be most aggravated this season owing to the fact that apples are so high that the average consumer prefers to get more of the fruit in the box than formerly still the very large sized apple has perhaps seen its best marketing day except perhaps in years when very few of this size are available."

The above news item from the Northwestern Fruit exchange, which handles the bulk of the fruit grown in the Pacific Northwest is of more than ordinary passing interest to the fruit growers of Nebraska.

One of the strong talking points of the man who has been extolling the merits of the fruit grown in the Pacific Northwest was its size. They had the moisture at their command and could produce a large showy apple that was in great demand by the buying public. Why did the public buy these large apples? Because their size attracted their attention when placed beside medium or small sized apples to the discredit of the smaller apple. How about the quality of the large apple compared with the smaller apple? The larger the apple the coarser grained it is and lower in quality and this trait is more marked in an apple that has been forced in its growth than one grown naturally. The apple which is forced has a large per cent of water in its make up, the cellular structure is coarser and cells are larger, making the percentage of food matter in its make up smaller than in one grown naturally.

Compare the large apple of the Northwest with the average medium sized Nebraska apple.

You may say that we grow large apples in Nebraska. These are the exception rather than the rule. The average size of apples typical of Nebraska orchards will run on an average from 104 to 150 to the

standard apple box and are from $2\frac{1}{4}$ to 3 inches in diameter. The sizes that are in the greatest demand from the buying public run from 112 to 150 per box. These sizes more nearly meet the average needs of the consumer. He wants an apple of high quality, smooth, sound, well colored for the variety and of a size that he can eat out of hand the entire apple (core excepted) and feel that he is not compelled to eat more than he wants or throw part of the apple away, which he cannot eat. The medium sized apple fills this need while the large apple does not. Not only the ultimate consumer but the dealer who retails the apples by each or dozen lots would rather have the medium sized apple than the large one because there is more profit in the transaction for him.

There is no question that the Nebraska apple is superior to any apple grown outside the central west in flavor. Any one who eats a Nebraska Jonathan and one grown in other sections and especially the Northwestern Jonathan will after the first bite of each leave the foreign apple until the Nebraska apple has been consumed. We know by repeated tests that Nebraska apples when placed in storage will keep longer and stand up better when removed from storage, than the western apples.

In size the Nebraska apple fills all requirements of a discriminating public. This is where the Nebraska apple being grown under natural conditions will have a great advantage. Climate, soil and nearness to the best markets of the country have placed in the hands of the Nebraska grower, every opportunity to prove the superiority of his apple in the markets of the country. The western growers are alive to the advantages of the Nebraska grower and as they see the trend of the market away from their large apples which the consumer does not want they will exert every effort possible to overcome this and produce what the consumer desires. The Nebraska grower has it in his power to put his apples up in as attractive a manner as the western grower and to control the markets if he will but do so. He must not allow anything but the best fruit to go on the market, packed in strict conformance to rigid standards that are to bear the brand of his orchard or association. By so doing his apples will soon become known on the markets as the standard by which apples from other sections are judged.—(Jan. 1914.)

NEBRASKA APPLES SUPERIOR.

C. G. Marshall, Nebraska City.

That apples grown in the Missouri river territory between Omaha and St. Joseph are superior to those grown in many other sections of the United States is asserted by experienced apple producers of this section.

H. J. Williams, who is with a Chicago firm of wholesale apple merchants, has purchased and packed apples for fifteen years for the eastern markets which demand fancy fruit. He says:

"While I have purchased apples in New England, New York, Illinois, Michigan, Wisconsin, Arkansas, Colorado, and other fruit districts, it has been only when the Missouri river territory north of Kansas City was short of apples that I have gone elsewhere. I always buy all of my barrel stock from this section when it is to be had. I would rather have the Ben Davis, Gano, Winesap, Jonathan, and Grimes Golden from this territory than from any other apple section of the United States. I also prefer them from as far north in this territory as each variety thrives. The Missouri river apple is not overgrown, yet it has sufficient size. It is unsurpassed for flavor and keeping qualities. It is preferred to the same varieties grown in other sections, by the retail merchants and consumers in Chicago. Considering the price of land, proximity to markets, the quality and appearance, and the ease of growing, this section is not excelled. Cooperation among the growers and strictly up-to-date methods of orchard management should make this one of the very choice producing sections of the world."

This territory includes eastern Nebraska, western Iowa, north-western Missouri and northeastern Kansas. The loess soil formation of the Missouri river hills is particularly adapted to the growth and maturity of both tree and fruit and the seasons in this latitude have just the right length to finish the fruit and allow it to be gathered and packed during the cool fall weather. This places it into storage in prime condition causing it to keep longer than fruit grown further south which is gathered and packed by necessity during warm weather.

The flavor and texture of this fruit is conceded by all authorities to be unexcelled, while the abundant sunshine gives a most attractive appearance. As far back as 1876 at the Centennial Exposition, apples from this section won the Gold Medal on quality and this high standing is still retained. The superior texture and flavor over much of the western fruit is undoubtedly due to the fact that it is grown wholly under natural conditions and is not forced to abnormal growth by the application of artificial methods like irrigation, etc. The superior color and appearance over eastern fruit is due to the abundant sunshine and a freer circulation of comparatively dry air that has a tendency to hold in check the different fungi the growth of which is favored by moisture and which dulls and mars the appearance of the fruit.

Grapes, strawberries, raspberries, blackberries, and cherries are other fruits that thrive in this territory and can be made to give profitable returns under proper care. These can be grown between the rows of the trees in the young apple orchard. All except cherries will

give paying crops the third year after planting and may be left with profit for five or six years longer or until the apple trees begin to bear. A Washington county apple orchard inter-planted with small fruits showed an annual net profit above the average rental per acre after every expense connected with the orchard and small fruits was accounted for until the apple trees bore paying crops.

In organizing the Eastern Nebraska Fruit Grower's Association, the members, each one a grower of this section, were aiming to develop horticulture to a high state by cooperation, realizing that a unity of action would accomplish much more than individual efforts. They could see that more and better fruit grown in this territory resulting from standard methods in care, culture, and packing would give the product a standing on the markets and would attract attention of both buyers of fruit and those desirous of engaging in fruit growing and which would add impetus to the growth of the industry and help each individual. While the organization was handicapped the past season by the unfavorable weather conditions, its members count it a success. Growers east of the river in Iowa and Missouri have been very much interested in the organization. A thirty acre orchard at Tarkio, Mo., is now affiliated with the Association and several prominent Iowa growers have indicated that they will be with the Association next season. With a healthy growth of the Association and the right cooperative spirit among the members, the organization will be a strong factor in making the Missouri river hills the most profitable land in these states.

APPLE GRADING AND PACKING.

J. R. Cooper

Reputation to Be Made.

In attempting to better the grading of apples in Nebraska everything is to be gained and nothing lost. As yet there is no set standard, and few are the growers who put up a first class grade of apples. The idea of letting a few wormy apples go into the package is wrong. One wormy apple might not be of any great sin in a barrel of sound fruit. The one wormy apple, however, will often get in without the knowledge of the packer. This is permissible but when a certain percentage of wormy fruit is placed in the package knowingly, intentionally and with "malice aforethought" it is time to register complaint. This also applies to misshapen, bruised and fungous injured fruit. This practice, however, of allowing a percentage, more or less large, of poor grade fruits to go in with the No. 1. is extensively permitted. Why would it not be just as easy to draw a strict line between good and poor stock and adhere to it, as to draw the line 10 per cent on the "shady" side and attempt to follow it? Why not put up a good grade and demand a good price? All of the fruit eating public can be fooled part of the time and a part

of it all the time but it is impossible to fool all of it all the time. Making poor grades is like firing a rusty gun. It will recoil, and to the grief of the producers as a whole. Not only the man who sells the poor stock will suffer but his neighbors as well. The man who insists on putting out poor grades can only be forced into line or forced out of business by a united effort on the part of the more progressive fruit growers to raise the standard of excellence, in packing and grading, so high that in order to compete at all fruit must be properly cared for and handled. At the present time this standard is not high enough and the lines are not closely enough drawn.

OLD STYLE GRADING TABLES ENCOURAGES POOR GRADING.

The slant table where the apples are poured in at one end and rolled down the incline by sorters who worked on either side encourages slovenly grading. As a rule the grade which forms the highest per cent of the crop is rolled down to the low end of the table and on into barrels. They are kept from dropping too far and are supposed



Slant table in use.

to be kept from bruising by being dropped onto a canvas apron which is gradually lowered as the apples pile up. This does not prevent bruising. An apple will bruise quicker by striking another apple than by striking a board. Only the grades which run a smaller per cent of the crop are handled. Some tables are partitioned in the middle and run two grades into barrels. In this way many defective apples escape notice no matter how careful the sorters may be. An apple will start rolling down the incline, the sorter sees one side only, it gets to the man filling the barrel, and unless the defect is large and stares him directly in the face, he also passes it on, and another wormy apple has gone into the barrel. This, added to the bruising, should be sufficient cause for discarding the slant tables. The only

argument in their favor being the ability to handle fruit faster. However, this same argument is erroneous for if the same grade is put up, the slant table is no faster than the flat one where all fruit is handled.

FLAT TABLES ENCOURAGES BETTER GRADING.

By the use of flat tables, every apple must be picked up, no matter whether it be extra fancy or cull. The sorter sees one side of the apple before taking hold of it. With one extra twist of the wrist he can bring the other side into view. In addition to being able to see the entire surface of the apple, the sense of touch adds another safeguard. The touch is often of as much assistance as the eye in detecting defects, especially bruises. In using flat tables every apple is subjected to this second examination.



Flat table at University Farm, Lincoln.

Bruising the fruit is avoided by using canvas or burlap for the bottom of the tables, and by lining the boxes or baskets, into which the apples are sorted, with several thicknesses of burlap.

This method of sorting is as rapid as the old method besides being much more accurate and obviates much of the damage done in grading. It is just as rapid for the reason that the fruit is handled but once. Every apple is placed in its proper grade and out of the way. This is quite different from the old method where the grade which is being barreled is pushed and rolled around in seeking out the other grades.

A NEW METHOD.

Marshall Bros. of Arlington have instituted a new method in connection with the use of flat tables. The graders are paid by the bushel for all apples graded. A record is kept by means of cards of different colors. Each grader has a color and places a card in every bushel basket of graded fruit. These are collected by the foreman as the baskets are emptied. All cards for each separate grade are thrown together, therefore the number of bushels of each grade sorted by each man can be ascertained by counting the cards of his color in each grade, i. e. Mr. A, whose color is yellow and who has ten cards in the first



Flat table at Marshall Bros., Arlington.

grade, fifteen in the second and five in the third, will have sorted 30 bushels of apples. In keeping a record of the culls each man has a card tacked to the table, and each time a basket of culls is emptied the foreman punches the ticket. By paying for the sorting of all grades, any tendency to run poor fruits into the grades is obviated. Any poorly graded or bruised fruit can be traced directly back to the grader who did the poor work.

Mr. Geo. Marshall states that his men do much more and better work under this system than under any other he has used. The cost of packing per barrel by this method was as follows:

Picking, per bu. .05.....	.15
Grading, .04 .....	.12
Facing barrels .....	.03
Tailing barrels .....	.02
Heading barrels .....	.02
<hr/>	
Total not including package.....	.34

It will be seen by the above figures that it costs no more to do good work than to do it in any old way.

SUPPLY HOME TRADE FIRST.

After employing the proper methods in picking, packing and grading the fruit, what is to be done with it? Shall it be shipped to eastern markets to tickle the palates of strangers, or shall it be sold to the home dealers who are begging for it? Up to the present time the local merchants have been offered nothing but inferior grades, and in order to hold trade have been forced to pay a high price for second grade western grown stock. Why not save this double freight and patronize home industries? Nebraska consumers are becoming too well educated along this line to allow themselves to be imposed upon much longer, and the fruit growers will be compelled to find another market for the cull apples which eastern buyers refuse.

ONE MAN A PICNEER.

However, there is one man who has climbed out of the rut, leaving a good business in the city he went to the country and began growing fruit in eastern Nebraska. Being a city man he has met with many difficulties, but the market end of the business is a misery to him no longer. How does he handle his crops? Simply advertises good fruit over his own state, where there is the greatest need of advertising; sells good fruit put up in good packs for a good price. Mr. Lewis' orchard at Brownville is not large but he is adding to it every year and boosting home industries.

EASTERN FRUIT VERSUS WESTERN FRUIT.

Prof. J. R. Cooper, of the University of Nebraska, has traded fruit with the different experiment stations in all the important apple growing sections of the United States, both East and West. The fruit is being used in the classes on Systematic Pomology and Apple Judging. The comparison of the fruit from the different sections is very interesting from the producer's and consumer's points of view as well as from that of the student in Pomology.

Apples from the New England States, New York, and Michigan compare favorably with apples grown in Nebraska, Kansas, Iowa, and Missouri in color, texture and flavor, with the exceptions of some varieties. The Ben Davis and Gano apples from the eastern states are

inferior in size, color and quality. The Jonathan is not so good as ours, but is more nearly equal in quality to ours than is the western Jonathan. The Baldwin of the northeast takes the place of our Jonathan, but is surpassed by the latter in desert qualities. The eastern apples as a whole are less regular and symmetrical in shape and color than ours. In general quality,—this includes texture, flavor, and keeping qualities—we must give first place to the Nebraska apples, considering the varieties as a whole.

The great difference comes when we compare our own apples with the western apples. Western Jonathan, Grimes, and Esopus, have size superior to our own apples of the same varieties, but in quality they are very inferior indeed. The Winesap which is one of our favorite commercial varieties is not grown at all commercially. Western apples are very much more irregular in shape and color than our own or the eastern apples. Taken as a whole, the fruits grow longer, more regular, and the color is more in splashes while the flavor is much less pleasing to the fastidious taste than the fruit grown in the East or middle West.

THE DELICIOUS APPLE.

H. E. Van Deman.

Washington, D. C., Jan. 6, 1914.—Mr. J. R. Duncan, Secy. Nebr. Hort. Soc., My Dear Sir: As I am an honorary member of your society, and get all of its publications, among them the Nebraska Horticulture. I read it and find in it much of interest.

As I prepared something about that splendid new apple, the Delicious, I am sending you a copy to insert in your little paper for the good of the cause of good fruit. I think this variety deserves to be generally planted by lovers of good fruit.

It takes time to prove what there is good and bad in any new fruit, and there is sure to be some faults in any variety. What is a fault in one place or under certain conditions may not be elsewhere.

It has now been about twenty years since the Delicious apple has been under test in most of the apple growing sections of the country and it is no longer a matter of conjecture as to the real character of its tree and fruit. However, there are many who do not know what these facts are, and it is proper that they should be known by all who are interested in this subject.

The original Delicious tree, which is yet living and bearing fruit, came up in 1880 as a chance seedling, on the premises of Jesse Hiatt at Peru, Iowa, who was one of the pioneers of horticulture in that state. He allowed it to come to bearing age and was so much pleased with the appearance and flavor of the apples, that he gave them to many others to test and all were so pleased with the flavour that the name Delicious was given the variety.

It's fame finally reached the Stark Brothers of Louisiana, Missouri, and Mr. C. M. Stark, the head of the firm, went to see the tree and M. Hiatt, and bought the sole right to propagate from it. This was one of the wisest things any nursery ever did, for the Delicious apple has proved to be of so much value that it may well be counted a blessing to mankind.

The tree is hardy enough to withstand as much cold as is likely to occur in any of the regions where apples are grown successfully. In fact, this has already been proved by many tests besides that of the original tree in Central Iowa, where it has experienced more than 30 derees below zero several times. The habit of growth is very strong and vigorous, making a fine orchard tree and it bears abundantly as well.

The fruit is from medium to large, conical in shape and inclined to be angular and irregular at the apex. The color is suffused and striped red over a yellow ground, that gives a most attractive appearance.

The flesh is juicy, soft, tender and melting. The skin is thick and well coated with nature's wax, that protects the apples in the handling that is necessary in marketing.

The flavor is very mild, subacid and decidedly aromatic, which was likened by one lady who was tasting a Delicious for the first time to "the scent of a flower." A higher compliment could not be paid to any fruit and I think this variety deserves it.

Its season is early winter, but by proper handling and storing, the Delicious apple may be kept until late winter. Either for home use or for market, there are few apples that are its equal.

CORRECT COST OF ORCHARD MANAGEMENT.

A Plan of Cost Accounting for Orchard Operations Has Been Developed which Provides for All Current Expenses.

Washington, D. C.—What does it cost to run an orchard? A plan of cost accounting for apple orchard operations for fruit growers wishing to find the annual cost of managing an orchard has been outlined by the United States Department of Agriculture. The method presented is the result of records covering 19 years' work in several New York orchards. The bulletin gives details for two years' work on one of these orchards. The method is applicable to all similar operations. The result of the study is given in great detail in the department's new bulletin (No. 130), entitled, "Operating Costs of a Well Established New York Apple Orchard."

The orchard for which the details are given is over fifty years old and well located for the production of fruit. It consists of nearly 15 acres and contains 527 trees. The total annual cost of the operation of the orchard during the two years covered by the detailed

studies was divided into labor, cash, and fixed costs. Nine hundred and thirty-seven marketable barrels of apples were produced the first season for a total operating cost of \$1,217.92. Two thousand one hundred and four barrels were produced the second year at a total expense of \$2,125.69. In the table given below, the labor costs refer to the man and horse labor; the cash costs cover the expense of manure, spraying, barrels, and seed for clover crop. the fixed costs included in the use of machinery, land rental, and overhead expenses.

The distribution of costs in the orchard during the two years was as follows:

ITEM OF COST		Per	Per	Per
FIRST YEAR.	Total	acre	tree	barrel
Labor	\$504.91	\$34.254	\$0.958	\$0.539
Cash	428.10	28.364	.793	.446
Fixed cost.....	294.91	20.007	.559	.315
Total	\$1,217.92	\$82.625	\$2.310	\$1.300

ITEM OF COST		Per	Per	Per
SECOND YEAR.	Total	acre	tree	barrel
Labor	\$56.66	\$58.118	\$1.625	\$0.407
Cash	966.57	65.574	1.834	.459
Fixed cost.....	302.46	20.520	.574	.144
Total	\$2,125.69	\$144.212	\$4.033	\$1.010

Two elements of cost have not been measured in these estimates, namely, the cost of creating the orchard and depreciation of the orchard as its production declines as the result of advancing age. The presence of insect pests and fungus diseases and the thoroughness of their control also will have their influence on the life of the orchard. Two years study on the farm in question have not yielded sufficient data on this particular item to warrant definite conclusions. All apple growers, therefore, should bear this factor in mind.

The item included under "fixed" costs should vary little from year to year. The land rental, including interest and taxes, is about 6 per cent. For this particular orchard it will be noted that the fixed costs approximate \$20 a year per acre.

The details of the items of cash costs are as follows:

Cash Costs on 14.74-acre Apple Orchard, Containing 527 Trees, for Two Years.

ITEM OF COST	DISTRIBUTION OF COST				
	Spray	Total	Per acre	Per tree	Per barrel
FIRST YEAR					
Manure charge (50 per cent against 1911 apples)....	\$30.77	\$2.087	\$0.058	\$0.033

Spray materials used:

First spraying—

Lime and sulphur, 40 gallons at \$0.04 (1)....	\$1.60				
Lime and sulphur, 100 gallons, at \$0.16 (2)....	16.00				
Tobacco extract, 3 pints, at \$1.562	4.69				
Lead arsenate, 32 lbs. at \$0.08	2.56				
		24.85	1.686	.047	.026

Second spraying—

Lime and sulphur, 43 gallons, at \$0.16.....	6.88				
Lead arsenate, 102 lbs. at \$0.08	8.16				
		15.04	1.020	.029	.016

Third spraying—

Lime and sulphur, 32 gallons, at \$0.16.....	5.12				
Lead arsenate, 77 lbs. at \$0.08	6.16				
		11.28	.765	.021	.012

Fourth spraying—

Lime and sulphur, 15 gallons at \$0.16.....	2.40				
		5.28	.358	.010	.006
Lead arsenate, 36 lbs. at \$0.08	2.88				
Barrels, 937, at \$0.311.....	.....	291.41	19.770	.553	.311
Seed for cover crop (3).....	.....	39.47	2.678	.075	.042
		-----	-----	-----	-----
Total for season.....	.....	\$418.10	\$28.364	\$0.793	\$0.446

SECOND YEAR

Manure charge (30 per cent against 1912 apples)....	\$18.46	\$1.252	\$0.035	\$0.009
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Spray materials used:

First spraying—

Lime and sulphur, 80 gallons, at \$0.04.....	\$3.20				
Lime and sulphur, 75 gallons, at \$0.14.....	10.50				
		13.70	.929	.026	.006

Second spraying—					
Lime and sulphur, 44					
gallons, at \$0.14.....	6.16				
Lead arsenate, 105 lbs.					
at \$0.08	8.40				
		14.56	.988	.028	.007
Third spraying—					
Lime and sulphur, 52.5					
gallons, at \$0.14.....	7.35				
Lead arsenate, 126 lbs.					
at \$0.08	10.08				
		17.43	1.182	.033	.008
Fourth spraying—					
Lime and sulphur, 35					
gallons, at \$0.14.....	4.90				
Lead arsenate, 146.75					
lbs., at \$0.08.....	11.74				
		16.64	1.129	.031	.008
Barrels, 2,104, at \$0.421.....		885.78	60.095	1.681	.421
Total for season.....		\$966.57	\$65.574	\$1.834	\$0.459

(1) Undiluted Homemade solution: 36 pounds of lime, 80 pounds of sulphur, and 50 gallons of water. The cost of labor is included. Rate of dilution, 1 gallon of lime and sulphur solution to 7 gallons of water.

(2) Undiluted commercial lime and sulphur; rate of dilution, 1 gallon of lime and sulphur solution to 10 gallons of water.

(3) Items of seed cost: Clover, 180 pounds, at 16 cents; oats, 22 bushels, at 40 cents; turnips, 7.5 pounds, at 25 cents.

Apple Growers Should Have Other Sources of Farm Income.

The cost of growing apples is lessened by growing them in connection with other farm crops and utilizing the man and horse labor on these other crops when they are not needed in the orchard. The experiences of the best apple growers in old apple producing regions indicate that proper management of a well diversified farm is as important a factor in profitable apple raising as the use of different cultural methods, reduction of packing cost, or even cheaper wages for help.

The farm in question consists of 122 acres. Fifty per cent of this area is devoted to general crops other than fruit, and of the 39 acres devoted to fruit only about 15 are used for apple raising. Enough hay, oats, and corn are raised on the farm for feed. Potatoes are raised, but only for home use. Wheat and beans, as well as the fruit, are cash crops. Each year 20 or 30 sheep are kept and pastured during the summer. Lambs are raised and fattened during the early

spring months. Six horses are kept for work and one for family use. One or two colts are raised each year.

The actual costs given are not the most important result of this study, as other farms in the same community might show quite different results. The method of analyzing the various cost factors is the feature that is of most practical value. The department's new publication aims to outline for the independent apple grower a method that will enable him to determine the actual cost of maintaining and operating his fruit enterprise on his own farm. It does not attempt to give a concrete example of just what the costs will be. Besides the fact of the depreciation of the apple orchard already mentioned, other factors such as the variety, age, and size of trees, the soils, and the climate will influence the actual costs but not the method of analyzing these costs. Apple growers will find much to interest them in the new publication which is being sent free of charge to such persons as apply for it.—U. S. Department of Agriculture.

PRUNING AN APPLE ORCHARD.

C. G. Marshall, Nebraska City.

Mild days between now and spring may be taken advantage of to prune and clean up the orchard. Commercial fruit growers of this section are commencing to realize the importance of pruning more and more each year and this feature of orchard management should be just as carefully attended to in the home orchard as in the commercial orchard. Orchards as a rule are not grown for ornamental purposes or windbreaks but for the fruit that they produce. The objects sought in pruning, then, are to train the tree to the decided shape, to conserve its vitality and make it produce the maximum amount of desirable fruit.

Up-to-date growers have not questioned the advisability of pruning to obtain the above results and where orcharding has reached its highest state of development careful annual pruning is practiced just as carefully as spraying, culture, etc. The past season demonstrated, also, that well pruned orchards have a decided advantage to withstand drouth. In the commercial apple growing sections of this state very little marketable fruit was produced on trees where pruning was neglected even though they were sprayed and cultivated, while trees that were carefully pruned matured fair crops of good fruit in almost every case.

An old and accepted theory among the orchardists was that pruning should be deferred till the severe winter was past. It was generally thought that the freezing of large wounds and the drying out during the winter injured the tree. Such injury probably occurs if the wounds are left unprotected but nowadays no progressive grower would leave wounds unprotected. He seals all wounds of an inch or more in diameter immediately to protect against the entrance of moisture and

disease germs. For wound coating a thick paint of pure white lead and raw linseed oil is highly recommended. Several pruning compounds put out by paint manufacturers are also giving good results. Where wounds are properly coated immediately no injury is apparent from winter pruning and with this objection overcome there is really no good reason why pruning should not be done during the winter months when there is time for it. Summer pruning, however, is sometimes advisable to encourage the formation of fruit buds and bring the tree into bearing, but this is the exception rather than the rule in Nebraska.

There exists great differences of opinion, both among horticulturists, regarding pruning methods. Hardly two growers will agree on how certain trees should be trained or pruned and there are quite as great differences of opinion among trained experts. Pruning is one of the least understood crafts practiced in the growing of fruits. There are many erroneous theories and notions practiced each year, some entirely contrary to nature and the good of the trees and other unnecessary attempts at securing results easily obtained. One is impressed with the great variety found in the different orchards of our state. Some are low-headed, some are high-headed, some have broad open heads while others have close compact heads, but by far the greatest number have never been pruned and resemble more closely a brush pile than productive trees.

With so many conflicting opinions of the way to prune trees it is essential that each grower should have an ideal of tree structure and keep that before him in pruning and training his trees. Varieties and individuals differ greatly in form and habit but with even these great differences it is possible to approach the ideal. Yet no two trees can always be pruned exactly the same. Each tree should be pruned with respect to its own individuality and the pruner should be quick to detect the weak and strong marks of each individual. A strong growing tree should have different treatment from one making a weak growth, and one with an upward tendency demands different training from one with a spreading habit. The pruner's duty is to make the best of every individual regardless of its condition or shape.

Good tools are essential to a good job of pruning. This does not mean that every pruning tool on the market should be at hand but that those used should be well selected and be kept in good shape. The common saw with teeth on both edges is a good one and inexpensive. With this tool the average pruner will do the greatest share of the work. He needs, also, a heavy knife and a pair of light shears. The axe should never be used when pruning a tree. A good disinfectant with which to sterilize the tools is also an essential for thorough work. Diseases of different kinds and especially "blister canker," so prevalent and destructive in Nebraska orchards are readily spread same tree on the pruning tools. If the tools are treated with a solution

of corrosive-sublime, one part to one thousand parts of water, disease germs will not be spread with pruning tools.

In this paper the writer will not attempt to give directions for pruning to be followed in details by the inexperienced pruner but will point out a few of the essential points to be observed which may assist him. But he will have to rely on his own judgement and work out the detail of his operations. First, the general shape of the tree must be considered. If it is an upright grower the thinning and cutting back of the branches should be to encourage spreading of the naturally narrow, compact top. This can be done by cutting just above strong branches or buds situated to the outer sides of the limbs. If, on the other hand, it is a spreading or slender growing tree cut the buds or limbs that point toward the center of the tree in order to throw the limbs inward and upward. Just how much wood to be taken out or left depends on the variety and the individual tree, its age, condition, vigor, etc. Bearing tree with strong growing tendencies should be pruned more severely than young trees or those making a feeble annual growth. Some of our standard varieties tend to overbear and as a result the fruit is often undersized. The fruit bearing wood should be reduced to a greater extent with these varieties than with the more shy bearers. Thinning of the fruit can, to a certain extent, be done by the proper reduction of fruit bearing wood. With all varieties the head should be kept reasonably open and well supplied with fruit bearing wood throughout.

With a less amount of bearing wood and openness of the head to permit the entrance of sunlight and air, fruit is larger, better colored and freer of insects and disease blemishes. This opening of the heads should be done gradually with badly neglected trees. The trees will not feel the shock, from the pruning necessary in many Nebraska orchards to put them in shape, if the thinning process is extended over a period of two or three years. While the removal of one-third to one-half of the top at one operation may tend to force an excessive wood growth with many water sprouts and throw the tree out of bearing. Such severe pruning could occur, however, only in very badly neglected orchards.

All cuts in removing side limbs should be parallel with the main limb and should be smooth and close to the shoulder at the base of the limb removed. In heading back or cutting of a limb any distance from its base the pruner should remember that all food material capable of healing a wound is taking a downward course through the inner bark and that, to heal well, a wound must be in a position to intercept the downward flow of sap from foliage higher up. It should therefore be cut off just above a strong side limb that is capable of furnishing material to heal the wound. Stubs left in pruning do not heal because of this fact and should not extend more than a fraction of an inch from the main limb.

The branches that should be removed are mainly those that interfere with other branches. An even distribution of branches is desirable with fruit spurs scattered well over each branch. A mistake often made is by trying to accomplish the main part of the work from the ground. The main limbs are stripped too well toward their terminals where thick bunches of branches occur. Better start in the tops and work downward thinning the branches of each limb even though some of these main limbs are removed before the job is completed. In selecting between two limbs that are crowding the most desirable should be retained, keeping in mind conveniences in spraying, thinning and harvesting as well as the relation of this limb to the amount of sunlight and air admitted. Other things being equal the lower one should usually be retained. The general tendency at the present is to grow low headed trees. Low headed trees are much more convenient to spray and to harvest the fruit from and are more resistant against winds and storms. The lower limbs should be barely high enough to clear the ground when loaded with fruit. The weight of the fruit gradually brings them downward and to offset this they must be pruned annually to buds and twigs pointing upward.

FIRE BLIGHT OF APPLE TREES.

E. C. Stackman, Assistant Plant Pathologist, University Farm
St. Paul, Minn.

There is a great deal of twig and branch blight of apples this year. The most striking characteristics are the browning of the leaves and blackening of twigs. The dead leaves do not fall, but remain on the tree, thus showing very clearly the position of diseased branches. Upon close examination the blighted twigs or branches are seen to be very distinctly blackened. Not only the smaller branches may be affected, but also large limbs and, in some cases, even the trunks.

Trees showing such symptoms as those described are usually affected with fire blight, so called because in severe cases whole trees may appear to have been scorched. The disease is caused by a bacterium and is very contagious. Usually the microbe is carried to the tree by insects which visit the flowers. When it is deposited on a flower it multiplies very rapidly and the blossom is blackened and killed, this phase of the disease being known as blossom blight.

The infection may extend along under the bark, killing and blackening the twig, and often progressing into the branches. It may also get into the trunk, either through pruning wounds or through shoots growing out from the trunk. It may then cause the so-called body blight.

Infection takes place not only through the flowers, but also through tender shoots, water spouts, suckers, or spurs. For this reason, in orchards where the blight has gained a foothold, nothing should be done which would encourage rapid growth. Unfortunately the same

conditions which are conducive to a vigorous growth of the tree are also conducive to rapid spreading of the blight.

