ANNUAL REPORT

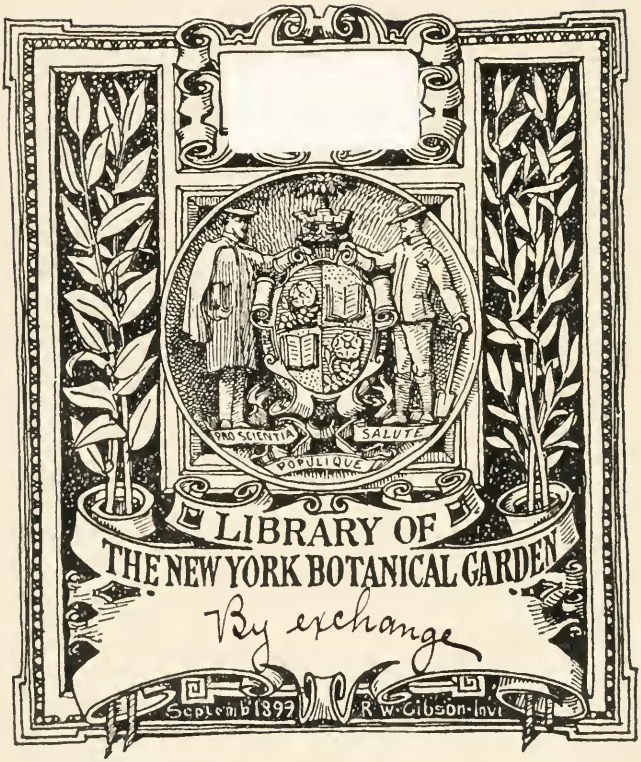
OF THE

NEBRASKA

State Horticultural Society

1910

BY C. G. MARSHALL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FORTY-FIRST ANNUAL REPORT

OF THE

NEBRASKA

State Horticultural Society

Containing all the Proceedings of the Summer Meeting held at Beatrice, July 21 and 22, 1909, and the Annual Meeting held at the University Farm, Lincoln, January 18, 19, and 20, 1910

By C. G. MARSHALL, Secretary

LINCOLN, NEBRASKA

LINCOLN, NEB.
PUBLISHED BY THE STATE
1910

LETTER OF TRANSMITTAL.

To His Excellency, Ashton C. Shallenberger, Governor of Nebraska:

Sir—In compliance with legal requisition, the annual report of the Nebraska State Horticultural Society for the year 1910, with accompanying papers, is respectfully submitted.

C. G. MARSHALL,
Secretary Nebraska State Horticultural Society.

Lincoln, May 1, 1910.

CONTENTS

OFFICERS.

President.....C. H. Green, Fremont
First Vice-President.....W. A. Harrison, York
Second Vice-President.....Ed. Williams, Grand Island
Treasurer.....Peter Youngers, Geneva
Secretary.....C. G. Marshall, Lincoln.

DIRECTORS.

For one year.....J. A. Yager, Fremont
For two years.....A. J. Brown, Geneva
For three years.....G. A. Marshall, Arlington

STANDING COMMITTEES OF THE SOCIETY.

SYNONYMS.

G. A. Marshall, Arlington,
A. J. Brown, Geneva,
C. H. Barnard, Table Rock.

METEOROLOGY.

Prof. G. D. Swezey, Lincoln.

ENTOMOLOGY AND ORNITHOLOGY.

Prof. L. Bruner, Lincoln.

VISITING COMMITTEE TO THE UNIVERSITY OF NEBRASKA EXPERIMENT STATION.

E. F. Stephens, Crete.

GEOLOGY.

Prof. E. H. Barbour, Lincoln.

FORESTRY.

Prof. E. T. Hartley, Lincoln.

VEGETABLE CULTURE.

Prof. R. A. Emerson, Lincoln.

ORNAMENTAL GARDENING.

J. H. Hadkinson, Benson.

FLORICULTURE.

Ed. Williams, Grand Island,
L. Henderson, Omaha,
C. H. Green, Fremont.

LEGISLATION.

Peter Youngers, Geneva,
L. C. Chapin, Lincoln,
C. H. Barnard, Table Rock.

MEMBERSHIP 1910.

HONORARY LIFE MEMBERS.

Beach, Prof. S. A.....Ames, Iowa
Brackett, G. B.....Washington, D. C.
Bruner, Prof. L.....Lincoln
Burnett, Professor E. A.....Lincoln
Campbell, G. W.....Delaware, Ohio
*Crounse, Lorenzo.....Fort Calhoun
Earle, P.....Post-office unknown
Garfield, C. W.....Grand Rapids, Mich.
Green, Wesley.....Des Moines, Iowa
Hansen, Prof. N. E.....Brookings, S. D.
Van Deman, H. E.....3630 13th St., N. W., Washington, D. C.
Van Houton, George.....Lenox, Iowa

ACTIVE LIFE MEMBERS.

Adams, W. R.....Omaha
Albert, U. G.....Normal
Aldrich, Benton.....Johnson
Aldrich, Carl.....Johnson
Alexander, A. A.....Peru
Alexander, G. W.....Peru
Allen, George L.....Spicer, Oregon
Anderson, A. N.....Ong
Atkinson, J. E.....Pawnee City
Backes, H. J.....Humphrey
Banks, E. H.....Post-office unknown
Barnard, C. H.....Lincoln
Beltzer, L. A.....Osceola
Bessey, Charles E.....Lincoln
Bliss, D. C.....Minden
Blystons, W. J.....33d and Dudley Sts., Lincoln
Bowers, W. B.....Post-office unknown
Boyd, Chas. J.....Ainsworth
Brown, A. J.....Geneva
Brown, Frank P.....Florence
Brown, J. L.....Kearney

*Deceased.

Bruning, W. H.....Cedar Bluffs
Camp, Charles B.....Cheney
Card, F. W.....Sylvania, Pa.
Carpenter, G. J.....Grand Junction, Colo.
Chapin, H. A.....Lincoln
Chapin, L. C.....Lincoln
Chowins, Charles E.....Lincoln
Christ, J. W.....Box 761, Lincoln
Christy, G. S.....Johnson
Christy, S. W.....Orchard
Colvin, W. E.....Post-office unknown
Coppoc, J. L.....Chambers
Corbin, E. E.....Grand Island
Crawford, William.....Post-office unknown
Cross, F. B.....Asylum
Damrow, Charles F.....Post-office unknown
Davey, R. H.....Omaha
Davidson, J. R.....Aurora
Davies, William.....Brownville
Davis, W. H.....Fullerton
De France, C. Q.....Post-office unknown
Deweber, H. N .....Pawnee City
Dillon, J. W.....Greeley, Colo.
Dole, E. W.....Beatrice
Dovel, O. P.....Auburn
Dugan, John.....34 So. Logan Ave., Denver, Colo.
Dunkin, J. M.....Ravenna
Dunlap, J. P.....Dwight
Dunlap, N. C.....Kearney
Dunman, W. H.....Lincoln
Emerson, Prof. R. A.....Lincoln
Erfling, E. C.....1150 Sherman Ave., Omaha
Ernst, C. J.....1418 So. 10th St., Omaha
Ernst, William.....Tecumseh
Field, B. E.....Fremont
Field, R. B.....Fremont
Floth, Paul.....Omaha
Fox, B. C.....Lincoln
Fredenburg, B.....Johnson
Frey, C. H.....Lincoln
Frey, Irvin.....Lincoln
Frey, H. H.....Lincoln
Frey, J. B.....Lincoln
Gage, J. A.....Beatrice
Gaiser, A.....Lincoln
Galbraith, G. B.....Fairbury
Ganson, L. E.....Kearney

Green, C. H. ..... Fremont
Grennell, E. N. ..... Ft. Calhoun
Guerney, C. W. ..... Yankton, S. D.
Hadkinson, J. H. ..... Benson
Harris, W. R. ..... Forest Grove, Oregon
Harrison, C. S. ..... York
Harrison, Harry S ..... York
Harrison, W. H. ..... York
Hartley, E. T. ..... Lincoln
Heald, Prof. F. D. ..... Lincoln
Heath, H. E. ..... R. F. D. No. 4, Lincoln
Helin, J. F. ..... 1612 Farnam St., Omaha
Henderson, Lewis ..... Omaha
Hess, Jacob ..... Omaha
Hesseltine, Ray W. ..... Peru
Hesser, W. J. ..... Pasadena, Cal.
Hogg, J. A. ..... Shelton
Hornung, Ernest ..... Raymond
Hornung, Geo. ..... College View
Howe, H. R. ..... Auburn
Hurlburt, C. M. ..... Fairbury
Jackson, T. C. ..... Purdum
*Jenkins, W. F. ..... Arcadia
Jessup, J. G. ..... Clay Center
Kaar, Theodore ..... 910 So. 13th St., Lincoln
Keyser, Val ..... Lincoln
Kretsinger, E. O. ..... Beatrice
Langdon, J. N. ..... Seward
Leonard, I. N. ..... Post-office unknown
Loughry, James ..... Geneva
Lundeen, N. P. ..... Alliance
Mackley, W. H. ..... Table Rock
Maiben, Ben ..... Palmyra
Marshall, A. C. ..... Weeping Water
Marshall, C. C. ..... Arlington
Marshall, C. G. ..... College View
Marshall, G. A. ..... Arlington
Marshall, H. W. ..... Arlington
Martin, Arnold ..... DuBois
*Masters, J. H. ..... Syracuse
Masters, J. W. ..... University Place
Martin, F. R. ..... 4622 Boulevard Ave., Omaha
McComb, H. A. ..... Post-office unknown
McIntosh, H. F. ..... Alda
Meek, John ..... Unadilla

*Deceased.

Meek, James.....Talmage
Mellor, W. R.....Lincoln
Mergen, Philip.....Omaha
Meyers, M. E.....Broken Bow
Mohler, Wm.....Falls City
Morsch, C. H.....Greeley Center
Mosher, D. C.....Colorado City, Colo.
Mosher, P. C.....Wilber
Murphey, P. A.....Exeter
Nation, J. W.....Fremont
Neff, J. G.....Davey
Nemechek, Paul.....Humboldt
Nownes, Charles.....Papillion
Parker, C. P.....Brock
Paulson, Paul.....Omaha
Payne, Mrs. G. H.....Omaha
Pearson, James.....Denton
Perin, S. W.....Lincoln
Perry, T. H.....Elk Creek
Peters, R. C.....1822 Cass St., Omaha
Peterson, Frank.....Post-office unknown
Peterson, John.....Post-office unknown
Pollard, E. M.....Nehawka
Pollard, Isaac.....Nehawka
Randall, J. C.....Hamburg, Iowa
Reed, M. H.....Granada, Colo.
Reed, Mrs. J. H.....Blue Springs
Riley, Alfred.....Greeley, Colo.
Roberts, E. A.....Albion
Rosenbaum, H. J.....Kennard
Russell, D. L.....Lincoln
Russell, J. D.....Lincoln
Russell, J. M.....Lincoln
Russell, L. M.....Lincoln
Sandoz, Jules.....Sandoz
Saunders, Charles L.....211 So. 18th St., Omaha
Schamp, L. D.....Lincoln
Schumacher, A.....York
Shroyer, J. O.....Humboldt
Slayton, George A.....192 Hillsdale St., Hillsdale, Mich.
Smith, E. E.....Lincoln
Smith, E. H.....York
Smith, H. C.....Falls City
Smith, H. L.....Geneva
Smith, O. F.....Blackfoot, Idaho
Stenger, Albert.....Columbus
Stephens, E. F.....Crete

Stevens, Frank G.....Nampa, Idaho
Stevenson, J. W.....North Bend
Stilson, L. D.....York
Stouffer, B. R.....Bellevue
Strand, G. A.....Minden
Swan, J. T.....Auburn
*Swan, W. G.....University Place
Swezey, Prof. G. D.....Lincoln
Tanahill, Wm.....Post-office unknown
Taylor, F. W.....711-715 Earnest & Cramer Bldg., Denver, Colo.
Tester, Harry S.....Grand Island
Tiffany, M. D.....Lincoln
Titus, G. N.....Nemaha
Tracy, Charles A.....1523 Douglas St., Omaha
Van Metre, C. M.....Valentine
Walker, J. W.....Crete
Ward, James.....Greeley
Warren, G. F.....Harvard
Watt, James.....R. F. D. No. 5, Lincoln
Welch, G. L.....Fremont
Wheeler, D. H.....Omaha
Whitford, C. A.....Arlington
Williams, Ed.....Grand Island
Williams, John.....Tecumseh
Williams, L. O.....University Place
Williams, Theodore.....Benson
Wilson, A. T.....Arcadia
Wilson, W. H.....Post-office unknown
Woods, A. F.....Washington, D. C.
Yager, J. A.....Fremont
Youngers, Peter.....Geneva

HONORARY ANNUAL MEMBERS.

McCandless, A. D.....Wymore
Mincer, C. E.....Hamburg, Iowa
Simons, A. A.....Hamburg, Iowa
Whitten, Prof. J. C.....Columbia, Mo.

ANNUAL MEMBERS.

Albers, John Jr.....Wahoo
Armstrong, W. A.....Greenwood
Babcock, H. E.....Columbus
Barr, John F.....Trumbull

*Deceased.

Barritt, H. E.....Chadron
Barker, E. A.....Council Bluffs, Iowa
Beckhoff, A. H.....3160 T St., Lincoln
Berthold, G. E.....Nebraska City
Beno, C. A.....Council Bluffs, Iowa
Borman, F. H.....Chalco
Brinton, Chas.....R. F. D. No. 3, Lincoln
Brugger, M.....Columbus
Buehler, C. A.....Sterling
Busch, L. A.....Orleans
Christy, L. D.....Johnson
Cone, H. H.....R. F. D. No. 7, Lincoln
Cook, L. W.....College View
Davey, H.....Blair
Davidson, F. A.....Holdrege
Davidson, W. E.....Holdrege
Davison, R. C.....Fairfield
Dole, W. A.....Beatrice
Duncan, J. R.....Peru
Duval, N. A.....Oxford
Fausch, H. R.....Guide Rock
Fiola, A. B.....Howells
Foal, O. P.....Table Rock
Fowler, E. C.....Cheyenne, Wyo.
Fritch, G. F.....Ashland
Funk, Louis.....Havelock
George, L. A.....Normal
Gould, H. G.....Republican City
Gramlich, Howard.....2409 G St., South Omaha
Green, H. C.....Kearney
Hall, W. A.....Arlington
Haney, Chas.....1141 Q St., Lincoln
Hanson, L. F.....Concord
Harrison, T. S.....York
Herminghous, E. H.....510 So. 10th St., Lincoln
Hess, J. P.....Council Bluffs, Iowa
Higgins, Miss Pansy.....Beatrice
Hiltner, J. K.....University Farm, Lincoln
Hoffman, F. W.....2128 R St., Lincoln
Hooker, A. R.....Maxwell
Howard, R. F.....University Farm, Lincoln
Howard, T. M.....Scottsbluff
Humiston, L. B.....Fremont
Hutchinson, W. C.....Elgin
Johnson, Mons.....Valley
Johnson, R. R.....Burchard
Jones, A. B.....Doniphan

Kauffman, B. V. ..... Monta Vista, Colo.
King, H. S. ..... York
Kolb, Andrew ..... R. F. D. No. 3, Lincoln
Kuska, J. B. ..... Milligan
Lamb, W. J. ..... Beatrice
Lasch, A. A. ..... 1801 Sewell, Lincoln
Leibers, Miss Hedwig ..... Minden
Leibers, O. H. ..... Minden
Leudtke, Ed. ..... Creston
Lonergan, Miss Grace ..... Florence
Loomis, Fred ..... Ord
Ludden, John ..... 1336 D, Lincoln
Marshall, Roy E. ..... R. D. 4, Lincoln
McDonald, J. B. ..... Emerson
McKnight, Dr. H. P. ..... Long Pine
Middleton, G. D. ..... Brady
Mieth, F. E. ..... Cairo
Miller, A. C. ..... Arlington
Mincer, C. E. ..... Hamburg, Ia.
Monnick, E. J. ..... Hooper
Morris, L. E. ..... Carroll
Moseley, T. W. ..... 1626 E, Lincoln
Nye, H. L. ..... Lexington
Ollis, Miss Ruth ..... Ord
Peas, Harry ..... Farragut, Ia.
Pence, H. A. ..... Falls City
Person, Miss Bessie ..... Holdrege
Person, E. T. ..... Holdrege
Pierce, J. H. ..... Atlanta
Reed, Freeman L. ..... Council Bluffs, Ia.
Rogge, W. ..... Sterling
Schoenbeck, W. O. ..... Odell
Scoenleber, L. K. ..... Bethany
Scneider, E. ..... Poole
Sellon, C. O. ..... Randolph
Shaver, F. D. ..... College View
Simanton, J. R. ..... Falls City
Slattery, E. M. ..... Chadron
Soukup, F. S. ..... Fremont
Stahl, J. L. ..... Uni. Farm, Lincoln
Spelts, W. T. ..... Grand Island
Smith, E. H. ..... York
Swanson, Philip ..... Bertrand
Tietze, E. E. ..... Holbrook
Thomas, J. M. ..... Lebanon
Turner, J. W. ..... Beaver City
Vasey, D. ..... Liberty

Vogel, P. G.....Florence
Webster, C. A. A.....Gibbon
Westgate, V. V.....Uni. Farm, Lincoln
Wilcox, G. E. .....Abilene, Kas.
Williams, R. L.....University Place
Willms, Sam .....Millard
Yager, Frank R..... Fremont
Young, Andrew, Jr. .....Craig
Young, C. S. .....R. F. D. 2, Lincoln

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-Presidents.**—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 reading of the minutes of the previous day's proceedings, and submitting the same to the approval of the meeting.

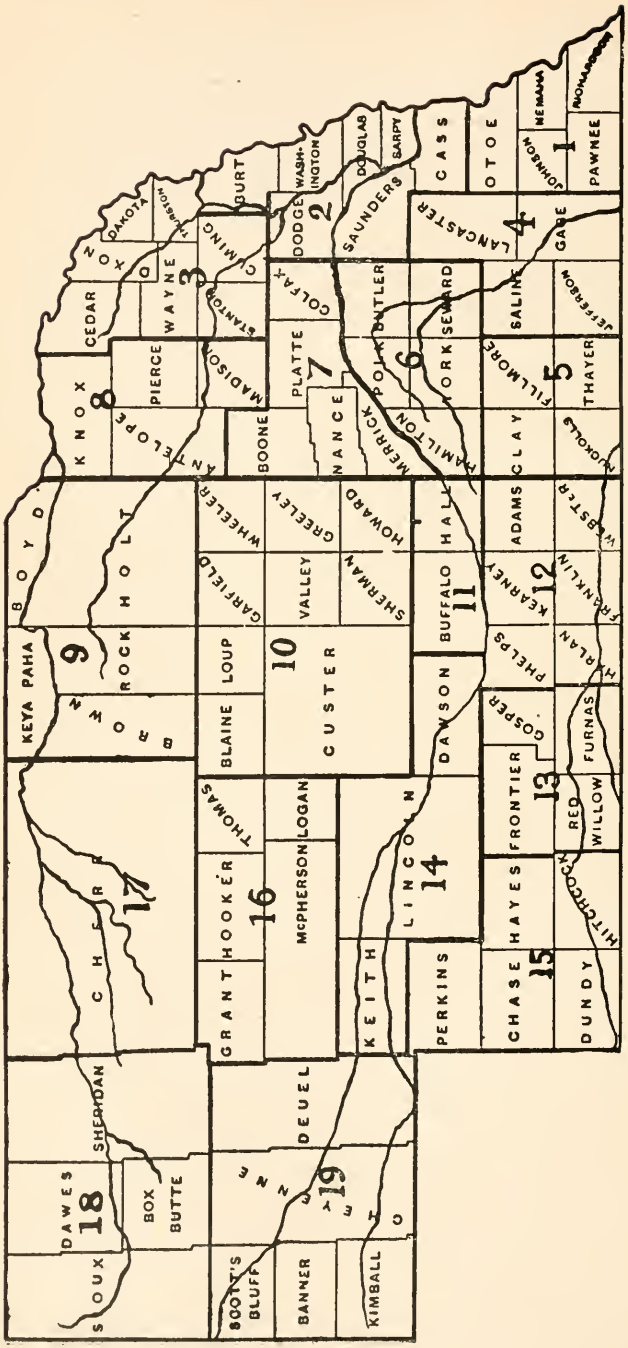
5. There shall be appointed by the board of directors nineteen district directors, one from each horticultural district in the state.

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.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DAWES
SHERIDAN
SIOUX
BOX BUTTE
DEUEL
SCOTT'S BLUFF
BANNER
KIMBALL
CHERRY
KEYA PAHA
BOYD
ROCK
HOLT
BROWN
GRANT
HOOKER
THOMAS
BLAINE
LOUP
GARFIELD
WHEELER
VALLEY
GREELEY
SHERMAN
HOWARD
McPHERSON
LOGAN
CUSTER
KEITH
LINCOLN
PERKINS
DAWSON
BUFFALO
HALL
HAMILTON
MERRICK
NANCE
BOONE
KNOX
ANTELOPE
PIERCE
MADISON
STANTON
CEDAR
DIXON
DAKOTA
THURSTON
WAYNE
CUMING
BURT
COLFAX
PLATTE
DODGE
WASHINGTON
DOUGLAS
SARPY
SAUNDERS
POLK
BUTLER
YORK
SEWARD
CASS
LANCASTER
OTOE
JOHNSON
NEMAHA
NOMAHA
PAWNEE
GAGE
JEFFERSON
SALINE
FILLMORE
THAYER
NUCKOLLS
WEBSTER
ADAMS
CLAY
KEARNEY
FRANKLIN
HARLAN
PHELPS
GOSPER
FRONTIER
FURNAS
RED WILLOW
HAYES
HITCHCOCK
CHASE
DUNDY

HORTICULTURAL DISTRICTS OF THE STATE.

REPORT OF COMMITTEE ON REDISTRICTING THE STATE.

We, your committee to whom was referred the matter of redistricting the state and revision of the list of fruits and ornamentals recommended for general planting in Nebraska, beg to submit the following report:

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

APPLES: Summer—Duchess, Cooper's Early White, Cole's Quince, Early Harvest, and Sweet June. For second choice we recommend Red Astrachan. Autumn—Wealthy, Maiden's Blush, Famuse, Dyer, and Warfield. Winter—Grimes' Golden, Winesap, Jonathan, Gano, Ben Davis, Salome, N. W. Greening, Missouri Pippin, and Virginia Beauty.

BLACKBERRIES: Snyder and Early Harvest.

CHERRIES: Early Richmond, Montmorency, and English Morello.

CRAB APPLES: Whitney No. 20, Hyslop, and Siberian.

CURRANTS: Red Dutch, Victoria and White Grape.

GOOSEBERRIES: Downing, Houghton, Industry, and Red Jacket.

GRAPES: Concord, Worden, Moore's Early, Niagara, Moore's Diamond, and Woodruff Red.

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

PEARS: Kieffer, Bartlett, Sheldon, and Seckel.

PLUMS: American—Forest Garden, Wild Goose, and Wyant. Japanese—Abundance and Burbank.

RASPBERRIES: Cumberland, Kansas, Gregg, Nemaha, Turner (Red), and Cardinal (Purple).

STRAWBERRIES: Senator Dunlap, Splendid, Bederwood, Crescent, Gandy, and August Luther.

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

APPLES: Summer—Duchess, Yellow Transparent, Cole's Quince, Dyer, Sweet June, Red Astrachan, Red June, Chenango, Strawberry, Early Pennock, Early Harvest, American Summer Permain, Benoni, and Summer Hagloe. Autumn—Wealthy, Utter's Red, Maiden's Blush, Ramsdell Sweet, Fulton Strawberry, Flora Belle, Plumb's Cider, Famuse, Warfield, Porter, Fulton, and McMahon's White. Winter—Ben Davis, Gano, Winesap, Windsor, Jonathan, Grimes' Golden, Janet, N. W. Greening, Salome, Ingram, Black Twig, and Isham Sweet. For second choice we recommend Missouri Pippin and Iowa Blush.

APRICOTS: Alexis, Budd, and Moorpark.

BLACKBERRIES: Snyder.

CHERRIES: Early Richmond, Montmorency, English Morello, and Dyehouse.

CRAB-APPLES: Whitney No. 20, Hyslop, Florence, and Martha.

CURRANTS: Victoria, Cherry, White Grape, Fay's Prolific, and North Star.

GOOSEBERRIES: Downing, Houghton, and Champion.

GRAPES: Concord, Worden, Moore's Early, Agawam, Brighton, Pocklington, Moore's Diamond, and Woodruff Red.

PEACHES: Alexander, Early Rivers, Triumph, Russell, Champion, Bokara, and Wright for general planting in Cass and Sarpy counties, and for trial in balance of district.

PEARS: Kieffer, Flemish Beauty, Sheldon, Duchess, and L. B. De Jersey.

PLUMS: American—Wild Goose, Wyant, Wolf, Stoddard, Hawkeye, DeSoto, Forest Garden. European—Lombard, Shipper's Pride, Green Gage, Shrop, and Damson. For trial, Japanese—Burbank, Abundance, and Wickson.

RASPBERRIES: Nemaha, Kansas, Palmer, and Cumberland.

STRAWBERRIES: Senator Dunlap, Splendid, Bederwood, Crescent, Sample, and Warfield.

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

APPLES: Summer—Duchess and Yellow Transparent. For second choice, Red Astrachan and Sweet June. For trial, Summer Hagloe. Autumn—Wealthy, Utter's Red, Flora Belle, Famuse, and Ramsdell Sweet. For second choice, Maiden's Blush and Plumb's Cider. For trial, Warfield and McMahon's White. Winter—First choice for entire district, N. W. Greening, Salome, and Janet. First choice for south half of district, Ben Davis, Gano, and Winesap. Second choice for entire district, Iowa Blush and Missouri Pippin. For trial, Windsor.

BLACKBERRIES: Snyder.

CHERRIES: Early Richmond, Montmorency, and English Morello. For trial, Terry, Baldwin, and Ostheim.

CRAB-APPLES: Whitney No. 20, Hyslop, Florence, and Martha.

CURRANTS: Victoria, White Grape, Cherry, and Fay's Prolific.

GOOSEBERRIES: Downing, Houghton, and Champion.

GRAPES: Concord, Worden, Moore's Early, and Pocklington. For trial, Brighton, Agawam, and Moore's Diamond.

PEACHES: Alexander, Triumph, Champion, Bokara, and Wright for trial only.

PEARS: Kieffer, Flemish Beauty, Sheldon, Duchess, and L. B. De Jersey for trial only.

PLUMS: American—Wyant, Wolf, Wild Goose, Forest Garden, and DeSoto. European—Lombard, Shipper's Pride, and Green Gage. First

choice for south half of district, Wild Goose. For trial in entire district, Japanese—Burbank and Abundance.

RASPBERRIES: Nemaha, Kansas, Palmer, Columbia, and Cumberland.

STRAWBERRIES: Senator Dunlap, Splendid, Bederwood, Crescent, Sample, and Warfield.

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, Early Harvest, Red June, and Sweet June. Autumn—Wealthy, Maiden's Blush, Famuse, and Utter's Red. Winter—Ben Davis, Gano, Winesap, Jonathan, Grimes' Golden, Missouri Pippin, and N. W. Greening.

BLACKBERRIES: Snyder and Early Harvest.

CHERRIES: Early Richmond, Montmorency, and English Morello.

CRAB-APPLES: Whitney No. 20, Hyslop, Florence, Martha, Red and Yellow Siberian.

CURRANTS: Red Dutch, Victoria, and White Grape.

GOOSEBERRIES: Downing, Houghton, and Industry.

GRAPES: Concord, Worden, Moore's Early, and Niagara.

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

PEARS: Duchess, Flemish Beauty, and Seckel.

PLUMS: American—Wyant, Hawkeye, Wild Goose, and Forest Garden. Japanese—Burbank.

RASPBERRIES: Kansas, Palmer, Gregg, and Turner.

STRAWBERRIES: Senator Dunlap, Splendid, Bederwood, Crescent, and Gandy.

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, Early Harvest, Red June, and Sweet June. Autumn—Maiden's Blush, Wealthy, Famuse, Dyer, and Warfield. Winter—Ben Davis, Gano, Winesap, Jonathan, Grimes' Golden, Janet, and Missouri Pippin.

BLACKBERRIES: Snyder.

CHERRIES: Early Richmond, Montmorency, English Morello, and Dyehouse.

CRAB-APPLES: Whitney No. 20, Hyslop, Florence, and Martha.

CURRANTS: Cherry, La Versailles, Victoria, Prince Albert, London Market, Red Dutch, and White Grape.

DEWBERRIES: Lucretia.

JUNEBERRIES: Dwarf.

GOOSEBERRIES: Downing and Houghton.

GRAPES: Concord, Worden, Moore's Early, Duchess, Agawam, and Brighton.

PEACHES: Amsden, Alexander, Hale's Early, Early Rivers, Russell, Cooledge, Champion, Triumph, Heath Cling, Wright, Smock and Hill's Chili.

PEARS: Flemish Beauty and Bartlett.

PLUMS: American—Wild Goose, Minor, Forest Garden, Wolf, Wyant, DeSoto, and Hawkeye. European—Lombard.

RASPBERRIES: Kansas, Palmer, and Nemaha.

STRAWBERRIES: Senator Dunlap, Clyde, Bederwood, Crescent, and Warfield.

For District No. 6, comprising Seward, Butler, Polk, York, and Hamilton counties, we recommend the following for general planting:

APPLES: Summer—Yellow Transparent, Early Harvest, Cooper's Early White, Red June, Duchess, Summer Queen, and Sweet June. Autumn—Wealthy, Maiden's Blush, Utter's Red, Patton's Greening, Wolf River, Peerless, and Snow. Winter—Winesap, Missouri Pippin, Ben Davis, N. W. Greening, Janet, Salome, Walbridge, Ingram, M. B. Twig, Gano, Jonathan, Iowa Blush, Grimes' Golden, York Imperial, Minkler, and Rome Beauty.

APRICOTS: Russian.

ASPARAGUS: Conover's Colossal and Palmetto.

BLACKBERRIES: Snyder.

CHERRIES: Early Richmond, Dyehouse, Large Montmorency, English Morello, and Ostheim.

CRAB-APPLES: Whitney No. 20, Florence, Martha, Golden Beauty, Hyslop, and Transcendent.

CURRANTS: Victoria, Cherry, Versailles, and White Grape.

DEWBERRIES: Lucretia.

JUNEBERRIES: Dwarf.

GOOSEBERRIES: Downing and Pearl.

GRAPES: Concord, Worden, Moore's Early, Elvira, Niagara, Wyoming Red, and Pocklington.

PEACHES: Alexander, Early Rivers, Triumph, Hale's Early, Russell, Champion, Crosby, Hill's Chili, Wright, and Bokara.

PEARS: Flemish Beauty, Seckel, Duchess, and Lincoln.

PLUMS: American—Wyant, Wolf, Weaver, DeSoto, Forest Garden, Stoddard, Cheney, and Hawkeye. European—Lombard, German Prune, and Tagge. Japanese—Burbank and Wickson.

RASPBERRIES: Cumberland, Kansas, Gregg, and Ohio.

RHUBARB: Linnaeus and Victoria.

STRAWBERRIES: Senator Dunlap, Warfield, Sample, Aroma, and Haverland.

For District No. 7, comprising Colfax, Platte, Boone, Nance, and Merrick counties, we recommend the following for general planting:

APPLES: Summer—Yellow Transparent and Duchess. For second choice, Sweet June. For trial, Summer Hagloe. Autumn—Wealthy, Utter's Red, Ramsdell Sweet. For second choice, Plumb's Cider, Flora Belle, Famuse, and Maiden's Blush. For trial, Warfield. Winter—Ben Davis, Gano, Winesap, Janet, N. W. Greening. For second choice, Iowa Blush and Missouri Pippin. For trial, Salome, Black Twig, and Windsor.

APRICOTS: Fully as hardy as the hardiest peaches.

BLACKBERRIES: Unsuccessful except in damp seasons and favored localities. Snyder, and for trial, Stone's Hardy.

CHERRIES: Early Richmond, Montmorency, English Morello. For trial, Dyehouse, Baldwin, and Terry.

CRAB-APPLES: Whitney No. 20, Hyslop, Florence, and Martha.

CURRANTS: Victoria and White Grape.

GOOSEBERRIES: Downing and Houghton.

GRAPES: Concord, Worden, Moore's Early, and Pocklington. For second choice, Elvira. For trial, Moore's Diamond and Brighton.

PEACHES: Alexander, Triumph, Champion, Bokara, Russell, and Wright for trial.

PEARS: For trial only, Kieffer, Sheldon, Flemish Beauty, and L. B. DeJersey.

PLUMS: American—Wild Goose, Wyant, Wolf, Forest Garden. European—Lombard, Shipper's Pride, and Green Gage. For trial, Japanese —Burbank and Abundance. American—Stoddard.

RASPBERRIES: Nemaha, Kansas, and Palmer. Successful only in damp seasons or favored localities.

STRAWBERRIES: Senator Dunlap, Warfield, Crescent, and Bederwood. For trial, Sample and Splendid.

For District No. 8, comprising Madison, Pierce, Antelope, and Knox counties, we recommend the following for general planting:

APPLES: Summer—Duchess and Yellow Transparent. For second choice, Red Astrachan and Tetofsky. For trial, Summer Hagloe and Sweet June. Autumn—Wealthy and Utter's Red. For second choice, Plumb's Cider, Flora Belle, Snow, Ramsdell Sweet, and Maiden's Blush. For trial, Warfield and McMahon's White. Winter—First choice for entire district, N. W. Greening. To be added for south half of district, Ben Davis, Gano, and Winesap. Second choice for entire district, Iowa Blush, Missouri Pippin, and Walbridge. For trial in entire district, Windsor.

BLACKBERRIES: Snyder.

CHERRIES: Early Richmond, Montmorency, and English Morello. For trial, Terry and Baldwin.

CRAB-APPLES: Whitney No. 20, Hyslop, Florence, and Martha.

CURRANTS: Victoria and White Grape. For trial, Cherry, Fay's Prolific, and London Market.

GOOSEBERRIES: Downing, Houghton, and Champion.

GRAPES: Concord, Worden, Moore's Early, and Pocklington. For trial, Moore's Diamond and Brighton.

PEACHES: For trial only, Alexander, Champion, Bokara, and Wright.

PEARS: For trial only, Kieffer, Sheldon, Flemish Beauty, and L. B. DeJersey.

PLUMS: American—Wyant, Wolf, as first choice for entire district. Second choice for entire district, DeSoto, Forest Garden, and Stoddard. First choice for south half of district, Wild Goose. For trial in entire district, Burbank, Lombard, Shipper's Pride, and Green Gage.

RASPBERRIES: First choice for river counties and for trial in bal-

ance of district, Nemaha, Kansas, Palmer, Cumberland, and Columbia. For trial in entire district, Cardinal.

STRAWBERRIES: Senator Dunlap, Sample, Warfield, Bederwood, Splendid, and Crescent.

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, and Summer Hagloe. For trial, Red Astrachan. Autumn—Wealthy and Utter's Red. For trial, Maiden's Blush and Plumb's Cider. Winter—Salome, N. W. Greening, Janet, Iowa Blush, Winesap, Walbridge, and Ben Davis.

BLACKBERRIES: For trial only, Snyder.

CHERRIES: Early Richmond, Montmorency, English Morello, and Terry.

CRAB-APPLES: Whitney No. 20, Hyslop, Florence, and Martha.

CURRANTS: Victoria, White Grape, Cherry, Fay's Prolific, and London Market.

GOOSEBERRIES: Downing and Houghton.

GRAPES: Concord, Worden, Moore's Early, Pocklington, and Moore's Diamond. Grapes should be covered in winter to insure success.

PEACHES: For trial only, Alexander, Champion, Bokara, and Wright.

PEARS: For trial only, Kieffer, Sheldon, Flemish Beauty, and L. B. DeJersey.

PLUMS: American—Wyant, Wolf, Stoddard, DeSoto, and Forest Garden.

RASPBERRIES: Kansas, Palmer, and Nemaha.

STRAWBERRIES: Senator Dunlap, Splendid, Bederwood, Crescent, Sample, and Warfield.

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, Early Harvest, Cooper's Early White, Duchess, and Sweet June. Autumn—Wealthy, Maiden's Blush, Utter's Red, and Patton's Greening. Winter—Missouri Pippin, Ben Davis, N. W. Greening, Salome, Walbridge, Janet, Gano, Jonathan, Iowa Blush, and Grimes' Golden.

APRICOTS: Russian varieties.

ASPARAGUS: Conover's Colossal and Palmetto.

BLACKBERRIES: Snyder.

CHERRIES: Early Richmond, Large Montmorency, English Morello, Baldwin, Dyehouse, and Ostheim.

CRAB-APPLES: Whitney No. 20, Florence, Martha, Golden Beauty, and Hyslop.

CURRANTS: Victoria, Cherry, Versailles, and White Grape.

DEWBERRIES: Lucretia.

JUNEBERRIES: Dwarf.

GOOSEBERRIES: Downing and Houghton.

GRAPES: Concord, Worden, Moore's Early, Elvira, Niagara, and Wyoming Red.

PEACHES: Alexander, Triumph, Russell, Bokara, Hill's Chili, Crosby, and Wright.

PEARS: For trial only, Flemish Beauty, Seckel, Duchess, and Lincoln.

PLUMS: American—Wyant, Wolf, Weaver, DeSoto, Forest Garden, Stoddard, Cheney, and Hawkeye. Japanese—Burbank and Wickson.

RASPBERRIES: Cumberland, Kansas, Gregg, and Ohio.

RHUBARB: Linnaeus and Victoria.

STRAWBERRIES: Senator Dunlap, Sample, Warfield, Aroma, Haverland, and Crescent.

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, Red June, Duchess, and Sweet June. Autumn—Wealthy, Maiden's Blush, Utter's Red, Patton's Greening, Wolf River, and Snow. Winter—Winesap, Missouri Pippin, Ben Davis, N. W. Greening, Janet, Salome, Walbridge, M. B. Twig, Gano, Jonathan, Iowa Blush, Grimes' Golden, and York Imperial.

APRICOTS: Russian varieties:

ASPARAGUS: Conover's Colossal and Palmetto.

BLACKBERRIES: Snyder.

CHERRIES: Early Richmond, Large Montmorency, English Morello, Baldwin, Dyehouse, and Ostheim.

CRAB-APPLES: Whitney No. 20, Florence, Martha, Golden Beauty, and Hyslop.

CURRANTS: Victoria, Cherry, Versailles, and White Grape.

DEWBERRIES: Lucretia.

JUNEBERRIES: Dwarf.

GOOSEBERRIES: Downing and Houghton.

GRAPES: Concord, Worden, Moore's Early, Elvira, Niagara, Wyoming Red, and Pocklington.

PEACHES: Alexander, Early Rivers, Triumph, Hale's Early, Russell, Champion, Crosby, Hill's Chili, Wright, and Bokara.

PEARS: For trial only, Flemish Beauty, Seckel, Duchess, and Lincoln.

PLUMS: American—Wolf, Weaver, DeSoto, Forest Garden, Stoddard, Cheney, and Hawkeye. European—Lombard, German Prune. Japanese—Burbank and Wickson.

RASPBERRIES: Cumberland and Kansas.

RHUBARB: Linnaeus and Victoria.

STRAWBERRIES: Senator Dunlap, Sample, Warfield, Aroma, Haverland, and Bederwood.

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, Utter's Red, and Plumb's

Cider. Winter—Winesap, Missouri Pippin, Ben Davis, N. W. Greening, Salome, Gano, Jonathan, Iowa Blush, Grimes' Golden, and Janet.

APRICOTS: Russian.

ASPARAGUS: Conover's Colossal and Palmetto.

BLACKBERRIES: Snyder.

CHERRIES: Early Richmond, Large Montmorency, English Morello, Baldwin, Dyehouse, and Ostheim.

CRAB-APPLES: Whitney No. 20, Florence, and Martha.

CURRANTS: Victoria, Cherry, Versailles, White Grape, White Dutch, and Fay's Prolific.

DEWBERRIES: Lucretia.

JUNEBERRIES: Dwarf.

GOOSEBERRIES: Downing and Houghton.

GRAPES: Concord, Worden, Moore's Early, Elvira, Niagara, Wyoming Red, and Pocklington.

PEACHES: Alexander, Early Rivers, Triumph, Hale's Early, Champion, Crosby, Hill's Chili, Wright, and Cooledge.

PEARS: For trial only, Flemish Beauty, Seckel, and Kieffer.

PLUMS: American—Wyant, Wolf, Weaver, DeSoto, Forest Garden, Stoddard, Cheney, Hawkeye, Wild Goose, Robinson, and Pottawattamie. Japanese—Burbank and Wickson.

RASPBERRIES: Cumberland and Kansas.

STRAWBERRIES: Senator Dunlap, Sample, Warfield, Aroma, Haverland, and Crescent.