The germs are killed in many of the branches during the winter, but in some they remain alive and become active again in the spring. These so-called holdover cankers are the source of new infection. Often on such cankers drops of milky liquid are exuded and sometimes there is so much exudate that it runs down the trunk. The liquid contains countless numbers of the bacteria, insects are attracted to it and thus carry it to other trees.

The only practicable method of eradicating the blight from an orchard is by cutting away all blighted wood.

This is most conveniently done in late summer or fall after the season's growth is over. At this time the blighted portions are quite easily detected. Every bit of blighted wood should be cut out, even if it necessitates the sacrifice of the whole tree. The branches should always be taken off some distance back from the clearly diseased parts in order to insure cutting out all the infected wood. In the spring the orchard should be carefully examined and any limbs which may have been missed in the fall should be removed. During the summer frequent inspections should be made and the blight cut out whenever it appears. Since the disease is contagious the pruning knife should be disinfected after every limb is cut. Corrosive sublimate dissolved in water at the rate of one part to one thousand parts of water is best for this purpose. A cloth soaked in the solution may be used to swab the pruning instrument, or it may be dipped directly into the solution.

The wild crabapple, thornapple, Juneberry or service berry, and the mountain ash, may be affected with the same disease. These should, therefore, be treated the same as apple trees.

Co-operation is absolutely necessary. Cutting the blight out of one orchard when a neighboring one is still affected, will do little good. Orchardists should recognize the true nature of the disease and make every effort to exterminate it.

THE SIDE HILL ORCHARD.

H. U. Beebe, Superintendent at Jewell Nurseries, Lake City, Minn.

The State of Minnesota has many northern slopes, most of them are underlaid with rock having many fissures that insure a perfect drainage. Many of these slopes are not available for grain crops and cannot be plowed.

Much of this land is covered with trees; the wood will pay for the cost of clearing and when cleared the owner cannot determine what to plant until someone suggests apples. Immediately the question arises,—how to prepare the land with least cost and greatest benefit to the crop to be planted.

This brings me to the main reason for writing this paper. Our secretary believing my experience for the past thirteen years with

the experimental Side Hill Orchard of the Jewell Nursery Company would be of benefit to someone.

Were I to plant a hillside orchard for myself I would select a hillside with a north slope and with an elevation of from one to five feet in thirty feet; a rich sandy loam with some clay in subsoil and underlaid with rock. If covered with wood cut stumps from ten to twelve inches above ground. If oak they will rot out in ten years. If possible to stake out levels before chopping trees I would grub trees where plow was to be used doing this work in the fall or winter. Early in the spring using a hillside plow a terrace eight or ten feet wide should be made thirty feet center to center following the contour of the land placing the first terrace at the foot of the hill. Plow deep and harrow these terraces during the summer and plant trees twenty-five feet apart the following spring. Use Virginia crab two years from the piece root graft with low head eighteen to twenty-four inches trunk. Plant firm, two inches deeper than grown in the nursery, cut all bruised roots with a sharp knife. The branches will be ready to graft the second spring from planting using the whip graft method.

As to variety of apple to plant for commercial purposes, only two varieties should be grown namely: Wealthy and N. W. Greening. Wealthy of course is my first choice. They can be harvested from August to October and will keep until April by proper cooling, sorting, and storage. Northwest Greening is my next choice; the fruit hangs well, can be picked after Wealthy and is ready to use after January 1.

A filler crop is necessary to furnish quick returns the first seven years while the apple trees are developing. We cannot grow peaches or pears as do our western friends but we can grow currants and raspberries and with slight shade gooseberries. Plant currants six feet apart or three bushes between each tree.

Cultivation is very important and should be thoroughly done. For two years a team cultivator can be used but later a one-horse cultivator only.

The second year of the currant bushes spraying will begin and roads will be needed to reach them. The first plan must include a road from foot of hill to top at such an angle as to admit of team hauling up outfit.

Every second space between the levels where trees are planted will be used as roads leveling same by sidehill plow, care being taken at intersection with up hill road that water is diverted onto level roads. Care must also be taken that water is not allowed to wash over side of levels but led along levels until absorbed. A harrow is one of the best tools to use on these levels.

I was surprised to find how much water was absorbed by the cultivated levels of our hillside orchard so much that the grass water runs in the grain field below could be plowed without fear of wash-

ing with the exception of one grass run that carried the water gathered above the orchard which was too great to be diverted.

The owner of the orchard must know the meaning of the word care. He must have a liking for trees, study them as a doctor studies his patient. By doing the work needed at the proper time he will be successful.

Pruning is the most important work to be done both in the dormant state and growing season not forgetting to cover all wounds that expose the wood with wax not paint. Use a cheap mixture of four quarts Resin, one quart Raw Linseed Oil.

Mix in a pail and boil together. Stir thoroughly while boiling. After partly cooling apply with a paint brush, the round metal bound brush costing fifty cents.

Most articles on pruning advanced by our experimental station and demonstrated at our meetings describe the ideal. We must get as near to that as possible.

The work of thinning is commenced by trimming either in March or June disposing of surplus wood. There are many who advise thinning soon after set fruit turns, I do not think this practical but prefer to pick off the largest, best colored fruit in July and August and sell for cooking, leaving as much as will mature without injury to the tree.

Part of our side hill orchard is in grass and part will grow weeds. The removal of this is important as it is a harbor for mice and impedes the harvesting of the crop. To remove this by hand is expensive. I believe it could be done by sheep if followed by a competent person starting early in the season. The sheep would go over the orchard when hungry and not molest the trees. I have not proved my theory but have only suggested it.

While the rocks below the subsoil and those mixed with the subsoil furnish the best drainage the moisture from above must be led to the trees through a cultivated surface. The terraces are a double benefit furnishing shelter from the sun and absorbing moisture.

There is a caution in the selection of land. Ravines that have no air channels and where frost is known to settle should be avoided. Cold air is heavier than warm air and settles to the lower ground.

Selection of site and exposure can avail nothing unless the trees are treated individually and pruned to change leaf buds to fruit buds. Too rapid growth can be checked by stopping cultivation in August and July.

I have used lime-sulphur for dormant spray, twelve gallons to 200 gallons of water applied in March. Second spray when blossom buds are beginning to show pink, nine gallons lime-sulphur, twelve pounds arsenate of lead to 200 gallons of water. Third spray when petals fall and before calyx closes using same mixture as second spray. I have found three sprays sufficient.

Editor's note: The above article was read at the annual meeting of Iowa State Horticultural Society December 1913. There are hundreds of acres in Eastern Nebraska suitable for orcharding that could be treated as Mr. Beebe treated his orchard and prevent the erosion of the soil to a large extent. By selecting varieties according to the recommended list for the district in which you reside and following the above method good orchards can be grown, on land considered valueless except for pasture.—(April Horticulture.)

FRUIT STORAGE INVESTIGATIONS OF THE UNITED STATES DEPARTMENT OF AGRICULTURE.

A. V. Stuebenranch, Expert in Charge of Field Investigations in Pomology.

During the past eight years the Bureau of Plant Industry of the United States Department of Agriculture has carried on an extensive investigation of the cold storage of fruits and especially of apples. From these investigations many important facts and principles have been developed, most of which have had an important bearing on the storage and warehousing of fruits: These investigations are still in progress, as there still remain important problems to be solved. Some fruits have not yet been studied, and furthermore, all sections of the country have not yet been included. Naturally, the first work was done on eastern and central western fruits, and as funds have been provided and experience has been gained the work was extended to the other sections of the country. Last season work was begun in the Pacific Northwest, comprising the important fruit producing districts of Oregon, Washington, Idaho, Utah, and Montana.

It has been found that the condition of the product at the time it is stored has a most important influence on its behavior in storage and the length of time it may be held in good condition. This has reference to the regions where the fruit is produced; to the orchard conditions and treatment; to the stage of maturity of the fruit at the time it is packed, to the care with it has been picked, handled and packed; to the promptness with which the fruit is placed in storage and cooled. All these factors are under the control of the producer, the packer, or the shipper. The duties of the warehouseman or the cold storage man follow these and have reference to the proper regulation of the temperature of the rooms, ventilation and handling in the cold storage house itself. It is the warehouseman's business to see that the proper storage temperature and proper conditions of humidity are uniformly maintained. A fluctuating temperature—if it fluctuates to a considerable extent—may be most injurious. Another important factor in the successful storage of fruit is the maintenance of uniform conditions throughout the storage rooms themselves. This is plainly the duty of the warehouseman. Where the rooms are

improperly piped or insulated the temperature will not be uniform. Parts of the rooms may be too cold, and parts too warm. This is especially true in very large rooms. This does not necessarily mean that small rooms are most desirable and efficient. Quite the reverse. Under proper conditions it is relatively easier to maintain a large room in a uniform condition than a small one, because of the smaller proportion of wall space to air volumes.

It is beyond the limits of this paper to describe the various types of storage houses. There are two classes of storage houses; common storage houses and cold storage houses. The former are not provided with equipment for artificial refrigeration, cool temperatures in the rooms being maintained by opening the rooms during cold days and nights and closing while the outdoor temperatures are high. Naturally the temperature conditions possible under these conditions are not as uniform as can be maintained in artificial cooling. This equipment may consist of ice, ice and salt, or of machinery for producing refrigeration. The common storage plants are located at railroad points, and as a general rule are operated by commercial warehousemen, although some large producers operate their own cold storage plants.

The standard storage temperature for apples has been found to be 32 degrees Fahr., and this temperature has so far proved satisfactory for all varieties with possibly one exception. This is the Yellow Newton produced in the Pajaro Valley of California, which holds best at a temperature near 35 degrees Fahr.

The various factors which have been mentioned as having important influences on the keeping quality of fruit products will be discussed in the order named.

Influence of the Place of Production.

There is a widespread opinion that the region producing a variety of fruit has little or no influence upon its behavior in storage. The investigations of the department show that such a view is erroneous. A great many varieties of apples have been studied, and these have been obtained from different districts of the United States. It has been found that the place and conditions of production have a material influence on the keeping qualities of different varieties. Moreover, the soil upon which the fruit is produced affects its keeping qualities in cold storage. Differences of from one to three months in the length of time a variety may be held in good condition have been due to the influence of different places of production.

Influence of the Method Culture.

The methods of culture and care in the orchard are also factors affecting the keeping qualities of the fruit. The character of the tillage, the pruning, the age of the trees and the climatic conditions may be governing factors in the behavior of the fruit in storage. Large, coarse and sappy fruits produced by young trees do not have as good

keeping quality as the same varieties grown on older trees. It has been found, especially under eastern conditions that trees with thick heads and branches which prevent the fruits from maturing uniformly, may yield a large proportion of green, poorly colored fruits, which do not hold well in storage. This is plainly a factor which may be controlled by a different orchard treatment. Opening up the trees, late cultivation, keeping the trees in active growth late in the season prevents the proper maturing of the fruits. This is not likely to be so important a factor in this region except where climatic conditions similar to eastern humid summer conditions prevail. In irrigated sections the moisture conditions are under the control of the grower. If he irrigates and stimulates growth at the time the fruit is maturing, he will bring about conditions which may result in the production of sappy, poorly colored fruit of low keeping quality. In sections having dry summers, but depending upon tillage for maintenance of proper soil moisture conditions, the effect will be opposite unless cultivation is carefully done. In orchards where cultivation and tillage are not thoroughly done there is likelihood of the trees being under stress from lack of moisture at the end of the dry season. Fruit from such trees has low keeping quality in storage.

Any condition of soil, climatic or orchard treatment which results in the production of abnormal fruits may be governing factors in their cold storage behavior. These factors are ordinarily not considered in selecting fruit for storage. If they could be taken into consideration, much loss would be avoided.

It may not always be practicable for the warehouseman to consider these factors, due primarily to the conditions of growth and production. Fruit is mostly purchased by jobbers and wholesalers who do not, as a rule know anything about the history of the fruit prior to the time it is received by them. The only way that loss from deterioration may be avoided in these cases is to keep close watch on the fruit during the season, and to dispose of it before it has gone too far.

A fruit is a living organism, which has a definite length of time for carrying on its life functions. As long as these life functions are active, the fruit remains in a vital condition and is fit for food. After the life processes have become weakened and exhausted, death of the fruit takes place, rapid deterioration results, and the fruit is unfit for food. The vital processes of the fruit go on normally while the fruit is on the tree, unless the tree is in distress. When the fruit is severed from the tree the life process is hastened while the fruit remains at relatively high temperatures, so that when the fruit is picked the ripening and life processes are quickened, and unless some means is taken to control or to slacken these processes, the death of the fruit ensues within a comparatively short time. When the fruit is stored at a low temperature, the vital processes are very materially retarded; they do not entirely cease, but continue slowly, the rate depending upon the character of the fruit and the temperature at which it is held. It fol-

lows that when the life processes are materially reduced, the fruit will remain in good condition a greater length of time. This is the principle upon which the cold storage of food products is based.

The low temperature may also retard the growth and development of various forms of decay or rot, due to fungi, which grow upon the fruits and destroy them. Most of these fungi can not germinate at the low storage temperature (32 degrees F.) but when once started, they continue slowly to develop, and may entirely destroy the fruit in the storage rooms. The most common forms of decay, however, are dependent wholly upon the character of the handling which the fruit receives in preparing it for market.

Other form of decay which are not dependent upon abrasions in the skin to gain entrance in the fruit are dependent upon proper moisture and heat conditions for their germination and growth. By reducing the temperature to a point at which the fungus cannot grow, disease can be held in check.

Under orchard treatment and conditions we must consider spraying for the control of insects and fungus diseases. Where the spraying work is not thorough and efficient a considerable proportion of the fruit may be injured by insects and consequently rendered susceptible to decay. All such injured fruit should be religiously excluded from packages intended for storage. Where the insect or disease injury is primarily not to the fruit itself, it is just as important that the spray be efficient. Any insect or disease which interferes with the normal vitality and growth of the trees, likewise affects the quality of the fruit. This is a fact well-known to all up-to-date orchardists, but the effect on the storage quality of the fruit is not so well appreciated.

Seasonal Influences.

It is a well-known fact that during unfavorable seasons the quality as well as the quantity of the fruit produced may be affected. In case of unusual drought the man who irrigates has some advantages over the grower who is wholly dependent upon natural weather conditions. Following destructive frosts the crop may be thinned to such an extent that the remaining fruits are overgrown and sappy, and consequently of low keeping quality in storage. On the other hand, fruit produced by overlaid trees has weak storage quality, and a spring frost may thin the crop just to the desired point. Fruit produced under favorable seasonal conditions must be carefully watched during the storage periods, so that it may be sold and consumed before it has deteriorated to any great extent.

Proper Stage of Maturity for Storage Fruit.

The investigation of the Bureau of Plant Industry have shown that fruit which is fully matured and well colored holds better and longer in storage than immature, poorly colored fruits. When the bureau investigations were began the common practice was to pick fruit

intended for storage before it was fully mature. A systematic study on a large scale has shown this to be erroneous. Green, immature fruit is subject to scald, and if very green, will shrivel in storage, while the same variety fully matured holds much longer and in better condition. This principle has been found to hold true for all kinds of fruits except pears and lemons. These are apparently the only fruits which are better when picked before full maturity or ripeness, as the term is ordinarily interpreted. By full maturity is meant full color with firm flesh and the seeds fully grown and colored. Overripeness must be avoided as much as immaturity. In some sections it is a general practice to allow the crop to remain until all the fruits are fully colored. There is danger when this is done that part may become overripe and consequently have low storage, or even shipping, quality. It is best, especially with the earlier ripening varieties, to make more than one picking, selecting each time the fully colored fruits and allowing the undeveloped to remain. The fruit grown on the outer branches develops more rapidly and consequently ripens first. Much more uniform storage-holding quality can be obtained by keeping these fruits separately, unless the trees are open-headed and there is a uniform development throughout.

Influence of Handling on Keeping Quality.

The bureau investigations have shown that a direct relation exists between the type of handling and the occurrence of decay in both storage and transit. As has already been mentioned, the common forms of decay are caused by fungi which gain entrance through some form of mechanical injury to the fruit. Fruit is most commonly injured in preparing it for market, in the picking, grading, hauling, and packing operations. In general, most growers appreciate that fruit must be carefully handled, but they have no conception of the amount of injury ordinarily done unless extra care is used. In the course of the bureau investigations many instances were found where growers who had the reputation of handling carefully were really injuring a large percentage of their produce through ignorance or oversight. From 10 to 15 per cent of apples were found to be injured, and in the case of citrus fruits the percentage of injuries was often much higher.

The apple, pear, peach, plum, cherry and grape are far more easily injured than the orange or lemon. The necessity for great care in handling these fruits is therefore all the more urgent. In California all up-to-date citrus growers and handlers use gloves in all picking, grading, and packing operations. If this practice does not prevail in Ontario apple orchards it should be adopted, as in this way many types of injury may be avoided. In the citrus investigations, sand, gravel, dried twigs and dirt in the packing bags and field boxes were found to be responsible for much abrasion of the skin of the fruits, which was always followed by serious decay. The tender skin of the apple and pear is very susceptible to this type of injury. For this

reason if these fruits are wiped before they are packed great care must be used to avoid abrasion of the skin the slightest scratch or puncture is sufficient to allow the fungus to gain entrance.

The urgent necessity for the greatest care to avoid injury in preparing fruit for storage or shipment cannot be too strongly emphasized. This is the foundation upon which rests the successful marketing of fruits intended for immediate consumption or for storage.

Influence of Prompt Cooling.

As has been mentioned above, a fruit is a living organism, during the normal growth and development of which certain physiological and chemical changes take place within the fruit itself. These changes constitute ripening, as the term is ordinarily interpreted. Up to a certain point flavor and quality improve and the fruit is considered as ripe. After this point is reached there is a gradual decline, and death and deterioration take place. Flavor and quality are lost, and if the process continues the fruit breaks down physiologically or is destroyed by decay or fermentation. It has been further shown that when the fruit is removed from the parent tree or plant these life and death processes are materially hastened while the fruit remains at relatively high temperature. A reduction of temperature retards these vital processes—they go on very slowly in storage; if they were entirely stopped the fruit would soon die and break down physiologically—and gives the fruit a longer term of life. The promptness with which the cooling is done has a material influence upon the length of time the fruit will remain in good condition. The Bureau of Plant Industry Investigations have demonstrated that apples placed in storage and cooled promptly hold in good condition from one to three months longer than the same varieties delayed ten days or two weeks, if the temperature is rather high. This point is therefore of the utmost importance, especially with a variety like the Jonathan, which ripens in the early part of the season while the weather is warm.

(Part of paper delivered before annual meeting Ontario Fruit Growers' Association, Toronto, Canada.)

THE GREAT NEED FOR APPLE ADVERTISING.

By H. F. Davidson, President, North Pacific Fruit Distributors.

Of all the lines of American industries open to exploitation, and demanding the highest skill and capability, and requiring the maximum amount of persistent energy, the advertising of the apple the great American fruit, the king of all fruits, certainly stands at the head of the list.

The opportunity for successfully advertising apples is a big one, and I believe the Apple Advertisers of America, through their efficient manager, Mr. U. Grant Border, have struck the keynote to the situation, and that The Apple World, will carry the right message forth, and that

phenomenal results will be obtained.

The organization, the publication, and the manager should have the support of every apple grower and dealer engaged in any way in the apple business.

In traveling about the country attending to my duties as president of the North Pacific Fruit Distributors, I meet some very curious conditions. On entering a dining car for breakfast, I often observe a large percentage of the people eating grape fruit, or, rather, sipping the juice, as there is really nothing about a grape fruit to eat. Frequently, later in the day, in private conversation, I learn that it is common for these grape fruit eaters to be looking for some medicine with which to relieve themselves of acidity of the stomach.

Bananas are a most excellent food fruit when they are allowed to mature sufficiently before being cut from the plant, but when cut absolutely green, as they must be in order to stand the transportation necessary to get them to us in sound condition, the real food value is largely lost.

People have been educated to use these and many other fruits through persistent advertising. Producers and dealers in these fruits have employed good talent to set forth their value as food products, and have even gone so far as to induce prominent physicians to recommend their use as a means of promoting good health.

The apple, which is produced in our own country to the extent of 50,000,000 to 60,000,000 barrels, or 250,000 to 300,000 car loads, is a common food product, and a real article of food, so common, in fact, that it is seriously neglected by its best friends. It is difficult to understand why people with delicate stomachs will use fruit with such strong acid contents as grape fruit, or bananas that were cut so green that they are unfit for food, when they have available at least ten months of the year, such luscious, healthful, nourishing fruit as the apple. There are more than 57 varieties, each one of which can be served in 197 different ways, which is certainly a sufficient variety for the most fastidious.

Apple shippers must demand of the dining car people that they serve a properly baked apple of the proper variety for ten cents, and the dining car people, hotel people, restaurant people, and the housewives must be educated to know the right variety to serve in the different styles, and they must be supplied with apples at a reasonable cost, so they can afford to use them regularly in large quantities.

We are willing to admit that it is consistent for consumers to give their attention to berries, peaches, etc., two or three months in the summer, as these fruits cannot be kept out of season successfully, but apples can be matured on the trees and served in prime condition for fully ten months of the year, so there is no valid excuse for loyal Americans to use any other fruit during the ten months' period. By selecting twenty of the very best varieties (and there are more than twenty kinds that are fine) and serving each of them in the 197 ways

which are fully described in Brother Eorden's booklet we have 3940 different dishes. If we serve them three times a day for ten months of the year, we can have a different dish each meal for four years and leave 340 dishes to carry over to the fifth year.

Out here in the northwest we are apple specialists; we are making a special study of the times at which the different varieties are in best condition for use, are making a study of the different uses to which the various varieties are most suitable, and are supplying special varieties, sizes and grades for special purposes, and having these different varieties delivered at the proper season when they are in the best condition for use.—From the "Apple World."

WINDFALL APPLES MAY BE CANNED AND USED FOR PIE FILLING, APPLE SAUCE, ETC.

Windfall apples, which are often left on the ground to rot, may be made to serve a useful purpose by the economical housewife. A little forethought and labor at this time of the year spent on a despised product of the orchard may supply the winter table with many an appetizing and wholesome dish which otherwise would either be lacking or supplied at a higher cost.

Windfall apples may be canned whole and used as a breakfast dish, for dessert, salads, or baked. There will be many which are too much marred for canning whole. In this case, the marred places may be removed and the apples sliced and canned for either pie filling or for apple sauce. Following are the recipes for thus taking care of windfall apples:

Whole Windfall Apples Canned.

Select firm, not overripe apples. A great difference in the canned products will be noted in the different varieties of apples. This recipe is intended for firm and preferably tart varieties. Some varieties will require less time and some more.

Remove blemishes, cut out core. Blanch for 2 minutes in boiling water; plunge in cold water. Pack in tin cans or glass jars and add just a little very thin syrup. Put on rubber and top and partially tighten. (Cap and tip tins.) Sterilize 20 minutes in hot water bath, 15 minutes in water seal, 10 minutes in steam pressure outfit, or 6 minutes in pressure cooker. Remove jars, tighten covers, and invert to cool.

Apples canned in this way, make a product, that is generally wasted, available for apples salads, dumplings, breakfast apple dishes, apple potpies, and baked apples.

Windfall Apples for Pie Filling.

Peel and core; slice; scald 2 minutes in boiling water; plunge in cold water; pack in glass or tin, and add about 1 teacupful of hot, thin syrup to each quart; put on rubber and top, partially tighten

(cap and tip tins); sterilize 16 minutes in hot water bath, 12 minutes in water seal outfit, 10 minutes under 5 pounds of steam, or 4 minutes in pressure cooker; remove jars, tighten cover, invert to cool. This is a good method of utilizing the good portions of partially decayed apples.

Note:—The thin syrup mentioned in these receipts is made as follows: One and-half cups of sugar to 1 cup of water brought to boiling.—U. S. Dept. of Agriculture

THE MENACE TO ORCHARDING.

Prof. J. R. Cooper, University of Nebraska.

Damages resulting in infection of Illinois or Blister Canker, in the United States amounts to millions of dollars annually, and the loss is constantly growing. Notwithstanding this fact, orchardists up to within the last few years paid very little attention to the disease. Even now many men who should know better from experience believe there is no danger from canker, while others who do know better desire to have just as little said as possible about it for fear of discouraging further planting. Here is one case however where it makes little difference whether publicity is desired or not "Murder will out" and I dare say there is not an orchard in the State of Nebraska that does not show evidence of canker infection. The question has become serious and demands consideration on the part of every man in the state who owns or contemplates owning an orchard large or small.

There is no reason however for becoming frightened or discouraged and giving up the fight (rather refusing to fight). This disease can be at least partially controlled in the old infected orchards and by a united effort on the part of the growers can be prevented from gaining a foothold in the young orchards.

As it is commonly used the term "canker" is applied to any diseased condition of the bark or wood of a tree. In order to control any abnormal growth or condition, it is first necessary to find the cause, the manner in which the infection—if such is the case—takes place, and the manner of dissemination. In the present case it is necessary to make a slight distinction between different apple tree cankers.

Named in the order of importance, the most destructive cankers in the middle west are: Illinois or blister canker, bitter rot canker, black rot canker and blotch canker. In appearance and effect on the trees they are somewhat similar, to the casual observer. Bitter rot and black rot canker, however, seldom extend deeper than the bark and blotch canker rarely or never attacks large limbs, while the blister canker attacks both bark and heart wood of the large limbs and trunk and is the most difficult to control. The last named disease differs from the others in that it attacks only the tree while the others attack both tree and fruit. It is much more prevalent than the

others and is much more destructive. The remedies recommended for it apply equally well to any of the others.

Illinois canker (*Nummularia discreta*) is easily recognized, even by a casual observer. It does not require close observation to distinguish dead branches of trees that are killed by this fungus. The flow of sap is cut off and the bark dies. Often a branch is killed in a single season and the leaves and apples cling to the twigs for same time. Often the apples hang on all winter. At the base of the limb and often over its entire length may be seen at first small blister like protuberances. As the disease progresses, the tops of these protuberances become more flattened and more nearly resemble nail heads. If a thin layer is cut away with a knife, irregular spots of tan surrounded by a dark brown or black ring may be seen. These spots vary in size from 1-16 to 1-4 inch and are scattered all over the diseased surface in most cases, though sometimes few if any are present. Two kinds of spores are produced from these spots, which spread the disease. The first set of spores are produced in the months of July, August and September. Masses of mycelium form in more or less compact branches called stroma; from these masses slender stalks arise, sometimes singly and simple, sometimes branched, on the ends of which the spores are formed. This is what causes the blister-like appearance of infected bark. The spores are set free by the cracking of the epidermis covering these masses and are carried by the wind from tree to tree, producing canker wherever the spores lodge in wounds, if conditions are favorable. The following season during the months of April, May and June another kind of spores are produced from these same Stromatic masses. Unlike those of the first season they are formed in sacks (asci) each sack containing eight spores. The sacks are also enclosed, several together in cases (perithecia) which are arranged in a layer throughout the irregular masses. Closing the opening of each perithecium is a plug which prevents the escape of the spores, until it has been sloughed off or disintegrated by the action of the weather or removed by some mechanical means, such as being cut into, by pruning tools, the rubbing of limbs together, etc. When freed, the spores cause infection the same way as the conidia of the season before.

Infection may arise through spores lodging either in wounds in the bark, or where branches have been removed in pruning. The cankered trees at the Nebraska Station and many orchards over the state were examined and 80 per cent of the cankers were found surrounding wounds caused by poor pruning. The remaining 20 per cent were caused by wounds of various kinds. Pickers in climbing trees for fruit, bruise the bark with their shoes. In cultivating the trees are often injured by single trees and machinery striking the limbs. The injury known as "sun scald" often is an open door for infection.

It sometimes requires several seasons for the disease to destroy

a limb, especially if it is a large one. At first the diseased area may be comparatively small, but it gradually extends farther and farther up and down the branch, as well as around it. I have observed these cankers extending down one side of a large limb and the trunk to the ground and affecting the roots. A peculiarity of this disease is that only a small area of the bark at the point of infection may be affected but the mycelium goes deep into the heartwood and travels both up and down the limb, coming to the surface again some distance away, especially if the limb is injured at some other point. The progress of the disease in the wood is marked by a dark brown discoloration of the fibers. It is this rapid growth in the heartwood which makes it so difficult to control.

In treating trees for canker we must divide them into three classes. First, those which may be cured profitably by treating. In this case we have trees with all degrees of infection, from a small cankered spot on one limb up to several large cankers on one or more limbs.

In general practice it is best to remove any diseased limbs entirely, unless the infections are recent. Sometimes, however, the removal of the limb throws the trees greatly out of balance, or, as is often the case, the cankered limb is on the south side, where its removal would expose the trunk and large limbs to direct sunlight. In such cases it is well to try to treat and save the limb unless the disease has progressed too far.

In treating the limb the cankered and discolored bark and wood must all be removed. It is safest to cut back behind the cankered spot at least one inch into clean growing bark. The wound must be made pointed both above and below because if left square a wedge-shaped piece of dead bark will result which will encourage a new infection. After removing the canker and making a good smooth cut the wound should be disinfected and covered.

Another important step in treating the canker is to cut the trees back heavily and force out an abundance of new growth. Trees with heavy tops compared to the root systems, or those which have been weakened by any cause, such as drought suffer most severely from Illinois canker. Cutting back the top so that the roots can supply water and plant food in abundance to the remainder, goes a long way towards correcting the trouble.

The second class of trees are those which are so badly cankered that it would be unprofitable to try to cure them, but which will still bear a profitable crop of apples. This is the most dangerous class of all for the lay man sees no reason why he should sacrifice a tree so long as it will bear fruit, and leaves it in his orchard to scatter millions of spores to his sound trees. We do not recommend that these trees be cut down but that they be prevented from scattering the disease. This can easily be done by cutting away and burning the dead limbs and by keeping the cankered surfaces of what are

left covered with a heavy coat of asphaltum.

Now is the time to cover all these exposed cankered surfaces, to prevent the scattering of spores which are formed during July, August and September. This same covering will also guard against the scattering of the spores which are formed beneath the surface next spring.

The third class of trees are those which are so badly diseased that they no longer bear. For this class there is no remedy but to cut down and cast into the fire.

The Question of Disinfectants and coverings for wounds, is a very important one in orcharding. The ravages of blister canker during the last ten years has especially emphasized the need of reliable disinfectants and covers for pruning and other wounds. Orchard sanitation is an absolute prerequisite to success in orcharding today. Under present conditions of the prevalence of disease two operations are necessary in dressing tree wounds. The wound must be sterilized to destroy any fungi or bacteria which may be present, and it must be covered to prevent infection through the later entrance of fungous or bacteria.

The sterilization of the wound may be accomplished by applying some antiseptic or germ killing material directly to the wounded surface by means of a brush or a small hand spray. The most satisfactory disinfectants are carbolinum, corrosive sublimate or carbolic acid, though gasoline, kerosene, copper sulphate solution, formaldehyde, etc., may be used. When the cover is applied immediately the disinfectant may be mixed with it and one application be made to answer both purposes.

Where there is evidence of disease in the orchard all pruning tools should be disinfected after finishing each tree, or after cutting through any diseased limb, by dipping in some one of the before mentioned materials or by swabbing off with them.

The cover must consist of such materials that the wound will not be allowed to dry out. They must be impervious to water and exclude air. They must be adhesive and not be so affected by changes in temperature that they will crack or fall away from the wound. In order to secure a good covering the material must be of such a consistency that it will spread easily and evenly, and must be cheap enough not to be prohibitive.

White lead and linseed oil, venetian red and linseed oil or chrome yellow and linseed oil make good coverings for small pruning wounds, but are useless for coverings for large wounds for if applied in a thin coat the wound checks, and if applied in heavy coats the paint blisters and peels off.

Tars of various sources are often used as coverings for tree wounds.

Coal tar, which is a byproduct of coal oil refineries and which contains gasoline or naphtha or both is said to be injurious to the

tree by being absorbed. The writer doubts whether this supposed injury is serious enough to receive consideration and the material has the advantage of being cheap.

Gas tar is the residue from the manufacture of gas. It is inexpensive which is in its favor, but it has the disadvantage of being almost entirely absorbed by the wood and as it is like coal tar contains some volatile matter which may be injurious to plant growth, it may do some injury to the cambium of the trees. No injury, however, has been done in our station orchard. The greatest disadvantage has been that, the tar being absorbed, allows the wood to check which is of course very undesirable.

Asphaltum is a byproduct manufactured from the residuum in the distillation of western petroleum. According to the stage to which this distillation is carried on the melting point will vary from 200 degrees to 285 degrees F. This is the only essential difference in the different grades.

All the above grades must be heated before they can be applied. For this purpose a charcoal heater or a gasoline tinner's stove is very satisfactory to maintain the required temperature in the orchard, but the asphaltum must first be melted over a hotter fire. The hot asphaltum is applied by means of an old brush or swab and smoothed up with a piece of hot iron either flat or curved according to the surface of the wound.

Solid asphaltum makes a good cheap cover, but it is hard to apply on account of its having to be heated. Then there is some danger of cracking during the winter months where it is used on large wounds, unless carefully applied. If the work is well done solid asphaltum makes a very effective cover.

Liquid Asphaltum. This is solid asphaltum dissolved by mixing it while hot with some substance such as gasoline or naphtha when it resembles very closely coal tar, and there are the same objections advanced against its use as against coal tar. The use of vegetable oils as solvents have been recommended to overcome those objections, but these oils make the product more expensive. Both forms of liquid asphaltum have been used at the Nebraska Experiment Station with good results.

The Standard Oil Company offers a solvent called "Varmolene" for making liquid asphaltum. To make liquid asphaltum by using gasoline, naphtha or "Varmolene" the asphaltum is melted, then withdrawn from the fire and stirred while the solvent is added. The amount of solvent to use will depend upon the melting point of the asphaltum and the desired consistency of the mixture. For winter use where the asphaltum has a melting point of 285 degrees F. two and one-half parts of oil may be used to one part of asphaltum. In summer the proportion should be about two to one. Vegetable oils may be employed as solvents in which case slightly less oil is used. When the solvents are added to hot asphaltum there is some danger of explosion if near the fire.

Liquid asphaltum has as a rule given better results than the solid. This is probably due to the fact that a better job of covering may be done. No ill effects have been noted from the use of any of the preparations of liquid asphaltum.

The key to success in treating canker is thorough and careful work. In pruning all cuts should be made smooth and close, and should be covered immediately. All dead and diseased limbs should be removed. Pruning tools should be disinfected after every tree and after cutting into any canker part of a tree. All dead trees and all pruned wood should be removed from the orchard at once and burned. No cankered spot should be left uncovered on any tree, for just as long as such spots are uncovered just so long will there be canker spores to infect the remaining trees. When spraying every part of the tree should be sprayed thoroughly. When these measures of sanitation are carried out, and not until then, will we be able to control the Illinois canker.

CEDAR RUST ON THE APPLE.

J. R. Cooper.

Cedar rust of apples (*gymnosporangium macropus*) is one of the most widespread and economically important diseases of the apple. It is found all over the eastern and central portions of the United States. The disease is not found except in regions where both red cedars and apples grow. The abundance of red cedars in Nebraska and the large number of susceptible varieties of apples in the state is the principle reason why this disease is so abundant. Orchards in the vicinity of the cedar trees always suffer more severely than those farther away.

Other diseases and insects are often blamed for the damages caused by cedar rust. If proper credit were given this disease for all the loss it causes it would amount to many thousands of dollars annually, regardless of the loss due to weakening of the trees and to impairing the vitality of the fruit buds.

The foliage is the first to suffer, and usually it is the foliage which suffers most, though the twigs and fruit are also attacked. Early in the growing season the leaves begin to show bright orange colored spots. Upon these spots soon appear small pimple like protuberances (pustules) on the upper surface. These pustules, at first yellow, soon turn black and exude a sweet viscid substance. The orange colored spots become larger and more thickened as the season advances. After the first of July small tubular openings appear on the lower surfaces from which spores are exuded. In cases of severe infection almost the entire surface of the leaves are covered with rust spots, and in some cases the trees are entirely defoliated by the last of August. Many trees succumb entirely, especially if the season is dry, while on those which survive the fruit is often so small as to be unsalable.

The fruit itself does not escape this disease. On the apple it causes a yellow wrinkled spot frequently containing openings similar to those seen on the lower surface of the leaves. Fruit spots are usually found at or near the blossom end. The disease gains entrance through the calyx lobes while the fruit is quite young.

The disease is disseminated from the corky galls found on cedar trees commonly called cedar apples. These galls contain spores which when the weather becomes warm and sufficient moisture is present, multiply rapidly, causing the cedar apples to throw out long, yellow, jelly-like masses containing millions of spores, which are blown away and scattered by the wind as soon as the mass becomes dry. It is impossible to say how far these spores may be carried by the wind, but few orchards are free from rust even when no cedar trees are near.

When these spores fall upon an apple leaf, infection is produced if there is sufficient warmth and moisture. Serious epidemics do not occur during extremely dry weather, for the reason that moisture is necessary to the germination of the spores. Ordinarily, however, there is sufficient moisture for germination at the time when spores are being disseminated, and after growth begins the disease continues, rain or shine.

The spots on the apple leaves produce spores, as before mentioned, which in turn infest the cedar trees, producing new galls, from which come the spores to infect the apple trees another season.

The varieties of apples most susceptible to the disease are Wealthy, Red June, Jonathan, Northern Spy, Rome Beauty, Iowa Blush, and Missouri Pippin. Ben Davis, York Imperial, Gano, and Grimes Golden are only moderately susceptible. Varieties only slightly susceptible or immune are Winesap, Arkansas, Northwestern Greening, Oldenburg, Ralls Genet, Staymen Winesap, Maiden's Blush, Sweet June, Yellow transparent, and Cooper's Early.

Susceptibility of different varieties varies with climatic conditions and often with individual trees.

Several experiments have been conducted for the purpose of determining the best methods of control for cedar rust. Dr. R. A. Emerson, of the Nebraska Station, found that if the apple trees are sprayed thoroughly with bordeaux mixture of the regular 3-4-50 formula, just as soon as the cedar apples have begun to enlarge, becomes gelatinous and orange colored, the disease may be largely prevented. This depends largely upon weather conditions and varies with the season.

The Virginia Experiment Station recommends spraying with either bordeaux mixture or lime-sulphur or the destruction of the cedar trees for the control of cedar rust.

The only safe and sure remedy for the disease is the destruction of the cedar trees in the localities where the cedar rust is most troublesome and where the removal of the trees can be accomplished without difficulty it is the best method to follow, but in some parts of this

state, especially the northwest, the cedar trees are more valuable than the apple trees, and some other methods must be employed. In the commercial orcharding districts the cedar tree must go, and in the west and north where the trees are badly needed and where the orchards are fewer and small the fruit grower should resort to spraying.

BEES AID FRUIT PRODUCTION.

J. R. Duncan.

Practically all the varieties of fruit grown under cultivation, need to have the blossoms cross fertilized in order to produce fruit. In other words the blossoms on a tree do not furnish pollen that will fertilize other blossoms on the same tree. These are called self sterile trees. Other trees may have blossoms that will fertilize the blossoms on the same tree but fruits thus fertilized are not as good as those cross fertilized. The number of varieties that are self fertile are very small as compared with those that are self sterile.

Numerous experiments have shown that wind plays a very small part in cross fertilization and cannot be depended upon. Bees and other insects are the real means of cross fertilization. Then in order to get a crop of fruit there must be a sufficient number of bees or other insects going from flower to flower in search of honey. In so doing the pollen grains from one blossom will be carried to another flower and that flower be fertilized and thus produce fruit. Farmers, fruit growers and the dwellers in town owe a large debt to the tiny bee for its work in helping produce the fruit consumed in our homes. In every orchard there should be several stands of bees.

Bees are attracted by showy blossoms. In spraying with a poison spray, the insects should be protected and this can be done by spraying after the petals have commenced to fall. The bees usually finish their work before this stage. Some farmers believe that bees sting the fruit and suck the juice from the fruit thus destroying production. It has been proven, however, that such damage results where birds, wasps or yellow jackets or disease germs have attacked and broken the skin of the fruit. It is not possible for the bee to puncture the skin and the damage attributed to them usually starts from some other cause. The bee should not be condemned for the faults of some destructive insect or pest.

DO APPLES DEGENERATE?

C. G. Marshall, Nebraska City, Neb.

Early horticultural experts maintained that cultivated plants deteriorate with age and some of the pioneer planters of Nebraska have taken the stand that certain varieties of apples, in particular, have lost ground and are not so valuable as once. Certain varieties that were favorites twenty or thirty years ago and very profitable in eastern Nebraska are considered valueless now and there seems to be a well-founded impression that these sorts have "run out."

In bulletin 361 by the New York experiment station the authors hold that from evidence to be had the fruitgrower is safe in assuming that for practical purposes varieties of apples do not degenerate and neither do they change for the better. Our observation leads us to conclude that the waning of popularity of certain varieties that were favorites twenty or thirty years ago has been due to fungus and insect enemies in many cases rather than to the inferiority or inadaptability of the varieties.

The first trees planted in Nebraska grew into bearing and bore fruit for a number of years before any of the new serious fungous diseases and insects were known in this section. Ten or twelve years ago when the "apple scab" was doing so much damage in eastern Nebraska and before science had worked out a way of controlling this disease the Winesap was unprofitable. Several years in succession "scab" was so injurious on this variety in Washington county orchards that not only the fruit was worthless but the trees were being weakened and killed. Some planters were classing this variety with the "has-beens" and eliminated it in planting new orchards. But when scab preventative measures began to be practiced the Winesap "came back."

The White Winter Pearmain was another variety that was a favorite with some of the early planters but has lost ground until it has not been considered at all recently. It is also quite susceptible to fungus and undoubtedly would now do much better since practical means of controlling fungus may be practiced. It is not, however, a standard at its best and should be planted only in a limited way.

THE CARE OF SPRING SET TREES AND PLANTS.

W. D. Wallace

Trees and plants require careful attention. We have found it good to wrap the trunks of newly set trees with heavy cloth, burlap, heavy paper or even cornstalks. In the nursery row, trees shade and protect each other, but when transplanted into orchards and exposed to the full power of the sun and wind, the bark often dries out and sunburns. Transplanted trees, as a result, are often attacked at this time by a flat-headed borer.

Anything that hastens root development increases the probability of vigorous growth before the extreme heat of summer. Frequent cultivation of the soil develops speedy cell and root formation, as well as conserving moisture. Small fruits should be cultivated twice a week and it is well to cultivate orchards at least six times monthly during the first three months provided, of course, that the cultivation does not interfere with the root system.

Grapevine for planting should be cut back to four buds. Two canes are really enough for the first season, but four buds guard against accident. In very dry and windy springs it is advantageous

to cover the vine entirely over, thus stopping evaporation until the plant has made new roots and is ready to support new growth.

The question of early or late planting depends largely on the season. If the spring is very dry we have found that planting the first of May is about right. Some years ago, during one of our late and windy springs, we planted 100 apple trees about the fifth of May without the loss of a tree.

If trees and plants are dormant or nearly dormant when planted they may be planted successfully as late as July. Where conditions are such as to make it impractical to cultivate, a fine mulch of straw or hay is excellent.—From Green's Fruit Grower.

ORCHARD NOTES.

Watch Out for Borers.

J. R. Cooper.

The tree borers will soon be abroad in the land if they are not already coming out. Healthy trees are not in a great deal of danger, but newly set trees and trees which have been weakened by any cause are liable to attacks by these insects. As a preventative the trunks and larger limbs, may be coated with the following preparation:

Formula for whitewash: As used for U. S. Forts and Lighthouses.

One-half bushel unslaked lime, slake in warm water, cover it during the process to keep in the steam; strain the liquid through a fine sieve or strainer; add a peck of salt previously well dissolved in warm water, three pounds of ground rice boiled to a thin paste and stirred in boiling pot; half pound of powdered Spanish whiting and a pound of glue which has been previously dissolved over a slow fire.

Add five gallons of hot water in the mixture, stir well and let it stand for a few days, covered from the dirt.

Strain carefully and apply hot with a spray pump.

Liquid asphaltum applied to the trunk and larger limbs of the trees is a surer prevention of borer damage than white washes. There is this one possible danger in using the asphaltum. Being black surface the trees may be subjected to too much heat. However, if the asphaltum is white washed over so that a white surface is presented to the sun's rays this danger will be done away with.—July "Horticulture."

Girdling of Apple Trees.

Question:—We have a number of 5-year-old apple trees. This winter the rabbits girdled them for about two feet. These stumps two to three inches from the ground are about two and one-half inches in diameter. Can grafts be made on these stumps? What time of year? What would you advise?

Answer by J. R. Cooper:—Many times trees are girdled by rabbits,

field mice and other rodents and thus die from starvation. This loss can be prevented in two ways. First, by protecting the trees from attacks of these rodents, by use of shields or by covering the trunk and lower limbs of the tree with some sort of heavy paint. (Asphaltum has proven very satisfactory for this purpose.) Second, by overcoming the effects of girdling. In case the strip of bark which has been removed is very narrow, (not more than three or four inches wide), the tree may be saved by bridging or bark grafting. If the wound is larger than this, it is doubtful if the tree will survive even if a good job of grafting is done. In any case, unless the tree is young or of some rare and valuable variety, it would be better to plant new trees and protect them as mentioned above. However, in case of young and valuable trees, which one is desirous of saving, bark grafting may be employed. The bark is trimmed back at the edges to sound growth, and scions of the current year's growth are cut a couple of inches longer than the girdle is wide and shaped to thin wedges at both ends. One end is inserted under the bark below the girdle and the other above it. The whole, consisting of wound and scions, should be covered by grafting wax in order to keep out water and to keep the part moist and in a growing condition.

If the wound is very narrow, strips of bark may be used instead of scions and may be cut to fit, edge to edge, with the bark of the tree and not forced between the bark and the wood. In this case, as if with scions, however, the whole should be covered with grafting wax, but care should be taken to keep the wax from between the edges of the bark and the tree and the grafted bark.—February "Horticulture."

FERTILITY IN ORCHARDS.

(From N. W. Horticulturist.)

The experiment station at the State College, Pennsylvania, through the work of Dr. J. B. Stewart, pomologist, has demonstrated that fertility is very essential to secure crops up to standards. With the soil sufficiently well supplied with potash the next most important elements to supply are first nitrogen and second phosphates. These, however are dependent on moisture conditions of the soil. The net profits from a proper fertilization including the control of moisture have run as high as seventeen times the amounts of fruits produced on the adjacent checks for untreated plots.

"Under the absence of nitrogen, as a rule, applications of phosphates and potash have not been profitable. On some soils, and in the presence of sufficient nitrogen, however, moderate amounts of these minerals are often profitable. Neither has had any material influence on color. On size, the influence of potash has been favorable.

"Nitrogen has had greater influence in increasing yield than any other element. It also materially decreased color. This is due primarily to delay in maturity, and may be overcome by later picking. The delay on it in one locality in 1911 was three weeks.

"Manure has usually proved profitable doubtless essentially because of its nitrogen contents. In most of the cases where it has proved beneficial, however, its net profits have been approached or surpassed by certain combinations of artificial fertilizers.

"In a few orchards no form of fertilization has yet produced a material response. This is considered to be due to the presence of other limiters, of which proper moisture supply is frequently important. The existence of such orchards emphasizes the need of local tests before making large and regular expenditures for fertilizers.

"In the long run, any orchard that is actively producing and growing is likely to require fertilization, since the total plant food draft of such an orchard is quite heavy—more per acre for every constituent except phosphorus than is required by a twenty-five bushel crop of wheat."

HANDLING THE FRUIT SOILS.

Hints from the Leading Authorities.

Trees must not have wet feet. The level of stagnant water in soil must be, at the very least, two or three feet down, if trees are to bear worth while.

Too much water destroys friendly bacteria that are necessary to put plant foods into forms in which trees can use them.

Too much water renders plant food useless by changing it chemically and by caking soil.

Carefully laid underdrains are almost an orchard necessity, and do good in many ways.

Breaking up hardpan helps drainage. Cover crops help to dry off land in early spring.

Apple trees must have at least enough water to make a layer a foot deep, and this must be held in the top thirty-six inches of soil. Other fruits can get along with slightly less but must have enough.

Too little water starves trees directly by allowing them to dry up, and to even a greater extent by making it impossible for roots to get the food in the soil. Plant foods and fertilizers are of no use unless they continually are accompanied by enough moisture to dissolve them and insure that they soak into the roots.

There is always enough rainfall between March and August to grow big crops, if it is rightly conserved. Right methods make this easy, wrong methods make it impossible.

To store enough water, ground must be broken up early, thoroughly and often; and to avoid its escape the surface must be worked and kept in a dust mulch, to prevent evaporation during the growing season, if other mulch is not used. This conservation tillage must begin early in the spring, while ground is still damp, and must be done every ten days or after every rain till in July or August.

Organic matter in the soil helps to hold moisture.

With sod mulch systems, the grass must be mowed often to

prevent its using up the moisture intended to be saved.—From N. W. Horticulturist.

PREPARING CHERRIES FOR MARKET.

(A few extracts from "The Kansas Cherry Book.")

"The cherry should not be gathered until fully ripe and then only when it is dry, for if it is gathered when wet or even damp from rain or dew it will quickly spoil. In all cases the fruit should be carefully handled and the stem be left attached to the fruit as the removal of the stem from the fruit will break the skin, allow the juice to run out and quickly injure the fruit. It pays to pack only the best fruit. All defective berries should be thrown out as they will injure the sale of the remaining fruit. It pays to pack only the best fruit and put it up in a manner that will be attractive as there is about as much in the packing of the fruit toward selling it as in the fruit itself, perhaps more.

In picking use step ladders and as trees become larger, ordinary ladder.

A crate made of light, but strong material and of a size to receive four common berry boxes is suspended to the picker adjusted to a convenient position in front of him relieving both hands for picking.

A shanty or packing room is convenient and will also be found handy for storing the fruit and to shelter the pickers from a sudden rainfall. In this may be constructed a facing and packing table. If for shipping the best time to gather will be when wholly of a light red color approaching scarlet; if for a near market, a dark red color.

The picking force should be divided into two sections. The first gathers all fruit within easy picking distance of the ground and keeps in advance of the second section which works from ladders, and cleans up all. Cherries must be picked by the stem and not by taking hold of the fruit, and care must be taken not to even start the stem from the fruit, as the juices will flow out and such fruit quickly spoils. None but sound ripe specimens should be placed in the boxes and the top layer in every box should be an honest index of the whole. With the picking crate swung to the picker he can easily do his work well and quickly detect any damaged or inferior fruit before it is picked. As soon as the boxes in the picking crate are filled they are taken out and placed in a shipping crate and others put in their place, and the crate when full, carried to the facing table.

Packing.—Facing consists in turning the stems of the top layer down which gives the appearance of a solid surface. Boxes should be filled a little above their edges to avoid the semblance of stinted measure, and provide for the inevitable settling sure to follow the jarring of transportation. Pack in twenty-four box crates, close

up securely, brand with name of variety and name of grower and consignee and send to destination at once.

The fruit is never so attractive as when first taken from the tree and the sooner it is in the market the more readily it will sell." EDITOR'S NOTE—

(The above extracts give a brief outline of the manner of handling the cherries in quart boxes. These are a very popular package in some markets. Most of the cherries sold in Nebraska are marketed in twenty pound baskets. These baskets make an economical and safe package to handle the fruit where it is intended for canning purposes. A very good package is a basket that holds ten pounds. This is a good size to sell to the ordinary family where they wish fruit to eat out of hand. The buyer can go to the grocery, buy a ten pound basket and carry it home whereas a twenty pound basket must be delivered. The fruit in the smaller package is not so apt to bruise as in the larger one.)

SOME AMERICAN PLUMS I HAVE ORIGINATED.

W. F. Sidders, Lincoln, Nebraska.

A few years ago I planted some plum seeds as a mere curiosity or that I might have something different but did not expect to get any great results.

The seeds were gathered from the choicest fruit in Professor Hartley's orchard in 1900, planted in the fall of that year and later placed in the orchard where they are growing at present.

The first point of value was shown in the years of 1908 and 1909, when, after the heavy late spring frosts, the trees were loaded with fine fruit and all the common named varieties bore very little or no fruit.

During these two years I numbered the best varieties in the order of the season in which they ripened, from "1" up and the second best lettered from "a" up preceded by the number nearest its season as No. 1a, No. 1b, etc.

At present there are in all about twenty good varieties, ten of which are of extra merit, part of these have met with much favor at our annual Nebraska state fair. Two of these varieties have been recognized by the board and they are kindly considering the others with a view of recognition.

Our secretary, J. R. Duncan, has asked me to give a short description of the most worthy. I will describe each variety in its order of ripening with its most important features, also the name it shall bear.

No. 1—Mona.

American seedling from Milton, ripens July 15 or with the Wild Goose. The fruit is extra large, red with heavy bloom. Flesh deep yellow, very rich, free, hardy, bears young, blooms late, and is frost proof, and has never missed a crop.

No. 2—Jesse.

American seedling from Wyant. Fruit colors ten days before ripe. Foliage is a dark rich green, would make a splendid ornamental tree for city lot; flesh yellow with high flavor; fruit can all be gathered at one picking; tree fine shape, extra hardy, a late bloomer and is frost proof.

No. 2a—Little Gem.

American seedling; small, round, bright red, free-stone, with light bloom, fine flavor, and extra hardy; may all be gathered at one time.

No. 4—Delicious.

American seedling from Wyant; ripens August 20; fruit bright yellow with bloom flesh yellow, of extra fine flavor; makes very best of jelly; jelly made from this plum took first prize in county and at the Nebraska state fair in 1913; free, extra hardy; bear young; bloom stands more frost than Wyant.

No. 1—Golden Rod.

American seedling from Wyant; ripens August 22; good size fruit; yellow turning bright red where exposed to sun; has no bloom; trees extra hardy; bears well; resembles Golden Rod flower at time of ripening; blooms late and is frost proof.

No. 8—Big Ben.

Recognized at Nebraska state fair, 1912; American seedling from Wyant; ripens August 25 to 30; largest of native plums; fruit yellow with light bloom and red cheek; flesh extra fine quality, yellow, mild and excellent for canning; tree extra hardy; bears annually and is frost proof.

No. 9—Perfection.

Recognized by Nebraska state fair, 1912; American seedling from Wyant; ripens August 25; large bright yellow fruit with rich bloom, turning to dark red where exposed to sun; flesh solid, yellow juicy, and sweet; tree extra hardy; bears a full crop each year; blooms late and is frost proof.

No. 10—Garden Valley.

American seedling from Wyant; ripens September 1 to 15; fruit large, dark red, oblong, slightly flat; rich bloom; flesh yellow, good flavor; tree extra hardy and of a weeping habit; bears young and a good crop each year; bloom not injured by frost.

Of the above varieties Mona, Jesse, Delicious, Golden Rod, Big Ben, Perfection and Garden Valley are far superior in score of points to our old named varieties, and will be sure to give good returns. The mild quality of the flavor is much sought after by many families where the more tart kind have failed.

Some of the others are of much value and would be preferred by some people, but I believe the seven are enough to give each grower a choice to suit his family.

I have watched the development of this fruit growing by the side of Miner, Wolfe, Hawkeye, Wild Goose, Wyant, and Wakeman for some time. The Hawkeye seems to be the only old variety hardy enough to withstand the climate.

None of the foreign types have lived long enough to bear any fruit in my orchard.

In caring for my orchard I have given it only ordinary care. I find that two good sprayings with cultivation will keep the curculio in check and also the brown rot. I use Bordeaux mixture and Paris Green and an ordinary barrel spray pump.

FRUIT FOR EXHIBITION.

By Leon D. Batchelor.

Selecting the Fruit. The basis of a good fruit exhibit is necessarily good cultural conditions to produce good fruit. Then it depends on the exhibitor's ability to select his best fruit. Do not wait until the crop is picked to select show specimens. The successful exhibitor makes his prize selections in the orchard while the fruit is still on the tree. By viewing the fruit as it hangs naturally on the tree, and by carefully surveying the different trees in the orchard a good comparison of a large quantity of fruit can be made. The prize fruit is generally on the outermost branches, where it gets sufficient light to be of proper color for the variety, and is enabled to grow without injury or deformity. The tree or actual specimens may be selected any time during the season, but they should remain on the tree until fully mature. Thoroughly thinning the fruit on the selected tree early in the season will help materially in producing prize winners. The vital points to be considered in the selection of the specimens are; freedom from blemishes, uniformity of the individuals, good color, and typical size and shape for the variety. This will be treated at length under Score Card.

Storing the Fruit. Although many of the exhibits occur just as the fruit is normally harvested it is often desirable to hold some of the early varieties in storage. And again many of the fall and winter varieties of apples are held over for winter exhibits. The specimens should be carefully packed in relatively small packages. While ice storage will be necessary for keeping some of the stone fruits until the fall fairs, most of the varieties of apples and pears can be kept in good shape in an ordinary house cellar. There should be sufficient ventilation so the air does not become musty and damp. Experiments show that apples and pears will keep much longer when each specimen is separately wrapped in paper than when packed unwrapped.

The Arrangement of Exhibition Fruit. The artistic arrangement of the fruit is of inestimable value to the show as a whole. If the tables can be covered with some material such as green crepe paper the red and yellow fruit will show up much better by contrast than by the use of

plain white or brown paper covering. The number of specimens per plate is usually regulated by each individual show association. In the case of the larger fruit five specimens are usually required and ten to twenty specimens of the small fruits such as plums, to make an exhibit. Five bunches of grapes usually constitute a single plate exhibit.

When fruit is exhibited in boxes, as in case of carload lots, clean standard apple boxes should be used. The fruit should be carefully sized in each box and a first class commercial pack should be presented. Poorly graded, loosely packed, or "jumble" packed fruit is seriously handicapped when compared with well staged fruit. Frequently superior fruit is placed second or third in a competition because of lack of care in arrangement.

Score Cards. The following score cards, or very similar ones which are in use, will give the exhibitor a general idea of the important points for consideration in show fruit. The score cards are as follows, for single plates:

	Apples and Pears	Peaches	Plums
Freedom from blemish.....	20	20	25
Uniformity	25	20	25
Color	25	25	15
size	15	20	25
Form	15	15	10
	100	100	100

Freedom From Blemishes. This important point in judging fruit is too often overlooked by the exhibitor. Judging fruit is primarily a process of elimination. More fruit is disqualified on account of blemishes than any other point on the score card. Freedom from blemishes means that each individual specimen shall be free from bruises, worm holes, limb rust, frost blemishes or any evidence of the presence of insect enemies or disease such as San Jose scale, apple scab, peach blight, grape mildew, etc. Each specimen must have its stem intact and show no unusual conditions. Some exhibit associations disqualify entirely insect infested fruit. That is if one apple on a plate of five shows a worm hole the entire plate is disqualified from competition.

Uniformity. Uniformity refers to the appearance of several specimens as they are brought together on one plate. To score high on this point the specimens should be of the same size, color, shape, and degree of ripeness. Four large apples and one small one would not score as high on this point as five medium sized fruits.

Color. Color is a very important factor in the sale of fruit, thus it is given an important place in judging exhibit fruit. The color should be bright, clear, and characteristic of the variety. It should not be yellow if the variety is usually blushed in the case of well grown specimens, neither should the specimens be streaked with red if well grown specimens of the variety are normally solid red.

Size. The size should be medium to large, but the advantage is not given to "overgrown" specimens. Whereas good size is one indication of good cultural conditions, each variety has a typical size which is perfection for the particular sort under consideration. Thus in selecting Winesaps, Ganos and Wolf River apples for exhibit a different size standard is used in each case.

Form. Form has to do with the general shape of the fruit, it should be smooth, regular, and typical of the variety. Most orchardists are familiar with general shape of each variety, and should by all means select specimens true to type.

Fruit Must be Correctly Named. Another point of importance is the correct naming of the fruit. Any fruit exhibited under a false name should be disqualified. If the grower is not sure of the variety names he can have them named free of charge by sending typical specimens to the Horticultural department.—Bulletin issued by Utah Agricultural College.

(The Synonym Committee of the Nebraska State Horticultural Society will name all unnamed varieties at the Fair or Winter Apple Show.)

Note: Another good score card for apples would be one that is used by the University of Nebraska in their student-judging work and is as follows:

Quality; freedom from blemishes; soundness; 30 pct. size, (uniformity) 30. Color 30. Form 10.

THE FAILURE OF BLOSSOMS TO SET FRUIT.

W. W. Robbins.

The failure of orchard trees to set fruit, in spite of the fact that an abundance of blossoms was produced, is due to one or more of several causes. These are as follows:

1. Self-Sterility.—Many varieties of apples and pears are self-sterile. That is, they are not capable of setting fruit properly unless pollen from another variety is used. For example, Bartlett and Keiffer pears, in many localities, when planted in solid blocks, gives less satisfactory results than when they are planted with such varieties as Lawrence, Duchess and Anjon. With apples and pears it is good practice to mix varieties. However, if varieties with proper affinities are selected, one variety to furnish the pollen is as good as a number.

2. Frozen Pistils.—The pistil, which is the part of the flower to develop fruit, is more easily frozen than other parts of the flower. Hence the pistil may often be frozen while other flower parts are not affected; consequently, blossoms are formed but fail to set fruit.

3. Weak Trees.—Trees in a weak condition, although blooming abundantly, often fail to set fruit.

4. Rain and Snow.—The pistils may be mechanically injured and the pollen washed away by rain or snow at the time when blossoms are open.

5. **Excessive Growth of Wood.**—Blossoms often drop in great numbers when the tree is forming excessive amounts of wood.

6. **Over Abundance of Nitrogen Fertilizers.**

7. **Diseased Buds.**

8. **Spraying.**—Heavy spraying of trees, especially before pollination, has in some few instances resulted in a loss of blossoms. This is not serious, however,—From "The Fruit Belt."

CO-OPERATION.

THE COOPERATIVE SOCIETY AND THE ORDINARY BUSINESS CORPORATION.

Wm. R. Camps, Chief Division of Markets, N. C. Expt. Station.