For District No. 13, comprising Furnas, Gosper, Frontier, and Red Willow counties, we recommend the following for general planting:

APPLES: Summer—Duchess and Cooper's Early White. Autumn—Wealthy and Maiden's Blush. Winter—Winesap, Missouri Pippin, Janet, Ben Davis, and Gano.

APRICOTS: Russian.

CHERRIES: Early Richmond, Dyehouse, Large Montmorency, and English Morello.

CRAB-APPLES: Whitney and Florence.

CURRANTS: Victoria, Cherry, Versailles, and White Grape.

GOOSEBERRIES: Downing and Houghton.

GRAPES: Concord and Elvira.

PEACHES: Alexander, Early Rivers, Hale's Early, Triumph, Russell, Champion, Hill's Chili, and Wright.

PEARS: For trial only, Seckel, Sheldon, and Flemish Beauty.

PLUMS: American—Forest Garden, Hawkeye, and Minor. Japanese—Burbank.

STRAWBERRIES: Bederwood, Warfield, Crescent, and Senator Dunlap.

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 and Utter's Red. Winter—Ben Davis, Winesap, Janet, Missouri Pippin, and Jonathan.

BLACKBERRIES: Snyder.

CHERRIES: Early Richmond, English Morello, and Montmorency.

CRAB-APPLES: Whitney No. 20, Hyslop, Florence, and Martha.

CURRANTS: Red Dutch, Victoria, and White Grape.

GOOSEBERRIES: Downing and Houghton.

GRAPES: Moore's Early, Worden, Elvira, and Concord.

PEACHES: Alexander, Early Rivers, Champion, Crosby, and Wright.

PLUMS: American—Wyant, DeSoto, Forest Garden, and Hawkeye. European—Lombard.

RASPBERRIES: Cumberland and Kansas.

STRAWBERRIES: Senator Dunlap, August Luther, Splendid, Bederwood, and Crescent.

For District No. 15, comprising Hitchcock, Hayes, Perkins, Chase, and Dundy counties, we recommend the following:

APPLES: Summer—Duchess and Yellow Transparent. Autumn—Wealthy, Utter's Red, and Famuse. Winter—N. W. Greening, Ben Davis, Gano, Janet, and Winesap.

ASPARAGUS: Conover's Colossal.

CHERRIES: Early Richmond, Montmorency, English Morello, and Dyehouse.

CRAB-APPLES: Whitney, Hyslop, Florence, and Martha.

CURRANTS: Red Dutch, Victoria, Cherry, and White Grape.

GOOSEBERRIES: Downing and Houghton.

GRAPES: Moore's Early, Worden, Elvira, and Concord.

PEACHES: Alexander, Early Rivers, Russell, Hill's Chili, and Wright

PLUMS: American—Forest Garden, Hawkeye, Wolfe, and DeSoto.

RHUBARB: Linnaeus.

STRAWBERRIES: Bederwood, Warfield, Crescent, and Senator Dunlap.

For District No. 16, comprising Logan, Thomas, Hooker, McPherson, and Grant counties, we recommend the following for general planting:

APPLES: Summer—Duchess. Autumn—Wealthy. Winter—Walbridge, Iowa Blush, and N. W. Greening.

CHERRIES: Early Richmond and Montmorency.

CRAB-APPLES: Whitney, Hyslop, Florence, and Martha.

CURRANTS: White Grape, Victoria, and Cherry.

GOOSEBERRIES: Houghton.

GRAPES: Concord.

PLUMS: American—Stoddard, Cheney, DeSoto, Forest Garden, Wolf, and Wyant.

For District No. 17, Cherry county, we recommend the following for general planting on dry land with good care:

APPLES: Summer—Duchess. Autumn—Wealthy. Any varieties recommended for Districts 3, 8, or 9 will do well in most places in District 17.

CHERRIES: Early Richmond, Montmorency, English Morello, and Dyehouse. For trial, Early Morello and Terry.

CRAB-APPLES: Whitney No. 20, General Grant, and Virginia.

CURRANTS: White Grape, Victoria, and London Market.

GOOSEBERRIES: Houghton.

PEACHES: Alexander and Wright.

PLUMS: American—Wyant, Stoddard, Cheney, and Hamer.

STRAWBERRIES: Crescent, Bederwood, and Warfield.

For District No. 18, comprising Box Butte, Dawes, Sioux, and Sheridan counties, we recommend the following:

APPLES: Summer—Duchess and Wealthy, with good care. Any varieties recommended for Districts 3, 8, and 9, will do well in most places for District 18, under irrigation.

CHERRIES: Early Richmond, English Morello, Montmorency, Dyehouse, and Terry.

CRAB-APPLES: Whitney No. 20, Hyslop, Florence, Martha, and Transcendent.

CURRANTS: Victoria, White Grape, White Dutch, and Red Dutch.

GOOSEBERRIES: Houghton.

PEACHES: Alexander and Wright.

PLUMS: American—Wyant, Stoddard, Cheney, and Hamer. European—Lombard and Shipper's Pride.

RASPBERRIES: Cumberland and Kansas.

STRAWBERRIES: Senator Dunlap, Sample, Warfield, Bederwood, Splendid, and Crescent.

For District No. 19, comprising Deuel, Cheyenne, Scott's 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, and N. W. Greening.

CHERRIES: Early Richmond, Montmorency, and English Morello.

CRAB-APPLES: Whitney No. 20, Hyslop, Florence, and Martha.

CURRANTS: Red Dutch, Victoria, and White Grape.

GOOSEBERRIES: Downing, Houghton, and Smith's Improved.

GRAPES: Concord and Moore's Early.

PEARS: Flemish Beauty, Bartlett, and Kieffer.

PLUMS: American—Forest Garden, Wolf, Pottawattamie, DeSoto, Cheney, and Stoddard.

RASPBERRIES: Cumberland and Kansas.

STRAWBERRIES: Warfield, Senator Dunlap, Brandywine, Gandy, and Crescent.

LIST OF ORNAMENTALS.

INCLUDING TREES, SHRUBS, ROSES, VINES, BULBS, ETC., WHICH APPLIES TO THE ENTIRE STATE, EXCEPT WHERE OTHERWISE SPECIFIED.

Hardy Shrubs.

Snowball.
Hydrangea Paniculata Grandiflora.
Syringa, all kinds.
Weigelia, Variegated and Rosea.
Flowering Almond.
Lilac, all kinds.
Spireas as follows:
  Van Houtii.
  Arguta.
  Thunbergii.
  Collossa Alba and Ruberea.
  Anthony Waterer.
  Bumalda.
  Billardii.
Prunifolia.
Golden Leaf (Aurea).
High Bush Cranberry.
Altheas.
Caragana.
Moss Acacia.
Yucca Filamentosa.
Forsythia.
Purple Berberry.
Golden Leaf Alder.
Tamarix Amaurensis.
Dogwood.
Wahoo.
Rosa Rugosa.
Bechtol Flowering Crab.

Bulbs and Tubers.

Paeonias.
Tulips.
Lilies.
Dahlias.
Gladiolas.
Tuberoses.

Perennials.

Phlox.
Oriental Poppy.
Columbine.
Gaillardia.
Bleeding Heart.
Golden Glow.
Iris.
Larkspur.
Foxglove.
Cannas.
Caladium.

Climbers.

American Ivy (Ampelopsis Quinquefolia).
Honeysuckles.
Wistaria.
Trumpet Vine.
Clematis.
Bitter Sweet.

Climbing Roses.

Crimson Rambler.
White Rambler.
Wichuriana-Creeper.
Prairie Queen.
Baltimore Belle.

June Roses.

Harrison's Yellow.
Persian Yellow.
Madam Plantier.

Moss Roses.

Luxembourg.
Crested Moss.
Glory of Mosses.
White Moss.

Hybrid Perpetual Roses.

Alfred Colomb.
Anne De Diesbach.
Margaret Dickson.
Baron De Bonstetten.
Mabel Morrison.
Prince Camille de Rohn.
Tom Wood.
Marshall P. Wilder.
Coquette Des Alpe.
General Jacqueminot.
John Hopper.
Ulrich Bruner.
Paul Neyron.
Magna Charta.
Madame Chas. Wood.
Fisher Holmes.
Jules Margotten.
Mrs. John Lang.

Weeping Trees.

Thurlow Weeping Willow.
Teas Weeping Mulberry.
Camperdown Weeping Elm.
Cut Leaf Weeping Birch.

Ornamental Shade Trees.

Hackberry.
Sycamore (S. E. part).
Carolina Poplar.
European Mt. Ash.
Black Walnut.
Butternut.
Ash.
Soft Maple.
Elm.
Russian Mulberry.
Catalpa Speciosa (S. E. part).
American Linden.
White Birch.
Horse Chestnut (S. E. part).
Sweet Chestnut (S. E. part).
Russian Olive.
Oaks.
Hard Maple (extreme east).

Ornamental Hedge.

Berberry.
Japan Quince.
Spirea.
California Privet.
Tamarix.

Common Hedge.

Osage Orange.
Honey Locust.
Russian Mulberry.

Forest Trees.

Elm.
Ash.
Soft Maple.
Catalpa Speciosa.
Walnut.
Honey Locust.
Russian Mulberry.
Osage Orange.
Box Elder.

Evergreens.

Black Hills Spruce.	Ponderosa Pine.
Pungens.	Austrian Pine.
Englemon Spruce.	Scotch Pine.
Douglas Spruce.	White Pine (extreme east).
Concolor.	Balsam Fir.

Respectfully submitted,

G. A. MARSHALL, Chairman,
G. A. STRAND,
A. J. BROWN,
C. H. BARNARD,
W. G. SWAN,
G. N. TITUS,
E. F. STEPHENS,
H. S. HARRISON,
W. F. JENKINS,

Committee.

PROCEEDINGS

Proceedings of the Summer Meeting of the Nebraska State Horticultural Society, held at Beatrice, July 21, 22, 1909.

SUMMER MEETING

PROCEEDINGS.

The summer meeting of the Nebraska State Horticultural Society convened at the Burwood Hotel, Beatrice, Wednesday, July 21, 1909; the following program being carried out:

WEDNESDAY, JULY 21.

10:00 A.M.

Arranging fruit and floral displays and renewing acquaintances.

1:30 P.M.

Invocation.....Rev. J. E. Davis
Address of Welcome.....D. S. Dalby
Response.....C. S. Harrison
Address.....Governor A. C. Shallenberger
Perennials.....Ed. Williams, Grand Island
Question Box.

8:00 P.M.

Music .....Centenary Male Quartet
Parks in Villages and Small Towns.....
.....A. D. McCandless, Wymore
The Evergreen.....C. S. Harrison, York
Question Box.

THURSDAY, JULY 22.

9:30 A.M.

Automobile ride about the city, through the German Nurseries and to the greenhouses of the Dole Floral Company.

1:30 P.M.

Music.....Centenary Male Quartet
Reports of District Directors.
Roses for Outdoor Planting.....V. V. Westgate, Lincoln
Horticulture in Our Public Schools.....
.....Supt. E. C. Bishop, Lincoln
Question Box.

President Green: The meeting will now come to order and first on our program will be the invocation, which will be delivered by Reverend J. E. Davis.

INVOCATION.

Our Father, who art in Heaven, we thank Thee for Thy grace and mercy. We thank Thee for the things with which Thou art beautifying the earth, for all the good things about us, and for all the smiles and sunshine around about us. We thank Thee for the righteousness and beauty Thou hast put into our lives and for the many and abundant blessings that have been ours. We thank Thee for the associations among men and for the work that is being done to bring forth better things upon this earth. We pray that Thou wouldst bless the work that this Society is engaged in, and we pray that their labors may be successful. Bless the officers in charge of this meeting and bless all the members of this Association, and may their meeting here be pleasant and profitable. All this we ask in Thy Son's name; Amen.

President Green: Mr. Kidd was to have delivered the address of welcome, but since he can not be with us the welcome will be extended by Mr. D. S. Dalby.

WELCOME.

D. S. DALBY.

Mr. Chairman, Ladies and Gentlemen, and members of the Nebraska State Horticultural Society—It is not in my line

of business to make speeches, and whenever I am called upon for one I never know what to say. I am glad, however, to extend a very hearty welcome to you on behalf of the citizens of Beatrice and Gage county, and to say that we will be glad to do whatever we can to make your stay here pleasant and interesting and profitable. I presume that in your discussions you will take up the question of crossing the potato and onion and probably that of the strawberry and milk-weed. But seriously, I do want to urge upon you not to overlook in your discussions the luscious, big, red Jonathan apple. I have not been a resident of Nebraska more than two or three years, but in that time I have never seen better apples anywhere than those grown right here in Nebraska. And more and better opportunities for horticulturists are not offered anywhere than in this state.

And on behalf of the citizens of Beatrice and Gage county and the entire community I want to extend to your Society a most sincere welcome. We are all very glad that you have come here for your meeting, and we hope it will be pleasant and interesting to you as well as profitable to us. And if there is anything that you don't see that you want, let us know and we will get it for you. Thank you.

President Green: Mr. C. S. Harrison, of York, will respond on behalf of the Society to the welcome so generously extended to us by Mr. Dalby.

RESPONSE.

C. S. HARRISON, YORK.

Mr. Chairman and Friends—In response to these kind words of welcome I want to say that we are glad to be here, and I want to say also that our calling is the best and noblest on earth. We are aiming to bring out new things and better things, and while we do this we are going to do it in an honorable way. We do not want any grafting or stealing;

our calling is too exalted for that, and our mission today is to bring out the new and undeveloped things. There is a great deal of unused capital lying around us that has never been used and that has never been called out. It is our mission, as I say, to bring this out, and in this work there is an unlimited amount of enjoyment. All around us is a veritable Eden,—acres upon acres of charming flowers, and one of our objects is to get the best of all these and others and make the farm home more beautiful and attractive. We must make the farm home so attractive and enjoyable that the boys will not want to leave it for the city. If we can do this our efforts will be well worth while.

President Green: Governor Shallenberger was to have been with us this afternoon, but he was unavoidably detained at Lincoln by matters of state, and has just sent word that he can not get here. The next subject on our program is that of "Perennials" by Mr. Williams, of Grand Island.

PERENNIALS.

ED. WILLIAMS, GRAND ISLAND.

Mr. President, Ladies, and Gentlemen:

Having been put on the program for a paper on Hardy Perennials, I will submit to you as far as my experinece goes the varieties best suited for our climate and a few remarks about planting and caring for same.

As this is the season of the year for a florist to make repairs and replant, and get his house in shape for winter, I have not had the time to prepare you a very complete paper, but I will give you the main facts; and as for varieties I could name hundreds, yes, more, but it is the same with plants as anything else, we have our standbys.

The term perennials stands for plants of herbaceous nature, that are hardy and will live through the winter without killing off. There is an increasing demand for this line of plants every year. As more people secure their own homes, the

first thing they set about to do is to beautify the same, and a few hardy plants of the perennials will do that. There are the tall growing varieties, dwarf, and the border ones, so that it is immaterial what corner or nook you care to plant, you can find among the varieties I will mention some that will do.

The most essential point is in the preparing of soil, for unlike tender plants that are replaced every year, the soil will wear out; so get your soil good and rich; spade over well and deep. Every three or four years, the plants should be taken up and divided; that is, of those that are subject to that kind of treatment and others that come from seeds, new seed should be sown, so that you can replenish your supply, and the best time to do that is in the fall.

They should receive a mulch of some kind every spring and fall.

In the following varieties, I have endeavored to name only a few of the best, those that I know will succeed, with ordinary care, and which you can secure from your local florist or nurseryman. The blooming period for perennials is from about the middle of May until frost.

Achellia—The Pearl.
Aquilegia—Columbine, all colors.
Asters, all colors.
Bellis—The English Daisies, white.
Campanulas—The Bellflower, all colors.
Centaurea—Corn Flowers, all colors.
Chrysanthemums—The pompon varieties, all colors.
Dianthus—Sweet William, all colors.
Dielytra—Bleeding Heart, pink and white.
Digitalis—Fox Glove, all colors.
Funkia—Day Lily.
Ferns (Flowering fern) (Sensitive fern).
Wood Fern (Ostrich fern) (Royal fern), etc.
Feverfew—Little Gem.
Ornamental Grasses—Different varieties.

Gypsophila—Baby Breath.
Hibiscus—Crimson Eye.
Hollyhocks.
Iberis—Hardy Candytuft.
Iris—German and Japan varieties.
Lobelia.
Lily of the Valley.
Myosotis—Forget-me-not.
Paeonies.
Poppies—Oriental variety.
Phloxes.
Pyrethrum Hybridum.
Primroses, all colors.
Sedum.
Shasta Daisies.
Tretoma—Flame Flower.
Violets—Hardy Russian.
Viola Cornutta—Tufted Pansies.
Wellflower.
Yucca—Adam's Needle.

DISCUSSION.

Mr. Keyser: Is that a list of indoor perennials?

Mr. Williams: No, they are all perennials for outdoor growing,—hardy varieties.

C. S. Harrison: It seems to me that there are others well worthy of mention in such a list, such as the poppies; then there are the Hibiscus,—of these I have five different kinds and they are all very satisfactory. I would add also to that list the Iris; on this I am now preparing a work, which will tell of some 170 varieties.

President Green: I would like to call your attention to the last thing on our program,—the question box. In case there is any question you want to ask on anything pertaining to horticulture we will be glad to take it up and answer it the best we can.

Mr. Brown: I just want to add a word to what Mr. Harrison has said about perennials. In the last two or three years I have been experimenting to a certain extent with perennials, principally for my own pleasure; and I find that there are many things that we can grow successfully in Nebraska that we don't usually think of. I have growing at my place now two deciduous cypress trees, and I guess that is 100 miles or more north of its habitat. We can make things cover a much wider field than we ever dreamed of.

Mr. Harrison: I have noticed that many things that are perfectly hardy in Minnesota are not hardy here. These same things some of them planted here will kill right down to the ground the first winter. A great many things will stand a much colder climate up in Minnesota than here; this is due to the drying climate that we have here in the winter. Perennials, though, will grow almost anywhere.

REPORT FROM DISTRICT NO. 10.

COMPRISING HOWARD, GREELEY, WHEELER, GARFIELD, VALLEY, SHERMAN, CUSTER, LOUP AND BLAINE COUNTIES.

The cherry crop in this immediate vicinity is good and apples are up to the average condition. Prospects good for crop wild plums, as the caterpillars were not as bad as usual. They usually destroy the wild plums in the canyons.

Our apple trees bloomed exceptionally well and some varieties are bearing better than usual, Duchess especially, while the Winesap have scarcely any fruit. Janet a medium crop, Ben Davis, light, currants exceptionally well set with fruit, currants and Early Richmond cherries being just ripe at present.

J. D. REAM,
District Director.

REPORT FROM DISTRICT NO. 12.

COMPRISING ADAMS, KEARNEY, PHELPS, HARLAN, FRANKLIN, AND WEBSTER COUNTIES.

In response to your request of June 7 in relation to fruit prospect in District 12 will say that I have been over but a small part of the entire district. The January freeze injured peaches very largely. Apples, cherries, and plums early in April promised an abundant crop but were cut short somewhat by the freezing weather about May 1. Fruit bloom, however, was late in coming out and injury not so great as otherwise would have been. The apple crop in Kearney and Adams counties and along the Platte Valley, I should estimate at a full crop for territory mentioned, while the same may not be what might be called a full crop for the eastern part of the state. Cherries and plums 50 per cent of a full crop. The Watson's Ranch, west of Kearney, reported to me 50 per cent of a crop of cherries and about one-third of a crop of peaches. Many smaller growers in other parts of the district report about the same. Currants, gooseberries, grapes and fruits not far enough advanced to be injured by the May freeze, in most places a fair crop.

I find that most planters at all interested are beginning to realize that one of the greatest causes of failure in growing trees successfully and raising fruit lies largely within themselves, and see a greater need of better care and culture see that time in that direction is well spent.

D. C. BLISS,
District Director.

REPORT FROM DISTRICT NO. 17.

COMPRISING CHERRY COUNTY.

The spring was very backward, holding bloom back until the frosts were entirely over, and fine rains started things nicely. Then our country was visited here and there with

severe hail storms, destroying much of the fruit and injuring the trees. There is very favorable weather at this time, and the trees are recovering rapidly.

C. M. VANMETRE,
District Director.

QUESTION BOX.

Question No. 1. (On raspberries.)

Answered by Mr. Fritch: I have raised raspberries more or less for the past fifteen years, in Iowa and Nebraska. At the present time I am located at Ashland, where I think it is very satisfactory for the growing of raspberries.

At Ashland we now have the Cumberland, Cardinal, Kansas, etc., for the best ones and a few others. The Cardinal I think is one of the best berries we have. As to the time for planting raspberries, for me the right time is in the fall, just before it freezes up. It depends, of course, upon the condition of the ground. As a general thing, the ground is in good shape just before it snows, and I have never had any trouble at all about getting a good stand. I never lose any plants at all; always get 100 per cent of a stand. The ground should be well prepared. This season we have had a good deal of trouble with the weeds, but inside of another week I think we will get rid of the most of them. And when I plant I plant only the best plants. I plant them quite deep and raise a little mound right over the plant,—about four inches deep and then in the spring level it off and they come good. As I said before, the Cumberland and Cardinal and Kansas are the leading ones; the Cardinal is the only red raspberry I would plant. They all come through the winters in good shape.

Question No. 2. (As to soil for perennials.)

Answered by Mr. Williams: I believe the soil should be heavy; it seems to be better than a light soil. And when you are preparing to plant hardy outdoor perennials always have

the soil in good condition. Use manure as a fertilizer quite freely and black top-soil as a dressing twice a year.

Mr. Harrison: In planting perennials it is quite important to get them pretty deep so they will not dry out.

President Green: A good deal of common sense and judgment can be used in regard to the different kinds of soil. In growing carnations I find that we have a soil which is doing very well without any fertilizing at all; in fact the plants seem to grow too rank at that.

Question No. 3. (As to the packing of apples.)

Answered by Mr. Pollard: As to packing apples in boxes we have had no experience at all with boxes; we have always used barrels for our apples. This practice saves packing and handling. In a barrel you can put three bushels, and in the ordinary box there is only one bushel, and a man can pack a barrel almost as quickly as a box. Then the barrel is the cheaper, too. We think the barrel is decidedly the best way for marketing apples.

President Green: If there are no more questions this afternoon we will adjourn until eight o'clock this evening.

Meeting adjourned till 8:00 P.M.

EVENING SESSION.

8:00 P.M.

President Green: The first subject on our program for this evening will be "Parks in Villages and Small Towns," by Mr. McCandless, of Wymore. Mr. McCandless has been interested in this work for several years, and through the experience and results he has accomplished at Wymore he is in position to give us some good information and help.

PARKS IN VILLAGES AND SMALL TOWNS.

A. D. M'CANDLESS, WYMORE.

Mr. Chairman, Ladies, and Gentlemen:

I am very glad that I am here tonight. I see that you have been unfortunate in that some of the people who were to have been here with you could not come, but I want you to witness that I am here and also to know that I am intensely interested in the grand work in which your Society is engaged.

On this subject of Parks in Villages and Small Towns I have nothing to offer except my experience. My subject does not require exact or scientific knowledge, as many of your more technical subjects do, and as the audience is small and as those who are here are all interested in this work, I shall give you a little back history tonight and suggest one or two places for the extension of park work among small towns and villages in Nebraska. My park work has all been done in the little city of Wymore,—a place of three thousand people, in the southwest corner of this county, and while it is a place of only about three thousand people, let me tell you that it has more parks—more acreage in parks—than any other city of its size in the whole country. We can show you more growing trees in park areas than can be found in any other town or city in the state of Nebraska today. We can show you a town that is thoroughly a railroad town and for twenty-five years was a saloon town, and yet it is a town more interested in park work than can be found elsewhere in the state.

My own home in Wymore is built on a half block of ground. When I built on that half block of ground it was all covered with cockle burs and sunflowers and surrounded by that kind of vegetation. I graded the streets around my place and sowed a few handfuls of red clover in the streets outside of the lawn space, and soon after that I noticed that the people would bring their cows half a mile to let them eat in front of my place. I asked them why they did not do as I

had done and have feed for their cows near at home, and they said they didn't know that they could. But now nearly every street in Wymore is sowed to clover or blue grass, and they are mowed and kept clean, too. And at this time two mowing machines have been kept going constantly for over two weeks in the parks and streets of our town.

Our park system was started a good many years ago, and at that time I contributed $10 toward buying a park. One of our parks is a beautiful piece of woodland lying just east of the Blue river. We are trying to get that in shape so it will be one of our most beautiful parks and of value to the future generations. The overflow of the river is a serious question there, however. The Burlington railroad has a dam across the Blue river bottom there at Wymore that is three-fourths of a mile long. They say this is all right, for they have raised the bridge four feet higher. The river bottom is dammed up there by two railroads though, and there are other things I might mention. We are going to keep on with what we have and do the best we can. Here at Beatrice you people have the Blue river and at Wymore we have the river and Indian creek, too, and along these streams there are many beautiful and shady groves. There at Wymore we could have many more beautiful spots if we could get the obstructions removed and let the water go on east. After we had gotten the Riverside Park and had it overflow a couple of times we thought we would get a better place. This is a very beautiful spot, though, and covered with fine timber. When the Lincoln Land Company laid out the town there was a beautiful piece of timber on Indian creek. There were twenty acres in that piece of timber, and the title of that land was with the Lincoln Land Company. It has been used as a park ever since the town was first started, and it is the one park in Wymore to which the city does not have title now. These parks, though, are both down on the river and creek and are not accessible to the people. We do have other parks that are more accessible. We have a park called Arbor State Park, so named because we had a paper by that name, which

was published by one of our citizens. And this man, while he had many faults, nevertheless did much good work and helped those of us engaged in park work. This park consists of more than thirty-three acres, and there is not another spot equal to it in the state of Nebraska. The land belongs to the city, and it will grow more valuable as time passes. The work of keeping these parks up, however, will fall upon future generations and they will get much of the benefit from them. McKinley Park is another one of our spots to which the city has acquired the legal title; this consists of two blocks of ground with the street between vacated and added to it. In this little park there are nearly six hundred splendid trees growing. In all the parks of Wymore now there are some two thousand trees being cultivated, and they range from four to eight years of age. Many years ago we had a very good man in Wymore,—a man who was for several years Secretary of this Society,—L. M. Russell. He was for several years a member of our city council and also a member of the school board. While he was a member of the school board he had the high school grounds planted to shade trees; there were forty-two of them,—ash and elm interspersed alternately. It is only a question of time, however, until the elm will have to come out. Our high school ground is one of the most beautiful spots in the country; those trees have been taken care of and the grounds well looked after.

Another thing we do in our parking system, and that is to park all of the little triangular spots here and there. We don't number these in our parks though, but just call it parking our street-ends. We have two streets in the residence section of the city that are one hundred feet wide and we are parking each of these with a little park ten feet wide down the center of them. At the Burlington station the railroad company has a beautiful little park where the people while waiting can enjoy the shade and plants. While many of our people are interested in this work, it has been the result principally of two or three men. And many of them have

made fun of me for being so thoroughly interested in this work. Thy said "McCandless is crazy on parks." We have regular park officers, and in the city treasury we have a park fund. And the cost of these parks to the city is very small indeed. Arbor State Park did not cost the city more than $15, and I suppose $500 would cover the entire cost of McCandless Park. There is not $200 outstanding warrants on our park fund. We don't owe a dollar on our parks, and the title for them is in the city. All this work, too, is a matter of record. I drew the ordinances, without any cost to the city, and I got them as I wanted them. The people are interested and aroused now, and the sentiment is spreading for parks and the care and cultivation of them. There is a proposition up now at Wymore to get twenty acres across the river for park purposes. The sentiment for parks and better streets is continually growing, for the people have come to see that it increases the value of their property. I could go into a section of this town and buy a piece of property and improve it and inside of five years make it the aristocratic section of the town. The people would want to move around to that part of the town. In Wymore I had this very experience. As a matter of fact it is a good investment.

It is important to get this before the people. Now in the little town of Barnston, seven miles down the river from where I live, they have a little park of two blocks that will make their town beautiful in a very few years. All that is necessary is to show the people that they have the power to get these little parks; convince them that they can have these things. In Wymore we didn't have any money to start with. We just simply took the parks and then got the money afterwards. To get at the right value of the land for park purposes just call in a jury of farmers to appraise the land. If this Association should take up this work there would be no limit to what could be accomplished, and I want to say that I will be only too willing to give my time and labor to helping this Society or any town in the state toward getting

a start at a parking system. I shall be glad to draw up ordinances or help in any way I can. The first object, of course, is to get the necessary money for the parks. There is no question at all but what a park system is of value to any town; and no town in the state of Nebraska should be without a park or parking system of some sort. The property values around these parks increase so rapidly that we get our money back in a very few years. Here is a little booklet that I have to pass around, and in it you will find a good deal of valuable information as to how to proceed.

Now I am going to ask you to excuse me from going into this subject much further. This park idea is not new to you; but it is new to the people of these small towns and villages. It has been less than thirty years that the city of Boston asked the legislature of Massachusetts to make an appropriation for their parks. Since 1879 Boston has spent more than $3,000,000 on her park system, and it is cleaimed that Boston today has the finest park system of any city in the world. So you see that the idea is not old even in Boston,—in that state of culture and learning. If those states in the East had taken up this question of parks and more beautiful streets years ago it would not have cost them nearly so much as it does now. In nearly every town or city now you find some kind of woman's club or society that is interested in city improvement, and it is to the ladies that we must look for higher ideals along such lines. The men seem to be too busy for much of this kind of work, but when you do find a man with high ideals and who is interested in this sort of work you might know that his mother was a lady and had high ideals. So I say if we can get the ladies of Nebraska interested in this work of parks and tree planting and city improvement there will be great good accomplished. It is the greatest work and noblest work outside of horticulture; in fact it is horticulture in a sense. And now before I sit down I want to extend to the Nebraska State Horticultural Society a hearty invitation to come to Wymore for your next meeting.

We will pack every seat in our opera house with people who are keenly interested in this line of work. And we will show you a little town that for beauty is not surpassed by any in the state. I want to say again that I am ready at any time to help you men along the lines that I have spoken of and do what I can to assist in any way this worthy cause.

I want to thank you for the kind invitation to be with you and to take part on your program here tonight, and I thank you also for your kind attention and the interest you have in this subject. (Applause.)

Mr. Yager: Mr. Chairman, in view of the splendid talk Mr. McCandless has given us on this subject of parks and also in view of the good work he has done along this line I want to suggest that he be made an annual honorary member of our Society.

Mr. McCandless: I wish you would remove that "honorary" condition and let me pay my dollar the same as the rest of you do.

By a unanimous vote Mr. McCandless was made an annual honorary member of the Society.

President Green: The next subject on our program this evening is that of "Evergreens," by Mr. C. S. Harrison, of York.

EVERGREENS.

C. S. HARRISON, YORK.

A rich prairie farm is a canvas and the farmer should be an artist, painting on it a beautiful picture. This can easily be done if he gives the same attention to horticulture that he does to grain and stock raising. The one is as important as the other and should not be neglected simply because it is the fashion to ignore it.

THE MISSION OF EVERGREENS.

Go into a northern forest in the stillness of the winter and the scene has its charms. The branches are laden with snow, and you have the sunlight glinting on the white and green, and then you are impressed with a sense of security and comfort. The mercury runs about three degrees higher than out in the open. You have a feeling that you are being sheltered and protected. This same security and comfort can, in a measure, be transferred to the prairie home. It can easily be done and with very little expense. People have two erroneous ideas. One is evergreens are so hard to handle and another is that they are of such slow growth they will do nothing for you in a lifetime.

If handled right, you can transplant them as easily as you can elm or cottonwood, and on account of their rapid growth they are the terror of the nurserymen. Out in our field are Ponderosa or Bull Pines, only three years old and once transplanted that are twelve to eighteen inches tall. They are now well established and ready to make from one to two feet growth each year. Scotch and Austrian Pines are about the same, so with Douglas Spruce, while Jack Pines are the thriftiest of all.

SOME THINGS TO REMEMBER.

In planting evergreens, you must get those that naturally grow nearest to you. The Ponderosa Pine is peculiarly adapted to all that region lying between the Missouri river and the Rocky mountains. For the hot plains of Kansas, Oklahoma, and Nebraska, they should be grown from seed secured from the foothills of Colorado. For Minnesota, the Dakotas, and Manitoba seed should be obtained from the highest altitudes of the Rockies or the northern and highest ranges of the Black Hills or Wyoming. The Contorta and Aristarta Pines, the Englemanii Spruce, and Pungens grow at high elevations and would therefore succeed well in the North.

People often make this mistake. A man in northern Nebraska wishes to plant a lot of red cedar. He finds those raised in southern Illinois quoted at about half the price of the Platte Cedar grown nearer home. He gets a few thousand. They may do well for a year or two and then a hard winter knocks them all out. Another wants to plant some White Spruce. He hears that imported ones can be had cheap and he buys some. They prove to be worthless. Then he gets some from seed grown in Maine or New Hampshire and they are short-lived. He has some from northern Minnesota and Wisconsin and they do fairly well. There is a belt of White Spruce which lies along our northern states and swings down into the Black Hills into a climate somewhat analogous to our own. He gets this variety and they hit the spot completely. There are portions of eastern Minnesota, Nebraska, and Kansas where Norway Spruce and White Pine will grow if seed is secured from the nearest northwestern belt, but you try them with Scotch Pine, White and Black Spruce two hundred miles further west and they are a failure.

Inexperts recommend Scotch Pine for western Kansas and Nebraska. We who have watched things for thirty-five years, meeting with bitter experience, know bettter. We have seen groves of them in the Republican Valley going down under the sirocco. They can not live. Don't try to make an evergreen with soft foliage live under the 100th Meridian.

HERE IS THE SITUATION.

In the West we have the wet and dry cycles which may last for five or six years each. During the wet period, the plains fill up with people and the success of dry farming is heralded far and wide. The people move in with great hope. Trees adapted to conditions farther east are planted and do well for a time. Then comes the dry cycle with the fierce hot winds. White Willow, Soft Maple, Boxelders, Scotch Pines, White Pines, and Norway, White, and Black Spruces go down

completely cooked by the siroccos. I heard an instructor say, "You give the trees the forest conditions by planting them close together as they grow in the Black Hills and you can raise evergreens anywhere in Nebraska." Perhaps, if you could elevate the country 4000 feet and spread the Black Hills' climate over it, but you can not with present conditions unless you take trees adapted to the locality. This can easily be done. Most of the eleven kinds of Colorado evergreens will do well on the plains. The Ponderosa and Pinon Pines, the Brown and Silver Cedars, grow with the least moisture of any trees. The Ponderosa propagates itself on bald bluffs where nothing else will grow and it would probably have covered all our northern and western plains had it not been for the fires. They have saved themselves by perching like the cliff-dwellers beyond the reach of danger where they wave defiance while they cling to the sides of precipices or from almost inaccessible hilltops away from the reach of the fires. There is probably not a section of land on our western plains that might not be covered with these thrifty and heroic trees. When their character is known and people understand the ease with which they can be grown, our semi-arid regions will be filled with groves and windbreaks which will check the fury of the hot winds and make dry farming a signal success.

THEIR PROPAGATION.

You can raise them by the thousand as easily as you can peas. I am emphasizing this for this pine is the hope of the plains, and when I am gone people will remember what I say and benefit by my experiments. Nurserymen, and myself among them, have been on the wrong track. We did not understand this pine, and we treated it like other evergreens, planting under screens, and they resented it. They did not want any coddling; when covered they would damp off badly. In making a trip to the Black Hills, I saw a fine patch of

these young trees growing on hard pan where the soil had all been scraped off for the embankment. Near by were the parent trees. Then I reasoned, these seeds fell in the fall. The slush and snow covered them, they came up before the ground had time to dry off, and there they are. The next fall, with thanks to good old mother Nature for the lesson, I planted some seeds, about a pound to eight feet square, and covered with a half inch of fine earth or sand, either would do. And lo! the problem was solved. They came up with great vigor early in the spring. Damping off is the great trouble with raising evergreens. Often a man will have a fine stand, and all at once they will be mowed down in a day. The trouble is that the heat comes on before they have put on their second set of leaves while they are yet tender. Now, by sowing in the fall the plants get an early start and put on the second set of leaves and thus are immune before the excessive heat strikes them. Use these precautions and your success is sure. Do not allow birds or squirrels to interfere with the buds. Do not allow them to dry while germinating. In preparing the bed, take some clean ground, spade up the earth a foot deep, rake it down fine, level it, and put in the seed in rows, if you like. Put it in rather thick, cover with half an inch of fine earth or sand. If you can't get seed in the fall, then about the 15th of April soak it till it sprouts in warm water, changed every twelve hours to keep it from souring. Plant as directed as soon as the sprouts begin to show. When they come up they begin to go down, and the first year they will have roots twelve to fifteen inches long. If they are grown in the open, toughened to the heat of summer and the cold of winter, you can plant them out when a year old. If too dry in the spring, you can wait another year, but I have had splendid success with yearlings. When you dig, drift under the bed and get the full length of the root, for you need it all. Nature made no mistakes in furnishing it at such a length to support these long needles.

Dig a trench eight inches deep, perpendicular on one side.

The moment your trees are dug they must be put in a pail of water. Get down on your knees, take a tree with your left hand, place it against the upright bank of your trench, and with the right hand bring the loose dirt against it, pressing it down. Of course the root is doubled in. Put them three or four inches apart. After you have planted a while take the hoe and fill the trench, stamping the earth solid on either side. One serious trouble in planting evergreens is the earth is not packed solid enough around them. In a day or two go over the surface with a hoe or rake to loosen the top and keep it from drying out. You will soon get on to it and can plant two or three thousand in a day, with little trouble.

THE COST.

The seeds are hard to get. There are not enough saved. They usually run about $2.00 a pound. At the lowest estimate, you should have four thousand to the pound. You might get twice that amount. It does not take long to plant them. After transplanting let them stay two years, when they will be a foot or more in height, with splendid roots. Now plant them in a grove or windbreak. Cultivate well the first year. It would pay you to cultivate thoroughly for several years. I have raised these pines for years in this way, in the dryest and hottest seasons, with no irrigation except that given with a diligent hoe, without losing more than five per cent. You can plant eight feet apart each way and put some deciduous trees between them which must be cut out before they begin to crowd, or you can plant potatoes or beans or some sweet corn in alternate rows. Strong field corn might be too rank. In planting beware of spots infested with white grubs unless you see the ground ridged with moles, which are the farmer's best friends. I had $1000 worth of evergreens destroyed in one season by these grubs, as the moles had not found them. These never eat vegetables but always eat grubs and worms, and their presence is a sure

sign they are needed. These pests multiply so rapidly that were it not for our underground friends they would take the earth. On my place, I count every mole worth $5 at least.

The Ponderosa Pine is the best known for the West. I once brought a lot of collected trees from the mountains and cultivated them well the first year and then, to test them, left them alone to fight their way with drought and weeds. For two years it was very dry, and I do not see how a drop of water could have reached the roots, and yet they made a foot a year, and where cultivated, they grew two feet. There has been a prejudice against this tree because we are told they are so hard to transplant. This is because so many have attempted to grow these trees pulled from the forests. The trouble with the forest tree is, when you go after it, the root is not at home, it is out foraging, you just get the stub. Grow them according to directions and you can raise them as easily as you can potatoes. Perhaps you do not wish to bother with the seeds and prefer to try plants. These at one year old, selected strong ones, are about $1 per hundred; two year old transplanted, $3 per hundred; fine three year old, transplanted, $5 per hundred.

THE JACK PINE—PINUS DIVARICATA,

While young, is by far the most rapid-growing of all our evergreens. There are two varieties of this tree. The eastern type is a poor, bushy, stunted affair. The Northwestern variety is a tree of great vigor, and in its native forests is packed and crowded like the Pinus Contorta of the Yellowstone, which is a field of masts crowded thickly together. This tree is now in great demand for railroad ties. In a trip to the North I saw thousands of them beside the track which, having had a treatment of creosote, were made quite durable, and the amount that could be secured from an acre was something wonderful. This tree grows rapidly on any kind of soil. I have known them to make two and one-half feet a year on a clay bank, without cultivation.

Years ago, the Bruner Brothers, under direction of Dr. Fernow, then U. S. Chief of Forestry, planted several thousand in the sandhills of western Nebraska. They could not plow the land on account of the drifting of the sand, so they were put in and left to themselves, without cultivation or irrigation. Under those unfavorable conditions, they are now making two feet a year and scattering seeds so that young plants are coming up all around them. Nearly one-fourth of our great state is a desolation—a succession of sand banks now worth $1 per acre, but a sand bank is a cordial invitation to a pine tree. These almost worthless lands planted to Jack Pines, which would cost, delivered, about $10 per thousand, would, in a short time have a present and prospective value of $100 or more per acre. Land is rising in value, and the wonder is that such an opportunity is so long neglected. The trouble with us as a people is, we never can wait to grow a crop of acorns. We won't do anything for the future. We must have immediate results. A man should realize that there is a future, and he is related to it. He can plant a forest which will continue his usefulness as a benefactor long after he is dead. He can create conditions which will surround his memory with a halo. You plant forty acres of pines. You see them growing while you live. Your name and history are in them. You pass away and thousands see the work of your hands, and as they walk through those long aisles, overarched with green, they will bless your memory. If you are not immortal then live and die like a dog. If you believe you are to live forever, leave something behind you to let people know you passed this way and left blessings in your path.