One great difference between the organization of farmers and that of those in manufacturing, transporting, mercantile and banking enterprises should be emphasized. In the ordinary business corporation there has been no consistent effort to distribute the profits to as many as possible. Some business pools have been democratized. Membership has been open to all on equal terms. As many as possible have been induced to join. But usually the great movement for the organization of all business except that of agriculture has had for its motive the profits which the leaders hoped to obtain out of it. The great fortunes of today are not made by the rank and file within business corporations but by their directors. Such profits come as a result of promotion, reorganization, consolidation and sale of securities generally. The promoters of the United States Steel Corporation received \$150,000,000 par value of stock, or one-seventh of the total capital stock, for their services. Upon this stock they were able to realize a net profit of \$62,500,000. It is by such efficient methods as this that wealth has become centralized in a few of the financial centers of the United States.

In the organization of the farming business the appeal for leadership can not be made to the self-interests of the few. The aim in a co-operative society is not to give any special profits to promoters. Ownership of shares in an agricultural corporation must be distributed among as large a number of growers as possible in order to present a united front in the market. Shares must be made transferable only at the option of the growers so as to prevent the shares of the organization from falling into the hands of buyers, who naturally would control the organization for their own interests. If the shares are distributed to and kept in the hands of the growers in the proportion of their acreage, then it may be possible to distribute the profits to all growers in proportion to their contribution of products. This method of division of profits is the main distinction between a co-operative society and the ordinary business corporation.

If the appeal for leadership cannot be made mainly on the basis of self-interest then the appeal must be made for a democratic leadership. Large landholders should take the responsibility of leadership both to better preserve their own interests and to fulfill their obligations to the community. If they do not, it is only a question of time when they will see the profits which might go to farming made by agencies outside of the landholding interests. The only safeguard for the landholding interests is organization as in other lines of business. Only through organization can the economies of large scale business be obtained. These economies are easier and better sale of standardized products, more ample and cheaper credit facilities, car-load shipments and better freight rates, a wider, more even and less expensive distribution of farm products, and a saving of payment of profits to others for marketing services whenever the work can be just as effectively done by a growers' organization.

If a farmers' organization is not to be controlled in the interests of a few the rank and file of growers will have to be trained to take an intelligent part in the organized business of farming. In the ordinary business corporation the stockholders may give little or no thought to what their directors are doing. Shareholders only ask for a dividend. A growers' organization cannot succeed on this basis. An efficient management must have an intelligent and loyal membership if the farmers' organization is to hold its own in competition with the powerful middlemen's organizations. Members that seize a temporary gain by the sale of their products to a competitor may be the means of destroying their own organization and of turning the whole business over to a hostile combination of middlemen. It may be penny gain and pound lost. Investment in stock in proportion to the acreage or to the contribution of products of each member will prevent a farmer from abandoning his organization for the casual gain of temporarily high prices. The necessity for an intelligent membership in every growers' organization is what makes the organization of agriculture a vaster undertaking than that of any other line of business.

(From Bulletin, "How Shall Farmers Organize?" North Carolina Agr. Expt. Station, February, 1914.)

EASTERN NEBRASKA FRUIT GROWERS ASSOCIATION.

C. G. Marshall, Nebraska City.

The annual meeting of the Eastern Nebraska Fruit Growers' Association was held at Nebraska City, April 1. A report of the past season's business was read by the secretary and the membership was well pleased with the progress during the first year after organizing. A number of new members were admitted increasing the acreage several hundred acres. Among these was more than 100 acres of northwest Missouri orchards. The local association of about twenty members at Brownville, Nebraska was admitted as an auxiliary to the central organization.

The election of officers for the next year resulted as follows:

- E. M. Pollard, Nehawka, Nebr., president.
- G. S. Christy, Johnson, Nebr., vice-president.
- A. M. Shubert, Shubert, Nebr., treasurer.
- C. G. Marshall, Nebraska City, secretary and manager.
- G. E. N. Sanders, Brownville, director.
- G. A. Marshall, Arlington, director.
- W. W. Grigsby, Skidmore, Mo., director.

The association contracted for spraying materials for its members at a saving of almost 25 per cent over prices made to individual growers. One of the new members had contracted for and paid for his lead-arsenate and lime-sulphur before becoming a member. He purchased from the same company the association contracted with and the company was induced to make him the same prices. A check for \$117 was sent him by the company, being the difference between the association price and individuals price on the material for just one orchard. Co-operative buying as well as co-operative selling pays.

Plans are being made to establish association packing houses at points where fruit from a number of orchards is loaded. The growers will deliver their fruit at these central packing houses and association packing crews will sort and pack it. This plan will relieve the growers of the bother of housing a force of men at their farms and allow them to give their undivided attention to the gathering of the fruit as well as reduce the cost of packing. It will also insure a very uniform pack from each locality. It is planned to pack grapes and apples at these central stations this season.—April "Horticulture."

CO-OPERATION.

C. G. Marshall, Nebraska City.

The membership of the Eastern Nebraska Fruit Growers' Association is gradually growing. Several large orchards have recently been added to the association acreage. The officers feel confident that the association will handle the fruit of practically every important orchard in eastern Nebraska this season, but it is not the large grower that is benefitted so much as the man with only a few acres.

Cooperative marketing enables the several small growers of the community to combine their fruit and make up car lots. They are not compelled to unload their fruit on the nearest markets as in the case when they ship locally, but can have the benefit of carload rates and reach the distant markets.

Cooperation also provides for a standard and uniform pack from the whole territory covered. The volume of fruit bearing the same brand makes an impression on the markets and creates a demand for these brands. The individual seldom has enough fruit so that he

can build up a reputation for himself on his own brand. The association can better distribute the fruit to give the near-by markets just the amount that they can use. It is also enabled to keep in touch with all the principal markets of the country and can so distribute the fruit that no market is over-loaded and none is without fruit. Individual efforts at distributing and marketing quite often result in an uneven distribution and certain over-stocked markets, while possibly the same distance in another direction the supply is limited and the price much better.

The buying public have more confidence in fruit, bearing an association label than fruit from the same territory with a plain mark or an individual's label or mark. They realize that a cooperative selling association much standardize its pack and have everything claimed for it in the package or the association could not continue to exist.

The success or failure of cooperative associations depends more on the standardization and quality of its pack than any other one thing.

The fruit grown by each member of the Eastern Nebraska Fruit Growers' Association never passes from the individual control until it is sold. While the sales-manager of the association is employed to sell the fruit for all the members, he cannot dispose of any member's fruit without the individual's consent. If the grower wishes the fruit stored and held for later disposition, it is the duty of the association management to store this fruit and keep the individual advised on the conditions of the market and the prices prevailing. When the manager finds a market that is suitable to the individual, he then disposes of the fruit, but not before.

Association Rules for Handling Strawberries.

Picking and Packing.

1. Berries must be picked as free from moisture as possible.
2. Pick every day after the season is fairly started, and if the weather is rainy or there is much dew, wait until the fruit dries off somewhat before picking.
3. Each patch should be picked once over at least every other day.
4. See that all ripe fruit is picked each time.
5. Berries must be pink all over or three-fourth red.
6. Berries should be picked riper in cool weather than in warm.
7. Berries must be picked with stems.
8. Pickers must not be allowed to hold several berries in their hands at the same time.
9. Filled carriers must not be allowed to stand in the sun.
10. Use clean crates and keep them from being soiled.
11. No culls in the boxes. Put nothing but fair sized berries.

12. All green, over-ripe, mis-shapen and undersize berries must be sorted out.

13. It is best to grade the berries in the field, for every time a berry is handled it is damaged to a certain extent.

14. Fill boxes solid, leaving no vacant spaces, especially at corners, or they will be short weight, settle, spoil your pack and bring less money.

15. Fill box so that top of layer will come one-half of an inch above the top of the box.

16. Allow no berries to project over side of box, if you do the berries will be crushed, the pack spoiled, and the box stained.

17. Place the fruit immediately in crates and put in a shady place protected from air, so it will keep its fresh appearance until ready for market.

18. After crates are nailed place them in a cool part of the packing house.

19. Each variety should be picked and crated separately, where possible, as uniformity in size and color has much to do with the appearance of the fruit.

Hauling.

1. Haul in spring wagon and use wagon cover to keep out dust.

2. Growers are requested to send in a load as soon as ready.

Fruit growers in eastern Nebraska are delighted with the crop of bloom that put out on almost all kinds of fruits. It was feared that the bloom would be light this Spring following the unusual severe season of 1913. Trees and shrubs suffered so much from drouth that it was felt that they would not set fruit buds. This was especially true where a crop of fruit was being matured last season.

We have found the bloom on almost all varieties except Jonathan very heavy in Richardson and Nemaha counties. In Otoe, Cass and Douglas counties Ben Davis, Jonathan, York Imperial and Genets have a light bloom on most orchards. The Winesap, Black Twig and Arkansas Black are blooming full in all parts of the territory

The well-cared-for orchards show a much heavier bloom even where they bore heavy last year than the neglected trees. E. M. Pollard's Cass county orchard, that set a full crop last year but matured only a sixty per cent crop on account of drouth and heat, is blooming heavy again this spring. Mr. Pollard estimates his crop at seventy-five per cent. On the other hand, his neighbors orchards that bore heavily last year but did not have cultivation and good care have a very light bloom.

Summing up the prospects for the commercial apple section of Nebraska (Missouri River territory) there is indications at the present time for at least three-fourths of a crop. This is remarkably good showing following the unfavorable season of 1913. Almost all

the small fruits are blooming heavy and promise good crops all over the territory.

The average date of the last killing frost in southeastern Nebraska is April 25. As one goes west and north in the state the average last frost occurs later. At Scotts Bluff it is about the tenth of May. At this writing (May 6) nothing has been injured by frost in southeastern Nebraska. The temperature has not been below 36 degrees for more than two weeks. The last three days of April threatened frost and the fruit growers having their orchards equipped with firepots lost some sleep watching the thermometers, but only in low places did the mercury go below 40 degrees. It is quite unlikely that frost will occur after this late date and the growers are feeling confident of another fruit crop this year.

The very warm weather just at the time the buds appeared forced their opening so fast that some of the growers did not finish the first spraying. This application is made while the flowers are in the pink but before the individual flowers open.

Usually this period extends over six or seven days time, but this year it was but three or four days from the time the buds showed pink until the blossoms were open. On account of the damp cool weather following it is feared that some scab may result. The next application will be made just after the petals fall. It is the important spraying against codling moth (apple worm.)—May "Horticulture."

Fruit Growers' Picnic.

J. R. Duncan.

The Eastern Nebraska Fruit Growers Association held their second annual picnic at the home of E. M. Pollard, Nehawka, Wednesday, August 19. A good attendance of growers from different portions of eastern Nebraska and western Iowa, were present. In the forenoon an automobile trip was taken through Mr. Pollard's large 125 acre orchard. The trees showed that spray materials had only recently been applied. Some trees were well filled with fruit, others had a partial crop and there were still others with nothing on. Clean cultivation is practiced and the trees showed the benefit of the cultivation. Mr. Pollard estimated that he would have half a crop. After looking over the orchard the party returned to the house where a bountiful basket dinner was served on the lawn of Mr. Pollard's home. After dinner several talks were made. Mr. Pollard, as president of the association, gave a brief history of the causes leading to the formation of the association, and what the aims were in producing better marketable fruit, and disposing of it to the best advantage. Mr. J. M. Bechtol of Hamburg, Iowa, gave a brief talk on his experiences in growing apples in Iowa. Mr. Hess of Council Bluffs gave

a talk on the association at that place which has been in successful operation for twenty-one years. Prof. J. R. Cooper gave a brief description of canker, its method of spread and means of controlling it. Mr. C. G. Marshall, secretary of the association gave a talk on the crop outlook for the association orchards and general conditions in the U. S. He stated that in his estimation the fruit crop of the U. S. would not exceed thirty-six million bushels and this was less than the crop of 1912. He thought that growers who have good apples would get good prices.

After the talks an inspection was made by the party of a grading machine which was on exhibition. Also Mr. Pollard's cooper shop, where all his barrels are set up, and the packing house, vinegar plant and storage were looked over. The growers present all seemed to have the one idea that cooperation was the salvation of the fruit man and that the standard of Nebraska fruit could be raised so that nothing but the best fruit would be placed on the market. Nebraska grows the finest flavored and best keeping fruit and it is the duty of the growers to grow, pack and market this fruit so that nothing but first class fruit will be placed on the market. The Eastern Nebraska Fruit Growers Association is an important step in bringing the standard of Nebraska fruit up to where it ought to be.

SMALL FRUITS.

THE GRAPE ROOT WORM IN EASTERN NEBRASKA.

Myron H. Swenk, Nebraska Experiment Station.

During the month of May, 1913, there were many complaints from the owners of vineyards in the vicinity of Omaha that their vines were being badly bored by the apple-twig borer (*Schistocarus hamatus*). As these beetles do not usually attack vines until they have been weakened from some other cause, it was deemed desirable to investigate the condition of these infested vineyards. Accordingly on May 24, in company with Professors E. M. Wilcox and J. R. Cooper, respectively of the agricultural botany and horticulture departments of the experiment station, the writer made a thorough examination of several vineyards near Florence. It was found that in several cases not only was the apple-twig borer present in considerable abundance but many vines of all ages were quite dead. An examination of the roots of these dead vines quickly revealed the cause of their condition, for the entire system of fine rootlets had been destroyed and the bark of the roots themselves was extensively burrowed and gnawed—typical work of the grape-root worm. Although we had known for years that this insect was present in small numbers in eastern Nebraska, this was the first case of serious injury in this state which has come to our notice, and, judging from the severity and extent of the trouble, the insect had apparently been a serious pest in the vineyards about Omaha for several years. Believing that

this insect may be the cause of grape troubles elsewhere in the state, either at the present time or in the near future, and that because of the semi-concealed nature of its attack the cause of this trouble is not likely to be quickly recognized unless intelligently looked for, this brief discussion of the habits, life-history and means of control of the grape-root worm has been prepared for the grape growers of this state.

The grape-root worm (*Fidia viticida*) is a native insect which originally fed principally upon wild grape vines and which still attacks them to a limited extent. Shortly after the Civil War instances of damage to cultivated grapes by this insect began to be noted in the upper Mississippi Valley, first in Kentucky and Missouri and later in Iowa, Illinois, Ohio, Pennsylvania and New York, and in each locality the insect soon became a vineyard pest of prime importance. For the past twenty years, especially, it has been destructively abundant in those states, and is now known to occur from eastern Nebraska and Kansas, Arkansas and northeastern Texas through Iowa, Missouri, Illinois, Indiana, Kentucky and Ohio to southern New York, Connecticut, Pennsylvania, Maryland, the Virginias and northern North Carolina.

The injury by the grape-root worm is of a dual nature; first, the larvae attack and feed upon the roots of the vines, devouring the root fibre, channeling the larger roots and even eating pits in the main trunk, and second, the adult beetles emanating from these worms gather on the leaves and eat holes in the upper parenchyma, leaving chain-like lines on the leaf as a result of this activity. The work of the larvae on the roots is, however, much the more serious form of attack, and the dying out of the vines, such as was observed this year, is the frequent result of it. Old and vigorous vines will withstand a considerable amount of attack, sometimes until the roots are largely consumed and the half-severed root ends are decayed, provided the soil is rich and is kept in good condition and the new root-fibre are consumed also or conditions are otherwise adverse, the vines become sickly, fail to grow and produce only small fruit clusters, or they even suffer the premature dropping of the leaves and the shriveling up of the fruit, followed by the death of the vine. The attack of the beetles on the leaves is ordinarily not very serious, but in some cases, especially on young plants when the beetles are very numerous, the leaves may be so badly shredded that they discolor and causing a consequent sever setback to the vines.

The grape-root worm has but a single generation in a year. Winter is passed as three-fourths grown larvae in cells deep in the soil of the vineyard and under the roots. In May these larvae leave their winter cells and feed slightly for three weeks or thereabouts, completing their growth. They then begin to form their pupal cells by rolling and twisting about so as to pack the surrounding soil two

or three inches below the surface, requiring about two weeks for this task. On the average three weeks are spent as larvae in this pupal cell, during which period the larvae undergoes marked structural changes and is extremely helpless and delicate, this finally resulting in the formation of the pupa, equally helpless and delicate. Pupas begins to occur the second week in June and continue to be present in the soil until the end of July. The pupal period lasts from twelve to twenty-one days with an average of seventeen days. Even after the pupa has transformed to the beetle stage, several days are spent in the pupal cell before the beetle ventures above ground. In two to seven days, with an average of four days, the soft, yellowish, freshly transformed beetle has hardened and assumed its normal color and is ready to leave the cell. After two or three days of digging the beetle reaches the surface of the soil, and makes its way out.

The emergence of the beetle begins the last few days in June, reaches a maximum the second week in July, and gradually falls off until the end of that month the beetles have practically all emerged. The beetles are about a quarter of an inch long and are covered with very short, grayish hairs so as to appear hoary in color. In looser, more porous, sandy or loamy soils the emergence is somewhat earlier than in heavy, compact, clay soil, sometimes as much as a week earlier, and in hillside vineyards the emergence is usually later than in valley vineyards. The beetles quickly seek out the grape leaves and feed upon them, causing the injury already described. Within a few days after emergence mating begins, and from nine to twenty-four days after emergence, with an average of about sixteen days, the female beetles begin their egg laying. They first cease feeding and become somewhat sluggish, locate on the canes and then by means of the protrusible ovipositor the females lay their eggs under the loose bark of the canes and trunk of the grape. The eggs are laid in clusters of about twenty-five to thirty-five individual eggs, but sometimes there are as many as sixty or as few as four in a cluster. These clusters having the individual eggs glued together and the clusters as a whole glued to the bark or wood by means of an adhesive secretion. At average intervals of four days the female deposits such a cluster, until on the average four or five, but sometimes as many as nine, of such clusters are laid. The average number of eggs laid by this insect is about one hundred and twelve, but as few as fourteen or as many as two hundred and sixty-three may be laid, this depending upon the vitality of the individual female insect. Egg-laying begins early in July and continues until latter September, but the bulk of the eggs, practically three-fourths of them, are laid during the last ten days in July and the first week in August. The individual beetle lives on the average about a month, but some individuals may live for twice that period of time.

The hatching period of the eggs is from ten to twenty-four days, but on the average is about twelve days. On hatching, the little

larva drops to the ground and makes its way to the roots of the vine through cracks in the soil and by burrowing. These larvae are very tenacious of life and can exist for over a week without food, though prior to finding grape rootlets they may feed upon humus in the soil, and they have been known to travel for several hours at the rate of six feet an hour and to burrow through nearly a foot and a half of soil in four days. However, probably many of them perish before finding the roots of their food-plant. The young larvae feed first upon the finer roots and root-fibers, and later, as they become large, furrow and notch the larger roots. They work within two or three feet of the crown of the vine, and at a variable depth in the soil. During the latter summer and until quite late in the fall the larvae feed extensively, doing much harm and completing about three-fourth of their growth. When cold weather arrives, that is by latter October and early November, they go down deeper into the soil, usually slightly below the roots of the vines, and there construct an earthen cell in which they spend the winter.

Grape-root worms sometimes fall prey to predaceous ground beetles and their larvae, and are eaten to a very limited extent by white grubs. The eggs of this species are attacked and destroyed by mites, lady-beetle larvae, lace-winged fly larvae and ants. They are also parasited by two minute species of hymenopterous egg parasites and a dipterous egg parasite. Natural enemies, however, do not seem to be a very potent factor in controlling this pest, and when favorable conditions occur they increase to such an extent that artificial means of control are essential.

In the artificial control of the grape-root worm the insect is most vulnerable in the pupa and beetle stages. The egg clusters are so effectually concealed and protected in their position under the bark of the grape canes that it is practically impossible to reach them with a killing wash, especially as the vines are in full leaf at the time the eggs are laid. Attempts to kill the larvae in the soil have likewise proved a failure, either because of total ineffectiveness, prohibitive cost or injury to the vines.

We have seen, however, that in the spring, as the time for pupation approaches, the larvae approach the surface of the soil and form their pupal cells at a depth of only two to four inches, and that this pupating normally begins about the second week in June, reaching a maximum about the middle of June, and gradually decreasing toward the end of the month. The vineyardist can readily discover the pupas about this time by removing a few inches of soil from about the bases of the vines. When pupation is found to have commenced, the soil beneath the trellis should be removed to a depth of three or four inches with a horse hoe, and the soil immediately surrounding the base of the vine then thoroughly cultivated with the hand hoe. The pupal cells are thus broken up, and the delicate and helpless pupas, being unable to reconstruct them, perish from

exposure to the air and sunlight. Especially is this method valuable in loose or sandy soils, where the pupal cells are so friable that they are easily broken up by this cultivation. If a ridge of earth is thrown beneath the trellis at the last cultivation of the previous summer, the pupas will tend to form their cells in this ridge, well above the roots of the vine, thus facilitating their disturbance by cultivation with minimum chances of injury to the roots of the vine with the horse hoe. The ridge should not be thrown up in the spring, because the leaves and trash which have accumulated under the trellis during the winter will be thrown at the bottom of the ridge and there will form a barrier through which the larvae will not penetrate when working upward in the soil to form their pupal cells, and they are consequently not disturbed when the ridge is thrown back by the hoe later in the spring.

The above method of control by cultivation is especially successful in normally moist springs and on loose soils. In seasons when pupation comes unusually late the vineyardist is often reluctant to postpone the first cultivation to so late a date, and quite reasonably so, because early and thorough cultivation is a very important thing to do in the vineyard. Consequently, in some abnormally late and dry seasons, it might be better management not to await the pupation period for cultivation but to cultivate at the usual time and depend upon spraying to take care of the insects. Moreover, in dry years it may be difficult to cultivate with a horse hoe as thoroughly and deeply as is necessary to disturb the pupal cells, especially in clay soils, if the cultivation is deferred until latter June. In such cases the vineyardist must use his best judgment, remembering that in normal years the cultivation may be done at such a time and under such conditions as to prove an exceedingly valuable supplementary aid to spraying, and one involving additional expense to him.

The principal method of control is spraying with arsenical poison so as to kill the beetles shortly after their emergence from the soil and before they have laid their eggs. As the time for the emergence of the beetles draw near, that is toward the end of June and early in July, the vineyardist should make daily examinations of his vines to ascertain exactly when the beetles begin to appear. It will be found that considerable variation in this point occurs from season to season, sometimes as much as two or three weeks in successive seasons, so that no definite calendar dates can be assigned, but the time must be determined by field observations each year. With the appearance of the first beetle all preliminary preparations for spraying the vines should have been made, and actual spraying operations should be started at once. It is highly essential that the beetles be killed by their first feeding after emergence, when they eat very freely, and before they have had an opportunity to deposit their eggs. In spraying for these beetles arsenate of lead has given the most satisfactory results, and it should be used at a strength

of three pounds to fifty gallons of regular 5-5-50 formula bordeaux mixture. By using bordeaux instead of water the same application fights the fungous diseases of the grape as well as the root worm beetles. Applications may be made with a gasoline engine sprayer in large vineyards, or with hand power sprayers in small ones, maintaining a pressure of not less than 100 pounds and applying at least 100 gallons of spray to the acre as a mist spray. Nozzles of the Vermoral or Cyclone types should be used. If the vineyard is a large one a gasoline engine spraying outfit specially adapted for vineyard work by an arrangement of fixed nozzels, three on each side, the upper pair reaching out over the top of the row and throwing a downward spray and the two side pairs throwing sprays on the side of the vine, is the most satisfactory. With this arrangement from eight to ten acres a day can be sprayed. About a week or ten days after the first application—a second spraying should be given the vineyard to cover the new foliage and to destroy the beetles which had not emerged at the time of the first application. The second application should not be made later than the middle of July, so that there may be no danger of staining the fruit or of poisoning the fruit, although there is little or no real danger to persons in connection with the latter contingency.

When replanting of an old vineyard is found necessary, some immune crop should be grown on this ground for at least one season, in order that the grape root worms in the soil may be allowed to emerge or caused to starve before the young vines are planted. Otherwise, with the soil heavily infested with these larvae, serious injury to the young vines may result by their attack on the roots and the subsequent attack of the beetles on the leaves. If numbers of the beetles appear on the young plants anyway, the plants should be given a thorough spraying with arsenate of lead at the rate of three pounds to fifty gallons of water. As a rule permanent and serious infection of a vineyard does not take place until the third season of its growth, and it is during the next few years that especial care should be taken to keep the root worms in check by spraying and cultivation. When old bearing vineyards have been badly injured by this insect, the seriously affected vines may sometimes be helped by cutting them back to the ground so that the whole vitality of the plant may be centered in the renewal of vegetative growth. A heavy application of barnyard manure or a highly nitrogenous commercial fertilizer should be made and the vines protected by thorough cultivation and spraying at the proper time.

EVERBEARING STRAWBERRIES

G. S. Christy, Johnson.

Several years ago I forced Dunlaps, Bederwood, and Warfields to bear fall crops of berries. While this required some special work the

treat of nice berries from August to November amply repaid all trouble and incidently paved the way to an acquaintance with Mr. Rockhill of Iowa, the berry specialist.

He wrote me that he had four varieties of everbearers that he wanted me to test, with the restriction that I was not to allow any plants to leave the farm. One dozen of each variety was planted and each variety grew fine.

The berries of one variety were poor and it was discarded, the other three varieties were named Iowa, Frances and Americus. The Iowa was sold to an Ohio nursery but I continued to grow Frances and Americus.

The next year I planted 200 Frances and Americus and from these plants we picked sixty quarts of nice berries in August, September, October and November. Frances appears to have some of the Alpine "blood" left in it, consequently it is more tender in plant and a smaller berry than the Americus but both are persistent summer bearers and the new plants are often in bloom before they have taken root.

In 1909 I received two more varieties, but did not consider them equal to the ones already tested. In 1910 one more variety was received to be tested. They were prolific plant makers of very strong plants and ripened berries of larger size and better quality than any of the others, and well named, "Progressive." I grew several thousand of these in 1911 for Mr. Rockhill to distribute among nurserymen in Iowa, Missouri and Michigan.

They were strong plants with a very heavy foliage and it was a pleasure in August to find nice luscious berries nestled away in the foliage.

In 1913 the first Progressive plants were put on the market at \$75 per thousand. I planted 10,000 of the ever-bearers last spring and by the last of July were picking berries by the crate, but the 1913 drouth was too much for even the Progressive and while they lived through and continued to bloom they failed to ripen any berries in the later part of August or September. A small bed was left to bear in the spring of 1913 and they more than doubled the yield of any other berry on the place and were as early as Excelsior.

I expect to plant 20,000 in 1914 and with a normal season will pick berries all summer and have a fine bed for berries in May and June of 1915.

Ten thousand will be planted in a field where it will be possible to irrigate them.

Mr. Rockhill claims to have spent \$10,000 in time and money perfecting the everbearers and puts in all his time on new seedlings; keeping a record of his crosses so that he possibly has the only real pedigreed plants in the United States. The growing of everbearers is a fad with Mr. Rockhill or he would never have the patience to work three years pollenating, growing and destroying plants in

order to get a single plant worth propagation, that being about the average since he has been at work.

The everbearing strawberry which has been a joke in the past is now a reality.

GRAPES IN MY VINEYARD.

Henry Lal, Davenport, Ia.

The name of the vineyard which a great and good horticultural secretary has put into the title of this paper can scarcely be applied to the little collection of about 120 vines consisting of about fifty varieties which are not cultivated with a view to pecuniary profit, but serve as a hobby to a retired farmer.

The chief object is not quantity but quality, large and shapely bunches of choice grapes, suitable as presents to friends near and far.

To attain this object vines should have a sunny and sheltered location, they need all the heat and sunshine which the climate of Iowa can furnish, a warm mellow and well drained soil and careful and judicious pruning. Late or delicate sorts do best on east or south wall of a building.

Then new bearing canes raised for next year's crop should be trimmed along the top of the trellis; they require sunshine to produce good fruit buds, no sunshine, no bloom. Vines should not be allowed to overbear, the bloom should be trimmed out to what the vines are able to ripen in an average season.

Even early kinds like the Iona, Brighton, and Jewell will not ripen their fruit if the vines are overloaded and will also fail to make good ripe bearing wood for the next season.

There is quite a variation in the behaviour of different seasons, soils and locations. The flavor, color and even the size of the individual berries are variable. Some sorts are not good until overripe others have their best flavor before complete maturity like Brighton, Amber Queen Goethe and Herbert.

To make sure of unblemished bunches they ought to be put in paper sacks early enough to be a protection against disease and worms and to prevent the birds from tearing them up later. There are some seasons when they do not touch them at all while at others they will not leave a bunch untouched. I cover only the finer bunches beginning with Brilliant, Jefferson, Iona, Catawba and Lady Washington these being the kinds most susceptible to disease.

From 1,500 to 2,000 sacks were used every summer mostly one-half pound sacks; it takes a very large bunch to require a two pound sack.

There is one drawback to this business. Those heavy rains following a drouth about the time of ripening, some thin skinned

sorts will crack and of those that make a very compact bunch of berries will force each other off the peduncle. They are more apt to do this when inside a sack where there is less evaporation and they also start to rot, while outside they probably get dry.

Among the Blacks, Herbert and Barry are my favorites. Iona seems to me to be the finest table grape of all but it is not easy to produce fine bunches of it. Agawam Delaware, Brighton and Amber Queen are fine red sorts, Green Mountain is perhaps the finest of my white sorts, Champion, Ives and Elvira have been dug up because no one would eat them and Diana might just as well go too being not worth much.

(Paper read before the annual meeting of the Iowa State Horticultural society, Dec. 1913.)

PICKING AND PACKING GRAPES.

J. R. Duncan.

The grape harvest will soon be at hand and it should find the grower with everything in readiness to handle the crop quickly and carefully. Grapes, unlike other fruits, must be allowed to ripen upon the vines in order to get the true flavor that only sun, water and soil can give. So many growers commence to pick the grapes as soon as they are colored. The first grapes, even if colored, will sell for a good price because the consumer is grape hungry. It would be better to let him wait a few days and send fruit that not only was well colored but was well flavored as well. This can only be determined by the grower himself. They should not, however, be allowed to become so ripe as to not stand up in shipment. Where a grower has a large commercial vineyard, his method of handling his crop would be much different from the man who had only a small acreage. In the large commercial vineyards of Michigan the vines are planted in rows from eight to ten feet apart. These rows are cut at right angles with roads across the vineyards about ten or fifteen rods apart. The grower either supplies himself with a supply of stiff splint baskets that will not give, thus mashing the grapes, or a lot of flat trays in which the bunches are placed as cut from the vines. Crews of from five to eight persons work under one foreman in gathering the crop. The grapes are removed from the vines with a sharp knife and carefully placed in the baskets or trays. These trays are gathered up and hauled on wagons, with flat bottomed rack, to the packing shed. Springs are used on the wagon thus minimizing the liability of bruising the fruit. On arriving at the packing house the grapes are unloaded into one end of the house. Long tables are found in the houses behind which are girls who do most of the packing of the fruit. Only full bunches are packed in the baskets to be shipped out. Usually the ragged and small bunches are sold to the grape juice factories.