The United States Government is planting nearly half a million acres of Nebraska sandhills, and our great state looks on and does nothing. It is a burning shame that neither governor nor legislature take this matter in hand. We are a parkless state. While our neighbors are launching out with improvements along this line, we are content to drift, when

there is no state in the Union that could have parks so cheaply planted on so grand scale which, in after years, would bring in such satisfactory returns.

You can not successfully grow Jack Pines from seed in Nebraska. They grow readily by the million in their own northern habitat, when they are sent out by the hundred thousand every spring.

EVERGREEN BARNS.

In many parts of the Middle West the air is dry and there is but little rain or damp snow in the winter. Lumber is getting out of reach, and yet cattle need better shelter than a wire fence. Lay off a quarter of an acre or more, according to the size of your herd. Have the ground in the best of cultivation, around this put two rows of Austrian of Ponderosa Pine. If toward the 100th Meridian, take the latter. Have the rows eight feet apart and put the trees the same distance apart in the row, breaking joints. Give the trees the best cultivation. They will cost you five to ten sents apiece. In five years you have quite a shelter which is growing better each year. The lower branches touch and the double row keeps out the wind. In about ten years you can cut off the limbs as they project into the yard so the cattle can get under them. At this stage the trees are making a splendid growth and giving fine protection. Put your stacks in the center, you can use a movable top. The trees will defend your hay from the winds and storms. In fifteen or twenty years you have a splendid shelter. You just plant the trees and Nature puts on the siding and covering. While a timber barn would decrease in value, this is getting better and better. The yard should be cleaned out every spring and sowed to corn or sorghum. The ground should be plowed, otherwise too much manure would injure the trees.

A WINTER FOLIAGE GARDEN.

In summer we love a diversity in our trees; we like different shades of green, and now and then one of purple, another of golden color to break the monotony, and in the autumn we love to see forest and mountain in variegated dress, as though the whole landscape were turned into one vast flower garden.

Beautiful, indeed, is the evergreen foliage garden of winter. There are numerous forms of shadings of the Douglas Spruce. The Picea Pungens has a pleasing diversity, varying from light green to silvery blue. The Austrian Pine is dark green, so much so that in Germany they make what is called black forests. The Ponderosa, with long and glistening needles is very attractive. The Scotch Pine is light green. In short, an evergreen grove, with a dozen kinds of trees gives a rich harmonious blend of color. The view is an unending delight. You have here a picture of warmth and cheer and this, too, when all else seems dead and gloomy, which is indeed a wide contrast to the somber earth and universal winter desolation.

In transplanting evergreens of larger sizes than we have mentioned, immediately after digging, they should be dipped in a puddle of thick mud, made of the richest soil. Some use clay on account of its adhering so closely to the roots, but it has been found that if this should dry, it forms an impervious coating which the tiny rootlets can not penetrate. So use rich loam for the mud, and your tree is virtually planted from the start. Trees thus protected, can be handled with safety out in the field. If there is danger of drying out before you can plant all of them, dip them again. Thus you seal the roots air tight. In planting be sure to firm the earth solid about the root. It is not enough to get up a war dance on the surface, you must see the earth is packed solid on the roots. Often trees thought to be well planted can be moved up and down like a churn dash, which shows the work has been poorly done. In a well-cultivated field, if the ground is moist when you plant, they will not need water-

ing in the summer if you cultivate thoroughly. Perhaps you wish to move evergreens from four to six feet tall. In that case, you must always dig around the tree, secure a ball of earth with the roots, and bind or sow burlap snug around it, then water it thoroughly. In this way you can move it. In planting evergreens of any size always plant in a depression, and not on a ridge. In planting large trees, have a good-sized hole; put fine earth next to the roots to nourish them the first year and water thoroughly. You will have to watch trees set in the yard and water often the first year. Have them in a depression which will hold a tub of water and fill it often if dry. Once established, they will endure most any kind of weather.

THE PROTECTED AND UNPROTECTED HOME.

What would you think of a man who would not defend his home, who would not keep out any baneful influence at any cost? A man once came to me with tears in his eyes and amid his sobs said, "There is a man who comes to my house who is supplanting me in my wife's affections and my home is broken up" and then he broke down in a wail of despair, "What shall I do?" "Do, why just give that fellow a half a mile ride on the toe of your boot." "Oh, I can't do that," and so he allowed his wife to get a divorce and marry a brute who soon killed her with cruelty and his children were scattered and he left desolate because he didn't defend his home. A man would naturally protect his home from robbers and he would not care to have it surounded by troops of noisy hoodlums, and yet he will allow that tyrant of the north, Old Boreas, to fairly bombard his home when he comes with the scourge of the North Winds and all the imps and shrieking demons of the storm. He will allow him to assail his dwelling, year in and year out, and make no resistance, whatever. Whenever one of the women steps out of doors, she is assaulted by all the hoodlums of the air, pinched and pulled and driven

at the mercy of all the storms that rage. The poor cattle and horses, when turned out to drink, how they shiver. The cold gets into their marrow bones. How intensely they suffer under the keen torture of those piercing winds. It is simply cruelty, doubly distilled, to thus neglect those dependent on a man for his protection.

HERE IS HIS NEIGHBOR.

How cosily his home is sheltered by that beautiful grove of evergreens which throws itts protecting arms around the barn also. The storm king is defeated. His attacks are powerless. A splendid grove of pine windbreaks seems to have moved the farm barn three-hundred miles to the south. You have two different countries, two distinct conditions with only a line fence between them.

In buying evergreens, always get of your nearest nurserymen if possible. He has an interest in you and in the trees he entrusts to your care. Your success is his, also. He is not getting very rich out of the business, his work is largely one of benevolence. If it had not been for our enterprising nurserymen, what a dreary world we would have.

For further information along this line send 25 cents to the Experiment Station, York, Nebraska, for the evergreen book, which gives the result of thirty-five years' experience in the trying climate of the West.

President Green: If there are no questions to be asked Mr. Harrison the meeting will stand adjourned until tomorrow at 1:30 P.M. I want to announce, however, that tomorrow morning promptly at 9:30 we will meet here for an automobile ride about the city; we will go out to Mr. Dole's greenhouses and to the German Nurseries and other points of interest. Everybody should be here promptly at 9:30.

THURSDAY, JULY 22.

1:30 P.M.

President Green: Our meeting will now come to order. The first number on the program this afternoon will be given by the Centenary Male Quartet.

The quartet gave three very enjoyable numbers, which the audience appreciated very highly.

ROSES FOR OUTDOOR PLANTING.

V. V. WESTGATE, UNIVERSITY OF NEBRASKA, LINCOLN.

Of all our flowers the rose is, without doubt, the queen. It is not only the most popular for home gardens but is also the standard forcing flower, the carnation being its closest competitor in this respect.

Several factors are responsible for the great importance of this plant, such as the following: the wide adaptation of the rose, its various types, and the many fine qualities of its blossoms. The rose flourishes in the greenhouse and also does very well as a garden flower. Although it prefers special soil and weather conditions, yet it will give very satisfactory results when subjected to a variety of conditions.

In the genus Rosa we find flowers that bloom at all seasons of the year. Certain classes are perpetual or continuous bloomers, while others send out their masses of bloom at definite intervals. We also have the dwarf, bush, and climbing varieties so that it is possible to use the rose in many ways for landscape work.

Not only do its wide adaptation, various types, and habits promote its popularity, but its blossoms proper are equaled by but few, if any, of those of other plants. Their range and delicacy of color and fine odor place them in the lead for cut flowers. However, it is not my intention in this paper to go into detail regarding rose culture which the size and importance of the subject would warrant. I merely wish to give

briefly a few of the main points about their culture, and lastly to mention a few things respecting some rose varieties which I have tested under outdoor conditions.

First of all in planting roses in the garden, be sure to choose a good location, for it is impossible to remedy the site after the planting has been made. If possible, choose a well-drained southern exposure. Morning sunshine is better than afternoon, if one is forced to make a choice between them because of limited room. Most roses prefer a good deep rich loam, the hybrid perpetual class requiring a somewhat heavier soil than the more tender varieties. For this reason, after you have selected the location, prepare the bed by removing the soil to a depth of two feet. Put about six inches of manure in the bottom of the bed, and then replace the soil, mixing it with manure as you replace it.

In selecting plants for the bed, obtain those that have been grown in the nursery, because they will be more accustomed to outside conditions. If you must take greenhouse plants, they should be gradually subjected to the change of conditions by first setting the pots out into a cold frame or other similar place, where it will be possible to cover them during the frosty nights of spring. If they are transplanted directly from the greenhouse to the bed, they will be retarded and some of the more tender kinds may be killed on account of the sudden change. Too shallow and too deep planting are alike injurious. If planted too shallow, the roses are not well supported and the roots do not do well. On the contrary, if planted too deep the stems may rot. "Budded" plants are considered as being somewhat better than "own rooted" ones by the majority of growers. With "budded" plants, however, one must be very careful and keep off all "suckers" that may sprout from the stock portion of the rose.

If the rose bed is deeply prepared in the beginning, it is not necessary to practice deep summer cultivation. Stir the soil often but only to a depth of a few inches. In addition to preventing "sprouting" or "suckering" which I mentioned

before, one should keep all flowers or at least all withered flowers picked in order that they will not detract from the vitality of the plants. Liberal quantities of manure placed about the plants occasionally is also very good for forcing the roses to bloom more freely. When winter approaches, the roses should be mulched with about eighteen inches of leaves or straw. Even the hardier varieties will come out more vigorous in the spring if given a light protection.

Pruning is one of the most important factors in rose growing and it is one thing the average person fails to successfully perform. In general, light pruning will give many flowers, whereas heavy pruning will allow only a few of very large size to be developed. Very little fall pruning is neces sary. Merely remove the bushy tops and cut back the long canes so you can protect them better for winter. In the spring, cut back the hybrid perpetual, hybrid tea and moss roses about two-thirds of the previous season's growth. Such roses as the hardy climbers and rugosas should be pruned as little as possible. Cut off about one-fifth of the previous season's growth from such plants and trim out all old and dead shoots.

The rose is not subject to very many serious insect or fungous troubles. The rose beetle is considered by many as being the worst enemy of roses. About the only good way of preventing its ravages is to carefully examine the rose bed every morning and pick off all the beetles that are to be found and destroy them. Rose slugs also become injurious occasionally but may be held in check by frequent sprayings with a good insecticide such as lead arsenate (1½ pounds to 50 gallons of water). This adheres better on the plants than Paris green, and is not so apt to injure the foliage. Several fungous diseases such as the black spot and the mildew frequently affect the rose. In fact, one can scarcely find a rose bed which does not have one or both of these diseases unless such beds have been unusually well cared for. Spraying with Bor-

deaux or potassium sulphide will successfully hold these diseases in check on most of the varieties.

In general, it is best for the amateur to buy his plants from the nurseryman or florist and not depend upon propagating them himself. The only sure way of starting roses, except those which root when layered, as some of the climbers and Wichuriana, is from cuttings placed in sand in the greenhouse and given bottom heat. A few of the hardy roses may be started from dormant cuttings which are placed in the open. In making such cuttings for outdoor setting take six-inch lengths of the current season's growth and bury them about eighteen inches deep in sandy soil just before the ground freezes in the fall. Cover the soil above them with a thick coat of leaves or straw for winter protection. When spring comes, remove and plant them out, leaving a single bud above the surface of the ground.

The varieties which may be grown here are very largely determined by our climatic conditions. Certain kinds of roses are perfectly hardy and will withstand any of our trying winters; others are half hardy, and still others are so tender that they kill during winter even though given the best protection.

In the spring of 1907 we set out at the Nebraska Experiment Station about sixty different varieties of roses (having several plants of each). The varieties were of various colors and represented the different types or classes. We selected those which were especially recommended and had in the lot about 20 different kinds of hybrid perpetuals, 7 or 8 tea roses, an equal number of hardy climbers, and 20 kinds of rugosa, hybrid tea, moss and Wichuriana roses.

These plants were greenhouse grown, but we hardened them off in a cold frame for a time before planting them outdoors. They received very good care during the summer following planting and were carefully mulched the first winter. However, nearly all of the teas and hybrid teas were dead in the spring and the remainder were killed last winter. At

present all of the teas, hybrid teas (except Madame Eugene Marlitt) the Bourbon China, and several of the hybrid perpetuals are dead.

Nevertheless some kinds have withstood the winters very well and should be mentioned. Crimson Globe, Cumberland Belle, and Purpurea rubra, belonging to the moss group, came through exceedingly well. All of the rugosas, Rugosa alba, Rugosa magnifica, Sir Thomas Lipton, and the New Century, as would be expected, did likewise. The Wichuriana and its hybrids proved hardy also.

The climbers which did well might be summarized as follows:

Baltimore Belle—pale blush and white,—very good.

W. C. Egan (raised from Rosa rugosa)—pink.

Dorothy Perkins—shell pink,—very good.

Philadelphia (Crimson Rambler x Victor Hugo), flowers much like Crimson Rambler.

Northern Light—pink and white blossoms,—very good.

Sweet Briar—single pink.

Debutante (Wichuriana x Baroness Rothschild)—pink.

The following hybrid perpetuals have been blooming very good, two years after planting:

White—Madame Plantier and Margaret Dickson.

Pink—Baroness Rothschild, Belle of Normandy, Magna Charta, John Lang and La Reine.

Red—General Jacqueminot (Gen. Jack), Marshall P. Wilder, Ulrich Bruner, Baron de Bonstetten and Alfred Colomb.

A half dozen varieties of hybrid perpetuals in the test were too tender, and winter-killed. Among these were the American Beauty, Frau Karl Druschki, Gloire de Lyonaise, Jean Liabaud, and Vick's Caprice.

In conclusion, I would recommend that the average person confine his planting to those kinds that have proven perfectly hardy, although there is no doubt that some of the others can be carried through the winter if given very good individual protection. One can not afford to bother with the more ten-

der kinds, however, when there are good hardy ones that almost take care of themselves.

President Green: We will now hear from Mr. Bishop, on the subject of "Horticulture in our Public Schools."

HORTICULTURE IN OUR PUBLIC SCHOOLS.

E. C. BISHOP, STATE SUPERINTENDENT OF PUBLIC INSTRUCTION.

Mr. Chairman, Ladies and Gentlemen:

It would probably be better if I were to take the general subject of Agriculture in our Public Schools, for our agriculture course includes horticulture and all its kindred subjects. What we would like, however, would be to have each branch of agriculture treated as thoroughly and simplified as much as possible. Just to give a general idea of what we are trying to do in our agriculture course I will mention the different subjects that we aim to cover in the high school course. This first division covers a period of eighteen weeks, and includes under the title Garden and Orchard Crops, the following:

1. Location and site for gardens and orchards: elevation, aspect, soil, windbreaks, etc.

2. Laying out the grounds: (a) for fruit, vegetables, and flower crops; (b) for ornamental effects.

3. Propagation: (a) by seeds—stratifying, storing, scalding, soaking, planting, germination, seed testing; preparing seed beds, cold frames, hotbeds, etc.; (b) by separation—division, layerage—bulbs, corms, tubers, suckers, stools, stolons, offsets, layers, etc.; (c) by cuttings—roots, tubers, leaves, growing stems, dormant stems, etc.; by graftage—budding, inarching, root-grafting, top-grafting; preparation of grafting wax, etc.

4. Transplanting of trees and plants—digging, packing, unpacking, heeling-in, puddling, planting, pricking out, potting, shifting, etc.

5. Tillage of gardens and orchards—cultivations, mulching, cover-crops, etc. Windbreaks.

6. Manures and fertilizers.

7. Pruning and training—for growth and for fruit. Fruit buds, wounds, bush fruit, grapes, fruit trees, shade trees, shrubs, hedges, etc.

8. Protection against frost and freezing—burying, mulching, wrapping, shading, whitewashing, etc.; foretelling frost; relation of maturity to hardiness; of soil moisture to winter injury.

9. Protection against insects, rodents, diseases, etc.; types; preparation of spraying mixtures, use of spray pumps, etc.

10. Harvesting and storing fruit and vegetables.

11. Classification of shade trees, shrubs, hardy flowers, annual flowers, vegetables, fruits, etc.

12. Plant improvements—variation and inheritance of plant characters, hybridization, selection, etc.

LABORATORY EXERCISES

The laboratory exercises include drawing plan for (1) the ornamental planting of the school ground or of the home grounds, (2) small orchard and garden. (3) Preparing hotbed and sowing vegetable seeds in it. (4) Sowing vegetable and flower seeds in flats indoors. (5) Preparing seed bed and sowing seeds in the school garden. (6) Seed testing. (7) Stratifying peach pits. (8) Scalding honey locust seeds. (9) Examining the bulbs of tiger lily, corms of gladiolus, tip-layers of black raspberry. (10) Separating stools of canna and rhubarb. (11) Making and storing hard wood stem cuttings of grape, willow and various hardy shrubs; (12) root cutting of horse radish; (13) leaf cuttings of bryophyllum; (14) soft wood stem cutting (slips) of geranium, etc. (15) Preparing grafting wax. (16) Making root-grafts of apple. (17) Budding willow cuttings. (18) Transplanting trees, shrubs, and small plants. (19) Examining and using garden cultivators. (20) Mulching trees and plants. (21) Studying fruit beds. (22) Pruning trees, shrubs, and small fruits.

(23) Preparing Bordeaux mixture and (24) kerosene emulsion. (25) Identifying shade trees, evergreens, ornamental shrubs, etc., on school ground. (26) Studying variation in samples of beans and corn, (27) studying crossed popcorn and sweet corn.

EQUIPMENT FOR LABORATORY WORK.

The following equipment for laboratory work is recommended:

School garden.

Fruits, vegetables, and flowers.

Cellar storeroom, if possible.

Seeds of vegetables, flowers and trees; apple stocks and scions for grafting; willow cuttings for budding; various bulbs, corms, tubers, etc.; vegetables for storing.

Flower pots and shallow boxes (flats) for plants, seedlings, cuttings, etc.; earthen plates and blotting paper for seed testing; tin cups for making grafting wax; glass beakers or tumblers for mixing spraying materials.

Garden loam, rotted sod, fine manure, and sand for growing plants.

A pair of pruning shears, a saw, two grafting knives, twelve budding knives, a razor strap, six dibbers, six hoes, six rakes, a spade, a shovel, a garden line and reel, and a wheelhoe.

For spray mixtures: one peck quicklime, five pounds copper sulphate, one pound Paris green, soap, kerosene.

For grafting wax: two pounds resin, one pound beeswax, one pound of tallow, wrapping cord for budding, knitting cotton for grafting.

The course in agriculture is separated into five divisions: 1, soils; 2, field crops; 3, garden and orchard crops; 4, farm animals; 5, milk and its products. One point of credit in agriculture is given by the University of Nebraska if the course is properly carried out. Since all of the five divisions can not be properly covered in one semester, it is recom-

mended that each school select three divisions of the subject; that the selection include soils, field crops, and one of the three remaining divisions. We find that nearly all schools select horticulture as one of the divisions.

In the rural schools, horticulture is taught as a correlated subject under the head of nature study, home geography, and agriculture, the nature study work being given in the primary grades, the home geography work in the intermediate grades, and agriculture as applied to the state of Nebraska, in the eighth grade. What we aim at in the work in the public schools is to interest the child in such phases of plant and animal life as are concerned in his environment, and to lead him to the study of such phases of the subject as will enable him to conduct his study along right lines. For this reason, we begin with the plants and animals with which the child is concerned in his home and in his community, going from thence to more general fields in which the child should be concerned in order that he may have a better appreciation of those phases of the subject which are under his immediate observation.

Agriculture is a comparatively new subject with us. Our teachers have been preparing as best they could to teach the subject, but we are not yet in a position where it can be handled as effectively as it should be because of the lack of means of thorough preparation on the part of public school teachers. Conditions, however, are growing better each year. Our normal schools have put in special departments for teaching agriculture, and our normal training high schools, which turn out hundreds of teachers for the rural schools each year, must maintain a course in elementary agriculture. This will soon supply us with teachers who have had some training for the work and will lead to better preparation of teachers, hence to better teaching of the subject. As it is now, we aim at only very elementary work, and encourage the student to make original investigations, to read as extensively as possible from state and national bulletins and other sources

which will enable him to follow out his investigations intelligently.