In packing the bunches are laid so that every portion of the basket is filled. The grapes are packed so that they stand above the

edge of the basket about half an inch. All stems are placed down so that the surface of the basket of grapes after packing present only a smooth surface of grapes and no unsightly stems sticking out here and there. The baskets are allowed to stand over night in order to "wilt" as it is called. This gives an opportunity for the lid to be put on without mashing or bruising the top layer of grapes. Where the grower handles his grapes individually his name and brand (if he has one) are stamped on each basket and the full baskets are hauled from the packing house to the railroad station. In most of the districts the grape crop is handled through associations. In this case the fruit is hauled to the association warehouse direct from the vineyard and packed and inspected under association supervision. The association warehouse is usually located alongside of the railroad, and fruit is shipped out in car lots. All the surplus grapes and those which will not grade firsts are usually sold to the grape juice factory at 50 much per ton. Some growers contract their entire crop early in the spring to the grape juice factories and wineries for so much per ton. Sometimes this price is much less than what they could get by selling the product in fresh state. However they are sure of a market. In all the operations the grapes are handled very carefully with a minimum of loss by bruising. The packages used are mainly the ordinary seven and eight pound Climax basket. Concords, Moores Early, Delaware, Niagara, are among the main market varieties. The Delaware and that class of grapes are packed in smaller size baskets as well as the ordinary sized baskets..

In the Pacific northwest some American grapes are grown and are handled largely in baskets, the same as the eastern grapes.

Here in Nebraska our grapes have, generally speaking, been marketed in a haphazard manner. Not enough care was given to the manner of packing nor to the preparation of grapes for packing. Some falls our Concords do not ripen as evenly as they should. It has been the habit with some growers to market green, half ripe and fully ripe ones all in the same basket. Consequently when they came in competition with grapes from other sections they were sold at a less figure per basket. This condition of affairs is rapidly being changed however. Enterprising individuals saw the necessity of meeting the other fellow more than half way and putting up their product in a first class manner as well. One fruit growers association has been organized for several years and is growing gradually stronger, which had for its object the handling of its small fruits and especially grapes. The Omaha Fruit Grower Association by careful packing and uniform grading was able the next year after organization to sell their grapes for 22 cents per basket as against 10 and 12 cents a basket before under any old method of packing. The Eastern Nebraska Fruit Growers Association, which has been in operation over a year expect to handle a good number of grapes this season. A rigid standard of inspection will be adhered to. The consumer wants to get value received for

what fruit he buys. If your grapes are packed honestly and are at proper stage of maturity then you can, if associated with other growers of your community, ask a good price for your product and get it. Nebraska growers have a growing market here at home if they will cultivate it as it should be. Pack only the best and so label them. Put your name on the package and set a standard that you can adhere to year after year and that will bring your customer back again and again. Nebraska grapes as well as Nebraska apples and other fruits have as fine a flavor as can be found anywhere and it is the duty of the grower to put those grapes up in such a manner that their pack will be standard by which other growers will pattern.—July Horticulture.

GROWING STRAWBERRIES COMMERCIALY.

G. S. Christy.

A record of better than \$700 per acre growing strawberries in Nebraska. It seems strange that commercial strawberry growing is not better developed than it is at present. The \$700 per acre return like land promoters stories occurs more often on paper than it does in fact, too often the man that believes the promoters big stories, or that will expect a record breaking yield every year will be sorely disappointed. Disappointments occur more often than record-breaking crops. The drawbacks to commercial growing are many. First there are too few growers in each locality, and the berries must be shipped locally. The express company absorbs too much of the profit. To succeed berries must be shipped in car loads, and all berries examined by an expert before they are loaded. Second too much nitrogen in our soil and the berries are hid beneath such a mass of foliage that they ripen in the shade and are soft as soon as colored. Then our pickers have always been trained to pick ripe berries. While berries from all commercial centers are picked before entirely colored and allowed to ripen on the road. In the southern berry districts where you have to carry dirt in your hat to cover the roots of a plant after you have wedged it in between rocks, the soil contains mineral elements necessary to color the berries instead of nitrogen to force rapid plant growth.

One plant to the square foot is as thick as plants should be grown to produce the best commercial berries.

Dunlap, Warfield, Klondike, Stephens Late, Gandy, and many other varieties will bring big returns on the investment if planted in sufficient acreage that they can be shipped in car loads. No overripe berries should be allowed in the boxes. If plants are well mulched and not too thick very few small berries will need be sorted out. Pick ripe berries for the local market, and three-fourths ripe for the distant market, and soft berries will not be a hindrance to Nebraska berry growing.

Grading Berries for Market.

For strictly commercial berry growing only a few varieties should be planted, and with expert pickers very little grading will be necessary, but with thirty to forty varieties as we often have and some of them worthless, under our conditions, grading becomes necessary. Some pickers that have but one idea in view "to fill the box" are prone to pick over ripe berries and green berries in the same box, the green berries will not do for local markets nor the over-ripe for the distant markets, so they must be turned out on a table and separated by trained and trusty help. The ripe berries goes to the local market and the unripe berries to distant markets, the green berries discarded, and sometimes the picker "fired." When berries are good and pickers No. 1 it will not be necessary to grade except to place the last tier of berry stems down, as that adds much to the attractiveness of the box. Every berry should have one-half inch of stem, and no berry should go to market without its calyx.

HARVESTING AND MARKETING CURRANTS AND GOOSEBERRIES.

"In harvesting currants for market purposes a particularly close watch must be kept of the pickers. The stem of each cluster should be grasped above the fruit and removed from the bush without crushing or loosening any of the berries. Only careful pickers will do this. It is so much easier to grasp the cluster of fruit as a whole and pull it away than it is to take hold of the stem alone with the thumb and finger. For this reason a variety which affords more space between the branch and the first berries of a cluster possess an advantage. Fay is a good variety in this respect. While currants will stand shipment well if sound they will quickly spoil when torn from the stem and the skin broken.

Gooseberries are among the best of all our fruits to ship since they are nearly always marketed green. They can be handled like so many beans and will stand up well under ordinary shipping conditions. They are, however, difficult to pick since the plants of all good varieties are thorny. These thorns are stiff and strong and particularly troublesome to the pickers. One method of picking sometimes practiced which obviate the difficulty in part is to wear gloves and strip the fruit from the bushes into trays or dishes. They are then run through a fanning mill to blow out the leaves and other light refuse. If picked while still perfectly green and firm this method is entirely feasible.

The five or ten pound grape basket makes a very convenient and satisfactory package for marketing these fruits, particularly gooseberries though they are often marketed in the quart box."—Extract from Bulletin 4, 1912, Massachusetts State Board of Agriculture.

FLORICULTURE, ORNAMENTAL GARDENING AND FORESTRY.

SOME BULBS WHICH SHOULD BE PLANTED IN THE FALL.

Chapin Brothers, Lincoln, Neb.

Bulbs of one kind or another should be grown by all lovers of early spring flowers. Here are plants for every place and purpose—beautiful for the formal beds and borders and especially attractive for the wild spots of our lawns.

For several reasons bulbs are the most popular of any spring flowers. They have so much latent beauty stored in them, and require so little skill from the amateur gardener. Then, too, coming as they do so soon after a long winter, they seem especially symbols of spring.

Snowdrops, crocus and scillias even bloom while the late snow is on the ground. Not having to forage for food in the spring (the flower having formed the previous year and being within the bulb) they are ready to flower at the first sign of spring.

The above mentioned bulbs may be planted in beds or in borders, or among the grass in the open lawn. The soil of Nebraska is especially suitable for bulbs as they do best in a soil which is rather light and loamy. Too sandy soil may be helped by having well rotted manure well spaded in, but this fertilizer must be spaded in sufficiently to prevent it from coming in contact with the bulbs.

Early tulips such as "Yellow Prince," "Cottage Maid," "La Reine," "Duchess de Parma," "Tom Moore," "Artus," and many others should be planted in solid beds only, in order to get the best results.

We, however, recommend especially the late tulips for out-of-doors planting. These varieties are as gorgeous as the early ones, perhaps even more so. In addition to this, they have the advantage of blooming about the last of May when all danger of frost is over. The stems of the later varieties are usually longer, varying from about 18 to 24 inches. Then, too, the flowers last longer, and the bulbs as a whole have more vitality and do not require replanting as soon. Indeed, we have had some bulbs in the ground for six or seven years, and each year fine flowers are produced. The later tulips are more showy in a border than in a formal bed, and should be planted in that way if the best results are to be obtained.

Among the best of the standard varieties are: Gesneriana Major (scarlet), Gesneriana Lutea (yellow), Golden Crown (Golden yellow striped with red) Picotee (pink), Ida (white), Gala Beauty (vermillion striped with yellow), also Parrots and Darwins.

Among spring flowering bulbous plants, the narcissus family, which includes daffodils and jonquils is one of the most important and of world wide popularity. They may be grown in garden beds among hardy plants in herbaceous borders or "naturalized"—that is grown as if wild in outlying portions of the lawn or grounds. They thrive in ordinary garden soil but grow and flower most luxuriantly in

deep, moist loam. The depth to plant varies according to the size of the bulb, from three to five inches is about the average and from four to six inches apart.

The narcissus are of longer life than most bulbs. There is a field in New Jersey where the daffodils which once surrounded an old garden have been multiplying and blooming without care for over a hundred years. There are many varieties some fifty or sixty of which are exceptionally good. Among these are: Emperor, Golden Spur, Henry Irving, Empress, Princeps, Victoria, Princess Ida, Sir Watkins, Stella, Ornatus, Poeticus, Triumph, Van Sion, Campbell, Jonquil and J. M. Camm.

Hyacinths are popular, both because of their fragrance and beautiful colors, the lavenders blues and purples which are so scarce in other flowering plants. These should be planted in a deep, well-spaded and loamy soil, about four inches deep and six inches apart. The best effect with these is obtained by planting them in formal beds.

This list, although very incomplete, serves to remind you that all spring bulbs should be planted before November 15th.

THE EAST AND THE WEST.

C. S. Harrison, York, Nebr.

We will suppose a cast of two men with the two different systems of putting their theories in practice. Hiram Jones is from eastern Massachusetts. He has fallen heir to a fine Nebraska farm—a gift from his aunt, who secured it by mortgage which fell due and could not be paid, along in the disastrous nineties. The farm is out in Phelps county, near Holdrege. He was delighted with it. The crops on the adjoining farms were fine. The corn gave promise of an enormous yield and the country seemed very prosperous. The soil was deep and rich, and he said; "If they had such land in the old 'Bay State' they could do wonders with it." He visits the nurseries at York, Geneva and Crete and has a feeling of deep pity for the nurserymen, who are so much behind the times and so deficient in so many ornamentals which he deems so important in adorning a home. They intimate that there must be a different horticulture for the west and different class of evergreens, trees and shrubs. But he is a graduate of Williams, has studied at the Buzzy institute, has spent much time with Dawson in the Arnold arboretum, is a member of the Massachusetts horticultural society, and is well acquainted with the leading nurserymen of the state. He is sure he can make his eastern favorites grow in Nebraska. He has great faith in himself and his teachers. He has had Professor Bailey's books and no one can surpass Thurlow, Whittier, Manning and the Meehans, and a host of others who are at the head of the profession. The Nebraska nurserymen let him talk. They have been along the same road and left behind them for any new men who wanted to go that way.

He leaves directions to have the place put in the best condition, especially where the planting is to be done in the spring. Early the next season he is on hand with competent help, for he wishes his work well done. A landscape artist has laid out his grounds in fine shape. It is all planned where to put the trees, shrubs, peonies and perennials—the backgrounds and the borders. It looked beautiful on that plot. And there is "Country Life in America," the instructions of which he follows implicitly. He has great faith in the rich soil. He has boxes and boxes of the choicest trees, shrubs and evergreens, taking especial pains to bring those very things in which the western nurseries were deficient. He goes to work with zeal, and in imagination he sees himself surrounded with the most attractive grounds in all Nebraska. He insists on planting just the things ignored by western men. He has a beautiful lot of azaleas, kalmias, rhododendrons and those charming red-berried hollies. He will show people what Christmas looks like out of doors. He brought a lot of hemlocks, Irish junipers, white pines, Nordmann's firs, and these delicate retinosporas from Japan. He also had a lot of bright looking Norway and white spruce, and long needled Norway pines, also a beautiful lot of eastern arborvitae for a hedge. There was also a choice selection of magnolias and those River's purple beech that are so charming in Massachusetts. He brought a lot of common beech and one hundred beautiful tulip trees, as he saw none growing in the west. There were also some delicate Japanese maples, with their deep crimson foliage. He brought out the whole family of Deutzias which he was sure would be hardy, and among them, the dainty little *Gracilis* which in bloom is like a mound of snow. *Elaeagnus longipes* was a great favorite and he had picked a peck of their fruit from a single bush in the east. He knew it was a shrub of merit westerners had overlooked.

When he had everything well planted they did look fine. Those purple beech, as well as the common ones, did not seem to take kindly to their new conditions, but, on the whole, he is satisfied and, looking over his work, he felt rather proud of himself. It had been a mild spring with abundant rains and everthing was favorable. He was teaching the natives a lesson. Those Irish junipers, so beautiful and symmetrical, were starting finely. The European larches were growing beautifully. The fragrant arborvitae hedge was a delight. Some of the deutzias were in bloom, and even the little *gracilis* made a faint attempt at smiling. He asked the neighbors to call and he expatiated on the beauty of his trees and shrubs and said: "Now this is an object lesson. What I have done you can do. I thought I would do a little horticultural missionary work out here and teach you men of the possibilities in store for you."

Joining him on the same section was Bert Johnson, who has attended the horticultural department of the university at Lincoln, and had worked a couple of years in a Nebraska nursery. He would intimate now and then that Mr. Jones had not gotten through yet. He

was fixing up his place with about the same number of trees and shrubs, but he knew every inch of his ground. They often compared notes and looked over their places together. Then Mr. Jones quoted his eastern precedents, and his teachers showed him pictures of those very things in Country Life.

July was hot and dry and then for three mortal days the American sirocco was blowing like a blast from a fiery furnace while the mercury went up to 112. Mr. Jones could smell the foliage of his beautiful evergreens as they were withered by the fiery blasts. How it made his heart ache. The evergreens were turning brown. White pines and larches were cooked through. Everything wore such a bedraggled look. Copious rains at last stayed the ruin, but unseen forces seemed brooding in the air, which whispered, "We have not done with you yet; wait till spring." Spring came and there was not a single tree or plant alive on the place. Even some eastern elms were killed to the ground by the winter drouth. Hiram was in despair, but Bert said, "You have landed just where scores of men have before you. Now you are ready to do something. We would gladly have saved you from all this but you must see for yourself. You have found out what you couldn't do. Now, go in with what you can do."

You wanted Irish juniper, you see it could not possibly live. What is the matter with this *scopulorum* or silver cedar—like it in form; accustomed to this climate, its silvery foliage transcending the other in beauty? You mourn over your Nordmann's fir. There is the sturdy concolor of the Rockies, far more beautiful with its blending of richest tints. You see it weathered any storms and is immensely superior to the other in hardiness and beauty. Your arborvitae never do well unless they can have wet feet, and they often kill on dry ground, even in old Massachusetts. But what is the matter with these sturdy ponderosa pines? Do they wince under the siroccos? They are used to them and those long needles of shining green are fully as attractive as ever were your dead favorites yonder. You can raise them as easily as you can corn. They cost but little, as you know where to find them. I guarantee they will never go back on you. You love the hemlock, so would I if it would let me, but it dies. Yet there is its imitation, *Pseudotsugo Douglassi*, that means imitation of hemlock. This is far ahead of it in every respect. There are few species that have such a marvelous variety of form and foliage, you see this, and how well it endured the heat. Notice I took the precaution to shelter it a little from the south wind. You are arcently attached to the white pine, but you can't make it live; right here, however, is the *pinus flexilis*, fully as beautiful in form and in addition you see some of them have this glauco or silvery foliage. And the aristarta or foxtail pine succeeds well in our dry air. Look at this specimen; so you are not losing much in the way of evergreens. I am sorry to see your beautiful holly go down in its despair. But here you see this *berberis* reopens, a holly leaved plant with exceedingly

fragrant blooms and purple fruit; this is alive. Of course it is sheltered a little by this fence, but it is doing well. We would like your holly, but we can't have it, so we take the next best thing. Your *elaegnus longipes* is a beautiful shrub; I wish we could grow it, but we can't. In its place we have the Siberian type, which will stand both heat and cold. The *hippophea*, equal in form and far surpassing it in fruit; in short, it is the most prolific berry I have ever seen, the branches breaking down with the enormous weight of these berries of polished gold.—From Independent Farmer.

DO YOU WANT TO BE AN ARTIST?

C. S. Harrison, York, Nebr.

"Oh it would cost too much and I can't afford the expense and then think of the years it would take and I would have to build a studio. No I can't think of it and yet I wish I could."

It is an easy enough matter to be an Artist of Nature. The cost is but little. For a dollar you can get manuals on the Iris, the Peony, the Phlox and the Evergreens. Your studio will be a rich piece of earth and in a couple of years you can have a resplendent picture.

Did you ever read of the famous Persian carpet of gems, captured by the Saracens? The ground work was of rich brocade woven with silk, mingled with threads of gold. This carpet was one of the marvels of the world. It was four hundred and fifty feet long by ninety feet wide. It was designed to imitate a garden of flowers. Thus earth's richest gems were made to pay deference to floral loveliness. The leaves were formed of emeralds and other green stones, while the buds and blooms were composed of pearls, rubies and sapphires and other rich gems of fabulous worth, the cost reaching to a hundred millions.

The one who can put a beautiful landscape on canvas, who can paint the carnation or the rose so as to faintly represent them and who can arrest the procession of flowers as they pass by and put them on perpetual exhibition is a genius.

Any man who could go into our great floral parks and put the varied expressions of the peony, the phlox, the *gaillardia* and columbine, with the radiant and stately delphinium, upon a canvas so the whole scene would represent a perpetual summer would immortalize himself. He who copies nature most faithfully wins the greatest renown.

Do you know that the original transcends the copy, and that you can produce the original, and the artists can be at his best only a feeble imitator? Take a live flower in all the prodigality of its loveliness—a living, breathing thing, exhaling that delicious fragrance. When it goes in the picture it can only be a corpse of itself. It is not alive. It cannot breathe—no aroma floats around it. It is dead. You can stand before the very highest productions of art in the effort

to portray the floral world, and you are not in the presence of reality. You simply see the effigies of things beautiful. So nature rises supremely above art, and the painter can only touch the hem of our garments.

Did you ever watch the flowers as they were making their toilets? No lady of fashion displays more exquisite taste or greater care in adornment. There must be a touch here and another there. The outer petals must be just so large, the inner must wear just such colors. Watch the La Tulip peony unfold. Did ever maiden before her glass show greater skill or pay more attention to detail. First you see a swelling bud, the surface interlaced with green and red. Then the ball expands, bound in bands of delicate pink and crimson. Look again, what a marvel of loveliness! Now the ball opens showing a lovely form of delicate flesh and carmine. Now it breathes and the breath has such sweetness. You look again and it is changing. At first it is the blush of the morning; then comes purest white with now and then a dash of red, and slowly it fades away, dying so gracefully, and by its side another is going through the same process. Look around you, see the columbine, the lilies, the majestic Oriental poppies, all busily at work, intent as blooming girls to put on their choicest garments. You can call these things into life, but where in all the wide world is the genius who can transcribe this work—these ever changing robes of beauty—yea the life of these radiant hosts that put themselves on dress parade to reward you for your interest on their behalf? Never warm hearted maiden in the radiant glow of her first love ever tried to make herself more attractive than these dainty flowers, which array themselves in all the witchery of their loveliness, that they may give you welcome.

What would you think of a picture on a vast scale 100 to 200 feet, every portion of which was aglow with the clearest and finest representation of the choicest gardens of flowers? Such a production would put a man at the very front of his profession. A building would be erected for it and crowds would come to visit it. What if he could so reproduce them that the spectator would breathe their breathe and could see them making their toilet.

Now it is possible for you my friend, be you man or woman, boy or girl, in one tenth of the time it would take to train a painter, to reproduce the living forms in all their delicacy, with the tints of the rainbow woven into their garments with touchings and pencilings and tracery, far more exquisite than ever came to human genius.

See that Oriental poppy. It is seven inches across. It is a flame fashioned into a flower of dazzling brightness. Look within. See those delicate, tremulous stamens. See that seed pod. Could human skill mould its equal? See those pencilings all done up in jet. Put it on the canvas? No! Such an object is the despair of the artist. What an immense amount of the highest skill nature displays in making that single flower and yet last year you got a little root like a parsnip,

the size of a pencil, and lo, there is your reward. Your skill and success are such no human skill can fairly represent. So you are an artist, far transcending the mere copying art.

All around you are those masses evoked by your skill. No deft hand, however well trained can reproduce them. You see an interpretation of God's love to man. Every radiant graceful form is but an expression of His "precious thought" to us. You may never be a painter but you can be a florist. With a little effort you can take a piece of unsightly brown earth for your canvas and put upon it a fairer scene than ever fell from painter's brush. This is not all. You stand in the very gateway of the eternal beauty. You are a co-worker with God, with the great Artist who paints life, who puts the resplendent bow on the brow of the storm, who hangs the mantle of splendor on the sun, who tints the mountains of cloud with amber and amethyst, as they stand sentinel of the dying day. Is it not wonderful that this Artist of everlasting beauty will come down and work with you, and second all your efforts?

You plant the seeds and bulbs, and wield the hoe, and the simple instrument is a wand in the hand of a king. You touch the earth and miracles of beauty spring up. Then the unseen brushes begin their work. In the sweet still and dewy morning, in the calmness of the night, and in the heat of the noon day He works with you.

Plant the rose, the peony, the tulip and the columbine and care for them, and lo the silent partner comes without noise or heraldry, and the blessed work goes on. Soon a thrill comes to you. You feel the honor of it, the glory of it—this partnership with Him who paints the splendors of the suns. All unconsciously you feel an ache and eagerness as though some unknown pressure were brought to bear upon you, and you are mightily moved with the fact that it is the yearning of God to reveal Himself through your brain and hands and hoe. He wants to be introduced to the world so people can understand him.

Yes, in a short time you can rival the splendor of that famous carpet which was the world's wonder and for weeks revel in its delights, allured by its restless fascination. How you will rise in your own estimation—thankful that you can invoke the beauty of the Lord to glorify your garden of delight.

Address given at Duluth, Minnesota, before the Garden and Floral Society, December 10, 1913.

ABOUT EARLY SWEET PEAS.

By L. H. Cobb.

The prettiest sweet peas are those that bloom before the weather becomes so hot. The seeds are very hardy and they can be planted so early that they are ready to start with the first warm days. The plants grow nicely when the soil is cool, and are sturdy.

If you want to plant sweet peas in rows it is best to make double rows about a foot apart and plant in a trench. The trench should be dug a foot deep and good rich soil filled in at the bottom, mixing about one part well rotted manure to two parts soil. On top of this put an inch or two of good garden soil and plant the seeds. Cover about a half inch deep. Your trench should lack five or six inches of being full when the seeds are covered.

Mulch During Hot Weather.

When the small plants are tall enough so you can, fill in some more soil, and keep doing this as they grow until the trench is filled. Keep thoroughly cultivated all the time so as to hold all the moisture possible in the soil, and when the hot days come mulch deeply with straw; grass clippings, or any loose material. It is the heat at the roots that hurt the sweet peas and make them short stemmed and small during the summer.

Plant the seeds pretty thick in the row, and then thin to about four inches apart. An evenly filled row adds so much to the beauty. Save fairly strong plants, but do not try to save all the largest for some varieties grow more strongly than others and you are apt to have about all that kind.

Plant Garden-Adapted Varieties.

Do not buy the seed of the early varieties, such as Mont Blanc, Earliest of All, Christmas Pink, and any of these forcing sorts, for they are hardly suited to garden culture, being so dwarf when grown in the open, and the flowers so small you will be disappointed. They are fine in greenhouses, and the larger sort do not succeed under glass so well, but the flowers are nothing like as fine when grown in the open ground.

Grow On Trellis.

If you want one of the prettiest displays of sweet peas you can imagine, plant a row in a circle about three feet in diameter. Plant thickly so as to have a perfect stand, thin to four inches and make a trellis for them to climb over. A ring of four-foot chicken wire is all right, if your soil is very rich, and three foot if it is not. This should be a very mound of bloom all summer, especially if you mulch them well, and have the center of the bed hollowed out a little and keep throwing water into it when the dry spells strike you. Remember that you will have to use plenty of water if you use any, for plants that are only partially watered are worse off than those not watered at all. Nature gradually prepares plants for a dry spell as the dry spell comes, and they survive much more drouth than we think possible, but if we water them a time or two this preparation of nature is interfered with and the plants suffer greater than when dry. Make up your mind to water well or not at all. This applies to all plants.

Removal of Seed Promotes Blooms.

Keep the seeds picked from your plants if you would have a long season of bloom. Nature is striving to produce seed, and when that is accomplished the work of the plant is done and it rests from its labor. You are growing it for bloom, nature is growing it for seed, and nature is very persistent, probably more persistent than you will be. The first thing you know she has scored and your plants are full of seed pods and no bloom and no amount of coaxing will have much effect after that.—From Kansas Farmer.

THE IRIS.

C. S. Harrison.

This is a large family with 170 native varieties and these have been crossed and improved until the collection, taken together, is the most beautiful of any of the flower family. They have been overlooked but they are the coming flower.

Why?

1st. Their fascinating and alluring loveliness. They are named from the Goddess Iris, the rainbow personified, who combined the beauty of heaven and earth in their matchless robes. It would seem as if she gathered the glory of the sunset, the beauty of the sun mantles, the tinting and coloring and the shading which plays on mountain and plain and wove them all in those opaline and iridescent robes with which she has adorned her children. The marvelous veining and tracery, and the delicate intermingling of colors give them a charm no other flower possesses. Many of them have a delicious fragrance. Some have a charming reflex like the richest silks which gives them a resistless fascination. In fact when you take a mass of them of a hundred kinds and see them all on dress parade, each vying with the other to see which can put on the most radiant appearance they seem almost human in their efforts to dazzle and attract. But they have this advantage; no gathering of royalty, no efforts of the select four hundred, none of the elaborate trousseaus of Paris can compare with the skill and high art of the great florist as He has adorned the brilliant host to charm the eye and feed the soul. All the rays and tints and colors of the rainbow are here—the concentrated beauty of cloud and earth united and blended in a harmonious whole.

2nd. They are the best drouth resisters we have. Last season was very hot and dry. Often the burning sirocco winds were blowing fiercely with the mercury soaring above a hundred, only 2 inches of rain from the first of May until the first of October, and yet we did not lose a plant in 150,000. In digging them in September, the ground was as dry as an ash heap, but the roots seemed to have gathered and stored the moisture. They were plump and full of life and when replanted, grew with great vigor. Beside them, the hardy peony drooped, and many of the perennials succumbed entirely. This trait

must make them the favorites of the semi-arid regions and even of California, the great thirst land where it rains one month and the other eleven months like thirty beasts of prey pounce upon the fields and suck them dry.

Though they repay the best of care they will bear neglect and survive where others would die. Too much water and too much manure are not good for them.

3rd. They seem capable of enduring any degree of cold. The Pumila, the German and Siberian families are very hardy. The Japs, though of rare beauty, if they can have their own way, are not a success in the West and Northwest. In California, they sunburn and in Nebraska they must be kept under a lath screen when they richly reward you with their rare beauty.

There are about thirty kinds of the Siberians. The flowers are somewhat smaller than the German, but many of them are of winsome beauty. The blue type has blooms of deep intense blue, borne on strong, slender stems like ramrods. Pick them just as they begin to open and they can be shipped quite a distance. The very deep color blends harmoniously with other tints, so they are great favorites with the florists. Snow Queen belongs to this family. It has a beautiful flower of snowy white with golden reflex in the centre, it is quite late.

4th. The peony is a slow multiplier, and there is no process by which it can be hurried up. If you have a new syringa or spirea or most any kind of expensive ornamental shrub, you can multiply it by cutting, by budding or root divisions. So from one you can soon have a hundred. But you can't hurry the peony. When a new and rare one is produced of very high price you must wait. No use in trying to push it. It is bound to take its time. Some will double every year, some will take two or three years and the fame of their beauty is growing much faster than they do. So the price mounts higher. We have one that cost \$10, some \$5 and there is not much prospect of their being lower.

But it is not so with the Iris. In the first place they are not as expensive. A fine collection can be had at about 25c each or less. The costliest are about \$1. But remember, on the average, they increase from one plant to ten in two years. I have divided 30 from one in that time. But that is above the average. From this rapid increase from ten you soon have one hundred and so on and then you can plant in masses and have an abundance as God does in his great flower gardens. How stingy people are when it comes to home adornment. Some expect two or three little flowers to cheer up a 160 acre farm. They can't do it. A man builds a fine house and furnishes it with costly furniture and carpets, but the moment he goes out of doors he must have the cheapest of trees and shrubs and a dinky little bed of flowers. The home should be a picture set in a worthy frame, with all the embellishment which art and skill can give it.

5th. The Iris is divided into four great divisions.

The Rhizomatous. These have rhizomes spreading out from the center, something like potatoes. They are separated and planted singly. Some wish to plant large clumps. This is not a good plan for the roots prey on each other and soon exhaust the soil. This group is the German and those closely related.

The Tufted are the Siberian and the Japanese. The roots grow in tufted masses. If you look closely you will find that there are individual plants all tied together. You pull these apart for planting or selling.

The bulbous are like Tulips. These are the Spanish, the English and the Juno varieties. With us they are not satisfactory. You cannot depend on them.

Then there are the Fingered Iris. These include the Hermodycytlus, the Acorus or Jacobs sword and the Gigantea, also the Longipetella. These are later than the other sorts, but are of a hardy tribe and are good multipliers.

6th. Time of blooming. First comes the hardy little Pumila and the dainty Verna which blooms with the Tulips. Then the Pumila hybrids. Then the Germans which vary much in their time of blooming. Then comes the Acorus and the Gigantea and lastly the Japanese, so you have flowers for about three months.

7th. The Iris as cut flowers. If you wish to decorate your table go out and cut your Iris with the dew on them. Be careful not to bruise them. If you wait until they are in full bloom they are so delicate that they do not ship well. Cut them just as they are opening, and they are all right. Put them in water and they will open with more delicate bloom than if left out of doors. They are usually on hand for Decoration Day. As in the Northern states the Peony is a little tardy at that time, you have a splendid flower to take its place. Though the individual flower may last but a few days, nature has arranged for a succession of bloom. One bloom fades and another is ready to take its place. I have thrown them on the packing house floor and watched them. The top one blooms and fades and the one below takes its place. That goes, to be followed by another. Vitality seems to be stored in the stem to keep pushing them. Of course when placed in water the process will continue longer. Hundreds and thousands are now used for Decoration Day.

The Iris can also be used for Forcing: put some choice ones in pots or boxes in a sheltered place out of doors. Bring them into the house in November and you will have fine flowers in the winter.

BEAUTY OF BERBERIS THUNBERGH IN WINTER.

Joseph Meehan.

The merits of *Berberis Thunbergii* as a hedge plant is known to

everyone, its bushy, prickly growth and moderate length of increase annually all being in its favor. Then when fall comes, the lovely scarlet colored foliage and berries form one of the attractions of the season. At this writing, early Winter, when all its leaves have fallen, it presents new features in the display of its berries, and it is indeed an object of great beauty. Its bright scarlet berries are alone, every one standing clearly in view. It matters not in what position the plants are growing, whether on the level or on elevated ground, but it is when surmounting a bank that it is viewed at its best. And it must not be forgotten that these berries are of a persistent character, keeping their plumpness and their color all Winter long, and even adorning the bushes after the new leaves of Spring have come. There is still another way in which the plant gives us pleasure, and that is in its use as a table ornament. Its cut branches placed in a vase with some Smilax or other small green leaved foliage afford a pleasing sight.—From Florists Exchange.