Horticulture is one branch of the subject which should have attention in every school. It should create in the child such interest as will lead him to get the information necessary to meet the climatic and soil conditions which are required for the cultivation of plant life in his community. Homes all over the state will be much better provided with home-grown fruits, and lawns and dooryards beautified in a way that will not only bring pleasure to the eye, but a profitable supply of adaptable fruit, as soon as our public schools are able to put in the necessary equipment and provide the teachers who can properly correlate the study of agriculture with that of the other branches taught in the public schools.

The Nebraska boys and girls clubs in their work in home gardening are bringing about a change in the idea as to what can be done in the way of home products in fruits in Nebraska. The canning and preserving of fruits by our girls' domestic science clubs has led to a better cultivation of fruits and to a better utilization of the products. The subject as a part of our public school work is here and here to stay, and it promises greater development than any other subject with which our public schools are concerned.

REPORT OF COMMITTEE ON RESOLUTIONS

Resolved that the Nebraska State Horticultural Society, assembled at Beatrice, this 22d day of July, 1909, express a vote of hearty appreciation for the efforts of the local horticulturists in making this meeting a success.

First—We wish to thank Messrs. Doles and Sondereggers for the splendid entertainment furnished the Society.

Second—We wish to thank the citizens of Beatrice for their hospitality and especially for the enjoyable automobile ride about their city.

Third, the proprietor of the Burwood hotel for his cour-

teous treatment of guests and his liberality in donating this pleasant hall for a meeting place.

We desire to thank also the newspapers of the city for the publicity they gave the meetings through the columns of their papers.

VAL KEYSER.
R. A. EMERSON.
C. G. MARSHALL.

Resolutions adopted.
Meeting adjourned.

ANNUAL MEETING

Proceedings of the forty-first Annual Meeting of the Nebraska State Horticultural Society, held at the University Farm, Lincoln, January 18, 19, and 20, 1910.

ANNUAL MEETING

Following is a copy of the program which was carried out essentially as published:

PROGRAM.

TUESDAY, JANUARY 18, 9:00 A.M.

Arranging Fruits and Cut Flowers. Renewing acquaintance and membership. Annual Membership $1.00; Life Membership, $5.00.

2:00 P.M.

Invocation . . . . Rev. J. W. Jones, Lincoln
Address of Welcome . Chancellor Samuel Avery, Lincoln
Response . . . . . C. S. Harrison, York
Growing Raspberries . . J. W. Nation, Fremont
Growing and Marketing Strawberries . H. Davey, Blair
Growing and Pruning Grapes G. W. Shaver, College View
Secretary's Report.
Treasurer's Report.
Question Box.

WEDNESDAY, JANUARY 19, 9:00 A.M.

Horticultural Opportunities for the Tenant Farmer . . . . . D. S. Dalby, Beatrice
Recent Advancement in Horticulture . . . . . Prof. J. C. Whitten, Columbia, Mo.
Question Box.

11:00 A.M.

Election of Officers.
Business Session.
Reports of District Directors of the State.

2:00 P.M.

Decorating . . . . L. Henderson, Omaha
Commercial Carnations . . Irwin Frey, Lincoln
Ornamental Trees . W. L. Adams, Supt. Parks, Omaha
Ornamental Shrubs and Plants . W. H. Dunman, Lincoln
Question Box.

THURSDAY, JANUARY 20, 9:00 A.M.

How We Grew and Marketed 12,000 Bushels of Apples
. . . . . G. A. Marshall, Arlington
Guarding Against Frosts and Freezes with Smudges and
Heaters . . . C. E. Mincer, Hamburg, Ia.
Nebraska at the Horticultural Congress of 1909 .
. . . . . C. H. Barnard, Table Rock, Neb.
Discussion: The Fence Post of the Future.
Reports of Standing Committees.
Question Box.

2:00 P.M.

APPLE JUDGING CONTEST.

Pro rata Premium, ... $100.00

Open to members of the Society who have not been a member for more than three years. Four plates each of ten standard winter varieties will be used for this contest. The contestants will rank the four plates of each variety 1, 2, 3 and 4, according to their merits and note the apples of different varieties substituted.

The premium money will be pro rated among those scoring more than 70 points out of a possible 100.

G. A. MARSHALL.
A. J. BROWN.
C. H. BARNARD.
Referee Judges.

PROCEEDINGS.

Opening Session, January 18, 1910, 2:30 p.m.

Meeting called to order by President C. H. Green, of Fremont.

Invocation by Reverend J. W. Jones, of Lincoln.

ADDRESS OF WELCOME.

CHANCELLOR SAMUEL AVERY, UNIVERSITY OF NEBRASKA

Mr. President, Ladies and Gentlemen of the State Horticultural Society:

I can assure you that it is a great pleasure to me to appear here and say just a few words of welcome at this the opening of your sessions. I think I am getting old because memory occasionally runs back to pioneer times. I remember when I first saw the state of Nebraska. Crossing on the old steamboat—the Vice-president—in the year of '76, we entered upon a land practically treeless, and I constantly found something that impressed my memory. Most of all was the fruitless country, because at that time the railroad had not incorporated the plan of cold storage, when the plains were almost divested of any fruit. I remember, friends, some pioneers and some agents that took cooked carrots and burnt sorghum and called it fruit, but it was just as palatable as burnt bran. There was only one man that held up his head and looked forward to the future with any hope of our ever bettering this condition, that man was a professor who made that good fruit, I allude to my old friend, Mr. E. F. Stephens, of Crete. Now, from the beginning of my acquaintance with this eminent member of your Society my personal relations all these years with horticulturists of the state have been most pleasing, and I remember a number of years later, as a student of the state of Nebraska, we as students welcomed his fruits, not only for the treats they contained, but for the exhibits of fruit;

furthermore from the fact that this Society in those days always had a barrel of perfectly sweet cider, and they never watched the students slip in with long straws under their coats and help themselves. Then as I went on into professional work my pleasant relations continued. I remember of one eminent member sending in samples of cider, and upon examination of it I reported that there was a great deal of salicylic acid in it, and immediately the students wanted to know what effect that would have on the system. I told them that it disturbed digestion but was said to be good for rheumatism, and the next day from the Dean down every one had the rheumatism.

Speaking in a more serious vein, scientific agriculture first began to develop along horticultural lines. Horticulture blazed the way to see what could be done, and when they first set about it to see what would make the field crop a better crop, of the men making agriculture such a success the first scientific agriculturists were horticulturists. So I think, not to make any disparaging comments on any other workers, we can say truthfully that the horticulturists have stood in the front rank of those dealing with agricultural subjects and of the phenomena therewith.

Now I realize that you have an interesting program prepared and I must not take up too much of your time. I will close by formally expressing the gratification the University authorities feel when such a splendid body of men meet here in our rooms, and I hope you will have during your sessions a most agreeable meeting and that everything will be profitable and pleasant. I thank you for your kind attention.

RESPONSE.

C. S. HARRISON, YORK

Mr. Chairman and Friends:

When one looks at that beautiful exhibit of flowers and fruits he feels like hurrahing for Nebraska. What changes

there have been from a fruitless to a fruit-bearing state. I remember when I first came here I wanted some strawberries, that was at York. I remember in the early days what an intense longing we had for fruit. With carrots and beets and everything else, I remember when mother used to chop up meat for mince pies. But when I went to York I planted some fruit; I planted some strawberries, but I found that the children were getting in and eating them, so I put up a warning, "Thou shalt not steal," and when I went out to get some strawberries I found that the children were just a little thicker than the strawberries, taking both the ripe and the green ones, too, and I said help yourselves and pick them as fast as you can, and they did. I have lived to see the time when we have Nebraska grown products of fruits, grains, corn, wheat, oats, young forests, and thus began the advancement along horticultural and forestry lines. I lived amid the students as they swarmed into our University, and I think the Nebraska-grown students are the best and the richest acquaintances we have yet received, and one we have received is a Nebraska-grown Chancellor. We didn't have to import him, but we got just as good a one as there is going; we are proud of him, we love him, and we will say God bless him.

Now then, Mr. Chancellor, our Society is near the dividing of the ways. In the first place we loaned our energies toward the development of fruits. Well, that was all right, but there is a higher phase, and we are paying especial attention to that. You will find it so east, west, north, and south that they are doing the same. I attended one of those great meetings in Minnesota, where there were over 3,000 members, with a society where you would think in that forbidding region there would not be anybody hardly, and there is great enthusiasm. Going farther east you will find still greater enthusiasm. You may visit the Wizard of the North, Professor Hansen. He is working problems along the same lines. And we want to push to the front. The girl that associates with the trees and flowers in the world is going to be a lady, and the boy

that doesn't spend all of his time in the backyard, but has some time for the frontyard and its beautifying, instead of being a bore, he will be a gentleman. So there is a higher education along the development of the beautiful. We are destined for the beautiful as we stand on the shores of life. The universe rises before us as the flower garden of God, field beyond field from the shores of chaos to the high arc of God. I am preparing a book now, "How to Become an Extinguished Minister." What little time I have left I want to make an impression, to preach the evangel of beauty, and I hope the whole state will be glorified and so await the call of the Father, who says: "I stand at the door and knock," who not only has the spiritual gifts but is adorned with the beauty of the Lord which is to be upon us.

President Green: The first paper this afternoon is "Growing Raspberries," by Mr. Nation.

GROWING RASPBERRIES

J. W. NATION, FREMONT

In presenting this subject I do not wish to pose as a "sage" on raspberry culture, but merely as an amateur; one who has his ups and downs, mostly downs.

The raspberry occupies a place in the berry season peculiarly its own, coming in as it does between the strawberry and blackberry, thereby making a continual crop throughout the berry season.

There are four distinct species of raspberries in cultivation: the black, red, purple, and yellow. Having never grown the latter two I know nothing about them.

The blackcap, or black raspberry (Rubus occidentalis) is an American species. Since its introduction in 1832 it has become one of the most important of bush fruits, and is extensively raised for dessert, canning and evaporating; so far as I can learn it is about the only raspberry extensively grown for evaporating.

The raspberry, like all small fruit, does better in a rich, heavy loam, but will do fairly well in a sandy loam, especially if it be rich in humus.

Our first experience in raspberry culture dates back to the spring of 1904, when we purchased 100 plants, supposedly Kansas and Cumberland, of our friend and neighbor, Bro. Yager, and so far as we have been able to learn they were Kansas and Cumberland. These were set in good rich Platte river bottom soil, not especially prepared, yet fairly well prepared by plowing, harrowing, and clod-smashing or floating. They were set by a green man (your humble servant) and a small boy. We set them in two rows five feet by about 3½ feet in the rows, by throwing out a spadeful of dirt and then placing the plant in and firming the soil well about the roots. Almost every plant lived. They were cultivated with a five-toothed one-horse cultivator and hoed enough to keep down the weeds. They made an excellent growth, and the next year had quite a crop of fine berries, more than enough for table use. The second year we cultivated them about the same as the first year, letting them have their own way as to growth and "tipping." They made a great growth, and in the spring of 1906, after two or three cultivations, we mulched them very heavily with common prairie hay, and such a crop, loaded with great big berries, that would make one's mouth water. By this time we had read several articles on "care and culture of raspberries" and were getting raspberry wise, and as each and every article had told us to pinch back the young shoots we proceeded to pinch them back, also cut out the old canes when the season was over. Our patch looked fine and we had the pleasure of admiring them all fall, winter, and early spring, but imagine our surprise when one day we examined them only to discover that about four-fifths of them were dead to the ground. Yes, dead! Right then and there we began to take notice; to sit up and think. Dead! Why had they died; what had we done, or not done to make them die? That was the question.

We had pinched them back; we had cut out the old canes; not needing new plants we had kept them from "tipping," except an occasional one here and there. We proceeded to cut out all of the dead canes, and cultivate the patch thoroughly, giving it a good coating of stable manure. Imagine our surprise as the season advanced to discover that all that had "tipped" were alive and bore heavily. Since then we have not pinched back the new canes and have good crops both in 1908 and 1909. Our observation has been that a plant begins to freeze at the tip, and if allowed to take root, there is no "tip" to freeze. Are we right?

Red Raspberries—Two species of red raspberries are cultivated. The native American (Rubus strigosus) and the European (Rubus idaeus). These two plants are closely related botanically, but differ very materially under cultivation, a marked distinction being the habit of the European species to continue fruiting throughout the season after ripening begins. The European sorts are less hardy than their American cousins, and can not be relied upon. Out of a total of 100 or more that have been introduced in this country, not more than six or eight have stood the test.

The red raspberry in some ways is more satisfactorily grown than the black, especially for home use and marketing. It comes into bearing rapidly, and is serviceable for a number of years; the canes grow directly upward, do not turn over and take root, hence are more easily cultivated.

Preparation for Planting—Put on from fifteen to twenty loads of stable manure to the acre, and if possible plow in the fall, but by all means plow deep. If plowed in the spring harrow every half day's plowing thoroughly, that is, harrow it two or three times so as to have a good well-firmed bed into which to set the plants. Carefully mark out the ground both ways so as to set the plants in rows each way. Too much care can not be exercised in getting your plants absolutely straight both ways. Hereafter we shall set our berries 3½ by 6 to 6½ feet. For the blackcaps we have no special

way, but generally scoop out a small hole with a hoe, and have a boy set in the plant and firm the dirt well around it. In setting the reds we take a spade, place it where the marks cross, and with the foot press it down as far as possible, then push it ahead and have a boy set in the plant. We then press the spade into the ground some 4 to 6 inches from the plant, and by pulling back on the handle firm the dirt well around it, and as a general thing give it a jab or two with our heel to be sure that the soil is well firmed. It is our belief that if a thing is worth doing at all it worth doing well. And this is especially true of plant setting as by setting them in straight rows both ways much time and labor may be saved in the cultivation, and with the reds they can the more easily be kept within bounds, and in hills; we firmly believe in the hill culture.

With the red varieties we believe in pinching back the young canes. It is our belief that it will pay to cover the reds, but we will have a good test, as we got caught in the mud last fall and did not get our fine patch of Cuthberts covered.

In covering have one lay the plants down and another throw a spadeful of dirt on top to hold them down, after which throw a furrow over them one from each side of the row. This leaves a dead furrow between each row, which is a good place to throw in a lot of manure. In the spring take a fork and lift the vine out from its winter's bed. In a few days they will straighten up and you can then get in with a cultivator and cross cultivate, which levels up the ground in good shape and mixes up the manure with the soil.

So far ups; now for our downs. In the spring of 1908 we bought 2,000 blackcaps from a reliable nurseryman who claimed to have bought them from a reliable grower. When we opened them it was quite evident that they had been "burned" in transit or else in keeping them over in the storage room. We sorted them up and threw out about 800. The balance were set out in good shape, nursed, and tended until

the stems dropped off, when we gave up. We got 25 to grow out of the whole lot. We have been told by "tree agents" that raspberries are hard to get to live (dead ones are) but we do not believe it, for the reason that what few we have set of our own growing have almost every one lived. The trouble is they are too often burned in handling, and are dead.

DISCUSSION.

Mr. Pence: What is it that kills the berry after it is nearly ripe? Years ago we used to get numerous crops, but just before they commenced to get ripe they commenced to wither and die, and we took up our patch and put grapes in there.

Mr. Nation: I could just guess at it. It is Anthracnose that makes them die down. Most of the winter killing is caused by that, it is not on the ground all winter. Speaking of the drying out, three years ago it was cold and we had snow on the ground all winter mine came through without a dead tip. Last year when the thermometer did not go to zero very nearly half died. I look for a big crop this year. The only thing I know of to get rid of Anthracnose is to replant every two years.

Mr. Harrison: You want to plant on new ground don't you?

Mr. Nation: Yes, sir.

President Green: In regard to the question box, in case some question should come up, that you might think of later, or don't feel just like bringing into the open discussion, we will have the last thing just before the meeting closes a question box and if you will prepare your questions you can drop them in the box and we will have the questions read and answered by some one who can do so.

Next is a paper on the subject of Growing and Marketing Strawberries by H. Davey, of Blair. Mr. Davey not being able to be present, his paper will be read by Secretary Marshall.

GROWING AND MARKETING STRAWBERRIES.

H. DAVEY, BLAIR.

In the growing of strawberries there are at least three things very essential: One must have a liking for the business and be able to stand disappointment; the right kind of soil well prepared and plants of varieties to suit his soil; and marketing conditions.

In preparing the soil one should commence the year before. I like best land that has grown a crop of potatoes or better still tomatoes. After taking off your crop of early potatoes or tomatoes the land should be sown to rye and then in the winter give a good coat of well rotted manure, and when ready for your planting plow under manure and weeds, which by this time will have quite a start. Disc this thoroughly and drag and cross drag until well pulveriezd, and then if possible roll it well with good heavy roller, and now you are ready to get ready to set plants. I mark rows two feet apart over the entire field. Then when ready to set plants I make my rows three feet eight and only make them as I set them. I set my plants a little different than any one I ever saw set them. I had a shovel made about two and one-half inches wide and about ten inches long which I attach to a wheel hoe with good large wheel and if the land is plowed deep and well prepared a man can easily shove this at a depth of five or more inches. Two men, and a boy to drop or carry plants, can plant quite a patch in a day. The man that pushes the plow can set plants about one-half of the time. You ought to be a good Methodist or a member of the Salvation Army. I get right down on my knees. With one hand I raise the loose dirt and I insert the plant with the other, and pack soil well. I suppose there are easier ways than this but I never have found one any surer to get a stand. As soon as the plants are all set I commence to cultivate both ways. For the first time I use a twelve tooth cultivator, then I

alternate with a five shovel. I find if the ground is clean from trash, by cultivating both ways I can save myself much hand work and keep my field free from weeds. I do not try to save the first runners, cultivating both ways until I want to begin to layer the runners which I do mostly with my cultivator by narrowing it up a little every time. When I have my rows wide enough I begin to put on runner cutter. I had one made from two rolling cutters to fit on the front of the five-shovel cultivator, leaving only three shovels to dig the plants loose I have cut off. I keep the cultivator going nearly as long as the growing season.

The varieties to plant depend on the markets to a great extent. You must have good solid berries if you ship to distant markets. For the home market you can use the larger and softer kinds. I have tried many varieties and have discarded most of them. Warfield is still very good if well fertilized. Bissell on the right kind of soil is all right. I use the Senator Dunlap for fertilizer as it blossoms early and late. Nearly my whole plantation of six acres is Senator Dunlap. I am looking for a better one but have never found it, so if any of you have a better one you will confer a favor by making it known to the writer. I here attach a card showing my type of the Dunlap, and showing size of two and one-half inches across and six and one-half inches around, sixteen filling this box on postal; twenty to fill these cans. Four acres in one picking gave 204, 24-box crates selling for $2.75 per crate F. O. B. Blair, Neb., a net of $110 per acre. We never try to grow strawberries without mulching. I mulch with clean wheat straw if I can get it as soon as the ground freezes, just enough to hide plants. I do not remove much of this mulch, only enough in the thick places to let plants come through freely. In this way I always have bright clean berries.

As soon as possible after the berries are picked they should be in a cool place. I believe a regular cooler should be provided by the growers or shippers. One should never pack

any soft or overripe berries, they should go to the home market or be canned. The picking of a large field is no small task and you must have your pickers well managed. To find good careful pickers is a hard job, for one careless one can easy spoil and leave on vines more than his picking amounts to. I believe where there are many growers there should be a good growers' association to market at the best advantage. I might add a few words as to spraying. I am intending to use the best spray. Sometimes the Dunlap is bothered by the leaf rollers. I will use Paris green with the lime for this purpose, being careful not to spray after berries have set.

There is much more that could be written about the delicious strawberry, which has become as staple as our bread, meat and sugar. I find that the more we think we know about the strawberry the more we find that we do not know. I might answer a few anticipated questions. In growing these heavy yields of berries I have never used any commercial fertilizer only plenty of good stable manure and good cultivation. Best results have been obtained by a thin mated row about fourteen inches wide. I would like some information as to best method of tallying and paying pickers. I have thought of having metal checks so as to give a check for each carrierful as they are brought in and have them cashed at the bank the same as a paper check. I use only large well rooted plants from new plantings.

DISCUSSION.

President Green: In regard to this method of tallying, if there are any questions you would like to ask in regard to this strawberry growing proposition, put it into the question box and we will have it answered. There are several competent and good strawberry growers present, and if there is anything you want to ask about, write it on a piece of paper and put in the question box, and we will have it answered the last thing

before the meeting closes. The next on our program is "Growing and Pruning Grapes" by G. W. Shaver, of College View.