HYDRANGEAS TO BE PRUNED.

It should be understood by those who have been in charge of Hydrangeas that there are two distinct classes of them as far as pruning is concerned. One requires heavy pruning in early Spring, the other must not be pruned at that season. Those to be pruned in Spring are all the species and varieties of native origin and the Japanese one, *H. paniculata*, and *H. p. grandiflora*. Our native ones consist of these. *H. arborescens* and *cinerea*, *H. quercifolia* and *H. radiata*, and included in this list are the snowball, varieties of *arborescens* and *cinerea*. It is these snowball, or sterile flowered forms, that will be best known, and these should receive the close pruning referred to. The pruning is better done in late winter, but any time before growth commences will answer. These Hydrangeas will flower without pruning, but the heads of flowers are larger on the pruned bushes than on unpruned ones.

These two snowball forms, *H. Cinerea sterilis*, and *H. Arborescens grandiflora*, are great favorites, flowering profusely in July and August. But it is a mistake to advertise them as everbloomers, which they are not, giving the one crop of flowers only. But by holding back some plants in cold storage, planting them late in Spring, a continuous display of flowers may be had. The same is true of *H. paniculata grandiflora*.—From Florists' Exchange.

FIGHTING THE ROSE APHIS.

Easy to Control the Pest, if Growers Will Use a Little Care in Spraying.

Washington, D. C.,—Rose growers who allow the flowers to be damaged by the ravages of the rose aphid, have only themselves to blame, according to the U. S. Department of Agriculture. Although

the aphid is widespread over the entire country, as well as abroad, it is easily controlled. Careful spraying of the plants with solutions of nicotine will remove all danger and neither the expense nor the trouble involved is sufficiently great to be a real obstacle.

The rose aphid is a small insect with a body about one-twelfth of an inch long. The young and some adult forms are wingless, but certain adults develop wings from time to time. The color varies from green to pink. By means of its slender beak the aphid sucks out the juices of the plant on whose buds and unfolding leaves it feeds. These, prevented from attaining their perfect form, become curled and distorted and the beauty of the flowers is in a large measure ruined. Moreover the aphid secretes a sweet sticky liquid called honey dew which spoils the appearances of the foliage on which it is deposited.

Under favorable conditions it propagates rapidly throughout the year. For example, some recent investigations conducted in California by the Department of Agriculture showed that one female gave birth to fortyeight young in six days. At the end of that time, the mother aphid was knocked from the rose and perished.

This is not at all an uncommon fate. A heavy rain, which washes the insect away is one of the most natural checks, though birds and other insects prey upon the aphid to a considerable extent. Extreme heat is also unfavorable to the aphid.

The rose lover should not, however, depend upon nature to rid his garden of the pest. A 40 per cent solution of nicotine is much surer and not much trouble. One part of the solution to from 1,000 to 2,000 parts of water with the addition of one pound of whale-oil soap to every 50 gallons of the mixture is recommended in Bulletin 90, "The Rose Aphid," which the U. S. Department of Agriculture has just issued. A more convenient recipe, when there are only a few bushes to be treated, is a teaspoonful of 40 per cent nicotine solution to 2 gallons of water and one half ounce of whale-oil soap. The soap should be shaved fine and dissolved in hot water.

Mixtures of this character should be applied as a fine, penetrating spray by means of a compressed air sprayer or bucket pump. Such a pump costs from \$3.50 to \$15.00. Together with nicotine solutions it can usually be obtained at seed stores. If no pump is to be had, however, the infested twigs should be dipped in a pail of the solution. Care should be taken to use these solutions at strengths no greater than those mentioned above, since injury to the foliage may result through the use of too much soap, or mildew be favored by too strong a nicotine solution.

Application of insecticides should be made on the first appearance of the pest which varies from the time that the leaves are put forth until the buds begin to form. Applications should be repeated as found necessary.—U. S. Department of Agriculture.

**OBSERVATIONS ON TREE PLANTING AS CARRIED ON IN
NEBRASKA.**

Prof. R. J. Pool, Uni. of Nebr.

For many years Nebraska has been known to the "Tree Planters' State." This nickname is of particular interest to the foresters. It is not that the citizens of Nebraska have necessarily planted more trees than have been planted in other states, but perhaps the cognomen was applied because of the tree planting stimulus which, born and applied here, has also been transmitted to distant regions and has at times secured responses that were practically nation wide. The infectious influence of such men as Morton, Furnas and Bessey has spread in the past years until Ferrow, Hall, Pinchot, Graves and other big men in federal forestry have felt the call and have responded from time to time in a most encouraging degree. The enthusiasm and devotion of the above western pioneers, augmented and accelerated by similar spirits in other states, have made a tremendous impression in national circles until at the present time the splendid response of the government is seen in the branch of reforestation or afforestation which is perhaps the most far-reaching and significant feature of the varied program of the U. S. Forest Service.

Our sister states have responded to the agitation for tree planting emanating especially from Nebraska until now Arbor Day is a holiday in many states and the spirit and practice of the day has encircled the globe. Arbor Day and the various "timber culture acts" of state and national scope have resulted in the addition of considerable areas of timberland to the originally treeless regions. Similar stimuli have also initiated attempts, at least, to rebuild the wasted forests and woodlands of states which were originally well covered with arboreal vegetation. Surely many portions of Nebraska owe much of their present beauty of landscape and air of homey contentedness to the presence of thousands of planted groves which so effectively and agreeably mask the lonesome monotony characteristic of rolling prairies and plains. Indeed there is much of inspiration in an extensive thought in the establishing of the vast majority of tree plantations throughout the state.

The timber culture act made possible the attainment of a quarter section of the public domain by planting one-sixteenth of this area to trees. This seemed to be an easy task and hundreds of "claims" were secured under this law. It has often been reported that many of these tree claims were fraudulently obtained, and that for instance it was often the case that permanent tree plantations were never established. Others were procured after planting worthless stock or perhaps by merely broadcasting the seed over a very limited area and then "breaking" the sod over a ten acre patch of virgin grassland. Many of these "timber claims" were eventually abandoned and the government finally put an end to such land frauds by repealing

the act. Of the thousands of claims secured under the above act in western Nebraska it is certainly true that relatively few vestiges of the original plantation survive today.

The tree species used in greatest quantities upon these claims, if one may judge in part from the present composition of the plantation relics, were ash, box elder, cottonwood, black locust, mulberry and hackberry. Occasional scrawny remnants of osage orange, elm, catalpa and maple "claims" indicate that these species were also planted to a certain degree. It appears that in the majority of cases the site was unwisely selected, the trees were poorly planted and then neglected soon after planting. I have seen hundreds of these pitiful vestiges as I have traveled across the sandhills and high plains in many different localities. The terrible struggle that such trees have endured through the years in the face of drought, fire, hail, fungous and insect pests and hungry beasts has reduced them to uncanny forms. Here they are dwarfed, deformed, diseased, victims of man's unconcern and abandonment and remnants of a pathetic struggle for existence. I have wondered why some writer with a love for the plains has not been inspired by these pygmies to write an additional chapter in the history of the timber claim generations.

But I would not have my readers believe that this picture of desolation is the only result of the various attempts to make the plain more inhabitable by planting trees. Numerous such projects have been crowned with signal success. Stately groves sometimes occur as close neighbors of desolate, abandoned tree claims. Many well established groves that have received some slight managerial attention have attained in thirty or forty years dimensions that should be at least encouraging. The attention that such plantations have received may all be included in protection from fire and grazing animals. Such stands of timber should be valuable lessons before the homesteader and the ranchman who really desires to secure some of the varied returns from a successful plantation of trees. I could take you to groves of ash and cottonwood trees in western Nebraska which would do credit to any country, climate or soil. Groves which not only afford excellent protection from the furies of the wind, but which in addition yield desirable quantities of posts, poles and possibly, in time, cheaper grades of lumber also. From studies that are now in progress with reference to prolonging the life of softer woods when in contact with the soil it does not seem too optimistic to predict that ranchmen and homesteaders in certain parts of the state may soon be able to produce quantities of post and pole material sufficient to meet all of their demands for such products; products which become more and more necessary as the population of remote areas increase.

So firmly has the federal government believed in the possibility of covering areas of semi-arid Nebraska with stands of trees that they are spending thousands of dollars each year upon experiments pointed toward the discovery of species and methods which will yield profitable

returns from the growth of a woody crop. Everyone who is familiar with all phases of the work of the forest service in this state must surely agree that it has been demonstrated that posts and poles may be grown from coniferous stock in economic quantities in our sand-hills. Surely this is an achievement worthy of all praise and we may pass over for the time being any discussions of the question as to the possibility of the production in such plantations of real forest conditions and forest products such as lumber.

In conclusion it seems to be that those phases of forestry which have to do with the artificial establishment of tree plantations and the management of such crops to insure a sustained and valuable yield of woody products are the most important aspects of the whole forestry problem in a prairie and plains state such as Nebraska. We should be taught how to plant trees; how to care for trees; how to harvest trees; how to use woody products; how to sell wood, but most of all, how to secure and maintain profitable woodland assets. The proper methods of procedure in this matter can only be determined from a study of the successes and failures of the past and by the careful condition of experiments from which the data may be secured for the successful management of the Nebraska grove or woodlot. Our motto should be: plant trees, utilize trees, sustain trees. Here, students of afforestation, you may find many and varied original problems awaiting solution in order that our population may be richer, more comfortable and happier.—From "Daily Nebraskan."

"A KNOWLEDGE OF FORESTRY AS A PART OF LIBERAL EDUCATION."

Prof. W. T. Childs, Uni. of Nebr.

In 1889 Gifford Pinchot was a senior at Yale. One day a college mate asked him (as students will) what he was going to do after graduation. "I am going to study forestry." "What is that?" queried the puzzled student. "That is the reason I am going to study it," replied the man who later was to become the great exponent of the conservation movement in America.

Mark the fact. An upper classman in a great university, in the "progressive" United States, in the nineteenth century, did not know what forestry was. Because of these things, Gifford Pinchot determined to study the subject. He went to Europe. There were no foresters or forest schools in America. He walked and talked with the greatest of forest-masters, Sir Dietrich Brandis, studying the best in Germany, in France, in Austria and later in India under the guidance of that master. His schooling finished, he came back to America to tell us what forestry is and point out our need of it.

You who are seniors of the University of Nebraska in 1914—you who are about to take up the important job of being a citizen in the republic and pass for a man or woman of liberal education, do you know what forestry is?

The average educated person whom one meets today has a layman's knowledge of the sciences. He or she knows something of engineering, of agriculture, of geology, of botany of irrigation. Mention forestry. They are lost in the woods. They know it deals with trees and possibly birds and buzzing bees, et cetera. What do you think forestry is?

Forestry is many things to many minds. To one it is the care or shade trees, to another the manufacture of lumber, to another the planting of trees. In a measure they are all right. Forestry does in "City Forestry" divide the honors with arboriculture in the care of street trees. Planting is a part of forestry, likewise lumbering or the harvesting of forest products. They are, however, only parts of the greater subject. It should be a part of a liberal education to get these part co-ordinated.

Forestry is agriculture in heroic mold. The farmer aims to raise perfect crops of wheat, corn and alfalfa—the forester aims to raise perfect crops of trees. The farmer judges his success by the number of bushels to the acre, the forester by the number of feet of wood board measure. Neither is satisfied with nature's product as to quality or quantity. Both aim to supply a nation's need, that one for food, the other for wood. The period between seed time and harvest being the major difference. Forestry in the truest sense is, then, the establishing, cultivating and reproducing of forests. Tree farming or silviculture is the forester's art.

This, says the academic student (if he has read this far), is for foresters. What has such knowledge to do with my liberal education? What is forestry to me?

If the technical art of forest culture as I have tried to describe it, were all, the question would be well asked. But this is not all. The forest problem is so far reaching that it effects every citizen. The cost of wood products, the regulation of stream flow as it bears on manufacture, on water supply, on public health, on a meat supply and on soil conservation are all bound up with this problem.

It has its political aspects. What is forestry to you as a good citizen? Strange as it may seem this new idea of scientific forest management has been bitterly opposed by otherwise intelligent public leaders. This very question of how we shall handle our public forests has been the policy "de resistance" in the great conservation movement. A movement so pregnant with new ideas that it has become a great political issue, split a powerful political party and become the rallying cry of a new party. Is a knowledge of forest conservation of any value to you who will soon align yourself with one of the political parties?

A general knowledge of the subject will teach you something of the relation of forest cover to stream flow; how this same cover will affect the quantity and quality of the water supply of the town in which you live. It will teach you how much or how little it will

do toward preventing floods. Remember Dayton in 1913. It will teach you something of the relation between forest cover and the price you will pay in the future for electric light in your home and horsepower in your mill. These are citizens' problems and forestry touches them.

As a citizen should know something of our great national forests—those wonderful and little known wilderness paradises. One hundred and fifty of them stretching down the length of the Appalachians and Rockies and the Sierras, and aggregating an area larger than Germany. Their history is interesting. Their resources in timber, in grazing ranges and in water powers are enormous. How are they managed? How should they be managed by the nation or the state? How will their proper management affect the price of lumber, of mutton and beef (three-fifths of all the sheep and cattle raised in the United States are grazed on national forests) to you? Will this management raise or lower the price you pay to be carried across the continent in a train driven by power generated by water falls safe-guarded by national forest? Yes, as a well educated man or woman you should know something of our national forests.

Suppose you are a modern Gallo. You care for none of these things. You are a plain city dweller. You own a home. You want to know what trees to plant in front of your home. You wish to know how to plant, to prune and to repair your trees, so as to best meet the demands of the street beautiful. City forestry should interest you.

Or are you going from the University back to the farm to raise crops? Why not learn to raise a crop of trees? The old farm wood lot can pay for the ground it occupies. Make it pay interest in posts, poles and cord wood. Second growth stands of white pine in farmers' wood lots in New England are paying 6 per cent. Cottonwood stands in the middle west are doing even better.

The establishing of wind breaks is a profitable work in farm forestry. Larger yields of fruit and grain are obtained from orchards and fields sheltered from wind and frost. Cattle which have been pastured on land shaded by windbreaks go to market pounds heavier than those unprotected from the prolonged heat of summer.

Farm forestry will tell you how and what trees to plant about the farm house. It will aid you in making the farm a more pleasant place to live. It is a distinct contribution to the movement for better rural conditions. Is a knowledge of forestry worth while on the farm?

A knowledge of forestry is a joy to the traveler. Particularly does an acquaintance with dendrology (forest botany) add to the pleasure of traveling and life in the open. As a forester I know of no keener pleasure when traveling over the continent than the recognition of different species of trees as the train swings across the states. To follow from the observation platform the boundries of our great forest regions, from the sombre spruce of New England

to the sunny yellow pine slopes of California is, to the trained eye, fun, just keen, mental fun. Even a limited amount of forest lore is a never failing source of enjoyment. It is the real resource to one who annually joins the American army whose stamping ground is the great out of doors.

The Forestry Department of the University offers a course (F. 1, p. 332 of the Bulletin) in General Forestry. The aim is to give students from all departments as well as those beginning forestry an insight into this new, little understood and mighty interesting subject. The department desires to make this course a live and very worthwhile one to students, both men and women. There is much in forestry for women, especially in farm and city work.

The department aims to make the course first a means to a better understanding of the great forest conservation problem so intimately related to the political and economic issues of our times. Such knowledge should make more intelligent voters and hence better citizens. Is there a more important excuse for liberal education than to make good citizens?

Secondly, the course aims to give an insight into city forestry as a step toward bringing something of the value of the open country to the confines of steel and concrete, asphalt and trolley cars.—From "Daily Nebraskan."

COMMERCIAL SURGERY FOR SICK TREES DEMANDS RELIABLE MEN.

Tree Surgery as a Science Every Year More Generally Appreciated. Suggestions for Improvement Through Cooperation.

Washington, D. C.—A cavity in the decayed tree is something like a cavity in a decayed tooth. If an unreliable tree surgeon who has been called in to save the tree only partially removes the diseased part of the wood, uses no antiseptic coatings in the cavity and fills it up with cement the tree is no more cured than is a person whose decayed tooth has not been properly filled by a dentist. The only difference is that after the cavity has been covered, if the work has not been properly done the tree has no way of making its trouble known except by further decay.

Within the last decade there has been a great increase in demand for surgeons to repair decaying trees, but the possibilities of practicing fraud in this profession like the instance just cited have tempted so many unreliable people to dabble in the science that tree surgery has fallen somewhat into disrepute. The U. S. Department of Agriculture realizes that commercial tree surgery should occupy a high place in the estimation of the public, and has recently issued a pamphlet entitled, "Practical Tree Surgery," wherein suggestions are made for improvement along these lines.

As in all professions, there are reliable and unreliable men and firms competing for contracts in tree surgery. In recent years so many occasions have arisen when property owners felt the necessity of calling in commercial tree surgeons to attend to their trees that there are now numerous firms, both honest and dishonest, engaged in the work. Usually tree surgery is practiced in connection with some nearly related line, but often it is taken up as a business of itself. When a blight such as the chestnut bark disease, infects the trees of a district, the community, or individuals in it, will often spend considerable money to control ravages which may rob the whole district of its trees. An affection like the chestnut bark disease is contagious. It requires scientific knowledge of the disease to know whether an affected tree should be destroyed at once or is worth treating. It requires scientific training to understand the manner of growth of the fungi causing the disease and what treatment is best.

Many individuals who have had faith in tree surgery have lost it through following the advice of unreliable tree surgeons who claimed to be able to diagnose a case, but whose main interest was to collect a good sum of money for their work.

Misuse of Pruning Hooks and Climbing Devices.

Besides the careless filling of decayed cavities in trees, there are other practices of certain so-called "tree surgeons" that do the trees more harm than good. Many of these "surgeons," as well as the people who employ them, do not realize the danger arising from fresh injuries to a tree. The tree owner should realize that prompt attendance to fresh injuries will largely do away with the need of tree surgery 15 or 20 years hence. The tree surgeons must realize that if they make fresh injuries in the living bark, when treating decayed portions, they are laying the tree open to more dangers of infection that will result in further decay.

Just as a person is subject to infection through cuts and scratches, trees are rendered subject to infection by having their living bark torn. Notwithstanding this, many tree surgeons use pruning hooks and climbing spurs and cut fresh gashes in the tree. To break off small dead branches a workman may use a long pruning hook as though it were a club. In doing so the hook usually causes injury to the young bark near by. Every new wound may furnish a new point of entrance for decay, even though the old dead branch may have been removed.

The use of climbing spurs should be particularly avoided on trees in vicinities where there is a contagious infection. They simply render the treated tree all the more liable to catch the disease which is "in the air."

All properly equipped firms of commercial surgeons should have ladders that would reach forty or more feet into a tree. Ladders, ropes, and rubber-soled shoes will allow a man to reach practically every part. Reliable estimates indicate that it takes somewhat longer

(perhaps 25 per cent on an average) to do work on a tree when these are used instead of climbing spurs, and this is one reason why many firms who value remuneration more than reputation use the spurs.

To Minimize Unreliability.

The U. S. department of agriculture is suggesting a plan that may help put commercial tree surgery on a better basis. Owners are urged to have a definite written contract with the tree surgeons they employ, and the following is suggested as a model for such contract.

- (1) No climbing spurs shall be used on any part of a tree.
- (2) The shoes worn by the workmen shall have soft rubber bottoms.
- (3) Ordinary commercial orange shellac shall be applied to cover the cut edges of sapwood and cambium (which is the soft formative tissue from which the new wood and bark originate) within five minutes after the final trimming cut is made.
- (4) All cut or shellaced surfaces shall be painted with commercial creosote, followed by thick coal tar.
- (5) All diseased, rotten, discolored, water-soaked, or insect eaten wood shall be removed in cavity work and the cavity inspected by the owner or his agent before it is filled.
- (6) Only a good grade of Portland cement and clean, sharp sand in no weaker mixture than 1 to 3 shall be used to fill cavities.
- (7) The contractor shall repair free of expense any defects that may appear in the work within one year.

If the owner prefers to have a cavity filled with asphalt or other material instead of cement, the contract can be altered accordingly. If it is desirable to substitute some other preparation for shellac, this can be done. Similarly, under certain conditions, various other modifications may be made, although alterations in Nos. 1, 2, 5, and 7 should be made with caution. It may so happen that if all insect-eaten wood is removed, the tree may be dangerously weakened; under such conditions the diseased matter can be removed to solid wood and the cavity fumigated. Other suggestions along these lines may be found in the pamphlet issued by the department.

Invitation to Cooperate.

The department realizes that this science is comparatively new and that methods in the near future may be developed that will prove far superior to some now in common use. It therefore invites correspondence either from individuals or firms concerning new methods of treatment and is prepared to advise regarding any particular method so far as experimental results will permit. The cooperation of all who are interested is necessary for this work. All interested are urged to write for the new bulletin.—U. S. Dept. of Agriculture.

SPRAYING EVERGREENS.

Before growth commences in spring, is an excellent time to spray evergreens that are troubled with the red spider or any other injurious insect. In fact, whether the presence of insects be known or not, a good spraying is work well done, ensuring the freeing of the trees from such insects as may not be visible. When evergreens are in bad condition from the attack of insects it is shown in the pale color of the foliage and by a cessation of growth. The sap is sucked from the foliage, half killing it, and this stoppage of sap prevents the flourishing of the tree, and a stunted growth is the result.

It is well understood that anything of an oily nature sprayed over insects is fatal to them, hence the value of many such compounds offered by those who prepare them. What is known as fish oil is popular with many. Its cost is little, and its application most effectual. Mixed in the proportion of about 12 lbs. of it in 50 gallons of water it is of the proper strength.

As aforesaid, before growth commences is a good time to spray, there being then no tender leaves to be injured. If not done then, wait until the new growth hardens somewhat, say about mid-summer, then spray. A thorough spraying before growth starts is often all that will be required, but another one in autumn is advisable, for then it may be relied on that the enemy has been routed. It is a great pleasure to observe the new growth following a thorough spring spraying. The growth will not be as vigorous as it should be at first, owing to the injury sustained from the insect attacks, but what is made will be of the normal green color, not of the pale, sickly look it would have, had no spraying taken place.

The several spruces are much preyed on by insects, particularly by the red spider. The Hemlock, the White, Black and Blue Spruces are their favorites.

In connection with spraying is the matter of cutting out dead branches from evergreens. These branches harbor the insects to a great degree, as it protects them from light, air and rains, which they dislike. This is why, when such trees are in confined positions, crowded together or near buildings, insects are always more troublesome than when rain and wind have full play on them. This explains why when such trees are near enough for a line of hose to reach them a full force of water alone will often suffice to sweep away all such pests.—From Florists' Exchange.

PICA ENGELMANNI OR ENGELMANN SPRUCE.

Among the Rocky Mt. evergreens that have met with much favor among gardeners is *Pica Engelmanni*, both because of its handsome appearance and its great hardiness. In common with all the Colorado evergreens it is entirely hardy in our coldest states. A companion tree to it in many of its wild positions is *P. Pungens*, the variety

glauca being the well known Colorado Blue Spruce. Because of its lovely blue color it is an extremely popular evergreen, but although lacking this merit of color, *P. Engelmanni* is just as much a favorite.

There is a style of growth it has which differs from *Pungens*; the shoots are more upright, giving a conical appearance to the tree, which is well represented in the specimen photographed. There is a deep green to the foliage which is pleasing; and to many persons the fact of the absence of the prickly rigidity of foliage possessed by *P. Pungens* is much in its favor. It may be that before many years there will be more of *P. Engelmanni* planted than there have been. The blue color of *pungens* has caused it to lead in plantings, rather to the neglect of *Engelmanni*, and to the loss of many a collection not possessing it.

This evergreen is wild over a large extent of territory. Besides Colorado, Utah, Montana and Idaho, it is on the Pacific Coast as well. Its accepted common name is Engelmann Spruce.

The Spruces are readily distinguished from the Firs by their cones, which are drooping in habit, while those of the Firs are borne erect. In addition to this, those of the Spruces persist through the Winter, while those of the Firs fall apart as soon as ripe, these being good distinguishing characters.

Gardeners recognize as a good feature of the Engelmann Spruce that it is not particular as to situation; any ordinary one suits it. It does not ask a choice spot, nor does it ask shelter in Winter.

Those well acquainted with the Engelmann Spruce say it will be more popular than *pungens* in years to come, being of a more lasting nature than the other, for old trees of *pungens* fail to keep of as good shape as Engelmann does.—From "Florists Exchange."

PROTECTING EVERGREENS FROM SNOW

The disfigurement of evergreen trees by the weight of snow they receive in Winter is, unfortunately, too common a sight, and it is the cause of much regret that means had not been taken to prevent it. When heavy snows have bent the branches out of place the shaking of them to dislodge the weight will enable many to regain their proper position, but this work would not have been necessary if a little other work had been done earlier in the season. This consists of tying in the branches by passing a few strands of string or rope around them before snow comes. To do this requires but a few minutes, not nearly as many as shaking the snow off does, and all damage is averted. In nurseries where blocks of *Arborvitae*s, *Retinosporas* and similar trees are liable to damage, the men are often sent to relieve the trees, not once, but several times through a winter. It would not take nearly as much time for a man or two with balls of string, to go over the whole blocks before snow comes, and to make the trees secure. There are some evergreens that are not as hardy as others and

the tying-in referred to would benefit them, as well in the protection from the cold afforded by the close contact of the branches. Anyone who has had evergreens injured by snow would be delighted with the appearance of trees in Spring that had been tied up in advance as recommended.—From Florists Exchange.

VEGETABLE GARDENING.

GARDENING AN IMPORTANT INDUSTRY.

L. O. Williams, University Place, Nebr.

As I look backward over the past forty years or more of my experiences in gardening and fruit growing, I am convinced of the growing importance of the gardening industry and of its adaptation to every section of this state, particularly to the eastern section. My early experiences in this work were gained in my boyhood days on my father's place in southwestern Iowa. For ten years or more I took an active part in sowing, tending, harvesting and marketing vegetables for the city market. Father ran two wagons, one in our home town at Glenwood, another wagon made trips two or three times a week to the smaller towns five to fifteen miles' distant. Our trade at that time was largely retail, as our salesmen would go from house to house. We combined fruit growing and gardening and made ready sales at good prices direct to the consumer. Prices of berries and vegetables were from 25 to 50 per cent higher in those days than they are now.

Gradually we worked from the retail trade into the wholesale work. Peddling from house to house is slow and tedious work. I never did like it myself, though I know it can be made to pay handsome profits where one has the knack and persistence of a good salesman. Personally, I would rather grow vegetables by the wagon load and sell to the dealer, letting him do the distributing to the consumer. Many a load of potatoes, sweet potatoes, onions, apples or grapes have I hauled for twenty miles to Council Bluffs and Omaha, starting at 2 or 3 o'clock in the morning so as to get in on the early market. Those were strenuous and trying trips, very often, and I would not care to repeat those experiences at this late day.

Getting Near a Good Market.

It is because of these early hours and long days that ended often at 9 or 10 o'clock at night that I resolved later to make a move and get nearer to my market. So I bought a fifteen acre tract five miles out from the center of Council Bluffs, and I did not have to pay very dear for my location then either. About that time, in the early nineties, land began to be boomed rapidly about our larger cities and the choice locations for gardening sold at \$200 to \$300 per acre. Despite these advanced prices for nearby locations to a good market I am sure that I would rather pay 50 per cent to 100 per cent more for such a

location than to go back to the old days of the long haul to distant markets. To be more explicit as to prices of land, I would prefer to pay \$200 per acre for a garden location within an hour's drive of a good city market than to go back from ten to twenty miles distant for the sake of getting \$100 land. In selecting a location for either small fruit growing or gardening, the grower should consider well the advantages of good soil, gentle slope, available help, good roads, etc. He can well afford to pay a good bonus for such advantages. Better have ten acres well located under such advantages than to attempt to carry on the same business on a forty acre tract under adverse conditions. Under the present stress of high prices for land adjacent to our larger cities the beginner had best secure a lease for a term of five years or more if possible. Rental values per acre, as a rule are very much less than the interest rates on land that is held at \$200 and upwards per acre.

For instance, I am located now within the limits of a corporate town where there are many idle acres that can be leased one year at a time for from \$8 to \$15 per acre. If I paid the price asked for this small land—\$300 to \$500 per acre—my interest bill would be from \$18 to \$30 per acre, and my taxes beside. See the point?

Possibilities of the Village Market.

What I have said in the foregoing lines about the advantages of the big market should not discourage any one who has the time and talent for developing the garden market in our small towns and villages.

I speak of developing a market, because that is a feature of gardening that every man who makes it a business will have to encounter. The garden business, in a two-fold sense, is a growing business. You must grow your stuff for the market of course first, then you can, if you will, make your market grow to meet your needs and ambition.

Finding out what your customers want and are willing to pay for at a profit to the grower is also an important feature of a growing business. One may be located in or near a small town where he (or she) can raise enough on a single acre perhaps to supply at first the needs of the town. But these simple needs may be cultivated and increased by means of a little genius and common sense until four or five acres may be planted to advantage. I have known men who would make a business of raising some special garden crop, like the onion, and they would find a ready market for them among the farmers who came to his village to trade. He might be compelled at times to haul a few loads away to other towns near by, but it is a paying proposition to specialize in some particular line of gardening, one for which you have a taste and talent, good soil, etc.

I have often known these village markets to afford better prices for such staple articles as potatoes, onions, cabbage, etc., than could

be obtained by the large gardeners in our big cities. These large city markets are often glutted by means of the heavy shipments that come to the wholesale dealers. These dealers or commission men will force the prices down at their home market very often when the country towns are hungry for such produce at advance prices. The small markets are worthy of careful development.

Some of the Profits.

There is a wide margin as to the profits to be made, and the man who is back of it all is the main factor of control. I will give, as near as I can, a number of examples from the gardeners adjacent to Lincoln, just good average professional gardeners, showing what they reap per acre in the way of profits. One man who is rather new in the business told me that he had sold \$130 worth of early tomatoes from about one-fourth of an acre, or from 500 plants. This was last year in a time of extreme drouth, but prices went soaring. This same man sold \$100 worth of carrots and beets from about one-sixth of an acre. They were marketed in the green state mostly, being washed and tied in bunches. I have known some of our gardeners to reap as high as \$250 per acre from their early potatoes, though a fair average income one year with another is around \$75 per acre.

One of our largest gardeners who has sixty-five acres devoted to this work, with quite a large green house in connection for winter and early spring vegetables, told me that he cleared up \$5,000 from his plant in the season of 1912. This last year (1913) his profits were very small because of the very unfavorable season. His annual bill for hired help is about \$2,000, and this is about the same whether a good crop or a poor crop is raised. The labor problem is in fact one of the large factors to consider. One must have competent help and have it at the right time or much may be lost from the possible profits.

The gardener who has a family of children trained and interested in the garden work has a big advantage over the man who has to hire all of his help from the outside. The children should be made shareholders, partners if you please, in the business, and there is one of the mainsprings of success in this interesting occupation.

POTATO SITUATION IN SCOTT COUNTY, IOWA.

G. R. Bliss, Davenport, Ia.

Scott county, Iowa, has long been noted for its heavy production of potatoes. It stands pre-eminent among the counties of Iowa in the production of barley, potatoes and onions. The following reports from the year book of Agriculture give an idea of the extent of the potato industry.

	Acreage	Production	Bu. Per Acre	Price Dec. 1
1906.....	4,020	482,400	120	\$0.43
1907.....	6,340	507,200	80	.55
1908.....	6,090	669,900	110	.60
1909.....	8,430	868,200	103	.55
1910.....	8,500	875,000	103	.60
1911.....	6,068	901,808	148	.73
1912.....				.46
*1913.....	3,500	157,500	45	.80

*Estimated.

Despite the extent of this industry in Scott county it has been steadily losing ground in the last two or three years and if the present rate of decrease continues promises to soon take Scott county out of the list of heavy potato producers just as various other sections of the state which at different times have grown large numbers of tubers now produce practically none. Among such sections might be mentioned Central City, Anita and Shenandoah. The cause for the falling off in production are three. In the first place while Davenport is a splendid local market and could consume all the potatoes which the county could produce. Nevertheless market facilities are very unsatisfactory and the growers from this county regularly receive from 20 to 25 cents per bushel less on the average than those growing potatoes in counties of smaller production. In the second place the low yields due to unfavorable weather conditions during the past two seasons have tended to discourage growers. In the third place the potatoes of Scott county do not rank up with those of some northern sections. This is due chiefly to the fact that growers have been paying little attention to this phase of the subject and many of the potatoes are green and immature and a large number are very scabby. A prominent wholesale house in Muscatine informs me that it finds that it can not with profit or satisfaction buy potatoes at the leading centers of production in this county such as Eldridge, Walcott and Donahue because the growers will make no effort to furnish a quality of tuber that will meet the demands of their customers.

The potato growers in Scott county are mostly of German descent. They are industrious, hardworking people and seem to take naturally to the growing of this crop. They have a splendid soil for the production of potatoes and are as a rule well equipped with machinery such as diggers, planters and other tools for potato growing. Their methods of preparing the ground and of cultivating are thorough. As a rule they practice spraying and keeping the Colorado beetle well in check although practically nothing has been done towards the control of the early blight, by spraying.

They are just beginning to recognize the need of treating seed with formaldehyde for scab but they have grown potatoes on their farms so long that the ground in many cases is thoroughly infected with this

fungous and consequently the treatment is often ineffectual. In many instances treated seed has produced clean potatoes but in many instances due either to a lack of thorough work or to the presence of the fungous spore in the ground the results have been disappointing and the great bulk of the potatoes produced are more or less scabby. This coupled with the small size due to dry weather of the past season and the lateness of ripening and watery texture of the tubers has placed the Scott county potato in a bad position on the market, and thousands of bushels of northern grown potatoes have been shipped in and sold over the city of Davenport at prices ranging from 90 cents to \$1.20 per bushel. Home grown potatoes have sold as low as 32 and 33 cents in the market at Eldridge, Donahue, Dixon and Walcott while in Davenport they have brought prices ranging from 50 cents to 75 cents per bushel. This has been the poorest potato year Scott county has known for a long time and probably not one farmer in five has any more than made expenses from his potato patch and in some cases entire crop failures have occurred.

It would seem a pity since Iowa does not produce enough potatoes for home consumption to permit this industry to decline in those districts and among those people where it seems especially fitted to flourish but this decline is certain unless the following changes in culture and marketing of the crop are quite generally adopted.

In the first place, men must learn to rotate the ground and not produce potatoes on the same land over two years in succession. They must use the ground in the production of some other crop for a period of at least three years. Moreover the seed must be treated with formaldehyde each season. In this way only can the scab be controlled. The Scott County Farm Development League has conducted some experiments on the treating of scab during the past season at the state orphans' home farm. Seed treated with formaldehyde and planted on new ground which had not grown potatoes for several years yielded 103 bushel per acre and the resulting crop was especially free from scab. Seed from the same lot treated with sulphur, planted on same ground produced 89 bushels per acre and the resulting crop was comparatively free from scab. Seed from the same lot which was not treated yielded 98 bushels to the acre and the resulting crop was quite scabby.

In the second place the farmers of Scott county must have a better stand to start with. A poor stand in many cases cuts the yield more than half. This past season in some cases farmers had to replant, due to rotting of the tubers in the ground but in most cases the poor stand was due to the fact that the tubers are not planted thickly enough.

In a series of thickness of planting tests conducted by the League at the orphans' home farm potatoes planted 6 inches apart yielded $141\frac{1}{2}$ bushels per acre; those planted 12 inches apart yielded 115 bushels per acre; and those planted 18 inches apart only yielded $83\frac{1}{2}$

bushels per acre. It is probable that the average stand would be nearer 18 inches than either of these two closer distances.

In the third place pieces of larger size must be used to secure a maximum crop. Farmers are in the habit of cutting pieces too small and practically all the cutters in the world can be criticised on this point. Moreover few of the planters are adapted to the planting of pieces of such size as careful experiments have shown will produce maximum yields.

A careful series of experiments conducted by the league at the Orphans' home farm the past season shows the following differences in yield due to difference in the size of the seed. Skinned pieces which consisted of merely two or three eyes with little more flesh than you ordinarily have on a paring gave a yield of 22 bushels per acre. One-eye pieces yielded 45 bushels per acre; two-eye pieces yielded 62 bushels per acre; quarters yielded 105 bushels per acre; halves yielded 130 bushels per acre; small whole potatoes yields 139 bushels per acre; small whole potatoes with the seed end, which contains a number of small eyes, clipped off yielded 131 bushels per acre; large whole potatoes yielded 158½ bushels per acre. All the seed used in this experiment as well as in those mentioned before were Early Ohios and were planted on the 22nd and 23rd of April and given the same cultivation and other treatment throughout the season. This experiment brings out very clearly the large advantage to be gained in the use of good sized pieces. It must be understood that we would not recommend the planting of whole potatoes but rather of halves or quarters cut from potatoes of medium size.

In the fourth place: No effort has been made on the part of the farmers to determine the advantages from the use of seed selected from productive hills. Sherman Bros. of Eagle, Colo., found during the period of years extending from 1902 to 1910 that by selection of productive hills they more than doubled their annual yield. This was not merely a doubling of the yield one season over what it was previously but during this period of years there was a gradual increase until the yield in 1910 was twice what it was in 1902 and in no intervening year was the yield lower than during the preceeding year. Thus there was a steady gain throughout the whole period and they bred up by this means types of potatoes that the writer has never seen equalled anywhere. Results obtained at various experiment stations corroborate those secured by Sherman brothers and the writer firmly believes that the potato grower will some day realize keenly that there is an immense advantage to be gained by the careful selection of the most productive hills. With this idea in view the Scott County Improvement League has selected seed from such hills and expects to conduct a series of experiments along this line during the coming year.

In the fifth place: The growers of Scott county must sooner or later take up the practice of spraying with bordeaux mixture against

the early blight. Few men realize the extent of the damage caused by this fungous. It is hoped that we can start some experiments to demonstrate what bordeaux mixture will do in controlling this widely prevalent disease.

In the sixth place: A systematic effort must be made to improve the quality of the potatoes produced so that they will be able to compete more successfully with the northern product. The scab must be eliminated, irregularities in size and shape must be discriminated against, a definite standard to quality must be worked out and strictly adhered to. As long as the farmer foolishly goes on marketing everything just as it comes large and small; green or ripe; scabby or smooth, he can not expect to get the price which will make potato growing profitable.

In the seventh place: Some improved system of marketing must be worked out. At present time the buyers in the small towns do not pay what potatoes are worth. This is partly the fault of the farmers because it must be remembered that the potatoes that they are buying are not of a standard such as the wholesale houses demand. Nevertheless it is undoubtedly true in many cases that potatoes have been sold at these small towns for at least 25 cents less than what they should have brought and there are instances on record of growers who have happened to get in touch with men at distant points and have readily secured this margin over the price paid at Eldridge and Wolcott.

The buyers in the city of Davenport are chiefly Jews and other foreigners who make a practice of buying the potatoes at whatever price they can be secured. Very often the price paid for practically the same quality of potatoes on the same day will vary from 15 to 25 cents per bushel. Since these peddlers are shrewd bargainers and as a rule will cheat the farmers at every opportunity the market conditions are very unsatisfactory.

A potato growers' organization is needed and needed bad in Scott county for two reasons: First: To maintain high standards of quality and be instrumental in the production of potatoes which will meet the demand of the market and second; to secure a price for those potatoes which will be approximately what they are worth and which will render their production at a profit possible.

Editor's Note: This paper was delivered before the Iowa State Horticultural Society December, 1913. The potato growers in Nebraska have much the same problems that confront the Iowa grower and the recommendations in this paper can well be put into practice in Nebraska. Nebraska has in certain parts some of the best potato land found anywhere and it is up to the growers to put the right methods into practice and bring Nebraska potatoes to the forefront in the markets of the country.

GARDEN HINTS.

G. W. Hood.

Such crops as peppers and tomatoes should be started at once. These plants require some little time to grow and the seeds should be planted in hot beds, and the plants transplanted again as soon as the second leaves begin to appear. This is usually about two or three weeks after the seeds are planted. A convenient distance is one and one-half to two inches apart between the rows. This produces stalky, healthy plants which will produce good crops.

All plants grown in hot beds should be "hardened off" before they go into the field. This is done by removing the sash in the mornings and exposing the plants to the air and sunshine during the day. This causes the plant tissue to harden and when the plants are transplanted to the open they will withstand the outside conditions.

Every farmer should construct hot beds for the production of early vegetable plants. Hot beds are easily made by digging a hole in the ground eighteen to twenty-four inches in depth and lining it with boards and giving the glass a slant of about six inches. The convenient size is about six feet wide and nine to twelve feet in length. The frame can easily be made of two twelve inch boards and one six inch board. The six inch board should be placed to the rear or north side, thus giving the proper angle. All hot beds should face the south and be protected by some wind break. Only fresh horse manure should be used in making. The compost should be collected and piled in some protected place, after which it should be turned two or three times after fermentation begins. In filling the hot bed the compost should be thoroughly and corners.

Early cabbage plants should now be placed in cold frames to get well hardened off. In ordinary years the cabbage plants can be placed in the field around the 15th to the 20th of March. The cabbage is quite hardy and will withstand considerable amount of cold, and even quite severe frosts. The Early Jersey Wakefield and Charleston Jersey Wakefield are probably the best early sorts to grow. The latter variety is a few days later but the heads are somewhat larger. Midseason cabbage plants can be started now, and the Early Summer or Succession Varieties are recommended.

The onion, one of our most important crops, ranks third place in production in the United States, and should receive more attention. Onions do best on a sandy loam or muck soil, although if heavier soils are properly handled and have a considerable amount of organic matter they can be grown fairly well. If your soil is suited to onions it is quite a valuable crop to grow.

Asparagus is also an important crop which should receive more attention and should find a place in every home garden. Asparagus may be produced by seeds or roots, and should be planted about this time. The roots should be planted two or three feet apart. If seeds are used they may be planted closer together, and the plants transplanted at the end of the first year.

Lettuce, one of our most important salad plants, should be started, in the hot bed early and then transplanted. By transplanting you secure a much better grade of lettuce and also much better quality. The seedling should be transplanted about one and one-half to two inches apart, and after they have grown this way for about two or three weeks they should be transplanted to permanent location. It requires two to three weeks longer by this method but the plants are much better. We have two types, the solid head lettuce and loose head lettuce. The solid head as a rule requires somewhat longer time to mature. The head resemble a small head of cabbage. They should be planted about one foot apart and the rows about eighteen inches apart. The Early Wayahead or the Big Boston are two very good varieties. The loose head types come to maturity slightly earlier and can be planted closer together, possibly eight to ten inches apart in the rows and the rows fifteen to eighteen inches apart. Lettuce should be grown in the early spring, because as the season advances and the warmer weather approaches the lettuce takes on a bitter taste and also becomes tough.

Early plowing is essential to successful gardening. This conserves the moisture and holds the water for the future use of the plants. Frequent cultivation is the key note to success, and should be practiced with all vegetables.—April "Horticulture."

VEGETABLE NOTES.

Geo. W. Hood.

It is usually safe to plant some of the earlier varieties of corn at this time. While there is still danger of frost, early planting when it does escape frost is quite profitable. If the corn is killed by frost it is a simple matter to replant, and the cost of the seed is trifling compared to the value of the product. The main crop, however, should not be planted until about the 10th to the 15th of the month to be sure of safety.

Muskmelons, watermelons or cucumbers that have started in a greenhouse or in the hot bed should be transplanted to the field about the 10th or 15th of this month. They should be well hardened off before going to the field as this insures a better stand and reduces

the loss from insects and fungous diseases. Cultivation should be started immediately, and a dust mulch should be maintained.

Cultivation should be started on potatoes, just as they are breaking through the ground. A spike or spring tooth harrow is the best to break the crust and destroy any weeds that have started. Cultivation should be frequent, and maintain a good mulch the entire season, which will materially conserve the soil moisture.

As a rule the potato beetle appears shortly after the potatoes come through the ground. Spraying with Paris green or arsenate of lead should be restarted to at this time. About four or five pounds of arsenate of lead to fifty gallons of water has been found to give the best results in controlling the potato beetle. In order to control the leaf blight and other fungous diseases it is well to spray with Bordeaux mixture a combined spray of 4-4-50 Bordeaux and four to five pounds of arsenate of lead gives good results both for controlling insects and plant diseases, and has been found to materially increase the yield.

Cucumbers plants can be planted at this time. There are two methods of planting in the field, one by the hill and one by the row or drill method. The latter seems to be more popular in many sections, and consists of planting in rows, each plant standing about a foot apart and the rows six to eight feet apart. The hill method consists of having three to five plants in a hill, which are about six feet apart each way.

A few early tomato plants can now be transferred to the field. While the danger of frost is not yet past the advantage of getting a few early plants in the field offsets the disadvantage of waiting until later. In case frosty nights appear the plants may be protected by plant protectors which are on the market, or the tomatoes may be covered with straw or soil. The tomato can stand an inch or so of soil for a couple of days without any danger and can be protected from frost in this way. Spraying with Bordeaux mixture should be given before the plants are placed in the field, and subsequent spraying until the plants touch in the row. This spray is most effective in controlling the leaf blight. Usually three or four sprays are sufficient to materially hold the fungous in check.

Cutworms on cabbage or tomato plants can be held in check by placing a small band of paper around the plants. Another good remedy is to mix six pounds of bran, one pint of molasses, and one-half pound of white arsenic with enough water to make a paste. A teaspoonful of this mixture should be placed close to each plant.

Peppers and egg plants which have been started in the hot bed should not be transferred to the field until all danger of frost is past. These are both warm plants and if set in the field before the ground is thoroughly warmed up receive a sudden checkback from which the plants never recover.

If a small quantity of nitrate of soda is placed about each plant of the cabbage or tomato they will be found to be materially benefited and an increase in growth will take place. Care should be exercised in not getting the nitrate too close to the plants, since the plants might be injured by burning.

Lime sulphur is now being used in place of Bordeaux in spraying for many diseases. However, judgment should be used in selecting the sprays because it is clearly demonstrated that the lime sulphur will not control certain diseases that Bordeaux mixture will. It has been found that Bordeaux mixture, generally speaking, is more effective on the potato, melons, tomatoes, and in fact the majority of vegetables crops, while the lime sulphur seems to give equally good results on fruits. Paris green and arsenate of lead can be used in combination with Bordeaux mixture, but has been proven that Paris green should never be used in combination with lime sulphur. It has been found that Paris green and lime sulphur are mixed the Paris green undergoes a chemical decomposition and this is extremely dangerous to foliage. While there is also a slight chemical decomposition with arsenate of lead the resulting product is not so injurious to foliage, and it is usually the common practice to combine the sprays indicated.

It is an advantage to mix a few radish seed in the seed drill when planting crops like parsnips, beets, carrots, the seeds of which are slow to germinate. The radishes which germinate quickly will mark the rows so that cultivation may be commenced much quicker than if delayed until the other seeds came up.

All kinds of melon seeds can be safely planted in the open ground by the tenth of May.—May "Horticulture."

Notes on Vegetables.

Insects and diseases have been quite prevalent at the Station this spring and summer, and continual warfare has been necessary in order to successfully keep them under control. It would be well to examine all of your crops and determine if any injury is resulting from diseases or insects, and then apply the proper methods for their control or eradication. The unusual wet weather has made it possible for many fungous diseases to thrive.

Cucumbers at this date are looking excellent. The first cucumbers have been marketed, but they are rather small. Fruit is setting well and gives promise of making an excellent crop.

Th two insects which have given us the most trouble this year are the melon aphis or plant louse and the striped cucumber beetle. The aphis appeared early in the spring on the under side of the leaves, causing them to curl, but they have practically been eradicated from our vines by spraying with strong solution of tobacco extract. The vines were held up and the spray directed on the under side of the leaves. The vines have been carefully watched since, and at the first appearance of any colonies the leaves were destroyed and the vines thoroughly sprayed. Another very important and troublesome insect which attacks the curcubits, and particularly the cucumber, is the striped cucumber beetle. This insect appeared in great numbers this year, and has necessitated a continual and constant warfare against the beetles, and with very little success in their control. The nature of the injury and the mouth parts of the insects are such that they are very hard to reach. It has been recommended that arsenate of lead or Paris green will successfully hold these in check, but our experience with spraying with these insecticides gives very little satisfaction. We have attempted to keep the vines thoroughly covered with slacked lime which is more or less of a repellent and keeps the beetles away. After the vines become rather large the direct injury from the beetles is not serious, but they spread the bacterial disease known as the melon or or cucumber wilt, which is a secondary result of the insect injury and which is very troublesome. Many of the vines wilt and die over night. However, the best way to prevent this is to exterminate the beetles.

We are marketing cucumbers from the following varieties: the Early Frame, Early Russian, and Thornburn's Everbearing. The latter perhaps is the best. We are testing a number of other varieties which give promise of being excellent, but all somewhat later. These early sorts are usually a short, compact cucumber.

Prospects for the potato crop at this time are excellent. Our first early Ohios have been marketed and the yield seems to be good. From five to fifteen tubers are found in the hills, and approximately one-third are of marketable size, being as large as a duck egg and some larger with numerous smaller potatoes. The vine growth is somewhat large rthan in ordinary years, but this seems to be an index to good yield. Uncle Gideon's Quick Lunch compares quite favorably with the Early Ohio, although the number of potatoes in the hill is not quite so large, varying from five to ten with approximately one-half marketable size. Burpee's Extra Early is a white potato and gives promise of being an exceptionally high yielder, as

they average ten to fifteen to the hill, although smaller, being about the size of a hickory nut. Numerous other medium and late varieties give promise of excellent yield.

About the first of July the late cabbage plants should be placed in the field. The plants should be carefully watched for the cabbage worm and sprayed with arsenate of lead at the rate of three pounds to fifty gallons of water. The cabbage worms at the Station have been exceptionally abundant this year, and have necessitated spraying three or four times to prevent serious injury. Practically all of the early cabbage has been marketed at this date. The variety was Early Jersey Wakefield. The medium and late cabbages which were planted sometime ago are in excellent shape, although they have been injured considerable by the cabbage maggot, which is a small grub that attacks the roots of the plant, causing the plant to gradually die. This insect is rather hard to control and several remedies are recommended, namely spraying with carbolic acid emulsion shortly after the plants are placed in the field or by injecting a small quantity of carbon bi-sulphide into the ground close to the plant.

The onions grown from seed are looking well. The Bermuda Island Red, the White Queen and the New Queen are one inch in diameter at this time. Many other later varieties give promise of producing an excellent crop.

The bush beans at this date are promising. The hail which occurred here a short time ago injured the plants materially, although they are coming out of this slowly. The Admirable Wax and Early Carmine, the Michigan and the Early Yellow Six Weeks have partially matured their crop and appear to be excellent beans for this locality. Many later sorts give promise of producing good yields.

Tomatoes have suffered from the leaf spot, sometimes known as the Septoria blight. This is a fungous disease that attacks the leaves of the plant, first appearing on the older leaves and gradually attacking the newer leaves as they appear. The wet season of this year has been very favorable for the spread of this disease, and a number of varieties are quite seriously attacked. Usually in a good season the plants can grow fast enough to mature some fruits, but the yield is materially reduced when the plants are attacked by this trouble. Experiments which were carried on at Michigan prove without a doubt that this trouble can easily be prevented entirely by the spraying with 4-4-50 Bordeaux mixture. Three or four sprays are usually sufficient and should be given at intervals of every ten days or two weeks.

Of the twenty varieties of beets that we are testing the Crosby improved and the Long Smooth Blood are maturing first. These

beets are vigorous, thrifty and have been ready for market for the past week.

The Malakoff, White Mexican, White Corey, Early Fordhook and the Early Ohio varieties of sweet corn are in tassel, and ears have started on all these varieties. From present indications it seems probable that the corn will be ready for market within ten days or two weeks. The later varieties of corn are looking excellent.

Peppers and egg plant are doing excellent. The foliage is good and an abundance of fruit is setting, although it is small.—July "Horticulture."

BRIEF SUMMARY OF SOME OBSERVATIONS TAKEN ON THE VARIOUS VEGETABLES CROPS AS GROWN AT THE UNIVERSITY.

Prof. G. W. Hood.

Season 1914.

Cabbage generally speaking suffered somewhat owing to the drouth which was more or less pronounced this fall, and many plants refused to head. However, some varieties, particularly the Flat Dutch, Sure-head, Savoy and Red Dutch, seemed to withstand the conditions better and produced marketable heads. Generally speaking the yield was not entirely satisfactory with many of the 35 varieties that were tested, and we might easily limit the commercial varieties which give promise under one year test to the Flat Dutch, Early Jersey Wakefield, Early Summer and Savoy. While some varieties give promise it would require further testing before recommendation could be made.

Of the six varieties of egg plant the ones which gave the greatest promise were the Northmount, Spineless and Improved Large Purple. The Montmayer, while it was fairly early in maturing, seemed to be seriously injured by the hot winds. The Black Pecan which is a standard sort in many sections did not stand the climate here and grew very poorly, and made no showing at all. With practically no fruits of any value setting.

Twenty-four varieties of cucumbers in all were tested, and as taken from our records the following varieties gave by far the larger number of fruits: Early Russian, Early Fame, Long Green. Davis Perfect followed with a close second. The Gherkin made an excellent growth and produced a large number of fruits. The Snake or Serpent cucumber which is more or less of a novelty, produced an excellent yield and withstood the hot weather admirably well. All varieties were severely attacked by the melon or cucumber louse, and it was necessary to

wage continual warfare in order to keep them under control. Spraying with a tobacco decoction gave the best results.

The root crops, namely the beets, carrots and parsnips, all did well.

Because of late planting, the yield on the varieties of onions tested could not be ascertained owing to the fact that warm weather came on before they made much of a growth, and they were consequently injured.

Of the eighty varieties of tomatoes that were tested at the Station the Livingstone Beauty, Livingstone Globe, Acme, Ponderosa, Canadian Canning, Canadian Baltimore gave the highest yields. Two strains out of the ten of Earliana grown at the Station gave promise of superiority. There was more or less variation among these strains in the yielding quantity. Outside of this, however, the general growth of the plants was similar. The Peach tomato bore very prolifically, altho the fruit was rather small. The Stone gave a very fair yield.

Owing to the poor stand of sweet potatoes, the records are more or less uncertain. As a whole from the thirteen varieties that were grown the Red Jersey, Yellow Jersey, Vineless, South Queen, Black Spanish averaged approximately one pound per hill. The Early Golden, Nancy Hall, Red Bermuda and Porto Rican averaged between two and one-half to three pounds to the hill. The later varieties are the large types and some of the individual potatoes reached three pounds apiece.

There was a great variation in the yield of the Irish potatoes. The Early Ohio ranks first, followed by the Irish Cobbler, Triumph, Algoma and Empire State. The other varieties varied in yield from one bushel to five bushel per row with equal quantity of seed, one-half bushel being planted for each variety. However, definite results cannot be based upon one year's trial, and three or four year tests are necessary before recommending any variety.

CABBAGE GROWING.

Cabbage growing, of recent years has been a partial or total failure in many gardens owing to destruction from worms and unfavorable weather conditions.

In growing early cabbage the seed should be planted in the hotbed late in February or early in March and as soon as plants have grown their true leaves it is well to transplant them to the cold frame giving each plant plenty of space to grow. This will produce stocky and well rooted plants for setting in the field or garden. To those not having hotbeds, the seed may be planted in a box in the house. Care must be taken that it is kept where sufficient heat will insure germination and enough sunlight to keep the little plants growing. In growing plants in the house the young plants may be thinned out and transplanted into other boxes thus giving all the plants plenty of room.

The plants may be transplanted into the field as soon as danger of freezing weather is past and ground works well in the spring.

One of the best early sorts for general planting is the Early Jersey Wakefield, an old and time tried variety. It is a sure heading variety and gives satisfaction as an early sort.

The cabbage when set in the field should be set in rows so that cultivation may be done with horse cultivator or wheel hoe. A good distance to set the plants is two feet in the row and rows three feet apart. This gives ample room for the plants to develop and they can be cared for easily.

In transplanting I have found that a home-made dibble will serve as well as one purchased from the store. Take an old wooden spade handle and cut it off about eight inches below the handle proper and sharpen to a sharp point, with a long slope to the sharpened point. To set the plant push the dibble into the ground, making a round hole into which place the plant a little deeper than it grew in the seed bed. Then press the dirt firmly around the plant and see that the opening into which you set the plant is filled up and the dirt is pressed firmly around the roots. It is a good plan to take a damp, rainy day if you can to transplant the young plants, just so the ground is not so wet so that it is sticky. The plants should be kept moist while transplanting, Usually it is a good plan to have an old bucket in which is a little water to keep the roots moist. If due care is exercised in handling and setting, the loss from transplanting need not amount to anything.

Frequent cultivation and liberal use of the hoe is necessary to keep the ground free from weeds and thoroughly stirred. Then the plants will make a vigorous growth from the time of setting out until heads are matured.

The great trouble in growing cabbage successfully is the cabbage worm. This pest destroys annually thousands of dollars worth of cabbage which could have been saved by judicious spraying. The worm can be controlled by the use of poison spray applied while the plant is small. Spraying should be continued up to the head forming stage or until the head is about one-fifth grown. Don't be afraid that the use of the poison will make the cabbage unfit for table use. The edible portion of cabbage forms from the inside of the head and the leaves upon which you will place the poison are those on the outside which you throw away anyway. The worms being susceptible to even a very small portion of the poison are easily killed with a very diluted mixture. Paris green is the best thing to use in proportion of one pound to 200 gallons of water. This should be applied in the form of a fine spray. Due caution should be used in handling the poison as with any other poisons.

Late cabbage seed may be planted in the hills where the plants are to grow the last of April or forepart of May. The young plants should be thinned out leaving only strong vigorous ones to grow. Their later treatment should be the same as for early cabbage. The best late sorts are the Danish Baldhead, Surehead and Premium Flat Dutch. The Danish Baldhead is the longest keeper, keeping up until April and May

in ordinary storage. In size both the Surehead and Flat Dutch are larger but not as good quality.

J. R. D.

ASPARAGUS CULTURE.

J. R. Duncan.

Question: "I would like to have asparagus discussed. What size bed shall I make to supply a family of six? When is the best time to plant it?"

Answer. Asparagus is one of the earliest vegetables which can be grown in the garden and is in great demand on the market. The work of growing asparagus is not any greater than producing any other vegetable crop. In choosing the site for the asparagus patch, a sunny well drained location should be chosen as the asparagus should have the full benefit of the sun all day. In order to produce the best stalks of asparagus the ground should be made rich. The best way to accomplish this is to spade or plow under a liberal coating of well-rotted manure, thoroughly mixing it with the soil. This should be done in the fall but if not then as early in the spring as the ground can be worked. After the ground has been prepared you are ready to mark it out. The distance apart to set the plants is a mooted one but the best distance is two and one-half feet apart in the rows and the rows about four feet apart. This gives plenty of room for the plants to grow and not crowd each other. In setting the plants a trench or furrow should be dug making it deep enough so that the crown of the asparagus plants will be from six to eight inches below the surface of the ground. The roots of plants should be spread out and the dirt tramped firmly around them. A depression should be left above the plants, filling the trench up gradually as the plants grow. A liberal dressing of well-rotted manure should be applied to the surface and worked in by frequent cultivations. The young plants need to be kept free from weeds so as to make a vigorous growth. Don't cut any stalks the first year after planting as it will tend to weaken the plants. Let them get well established and when cuttings are commenced the second season the stalks will be large and period of cutting extended over several weeks. One of the secrets of successful asparagus culture is to keep it well fertilized and cultivated so that the plants are in vigorous growing condition and that they don't become crowded. The best size plants to buy and set out are strong one-year plants. These can be obtained from any good nursery or seed house. For an ordinary family of six, fifty plants well cared for will keep them well supplied during the spring with all the asparagus they can use. It is a good plan to set it in rows so that cultivation can be done by a horse. In cutting it is a good plan to cut part of the patch each alternate day thus having a daily supply. Every garden should have its asparagus patch to supply the table when other vegetables are scarce and high. In reading over the foregoing I notice the time of planting has been

omitted. This should be done as early in the spring as possible in order to get the advantage of all the spring rains to help the plants. They may be planted at other times but success is more certain if done at that time.

CANNING FOR WINTER USE.

That tomatoes are one of the most popular vegetables for home and commercial canning is proved by the fact that in the census year of 1909 there were about 14,000,000 cases packed in the United States. This is about three times as much as of any other vegetables, and represents the pack of the commercial canning factories, as the figures for the small home plants cannot be obtained. According to O. H. Benson of the U. S. Department of Agriculture, it is estimated that the area devoted to tomatoes in the home garden is equal to or greater than that employed in their field culture, and that of the quantity grown in the garden a considerable surplus goes to waste or brings no return to the cultivator.

While the tomato is most largely canned, it is only one of a long list of vegetables which may be held long after its season of ripening by the simple operation of canning. But because of its easy culture and the small amount of labor or skill required to can, it has probably had a great deal to do with its popularity as a canned vegetable, particularly for home use. On too many farms no attention is paid to the garden. The men think they are too busy to plow and cultivate the garden plot, and women of the household usually have plenty to do without this additional work.

A good garden and the canning of its products means wholesome meals and consequently better health for the family, as well as a substantial saving in the grocery bill. This latter item will alone, in a single year, more than pay for the time that would be required in giving the garden the care that it needs.

While tomatoes are the most largely canned, and one of the easiest vegetables to can, green corn, string beans peas and vegetables of that type are considered as being much more difficult to can so that they will keep perfectly. The principal reason for this is that the method of canning such vegetables is not well understood, but when the right methods are used, there is but little more difficulty with them than with tomatoes.

The reason canned foods spoil is largely due to the presence of organisms of decay. These organisms, germs, are present on the fruits and vegetables when they are put in the cans, and unless they are killed it is but a short time until the contents of the can decompose and become unfit for use. Heat is one of the most satisfactory and most easily available means of destroying these organisms, and

it is by boiling the material to be canned that these organisms are to be killed.