GROWING AND PRUNING GRAPES.

G. W. SHAVER, COLLEGE VIEW.

Mr. President and Gentlemen:

In preparing my paper on grapes I left out a great deal expecting that you would ask me questions and bring out the points you wanted to know about my manner of growing grapes. There is one thing I would like to speak of before I commence reading my paper and that is, this location is favorable to grapes. When you go a way north of here, as far as they have to be covered in the winter, they fail in their mode of covering because they simply put straw over them, and in that way they start sooner than those that are left uncovered, so finally we had to take first and bury them in the dirt and let the dirt freeze hard and put some straw over the dirt so that the frost wouldn't thaw out. That means that you can hold them back, but if you cover them with straw only they start sooner. They have a similar trouble in the South. My own opinion is that this is one of the best localities for growing grapes because they can be left on the trellis all winter. They don't start as soon as they do when they are laid down, and we have plenty of sunshine and moisture. With me, grape growing has been very successful in a small way.

Probably there isn't any fruit that is grown that is of any more importance, if as much, as the grape. Going back to the ancient times you will find in the Scriptures in Isaiah a prophesy where the prophet speaks about growing grapes even in the world to come. There he says: "They have built houses and planted vineyards." A little further down when he speaks of the spies they sent out, and the fruit brought back, he says: "They brought back bunches of grapes." I

don't believe that Palestine is any better than Nebraska for growing grapes. Again the Saviour says: "I will drink no more of the fruit of the vine until I drink it anew with you in my Father's kingdom." And you know again what Paul said to Timothy in regard to grape juice for a medicine, he said: "No longer drink water, but drink a little wine for your stomach's sake."

I sometimes think that if we would take as much pains about eating grapes for medicine or medicinal purposes as Postum does for coffee we would have such a demand for grapes we would hardly have land enough to produce the grapes to supply the demand.

Now in this paper, as I stated before, I have not written a great deal, but what I have written I have tried to write right to the point, and have not tried to write a lot and not get it right to the point. If there is anything that is not plain you can bring it out by asking questions.

As I have been asked to write on the subject of "Growing and Pruning Grapes," the location for the vineyard will be the first consideration.

Contrary to most authorities on the selection of ground, I would select a high piece sloping to the northwest. Inquiry as to the air currents, if not already acquainted with them, should be made.

After becoming satisfied that the ground was free from frost and the soil suitable, preferring clay soil and downward drainage, I would prepare the ground by plowing in the fall. If the ground was deficient in fertilizers I would put about the same amount of barnyard manure, as to top dressing, as to grow a fair crop of corn.

In the spring when the proper time comes for planting, disk and drag the ground until the soil is well pulverized, then take a lister and lay the plot off in rows east and west to the depth of eight to ten inches, and twelve feet apart.

Having the previous fall purchased the varieties, namely, Moore's Early, Campbell's Early, and Worden, plant them

six feet apart in the row and from eight to ten inches deep. By slanting, the root and all the old wood is covered.

The first step in planting is to cover the roots about two inches deep with loose soil, and follow with a barrel spray, spraying about a half a pail of water to each root, then giving the water time to settle, follow with more dirt, and stamp firmly around each vine. Then cultivate as soon as possible.

Going back to the varieties I will give my reason for selecting Moore's Early, Campbell's Early, and Worden's.

First, I select the greatest number of Moore's Early, because, on account of their size, even and early ripening, they are easier picked, easier sold, bring a better price, and if pruned properly yield as much as others.

Second, the Campbell's Early. They are more of an experiment, but from what I have seen I believe they are equal to the Moore's Early.

Third, the Wordens, on account of lengthening out the season. They do not ripen as evenly as the others or bring as much per basket.

My reason for planting in rows twelve feet apart is that I plant one row of strawberries in the center of each grape row. Thus the vines partially shade the strawberries, and for the further reason to have room enough to drive a mowing machine, haul fertilizer, and to gather the fruit.

After the planting they are kept clean by cultivating with a five-tooth cultivator and narrow disk. This is kept up in the early part of the summer. Later on I may run the mower over it to cut off some few weeds that may have started, but do not approve of late cultivation.

The next spring I cut the vines back to about half their growth, having the summer before let them grow only two vines.

The trellises are now put in. The first post is slanted inward to save bracing. The rest are set straight with an arm two feet long running crossways at the top and are six feet from the ground after setting. These posts should be set be-

tween every sixth vine with a support between every third vine. No. 8 or 9 galvanized wire is now placed on the posts three feet from the ground and one on each end of the cross arm.

When the vines have grown sufficiently they are tied to the first wire.

During the first summer the strawberries are allowed to widen out from a foot to a foot and a half. The second summer to about three feet. The strawberries are not allowed to reach the vines until the grape vines have reached the top wire, which takes about three years.

After growing a sufficient amount of wood on the grapes, by proper pruning I attempt to grow the right amount of wood to produce a full crop of grapes.

The manner of pruning which I follow differs from other pruning in that the branches I cut off, I cut off buds and all. I do this for two reasons. First, to thin out the amount of wood. Second, to stop an excessive growth of wood which follows the two-bud system, thus reducing the labor of tying up the excessive growth, which almost of a certainty is broken off by the wind and liability of killing the next winter.

After cutting off the branches in this way the others are left full length unless they have reached the other vines or grown too far over the trellis. In case they have I cut them off, including the old wood, so as not to permit any new growth. By this means I expect to grow as near as possible enough wood for a full crop, and keep the vines in a hard and mature condition to winter. (The strawberries and fertilizer are used to the same end.)

As to fertilizer, I prefer fresh stable manure, because the phosphoric acid and the potash has not been leached away. (The phosphoric acid produces the strawberries and the potash the grapes.)

The ripening season is so far apart in these two fruits and the shade so necessary to the strawberries that they are well adapted to each other. The rows being east and west,

furnish this shade for the strawberries, hold the snow in the winter for protection, consequently both winter well.

DISCUSSION.

A Member: Don't you plant any Concords?

Mr. Shaver: No, sir.

A Member: Is that due to the market, or have you any other reason for that?

Mr. Shaver: It is because the Concords do not ripen. In a favorable country it is very productive, but here only about one-half of them ripen and the other half are green, and they are very bad to drop off the vines. They are not as good as the Moore's Early, which ripen better and come in earlier than those shipped in; I have always been able to market mine before any others are shipped in.

Mr. Harrison: Do you prune in the spring, did you say, instead of in the fall ?

Mr. Shaver: No, sir, in March.

Mr. Harrison: Won't they bleed?

Mr. Shaver: No, sir, until the sap starts they won't. I never had any grapes spill back; I don't think I have missed a crop in eleven years, except with some Concords. The Moore's Early I never have had a failure with.

Another Member: Do I understand you to say that you just left one bud on the spur?

Mr. Shaver: I don't leave any spur at all; I keep right up to the vine so there will be no more growth, I don't intend that there shall be any more growth.

Another Member: How do you renew it?

Mr. Shaver: That would be the same in growing to the spur; when you leave your whole branch it grows off side wise, you notice that a big apple on a little stem hangs right straight down; the same is true of the grape, a big bunch is on the vine of small growth. You trim just about as close as you can, just as you take a limb off of an apple tree, but not quite as close, I take it off, say a quarter of an inch.

Another Member: I am seventy years old and that is the first time I ever heard of trimming a grape vine.

Another Member: I don't seem to understand this. Can you make a sort of a chart on the blackboard showing how you trim Moore's Early?

President Green: I am sorry Mr. Shaver didn't do that before for it is a fact that he has taken better than $700 worth of grapes off of an acre and a half each year for the last two years.

Mr. Shaver: I am not very good at drawing but I guess this will show what I mean:

There are too many little limbs here (indicating) that will produce. There are more than I want to produce the grapes, so when I cut this limb (indicating) there will be no growth of wood and no grapes on that, but this one next to it I will leave the whole length if it don't go beyond the point of space I have. There wasn't so much growth in this stem (indicating) so I cut clear back to here (indicating) and cut off the old wood when possible so as to stop the growth again.

A Member: About how many limbs would you leave on the vine?

Mr. Shaver: That depends on the age of the vine and its thriftiness; on some vines I might take off half, others I wouldn't take off so much, and on others a little more. In California they put on a certain amount of water to control the growth of wood, but we can't do that here, we have to use other means. The strawberry is very serviceable because I can raise a larger crop of strawberries in the vineyard than in any other way; I had some few rows that I turned the other way because I was afraid the rows would wash! I had a full crop of strawberries, while between the rows running north and south the sun came in and they did not amount to anything.

Now I am planting this spring, and I set about 7½ acres of strawberries, peaches, and raspberries. I grow three crops, I plant them all east and west and plant them on the south

side of the grape yard; I plant the grapes 16 feet apart and all the raspberries and strawberries in the patch are put in between; I have raised on one plat of ground strawberries for seven years and they have never been changed or plowed up. Sometimes I take a disk and run up and down the rows, and by hauling the limbs over them I give them drag enough without taking a drag. And I have been very successful in a small way with peaches. I haven't very many trees but I rather think I have done pretty well for this section of the country.

A Member: How have you found the Campbell's Early in productiveness?

Mr. Shaver: I haven't raised them myself. The bunches seem to be a little larger and I thought I would start five hundred this spring as an experiment.

Mr. Christy: Mr. Shaver's statement in regard to the Concord and Worden, it seems to me that he has them changed about, and another thing the way he trims his Moore's Early. A great many have trouble getting them to set berries at all, and when he trims to one or two buds in the old branch the Moore's Early doesn't set a true bud short of where the second limb comes.

Mr. Shaver: I never trim but two buds.

Mr. Beltzer: Mr. Shaver is growing old, and I want to come to his support. I have the Concords and I succeed in getting all those before they are ripe, they ripen so uneven that parties want them for jelly hence I get them off my hands.

G. A. Marshall: When the Concords ripen uneven it is because they are unhealthy, it is caused by wet weather that makes trouble in the stem of the bunch and the same thing is troubling the Worden. And there is another trouble with the Worden; if you trim it as long as the Moore's Early it overbears and can not ripen the fruit. I think it is the best quality of any, but it is more uncertain, it is very perishable and must go on the market at once. It is really at its prime before

it is quite black. There are a good many things that you have to take into consideration, I think in Mr. Shaver's place and under those conditions his ideas are all right, but generally any man that will slander the Concord will slander his own mother. It is the best grape we have in the United States, take it all over. We eat more pounds in the United States than all others put together; we can't afford to turn it down; because we have had so much wet weather that has caused it to ripen uneven; all you have got to do is to spray the Concord and it will ripen up even all right. The Moore's Early is a better resister to diseases than the others. We noticed this trouble first on the Worden, and then it followed up by affecting the Concord, and we sprayed our vineyard. It is very easily controlled in our vineyard by spraying. It affects the stem of the bunch, and you can always see it on the leaves as well as on the stem. The stem becomes more or less black and the grape starts to get ripe, and some berries will be ripe and some green on the same bunch and it sticks there and stands for days and weeks.

President Green: What do you spray with?

Mr. Marshall: Bordeaux mixture.

A Member: 4-4-50?

Mr. Marshall: No, 3-3-50. We had that trouble right along, but it did not bother us last year.

A Member: What time do you spray?

Mr. Marshall: I sat on the fence and watched the other fellows do the spraying, it was done early in the season, just after the fruit set, after the blossoms are gone.

A Member: How often did you spray?

Mr. Marshall: We only gave one thorough spraying.

Mr. Shaver: I would like to say a few words about the Concord grape. Generally speaking, everybody calls everything a Concord that is black; when I first commenced to haul grapes to Lincoln everybody thought they were the brightest Concords they ever saw; they won't eat anything but Concords, consequently we can't say to them these are not Con-

cords. Now the real fact of the business is, in my observation, when you come right down to the point of ripening, the Concord isn't in it only in a few countries. Take Professor Green of Minnesota who has probably had as much experience as any man in the West. In his work he makes it a point that with Concords you must look out for localities where they ripen or you better not plant them. I know of growers that haul these grapes down to Lincoln to market for 75 cents a bushel when I am selling at wholesale for 30 cents a basket. This year I got 30 cents a basket for Moore's Early. There are always some green grapes on them. My pickers had to throw them away, especially on the top; I get off about one dose on the market, and they begin to say you have changed your grapes, and I say the others are all gone, the first Concords are all gone.

Mr. Marshall: The Worden is ripe before it is fully colored, and the Concord is not for ten days after it is gathered. You want to let the Concords ripen or you will make your customers all mad. I claim that we are in one of the best Concord countries in the West; go around Omaha and it will prove that. Go across into Iowa and they will tell you what they get on the east side of the river. I haven't a thing to say against Moore's Early or Worden; I will admit that the Worden is the best quality when well ripened, but the Concord is fully as good as the Moore's Early. The Concord is as reliable as anything we have but it has that one trouble, but the Worden has the same trouble in our community, we have to watch it the same as the Concord.

President Green: This closes our program this afternoon, but we have the Secretary's and Treasurer's reports, and I want to call attention to the question box. During the reading of these reports Mr. Yeager will collect the questions. If there is anything you want information on, write it on a slip of paper and Mr. Yeager will collect it and we will have some one answer the questions. We will now listen to the Secretary's report.

SECRETARY'S REPORT.

The season of 1909 has been one of profit to the horticulturists in general. The fruit crop was good in the greater part of the state. Late frosts injured the blossoms of apples and other fruits in spots throughout the southeastern part of the state, yet many orchards in this section were but slightly injured and bore large crops of fruit.

The apple crop in practically all of the territory west of Gage and Lancaster counties, and in all of the territory north of the Platte river was large and of good quality. A number of the larger orchards of the state were thoroughly sprayed the past season and for the fruit from these orchards good prices were received. The fruit from unsprayed orchards, while infested quite badly with worms, was comparatively free of scab and other fungous diseases and sold quite well, owing to the brisk demand for apples during the greater part of the season.

Severe weather injured the peach buds, and peaches were grown only in limited quantities in southeastern Nebraska. The yield of strawberries, raspberries, and blackberries was very good and the prices received for same held up well, netting those engaged in the growing of these crops snug incomes. Cherries yielded well in some sections and sold for good prices. Plums and other fruits not mentioned were up to standard both in quantity and quality. The florists report a thriving business for the year, having had a ready sale for all plants and flowers grown at good prices.

The showing made at the State Fair by the horticulturists of the state was encouraging. The space usually devoted to fruits was well filled with fruit of good quality. It was remarked by many who viewed the exhibits that seldom does the fruit shown at the Fair have as clean appearance as that exhibited last season. Worms and fungous diseases were not to be seen except by very close inspection. This was undoubtedly due to the fact that our fruit growers are giving

their fruit better care and culture and are spraying more thoroughly than in the past. The space devoted to floral displays was crowded on account of more florists exhibiting than for a number of years. However, the plants and flowers were all staged in a creditable manner and the showing was very good.

The executive board at its July meeting arranged to exhibit Nebraska fruit at the National Horticultural Congress at Council Bluffs, Iowa, November 15 to 20, 1909. C. H. Barnard was secured by the committee to gather the fruit and make the exhibit. Tomorrow morning Mr. Barnard will make a report to the Society on Nebraska's showing at this congress.

More extensive advertising of the Society and its work has been attempted recently through the Secretary's office. The newspaper mailing list has been enlarged, and to these papers a digest of each bulletin issued by the Society, consisting of from 200 to 500 words with attractive headings is being mailed. It is thought that more publications will publish this horticultural information when it is "boiled" down in this form than would if they are compelled to publish the whole of the bulletin or take the time to extract certain parts of it. A short letter in the form of a notice telling of the organization, its work, etc., is also being distributed. Many of our annual reports are distributed at farmers' institutes, and one of these notices is inserted in each report.

During the past year we have added to our membership list 44 members; 36 annual and 8 life. We have lost by death one of Nebraska's pioneer horticulturists and a charter member of this Society, J. H. Masters of Otoe county.

The following amounts have been received in cash by the Secretaries during the year and turned over to the Treasurer:

Membership fees, by L. M. Russell	$ 29 00
Membership fees, by C. G. Marshall	46 00
Fruit sold at State Fair	68 00

From State Board of Agriculture..... 800 00

Total.....$943 00

WARRANTS DRAWN DURING YEAR OF 1909.

No.	To Whom Drawn	Amount
	By L. M. Russell	
1	C. S. Harrison, delegate to Kansas Horticultural meeting	$ 10 00
2	Simanton and Pence, premiums	5 00
3	Dole Floral Co., premiums	16 00
4	C. H. Green, premiums	18 00
5	Lewis Henderson, premiums	16 00
6	David Hunter, premium	8 00
7	Ray W. Hesseltine, premium	17 00
8	E. Hornung, premium	2 00
9	E. F. Stephens, premium	27 00
10	Frank Williams, premium	5 00
11	H. J. Rosenbaum, premium	4 00
12	C. B. Camp, premium	1 00
13	C. W. Isaac, premium	1 00
14	C. D. Hahn, premium	5 00
15	G. S. Christy, premium	18 00
16	Chas. L. Saunders, per diem	9 00
17	Peter Youngers, per diem	6 00
18	A. J. Brown, per diem	12 00
19	G. S. Christy, premium	2 00
20	C. W. Isaac, premium	1 00
21	C. H. Green, per diem	12 00
22	J. A. Yager, per diem	12 00
23	G. A. Marshall, per diem	12 00
24	Don Russell, part pay reporting annual meeting	25 00
25	C. H. Barnard, per diem	9 00
26	Gene Russell, labor at winter meetings	6 00
27	R. A. Emerson, delegate to Missouri Horticultural meeting	10 00

No.	To Whom Drawn	Amount
28	Nebraska Paper and Bag Co., paper	2 10
29	Chapin Bros., vases for annual meeting	2 00
30	Benton Bros., printing bulletins	21 00
31	L. M. Russell, salary January	83 00
32a	J. D. Ream, per diem	6 00
32b	Globe Delivery Co., freight and drayage on books	18 01
33	J. M. Bechtel, hotel expense	5 00
34	L. M. Russell, salary February	83 00
35	D. L. Russell, balance pay reporting annual meeting	25 00
36	Globe Delivery Co., freight and drayage on books	8 00
37	L. M. Russell, salary March	84 00
38	Benton Bros, printing bulletin	14 00
39	L. M. Russell, salary April	83 00
40	Adams Express Co., express	3 43
41	Benton Bros, printing bulletins	21 00
42	L. M. Russell, salary May	83 00
43	L. M. Russell, for incidentals	32 25
44	C. H. Green, per diem	3 00
45	W. A. Harrison, per diem	6 00
46	Ed. Williams, per diem	3 00
47	Peter Youngers, per diem	6 00
48	A. J. Brown, per diem	6 00
49	J. A. Yager, per diem	3 00
50	G. A. Marshall, per diem	6 00
	By C. G. Marshall	
51	C. G. Marshall, salary June	83 00
52	Jacob North & Co., stationery	7 60
53	Benton Bros., printing bulletin and envelopes	28 00
54	Benton Bros., printing programs for summer meeting	12 00
55	Harry Porter, office supplies	1 25
56	C. G. Marshall, postage and incidentals	9 00
57	Nebraska Telephone Co., telephone service	40

No.	To Whom Drawn	Amount
58	Ed. Williams, per diem	9 00
59	J. A. Yager, per diem	9 00
60	C. H. Green, per diem	9 00
61	G. A. Marshall, per diem	9 00
62	A. J. Brown, per diem	9 00
63	W. A. Harrison, per diem	9 00
64	C. G. Marshall, salary July	83 00
65	D. L. Russell, part pay reporting summer meeting	25 00
66	C. G. Marshall, salary August	84 00
67	I. N. Roman, judging at State Fair	15 00
68	Dole Floral Co., premiums	49 00
69	C. H. Green, premiums	114 00
70	L. Henderson, premiums	145 00
71	Simanton & Pence, premium	57 00
72	Edward Williams, premium	92 00
73	J. R. Duncan, premium	42 00
74	Chas. W. Brinton, premium	20
75	G. S. Christy, premium	49 80
76	R. T. Chambers, premium	11 00
77	C. E. Campbell, labor at State Fair	8 00
78	Mrs. J. T. Clark, premium	1 00
79	Caldwell & Sheets, premium	5 40
80	Joe Chapman, premium	2 00
81	O. P. Dovel, premium	3 00
82	Elmer Dovel, premium	2 00
83	Chas. Dickinson, premium	2 20
84	H. Davey, premium	7 60
85	Jos. Epler, premium	2 00
86	John Furnas, premium	2 60
87	Chas. Grau, premium	2 00
88	Hesseltine Fruit Farm, premium	20 20
89	D. Heffelbower, premium	1 00
90	S. R. Hall, premium	40
91	S. C. King, premium	1 40
92	Theo. Kaar, premium	60