Water boils at a temperature of 212 degrees, and when the temperature is maintained for several minutes, or even as much as two hours, most of these organisms of decay are killed. However there are some which, in certain stages of their growth can resist even prolonged boiling, and in the course of time bring about the decomposition of the canned product. To overcome this, canners, both at home and in the factory, have resorted to the use of a closed vessel in which to do the boiling, so as to take advantage of the steam pressure, which materially increases the temperature of the water. For the usual kind of easily-canned vegetables, steam pressure canning reduces the time of cooking, and for those things which are difficult to can it increases the assurance of having the produce "keep."

There are several different makes of canning machines on the market, but they are all the same in principle—that is the application of heat to the product to be canned. Most of these are the "open kettle," in which the cooking is done at the temperature of boiling water; while some of them may be closed and the cooking done under steam pressure. But in either case, one operation which is frequently necessary in preparing the fruit or vegetables for the cans, is that of "blanching."

In the language of the housewife, this is nothing more than par-boiling, or dipping the fruit or vegetable in boiling hot water for a few minutes, for the purpose of extracting or drawing out some of the bitterness of the skin, which, if allowed to remain, would do more or less harm. In the ordinary canning operations this blanching is done by placing the article to be blanched in a screen vessel or one having many perforations through which the boiling water can quickly pass. Where the recipe for canning any certain fruit or vegetable says that it must be blanched, it is very important that this be done in order to secure the best grade in the packed product.

"Exhausting" is an operation in which commercial canners differ to a slight extent, some preferring to exhaust their cans before sealing them up tight and others omitting this operation. However, the purpose of this operation is to drive the air out of the can so as to prevent its expanding and bursting the can when the heat is applied. Exhausting is most necessary with those articles which are cold when put into the cans, and in less where they have been heated, as with those which have been blanched and the cans filled with hot syrup. To exhaust can is to heat it to the boiling point before it is sealed up tight. This expands the air in the can, and some of it passes out of the little hole in the center of the lid, after which this little hole is closed with solder in the operation called "tipping." But while each of these operations is important, the most important of all is that the "processing." This is the final cooking of the material to insure it against decomposition. In processing, the sealed cans are placed in the

canning vat and partially or wholly covered with water, as the case may require, and brought to the boiling point, where it is allowed to remain for a specified time.

With all of the canning outfits on the market, the manufacturer supplies directions for using and gives recipes for canning various fruits and vegetables. These recipes give the approximate time required to do the actual cooking, but usually advise that a small batch be tried before any considerable number of cans be packed. The reason for this is that differences in climate, soil, altitude, and even the kind of fertilizer applied to the soil affects the time required to properly cook or "processing."

These differences do not show until after the cooking operation has been completed, and because of this it is better to make a trial of a small batch, then open the cans and observe the conditions of the contents, as well as its flavor and texture. As a rule, fruits or vegetables produced in a rainy season need a shorter cooking than those produced in a dry one, and crops that come on late in the season require more cooking than those earlier in the season. The only way this can be determined with certainty is to pack a few cans, then open them and see the result.

Canning is not a difficult art. It is full of technicalities, of course, but there is no need of indulging in the fear that the operation is too difficult to undertake. The manufacturers of canning outfits supply the necessary directions for canning the majority of fruits and vegetables, and when these directions are carefully followed, satisfactory results will be obtained. But if they are not followed, or if the packer stops to ask why certain operations are done in certain ways, then he is liable to be plunged into a mass of detail which requires a knowledge of the technicalities upon which the principles of canning are based, for a complete understanding. Even then it is possible the information may not be obtainable as new discoveries are being made almost daily in the art of canning, and many facts are not yet entirely understood.—From Fruit Grower and Farmer.

CANNING TOMATOES IN GLASS JARS.

Last month an article was printed giving a general idea of canning fruit and vegetables. This month a part of Farmers Bulletin No. 521 is given to more fully explain the different operations and also several canning recipes. Every home should have an abundance of fruit and vegetable preserved for winter use. The method of canning as outlined in this bulletin is one that is practicable and one that keeps the materials perfectly if directions are followed.

"Almost everyone has canned tomatoes with more or less success. They are so easily kept in glass jars that a failure is almost inexcusable. There are a great many ways of canning tomatoes, depending upon the kind of jars used and the purpose for which they are intended

Cooking them in an open kettle, transferring them to jars, and sealing them while hot was probably the first and is still the most widely used method in home canning.

The Open-Kettle Method.

The open-kettle method of canning tomatoes is as follows: Select only sound and ripe tomatoes, dip them in boiling water for a few minutes, remove the skins and then cut them up and place them in an open kettle, preferably an aluminum or porcelain-lined one, and salt at the rate of about 1 level teaspoonful to each quart. Bring slowly to a boil, stirring frequently to prevent scorching, and keep boiling for at least one-half hour or until the tomatoes are thoroughly done. If you are anxious to economize on jars, boil off all the surplus water until the tomatoes become thick.

If you are using the screw-top type, immerse the jars, tops, and rubbers in boiling water. Remove the jars one at a time, place a rubber around the neck, and fill with the boiling-hot tomatoes. Take the top of the jar from the boiling water, being careful not to touch the inside with the fingers for fear of introducing spores into the jar, and screw it on tightly. Invert the jar and let it stand in this position until cold. Have everything sterile that is put into the jar. When using a spoon, fork, or cup with the tomatoes, first immerse it in boiling water.

The Closed-Boiler Method.

Another method of canning tomatoes, and the one which the writer always uses, is as follows:

Prepare the tomatoes as already described. Take off the skins and drop the tomatoes, as nearly whole as possible, into wide-mouth jars. Pack them in until the jar is full and add 1 level teaspoon of salt to each quart. Put on the rubber and top and fix the spring as shown on the jar in figure 1. This will leave the top loose and allow the steam to escape during the boiling.

In the wash boiler or sterilizer set as many jars upon the false bottom as the boiler will conveniently hold and pour in enough cold or tepid water to come about 2 inches up on the jar. It is not necessary to have the jars completely immersed during the boiling water; the steam does the cooking. Put the top on the boiler and set it on the stove; bring to a boil and sterilize for one hour. Remove the top of the boiler, allow the steam to escape, and press down the spring at the side of the jar. This will clamp on the top and prevent any outside air from getting in.

In the vast majority of cases this one sterilization is all the treatment that is necessary, but it is not always safe to rely on it. During occasional years and in certain places some kinds of bacteria develop that cannot be killed with one boiling. These sometimes break out in canning factories and cause a great deal of trouble. It is necessary to overcome this difficulty by giving the tomatoes two sterilizations instead of one. After the sterilization on the first day is complete,

remove the jars from the vat and let them stand until the next day; then place them again in the vat as on the previous day, lifting the spring at the side of the jar in order to prevent the accumulation of steam on the inside, but do not take off the top. Boil again for one hour. Clamp on the tops by pressing down the springs and remove the jars from the vat.

This double or fractional sterilization is to be recommended upon all occasions. Follow these directions and allow no air to enter the jar during or after sterilization, and except in case of defective rubbers or broken jars you will seldom lose a can of tomatoes.

The same method may be followed in using screw-top jars. Put in the tomatoes, put on the rubber, and screw on the top lightly. Place in the boiler and boil for an hour. Screw on the tops tightly and remove from boiler. If you want to practice double sterilization with the screw-top jars, place them in the boiler on the second day and wait until the water comes to a boil before loosening the tops.

It is best with tomatoes, as with all other vegetables, to cook them in jars. Cooking first in an open kettle will drive off some of the volatile oils or other substances that give the tomatoes their flavor. This does not happen when they are cooked in the jar.

Canning Tomatoes Thick.

For people who prefer their tomatoes thick, the following will be found a safe method:

Prepare them in the usual way, place in a preserving kettle, and boil till they reach the consistency desired. Pour them in the jars while hot, put on the tops loosely, and set the jars in the sterilizer, being careful to have the water already hot in order to prevent the jars from breaking. Bring to a boil, sterilize 20 minutes, fasten the cover on tightly and remove the jars from the sterilizer.

THE EVOLUTION OF THE CIDER INDUSTRY.

By M. Burr Talmake, President Hydraulic Press Mfg. Co., Mt. Gilead, O.

Industries which live and continue through many generations to be useful to man must pass through periods of the evolution. These periods of evolution make for the industry the development which fits them for the conditions resultant of ever changing time. Progress and conservation brings on these evolution periods. Conservative feeling has been foremost in the minds of prominent men for many years. The by-products of our mills formerly consigned to our scrap dumps are now being treated and much valuable material obtained therefrom. Forests at one time considered worthless only to be converted into a clearing are now being protected by the government. The same thing is true of our western land and of our mineral possessions. In the meat industry packers have gone so far as to conserve every part of the hog so that there is "nothing left but the squeal." And lastly but

not least, the farmer is cultivating fewer acres of land and producing more crops than ever before.

Neither has the apple grower been lax in adopting this conservation spirit. Apples which formerly rotted under the trees are now made into cider and from cider into vinegar, jelly and boiled cider. The latter is used extensively in making apple butter and for culinary purposes.

To the orchardist who is enthusiastic with this conservation spirit, the cider press especially should appeal. As a people, we Americans are still woefully wasteful, but we are learning. Some of us have bumped into the fact that it is not only our products that count, but our by-products as well.

There are no statistics to tell us how many millions of dollars have gone to waste in rotten apples. They have been allowed to drop from the trees and rot on the ground by the billion bushels. Occasionally some farmer has had the foresight to open the orchard gate and let the hogs in. With the further exception of a few mills with which a few farmers ground and pressed the apples into cider the loss was total.

By the old process of cider making the apple juice was permitted to remain in contact with the air so long that it was very difficult to keep it sweet; with the improved methods we can have sweet cider, vinegar, jelly and apple butter for our New Year's dinner all made from the same load of apples.

The old log beam having a fulcrum at one end and raised by hand power was our primitive cider press. The pressure was obtained from the weight of the log together with the weight of a man who was stationed at the other end of the log.

Next in line came the screw and knuckle joint presses; which served the apple grower long and faithfully. But these too came to the turn of the road and were supplanted by modern hydraulic presses.

The old style screw press of the small type is still used to some extent where it is desired to make a small amount of cider at odd times for private use. These presses will turn out from 40 to 100 gallons daily and are sold at prices ranging from \$10.00 to \$20.00.

The modern hydraulic press is equipped with a piston working in a cylinder. Water is easily pumped through a small pipe into the cylinder and the pressure being applied against the end of the piston or ram. The ram is thus forced out, pressing the apple pomace which has previously been prepared by a hand or belt driven apple grater. An average of $4\frac{1}{2}$ gallons of cider can be produced by these presses from a bushel of apples; and from 300 to 6,000 gallons made per day.

The hydraulic press has put the cider industry on a paying basis. The price for making cider ranges from 1 to 3 cents per gallon; one day's run of 4,000 gallons, say at $2\frac{1}{2}$ cents per gallon would make the operator \$100.00. Treated cider sells as a soft drink at 50 cents to 70 cents per gallon. One hundred bushels of apples unfit for

market could thus be made to yield between \$200.00 and \$300.00 with very little labor.

Some of the useful products which come from the apple are vinegar, cider syrup, cider jelly, apple butter, pasteurized cider, etc. Below is given a brief description of these products|

Vinegar.

The process of transforming apple juice into good cider vinegar is easily accomplished, and can be produced in every household where the necessary temperature can be controlled. For vinegar, the wind-falls may be used or the pomace of later pressings may be repressed, but for a superior article only sound ripe apples should be used.

Common experience teaches that if cider is exposed to the air it will soon ferment. Now by proper handling after the first stage of fermentation the cider may be converted to vinegar in a very short time. It is well understood now that fermentation is the work of myriads of bacteria that infest the cider and behave very much after the manner of yeast in bread making. Cider, in changing to vinegar, passes through two stages: First, the sugar of the juice is changed to alcohol. Next, the alcohol is changed to acetic acid or vinegar by further fermentation.

Cider Syrup.

Evaporation is another method of treating cider. By this process the volume is greatly reduced and the resultant product is so concentrated that it will remain in a perfect state of preservation for years. In this way two great advantages are secured: First, the product can be stored in much less space, and, second, it will keep indefinitely. When the cider has been reduced in volume in the ratio of five gallons to one the product is of such consistency as to be suitable for handling and in no danger of fermenting. This product is called cider syrup, or boiled cider, and is widely used in making apple butter, mince pies and the various products of the culinary art.

Cider Jelly.

When evaporation is carried further, reducing the volume in the ratio of about seven to one, the product is known as cider jelly. In this form it is quite acceptable to those who like a jelly somewhat tart. By adding sugar it may be made to please the taste of those who like jelly of a milder, sweeter taste. The jelly may be flavored to suit various tastes by using any flavoring material that will not evaporate readily. Apple jelly is usually marketed in glass jars holding two or three pints.

Apple Butter.

One of the chief uses of cider syrup is in the making of apple butter. Everybody knows the "goodness" of apple butter. Fond memory will hark back to "bread, butter'n apple butter." This apple product, combining as it does, the essentials of the best fruit known to man, well reserves high rank as a staple food and table delicacy.

The slow, laborious method our mothers used—making apple butter in a big copper kettle—has given place to the new steam cooker. A copper coil quickly and easily converts a quantity of pared apples and cider syrup to a clearer, smoother and more delicious product than even mother was able to give us for our “piece,” in the old method heat caramelized some of the sugar, which gave the butter a dark color and a burnt sugar taste. By the use of the simple, inexpensive apple butter cooker these objections are overcome.

Pasteurized Cider.

Still another method of treating cider is the process known as pasteurization. Many attempts have been made to preserve cider sweet and pure, just as it comes from the press. The use of preservatives is very unsatisfactory and often dangerous. It is well known that a fruit juice can be preserved by heating it and sealing it up, but the chief difficulty in this is to heat to the proper temperature and at the same time exclude the air. A temperature of 160 degrees Fahrenheit is sufficient to destroy bacterial life and prevent fermentation, but a temperature higher than 170 degrees Fahrenheit will give to the cider a baked apple taste, rendering it undesirable as a drink. A simple pasteurizer will perfectly sterilize, filter and seal up cider so that it will keep indefinitely and retain the same flavor that it had as it came from the press. The health giving properties and the medicinal qualities of pure apple cider give rise to a popular demand for the product of the pasteurizer. Pasteurized cider retails at prices that net the cider maker a handsome profit.—Fruit and Produce Distributor.

HOW A CITY MAN MADE ORCHARDING PAY.

J. R. Duncan.

There are times in a man's life when the occupation in which he is engaged ceases to have an interest for him and he is desirous of engaging in some new pursuit. Seven years ago last February a twenty-acre tract of land about two miles northwest of Ralston, a suburb of South Omaha, came into the possession of Mr. G. F. Beavers, then a groceryman of that city. Mr. Beavers had been in the grocery business for some fifteen years previous to this time. He continued to sell groceries and tried to run the orchard as well, for four years. During this time he handled the orchard as most orchards had been handled. No spraying and no particular care. He realized that he was not getting out of the orchard what he should by this method of running it. The apples produced were not first class and although he sold them through his store and got a fair price out of them yet the returns were not so great as if personal supervision could be given. Accordingly he sold the store and was then able to

give most of his attention to his orchard. The orchard consists of eighteen acres of which about sixteen acres are sixteen years old and two acres are eight years old. The oldest part consists mainly of Grimes Golden, Jonathan, Winesap, Ben Davis, Black Twig, Wealthy Missouri Pippin, Maiden Blush and some other varieties of only a few trees. The trees are set thirty by thirty feet apart. The varieties are set out together, that is each kind is in a block by itself. This is of marked advantage when gathering the fruit. The orchard is on rolling land but not so steep as to preclude cultivation. The soil is the loess soil found adjacent to the Missouri river and which is especially adapted to tree growth.

The first thing Mr. Beavers did after taking personal charge was to get what information he could from the horticultural department at the state experiment station in regard to spraying. He had some ideas of his own as to how an orchard should be cared for, also he had read a good deal of the methods pursued in other sections. The first year after taking personal supervision he pruned the orchard so that every limb of every tree had an equal chance of getting enough air and sunlight to produce the best colored and best size fruit. This pruning was done in the winter. The wounds made where limbs were cut off were painted with an asphaltum paint, so that the wound would not dry out and check, letting decay enter. In the spring as soon as the ground would work Mr. Beaver put a disc in the orchard and disced up the ground thoroughly, going both ways through the orchard. The disc was followed in a few days with a common spike tooth harrow and thus alternating the discing and harrowing until about July 1. As the trees in Mr. Beaver's orchard are getting large there is scarcely room to drive, after the fruit attains any size without knocking off the fruit. So it is impossible to continue cultivation much later than July 1. During the past two years on account of the dry weather it would have been better if cultivation had been continued later. However, there was enough moisture stored up in the soil so that the crop matured in good shape without any injury to the trees.

Before taking active charge of the orchard Mr. Beavers had not sprayed his orchard. He could see the difference in the sprayed and unsprayed fruit as it passed through his store. He saw that to get the greatest returns the fruit must be protected from insect and fungus injury. To do this he bought a Cushmon Power Sprayer with a tank capacity of 250 gallons and having a pump capable of throwing 8 or 9 gallons a minute under 200 pounds pressure. He followed directions received from the Experiment Station as to mixtures to use and time of application. The first application which he applies is what is known as the cluster bud spray applied at the time the cluster of flower buds has just opened. This application consisted of Lime Sulphur solution 1 gallon to 40 gallons of water and Arsenate of lead $1\frac{1}{2}$ pounds to 50 gallons of water. In this spray his chief concern

was to see that every twig and part of the trunk was thoroughly covered with the solution. He expected to control the scab with this application.

The second application was applied as the petals had fallen and while the calyx cup of the little apple was still open. This time he used more arsenate of lead, making it about 2½ pounds to fifty gallons. This application was directed at codling moth and other insects. Mr. Beavers has a tower on his sprayer which enables the men doing the spraying to throw the spray material down on the tree and thus get into the blossom end of the fruit better. Mr. Beavers himself worked on the tower and he knows an efficient job was done. He uses plenty of pressure so that the material is forced into the calyx, and thus is ready for the worm when it commences to eat its way into the apple. In spraying Mr. Beavers believes in thoroughness and is careful to see that each tree receives the proper amount of spray, before passing to the next. The third and last spray is put on immediately following the second. Thus he catches any part that he might have slighted in the preceding spray. In spraying as thoroughly as Mr. Beavers does, it takes from four to six gallons to a tree, depending upon the size and amount of leaves on the tree.

The owner who had the orchard before Mr. Beavers, had not made any money out of the orchard at all. His apples were wormy and were slow sale on the market. Under Mr. Beavers' method of handling the orchard, the reverse has been true. By thoroughly cultivating, pruning and spraying he has been able to produce a superior grade of fruit that the merchants are eager to get. Mr. Beavers' long experience in the retail business has been a valuable aid to him in the disposition of his crop. Located as the orchard is about 5¾ miles from the center of either Omaha or South Omaha and only 1½ miles from a rock road into the city he has a large retail market at his door. This year his crop is above the average for sprayed orchards in freedom of insects and fungous injury. Usually 85 to 90 per cent perfect fruit is considered a good average in a sprayed orchard. Mr. Beavers' fruit will run over these figures. In marketing his fruit Mr. Beavers deals direct with the grocers.

He has an automobile delivery truck with which he makes deliveries. He takes orders each day for the succeeding days and makes deliveries as needed. Thus the dealer gets his fruit practically fresh from the tree, for all the summer fruit. The apples are sold by weight so that a bushel of fruit is delivered legal weight or forty-eight pounds. Mr. Beavers says that a lot of buyers fail to take this into consideration when comparing his fruit with western box fruit. The box holds forty pounds and is sold for a bushel.

Before Mr. Beavers took his orchard and began to put business principles to work on the orchard the returns were not much greater than from ordinary farm crops. After putting the best methods in, growing the fruit into practice then dealing direct with the dealer, or

as sometimes is the case, with the consumer he has made phenomenal returns as compared with the average orchard. Mr. Beavers keeps books on his work and knows the amount of work put in and bushels of apples produced. He knows what each bushel of fruit costs him and what each bushel has brought him.

In 1912, the first year he sprayed, he harvested on the sixteen acres, 5,500 bushels of all grades of apples. That year the average price which he received throughout the season was eighty-five cents. In 1913, his crop amounted to 4,000 bushels and the average price, received ninety cents per bushel. This year the crop will be around 6,500 bushels. Although most of his crop yet remains to be disposed of the prices already received and those at which he is now selling, it would seem that he will get an average of better than sixty-five cents a bushel.

Although many orchards in the past three years have not produced enough fruit to pay for the use of the ground they occupy, yet this orchard has produced large crops of fine fruit. Neighbors who have the same soil, rainfall and same age orchards have not received any crops and their orchards are in bad shape. What is the cause? Why has Mr. Beavers' orchard produced in the past three years approximately 16,000 bushels and sold for an average of eighty cents per bushel? The answer is in using the right methods in care and handling the orchard as a business proposition. This farm when bought by Mr. Beavers cost about \$150 per acre. Land in the same vicinity without any improvements and used to raise general farm crops is now held at around \$300 per acre. Could corn and wheat be grown on such high priced land and yield a profit on the investment? Can apple growing on such land be made profitable? In answer to the first question, no. In answer to the second, yes, if right methods in growing and handling the crops is used. Apple growing along the Missouri river can be made one of the most profitable industries. Although not all men could have the opportunity for direct sales as Mr. Beavers has had, yet if men engaged in this work will cooperate, to market their fruit, as good returns can be obtained as Mr. Beaver's has done. Mr. Beavers was asked what he valued his farm at. He said \$1,000 an acre. And it is worth that and more when he can get an average of almost three hundred dollars per acre gross returns during adverse weather conditions such as has been experienced the past three years. Where could he invest his money to bring any better returns than his Nebraska apple orchard is bringing in. Mr. Beavers is not an exceptional man as compared with other men and his successful orcharding experience can be duplicated by hundreds of others in years to come. Nebraska apples are without a peer as to flavor keeping qualities, and color and if the right methods are followed will produce as great net returns on the investment as apples grown in any section of the country. In "Independent Farmer."

THE MORAL INFLUENCE OF HORTICULTURE.

C. S. Harrison, York, Neb.

As a class horticulturists have the highest ideals, lead the cleanest lives and exert the strongest influences of any of the secular professions. I am called on to address thousands of people in the various walks of life but never have I met a more responsive class. A public speaker is extremely sensitive to the attitude and sympathies of his audience.

I am often called upon to open meetings with an invocation for Divine aid and these men, many of whom are earnest christians, seem to move on with me to the throne of grace with reverent and devout spirit. If I touch the higher phases of our calling I am often deeply moved and thrilled by their silent or uttered responses. When after our great meeting at Cleveland people from Texas and California said "your address richly repaid us for coming." I felt I was not living in vain. I am always glad to touch those chords which respond to our highest inspirations.

Let me say, first we live nearest to nature and to God. We belong to the firm of Heavenly Father and Sons. Our mission is to make the world more beautiful and fruitful.

Through the ages people blundered and stumbled in darkness. Many of the most potent agencies were unknown. The savage trembled when the mighty oak was shivered by the lightening's blinding dash. Little knew he that in that tremendous force there was the untranslated lesson of Jehovah's love—a giant at play waiting for a harness so that he could dive under an ocean, leap a continent, illuminate our homes, drive vessels and cars and set in motion acres of machinery.

Only recently was the power of steam applied. The force by which God "taketh up the isles as a very little thing." Coal and oil are only recent discoveries. All these things reveal the far planning and kindly providence of our Father.

Alarmists predict the speedy disolution of all things. Never fear, the World is just beginning to live. Though what a stupendous past has this old globe of ours swung down to the present. Look forward, and the ages through which we are to move are lying like sands along the sea shores of eternity. I love to think of nature as the first born daughter of God. Sometimes she seems like a person whose motherhood embraces the world—ever fresh and vigorous though the snows of ages crown her head. On her cheeks are the tints of eternal youth. How much she is doing for us. She takes us into her holy of holies and reveals to us her mysteries and tells us of the wonderful things yet to come out of the unknown. In the Arnold Arboretum are some six primitive apples. She taught the horticulturists how to evolve from these in the long processes the Jonathan, Grimes Golden and the Wealthy. She has given us High Priests, who minister daily in her temple. Our beloved Hansen, Patten, Wyman, Elliott who fell dead

among his flowers and a host of others whose combined labors have glorified and transformed all the bleak northwest.

Nature gives us the single flowers and teaches how to improve them. How marvelous the transformation in the Peony, the Iris, the Carnation, the Phlox and the Rose. Standing on the threshold of the future she exalts a great hope before us .

It does not seem a great while ago when I used to ride over the vast prairies of Minnesota, and later those of Nebraska and in wide range of vision there was not a tree or house to be seen. Growing fruit was considered an impossibility. Now there are comfortable homes, well sheltered with groves and wind breaks and here and there orchards burdened with luscious fruits. The nurserymen have added millions to the wealth of the state besides beauty and cash—you have compensation for your long winters. A California spring bears no comparison to one in Minnesota, when all nature puts off her cold white robes for the royal garments of spring time— God's welcome to earth's new resurrection. What an honor to introduce the world to the beauty of the Lord and to give the people a view of His real nature and character and His willingness to aid us. It is an honor and a joy to swing the gates wide open and introduce to the world the hitherto unknown God.

We now come to the great issues of today on which our work has a powerful influence. Take the cause of temperance. Fruits of their unfermented juices are fast taking the place of intoxicants. In our town of York, Neb., there are no saloons. You do not see wagons loaded with the extracts of rotted grain but you do see trainloads of fruit poured into a town of 7,000 people and you see one of the healthiest cities in the land. There is a tonic in fruit which is not always recognized. You are a busy man, often overwhelmed with work. You get tired and are often worried with labor and business. Just sit down, drop all care and relax completely. Then eat a couple of the best, juiciest apples you can find and how you are refreshed and return to your work with renewed vigor. I often try this. Fruit is the best medicine one can take. It is the cheapest and used judiciously it would send half the doctors to raising apples and berries.

A mighty battle is on us and as Horticulturists we must throw our forces into the front ranks.

A writer has aptly said that in Europe there are two Germanies. One peaceful and progressive. Scholars, leaders of thought, inventors, Scientists, Poets, philosophers—men who seem to exalt the race, men whose grand lives have been a benediction to the world. The other branch are the War Lords, who concentrate all their skill and intelligence into the high art of destruction. See their work. Look at poor Belgium. The fairest portion of our fair earth now turned into a wilderness and a desolation. Homes destroyed, millions of peaceful industrious people homeless and starving and then they are assessed millions for murder and devastation. Here you see the condensation

of the savagery and brutality of the ages which is reaping the horror and hate of the world.

Do you realize there are two Germanies in America. One class are among our best and most loyal citizens. They are patriots standing shoulder to shoulder on our battlefields. They are in our legislative halls. They have been mighty factors in the building up of a great nation. We love and honor them for their loyalty, integrity and intelligence. But there is another class with the same spirit which has devastated Belgium. We have had an invasion of Brewers. They did not come with blare of trumpets and belching cannon. Under the lead of Gambrinus instead of bombs they have poured in beer kegs by the million. Their names show their nationality. They are not from the higher walks of life in the Fatherland—rather from the peasantry. They foster the saloons for they must have a place to sell their beer. They live on the degradation and debauching of men. This foreign invasion costs us millions and we pay the tax. They, for years, have ruled this nation. They control our legislatures and have influenced Congress. They hate Woman's Suffrage. Now strip off the mask and look matters squarely in the face. The same spirit which has ravaged Belgium has been at work among us. Many of these brewers are multi-millionaires. I stood before a splendid palace of one of them and wondered how many homes had been turned into hovels to build that mansion. I saw his wife in her costly equipage with driver and footman, a coarse featured woman like a veneered washerwoman. She made me think of a sow dressed in silk. All the art of dressmaker only accentuated her coarseness. She was a burlesque and I wondered how many poor women had been driven to the wash tubs that she might roll in splendor, when a pair of clomping wooden shoes and a denim dress would have become her better. Carlyle once said the "population of England is over 20 millions, mostly fools." We are idiots to allow this invasion of ruin and make millionaires of the invaders. What would you think of France if she should pay a billion of dollars a year to her invaders for destroying her land? The brewers, as I said, foster the saloon for they depend upon them. We know their influence. No saloonkeeper can make a living if he cannot ruin at least twenty men, body and soul. It is a terrible cost which reaches over into eternity. The man is a cannibal of souls. And we help him build Andersonvilles and fill them with the prisoners of despair. Brewers and saloonkeepers destroy more every year than died in the four years of the Civil war in rebel prisons and we, like fools, pay for the damage and ruin—all to support an army of men too lazy to work, who live on the wreck of homes, on the debauchery and ruin of men. Oh, Lord, how long?

In Belgium the mother raised her noble boy. How she loved him and looked forward to a bright future, but in the fullness of his young manhood he is murdered. Thousands of mothers in America raise boys of promise. How they look forward to their success in

life, but the saloons get them and they go down in ignoble graves. Thank God we are winning in the battle against this foreign invasion. There is a wave of indignation against the arrogance, the brutality of this whole business. The War Lords of Gambrinus have ruled a great nation. The expense is tremendous and the wreck and ruin is too awful.

The horticultural army is a tremendous force. Three thousand members of this society, the grandest in the world, will be a power. They work for cleanness and righteousness. They will be progressive and positive on all moral questions. Raise trees, fruits and flowers and you are working for the uplift of humanity. You are soldiers of peace instead of reaching out with all the craft and cunning of demons to perfect the high art of murder and destruction. It is your mission to glorify this old earth with beauty to bring out of the unknown yet more luscious fruits and more lovely flowers.

When you pass on you leave a path of peace behind you, not a path lined with wrecked homes and sobbing widows and orphans. You go through a wilderness and it blossoms as the rose. You conquer the bleakness and the desolations and leave landscapes which charm the eye and exalt the soul.

It is our mission to reach out beyond the dollar and take all that is in store for us. We are on the border of a vast, undiscovered country, full of the surprises of loveliness. We have but seen the hem of natures resplendent robes and know but little glory of her radiant apparel. But few homes in the land have reached their possibilities. There is room for more on every hand. It is our mission to gather the best the world affords and then develop new things. You young people little know what a vast field lies before you. What has been accomplished is but the promise of vaster achievements. We are surprised at what we ourselves have done in the development of new things. Already on our grounds we have phloxes, irises and peonies equal, if not superior, to our choicest importations, and yet but very little time has been given to their production.

Then, remember, this life borders on the great life beyond, "where everlasting spring abides and never withering flowers," where you pluck fruit from the tree of life which grows on the bank of the river of God's pleasure, and when you leave these fields of earthly toil you are to enter on the higher Horticulture of God.

Address delivered before the Minnesota State Horticultural Society, December 1, 1914.

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REPORT AUDITING COMMITTEE.

January 22, 1914.

We, the auditing committee appointed to audit the accounts of the Secretary and Treasurer have examined their accounts and find them correct.

C. G. MARSHALL,
L. C. CHAPIN,
G. S. CHRISTY,
Committee.

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