No.	To Whom Drawn	Amount
93	S. M. Lewis, premium	2 00
94	Marshall Bros., premium	148 00
95	H. Mathews, premium	7 00
96	Arnold Martin, premium	12 00
97	Mrs. Arnold Martin, premium	2 40
98	H. J. Rosenbaum, premium	12 20
99	S. W. Stewart, premium	8 20
100	G. A. Marshall, to collect fruit for National Horticultural Convention	150 00
101	Frank Storr, premium	2 00
102	Wm. B. Swisher, premium	2 00
103	E. E. Smith, premium	1 00
104	E. F. Stephens, premium	256 00
105	J. W. Turner, premium	2 00
106	A. Westenkamp, premium	20
107	Carl Ferguson, services at State Fair	20 00
108	Marshall Bros., 2 barrels apples	4 00
109	Jacob North & Co., supplies	16 20
110	Benton Bros., supplies	18 00
111	Nebraska Sign Co., banners	2 25
112	Newell Novelty Works, rubber stamps	55
113	Cornell Engraving Co., electrotype	2 10
114	C. E. Means, iron vat in floral case	10 00
115	Peter Henderson, hand book of plants	3 00
116	Aspegren & Strand, lumber	14 40
117	Ely Gripe, labor during State Fair	8 25
118	Chas. Haney, labor during State Fair	13 00
119	Dan Haney, labor during State Fair	13 00
120	W. J. Blystone, incidental expenses on Horticultural Hall	17 05
121	J. Grainger & Co., fruit	11 50
122	Ed. Williams, per diem	30 00
123	C. H. Green, per diem	24 00
124	A. J. Brown, per diem	24 00
125	G. A. Marshall, per diem	21 00

No.	To Whom Drawn	Amount
126	W. A. Harrison, per diem	24 00
127	J. A. Yager, per diem	21 00
128	C. H. Barnard, per diem	24 00
129	E. F. Stephens, fruit	7 75
130	Effie Von Nell, services State Fair	7 50
131	L. M. Russell, services State Fair	18 00
132	Lincoln Paper Co., paper plates	9 43
133	C. G. Marshall, postage and incidentals	11 85
134	W. J. Blystone, labor at fair grounds	65 00
135	Lincoln Ice & Cold Storage Co., storage of fruit	10 90
136	J. W. Scarborough, decorating Horticultural Hall	21 30
137	Nebraska Telephone Co., telephone in Horticultural Hall	4 00
138	State Fair Transfer Co., drayage	3 75
139	C. G. Marshall, salary September	83 00
140	Chapin Bros., smilax and vases	24 00
141	Clyde Barnard, for fruit for National Horticultural Congress	100 00
142	C. G. Marshall, salary October	83 00
143	Rudge & Guenzel, supplies for Horticultural Hall	24 04
144	C. H. Barnard, for fruit for National Horticultural Congress	50 00
145	C. H. Green, per diem	6 00
146	W. A. Harrison, per diem	6 00
147	A. J. Brown, per diem	6 00
148	Peter Youngers, per diem	6 00
149	J. A. Yager, per diem	6 00
150	G. A. Marshall, per diem	6 00
151	C. G. Marshall, postage	5 00
152	Harry Porter, office supplies	2 85
153	International Publishing Association, printing bulletin	10 80
154	Lincoln Paper & Box Co., filing cases	1 25

No.	To Whom Drawn	Amount
155	Benton Bros., printing bulletin and notices...	26 00
156	Hargreaves Mercantile Co., fruit.....	8 00
157	C. G. Marshall, salary November.....	84 00
158	C. G. Marshall, salary December.....	83 00
		$3,606 16

President Green: Treasurer Youngers is attending an important session of the State Board of Agriculture, of which he is a member, and has delegated Mr. Brown to read his report. We will now hear the report.

TREASURER'S REPORT.

THE NEBRASKA STATE HORTICULTURAL SOCIETY,
IN ACCOUNT WITH PETER YOUNGERS, TREASURER.

1909				
Jan.	19	Balance on hand.....	$2,397 32	
June	2	Cash, L. M. Russell.....	29 00	
June	2	State appropriation.....	1,500 00	
Sept.	14	C. G. Marshall, State Board of Agriculture.....	800 00	
Sept.	14	Cash, C. G. Marshall.....	68 00	
Sept.	27	State appropriation.....	1,000 00	
Dec.	16	Cash, Clyde Barnard.....	43 24	
1910				
Jan.	4	Cash, C. G. Marshall.....	46 00	
		Total cash received.....		$5,883 56
		Total warrants paid.....		3,605 76
		Balance on hand January 18, 1910.		$2,277 80

WARRANTS PAID.

Series 1908

No.		Amount
89	Geo. Schramm	$ 2 00

Series 1909

No.		Amount
1	C. S. Harrison	$ 10 00
2	Simanton & Pence	5 00
3	Dole Floral Co	16 00
4	C. H. Green	18 00
5	Louis Henderson	16 00
6	David Hunter	8 00
7	Ray W. Hesseltine	17 00
8	E. Hornung	2 00
9	E. F. Stephens	27 00
10	Frank Williams	5 00
11	H. J. Rosenbaum	4 00
12	C. B. Camp	1 00
13	C. W. Isaac	1 00
14	C. D. Hahn	5 00
15	G. S. Christy	18 00
16	Chas. Saunders	9 00
17	Peter Youngers	6 00
18	A. J. Brown	12 00
19	G. S. Christy	2 00
20	C. W. Isaacs	1 00
21	C. H. Green	12 00
22	J. A. Yager	12 00
23	G. A. Marshall	12 00
24	Don Russell	25 00
25	C. H. Barnard	9 00
26	Gene Russell	6 00
27	R. A. Emerson	10 00
28	Nebraska Paper & Bag Co	2 10
29	Chapin Bros	2 00
30	Benton Bros	21 00

No.		Amount
31	L. M. Russell	83 00
32a	J. D. Ream	6 00
32b	Globe Delivery Co	18 01
33	J. M. Bechtel	5 00
34	L. M. Russell	83 00
35	D. L. Russell	25 00
36	Globe Delivery Co	8 00
37	L. M. Russell	84 00
38	Benton Bros	14 00
39	L. M. Russell	83 00
40	Adams Express Co	3 43
41	Benton Bros	21 00
42	L. M. Russell	83 00
43	L. M. Russell	32 25
44	C. H. Green	3 00
45	W. A. Harrison	6 00
46	Ed. Williams	3 00
47	Peter Youngers	6 00
48	A. J. Brown	6 00
49	J. A. Yager	3 00
50	G. A. Marshall	6 00
51	C. G. Marshall	83 00
52	Jacob North & Co	7 60
53	Benton Bros	28 00
54	Benton Bros	12 00
55	Harry Porter	1 25
56	C. G. Marshall	9 00
57	Nebraska Telephone Co	40
58	Ed. Williams	9 00
59	J. A. Yager	9 00
60	C. H. Green	9 00
61	G. A. Marshall	9 00
62	A. J. Brown	9 00
63	W. A. Harrison	9 00
64	C. G. Marshall	83 00

No.		Amount
65	D. L. Russell	25 00
66	C. G. Marshall	84 00
67	I. M. Roman	15 00
68	Dole Floral Co	49 00
69	C. H. Green	114 00
70	L. Henderson	145 00
71	Simonton & Pence	57 00
72	Edward Williams	92 00
73	J. R. Duncan	42 00
75	G. C. Christy	49 80
76	R. T. Chambers	11 00
77	C. E. Campbell	8 00
78	Mrs. J. T. Clark	1 00
79	Caldwell, Sheets	5 40
80	Jos. Chapman	2 00
81	O. P. Dovel	3 00
82	Alma Dovel	2 00
83	Chas. Dickinson	2 20
84	H. Davey	7 60
86	John Furnas	2 60
87	Chas Grau	2 00
88	Haseltine Fruit Farm	20 20
89	D. Heffelbower	1 00
90	S. R. Hall	40
91	S. C. King	1 40
92	Thos. Kaar	60
93	S. M. Lewis	2 00
94	Marshall Bros	148 00
95	H. Mathews	7 00
96	Arnold Martin	12 00
97	Mrs. Arnold Martin	2 40
98	H. J. Rosenbaum	12 20
99	S. W. Stewart	8 20
100	G. A. Marshall	150 00
101	Frank Storr	2 00

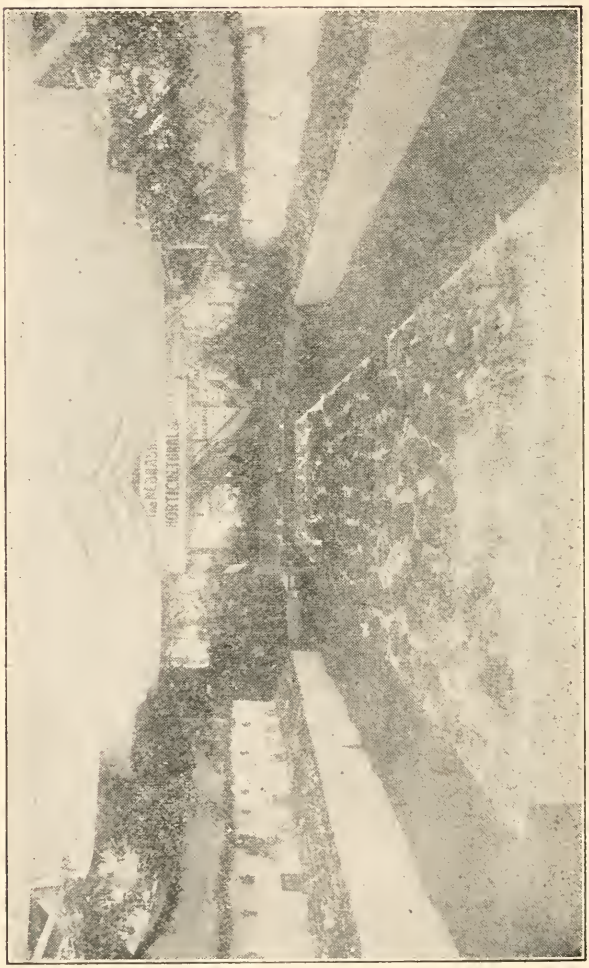
No.		Amount
102	Wm. B. Swisher	2 00
103	E. E. Smith	1 00
104	E. F. Stephens	256 00
105	J. W. Turner	2 00
107	Carl Ferguson	20 00
108	Marshall Bros	4 00
109	Jacob North & Co	16 20
110	Benton Bros	18 00
111	Nebraska Sign Co	2 25
112	Newell Novelty Co	55
113	Cornell Engraving Co	2 10
114	C. E. Means	10 00
115	Peter Henderson & Co	3 00
116	Aspegren & Strand	14 40
117	Eli Gripe	8 25
118	Chas. Haney	13 00
119	Dan Haney	13 00
120	W. J. Blystone	17 05
121	J. Grainger & Co	11 50
122	Edward Williams	30 00
123	C. H. Green	24 00
124	A. J. Brown	24 00
125	G. A. Marshall	21 00
126	W. A. Harrison	24 00
127	J. A. Yager	21 00
128	C. H. Barnard	24 00
129	E. F. Stephens	7 75
130	Effie Vonnell	7 50
131	L. M. Russell	18 00
132	Lincoln Paper Co	9 43
133	C. G. Marshall	11 85
134	W. J. Blystone	65 00
135	Lincoln Ice & Cold Storage Co	10 90
136	J. W. Scarborough	21 30
137	Nebraska Telephone Co	4 00

No.		Amount
138	State Fair Transfer Co	3 75
139	C. G. Marshall	83 00
140	Chapin Bros	24 00
141	Clyde Barnard	100 00
142	C. G. Marshall	83 00
143	Rudge & Guenzel	24 04
144	C. H. Barnard	50 00
145	C. H. Green	6 00
146	W. A. Harrison	6 00
147	A. J. Brown	6 00
148	Peter Youngers	6 00
149	J. A. Yager	6 00
150	G. A. Marshall	6 00
151	C. G. Marshall	5 00
152	Harry Porter	2 85
153	International Pub. Association	10 80
154	Lincoln Paper & Box Co	1 25
155	Benton Bros	26 00
156	Hargreaves Mercantile Co.	8 00
157	C. G. Marshall	84 00
158	C. G. Marshall	83 00
		$3,605 76

Lincoln, Nebraska, September 27, 1909.

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 No. 67560 in the sum of $1,000.

No.	Name	Amount
4	C. H. Green	$ 18 00
15	G. S. Christy	18 00
69	C. H. Green	114 00
70	L. Henderson	145 00
71	Simonton & Pence	57 00
72	Edward Williams	92 00



ONE WING OF HORTICULTURAL HALL AT THE NEBRASKA STATE FAIR, 1909.

No.		Amount
73	J. R. Duncan	42 00
75	C. H. Christy	49 80
84	H. Davey	7 60
88	Hasseltine Fruit Farm	20 20
94	Marshall Bros.	148 00
96	Arnold Martin	12 00
98	H. J. Rosenbaum	12 20
99	S. W. Stewart	8 20
104	E. F. Stephens	256 00
		$1,000 00

Witness my hand and seal this 27th day of September, 1909.

SILAS R. BARTON,
Auditor.
By J. W. Shahan, Deputy.

President Green: It will be necessary to appoint a committee to go over these reports and report at the meeting tomorrow morning, and as that committee I will appoint J. A. Yager, J. E. Atkinson, and Ed. Williams.

Mr. Brown: I want to call the attention of the committee to the fact that the warrants are all listed here and added up on an adding machine and it is very easy to verify it.

President Green: I believe this would be a very good time to have a report from the delegate to the Minnesota State Society. C. S. Harrison was appointed to go and represent Nebraska at that meeting and we will now have his report.

REPORT OF MINNESOTA HORTICULTURAL SOCIETY.

C. S. HARRISON, YORK.

Mr. President and Gentlemen:

I have watched with a great deal of interest the development of the Minnesota Society. I used to live in Minnesota, and they used to think they couldn't raise apples in Minne-

sota any more than oranges, but I found that they were shipping trainloads down to Omaha. There are 3,023 members in their society, probably the largest society in the world. Their collection of fruit was magnificent, fully as good as you have. One reason for the success of that society lies here, that instead of antagonizing any organized societies they are all in harmony, they all gather under the wing of the parent society; every member of a subordinate society must be a member of the parent society. In the first place they spend four days in their sessions of the Horticultural Society. A part of the day the Plant Breeders' Society have their session for perhaps two or three hours, the president of that society steps right in and takes charge; then there will be another meeting of the Horticultural Society, and then give away to the Ladies' Auxiliary, and they have about as bright women there as anywhere unless you come down to Nebraska and that beats them all a little. So things go off pretty lively; the ladies will spend two or three hours, and then it reverts back to the Horticultural Society. Then comes the Forestry Society, they come under the wing of the Horticultural Society, too. There is this benefit about these auxiliary societies, or affiliated societies, their reports are all published in the annual report of the Horticultural Society, so that nobody is left out.

In this state it has been a pretty hard matter to have our forestry reports published, as we have to dig down in our pockets and dig up $75 to publish them. There is a transformation going on in this state of Nebraska, instead of confining yourselves to fruit entirely you have to give some attention to tree planting and home adornment, and here comes in the Florists Society. And right here I want to suggest that this Nebraska Horticultural Society amalgamate these other societies under their incorporation, and the reports given by these various societies be given in the annual report of this Society. Don't you see that you are getting their support in gathering all those kindred interests, and you are not

only binding them together in organized enthusiasm and instead of having only scores or hundreds you may run up into thousands and so you will awaken enthusiasm in the whole state? Every member of a subordinate society must be a member of the Horticultural Society, then these other societies, like the Florists, and others will arrange to have their members pay twenty-five cents apiece. If possible, I wish this matter could be brought up before this Society, and perhaps it is just as well to discuss it. I offer a resolution that this matter be left with this Society and that the other societies cooperate with them in their annual meeting. Perhaps it would be well to fill up the three full days; the Florists want half a day and the other societies want some time. You are getting forestry by piecemeal. You are getting the florists' work, but of course the Florists is one society. The Forestry Society is doing good work, and a great deal of hard work. One-quarter of our state is a desolation, and we want to transform the dollar land up in the sandhills into better lands, and it can be done. I could show you reports that would astonish you. There are the Kinkaiders up there, we want to help to push them along.

I move you, Mr. President, that this Society arrange to have these other societies cooperate with us in their annual meeting, and that the reports of those societies be published in the report of this Society. Duly seconded by J. A. Yager, and carried.

QUESTION BOX.

President Green: We will now have our question box, and I will ask Mr. Davidson, of Aurora, to tell us about his grape crop and the way he harvested it.

Mr. Davidson: Mr. President and Gentlemen:

I do not claim to be an authority on this line of work at all, yet I suppose I raised the largest crop of grapes this year ever in Hamilton county, over three tons. I have a little less than an acre, and I gave it thorough cultivation. We had a

very dry August and I used dust mulch and cultivated it every week or ten days with a five-tooth cultivator and kept the ground even and loose. I have a small windmill irrigating plant, and I run the water through between two rows; the rows are eight feet apart, and I run the water through in the center between the rows and let it run there about ten days during the dryest weather. I thought I would see which would turn out the best, the dust mulch process or the irrigating process, and I must say that where I irrigated my grapes I had the best. They ripened a little later, but were a little larger, and I think there is no doubt but that my crop would have been very nearly a failure if I had not used the dust mulch process; and if I had depended on the mower to cut down the weeds I would have had very few grapes on account of the extreme drouth. The drouth hit my grapes and dried them up and they fell off badly. I believe I lost a quarter of my crop by drying up and falling off, and I did the very best I could with dust mulch, but it was too extremely hot and dry, I believe, to make a success of it. To make a success of grapes in this country you must give them thorough cultivation, and a person should hoe out the rows at least twice during the season and should not allow the weeds to grow. I believe when we have excessively wet weather it would be a good idea to furrow through the middle between the rows to give it a good drainage, because I have noticed that if the vine gets too much water the foliage looks bad and black spots begin to appear on the grapes and the leaves don't look right. This year I intend to have the ground lower in the center so that when the heavy rains come on a part of that water will run off. The grape stands dry weather better than excessively wet weather.

A Member: How old are your grapes?

Mr. Davidson: They have been out about seven or eight years.

A Member: Don't you strike the roots when you cultivate?

Mr. Davidson: No, sir. I plow first with a little stirring

plow, probably three or four inches deep and cut off some roots. You must have the top of the soil thoroughly pulverized as hard ground or soil will crack open and dry out in Nebraska. My grapes got ripe when the ground was wet, I had a lot of pickers go in and pick when the ground was wet and the ground became hard and packed, and I did not want it to go into winter quarters that way. I had this ground thoroughly cultivated after they were through picking, and then I sowed in oats, which I thought would grow and make a covering, but the first hard freeze we had bit them off on the ground and they came up again when this snow came on.

A Member: What kind of grapes have you?

Mr. Davidson: Mostly Concords, some Clintons, some Moore's Early and two or three white kinds. Moore's Early with me makes a very small growth.

A Member: What do you get for your Concords?

Mr. Davidson: I sold them for three cents a pound on the vine.

Mr. Harrison: Did they ripen even?

Mr. Davidson: Reasonably even. My rows extend north and south and by keeping them well cultivated they ripen quite well. In former years I made a failure by not having them cultivated. When there were weeds among them they didn't ripen nearly as well as they did when under thorough cultivation.

Mr. Harrison: How late in the season do you cultivate?

Mr. Davidson: I cultivated after I picked this year.

A Member: Is there any sand in the soil on those you irrigated?

Mr. Davidson: No, there is no sand in our soil.

A Member: When do you trim your grape vines, in the fall or in the spring?

Mr. Davidson: I am trimming now (January), I am not quite done; last year I didn't trim at all.

A Member: Are you trimming now while they are frozen?

Mr. Davidson: Yes, this snowstorm stopped our trimming,

and as quick as the snow is off I will finish. I find that few farmers raise grapes, and I think the best and easiest way to get rid of a crop is to do as I did. I got three cents a pound. I told them three cents a pound and do your own picking. The first day last fall I had forty-two families there and there are about four in a family; I took in something over $75 one afternoon.

A Member: Did you get pay for all the grapes that went out that afternoon?

Mr. Davidson: I think not, although I got pay for quite a lot. The worst trouble I had was where I let them pick them and they would not pick them clean. Some persons will have to pick on four or five different rows to fill a basket. They see a bunch off here and they are going to have it.

A Member: How do you trim?

Mr. Davidson: I leave 3 or 4 buds on the new growth, and I leave quite a lot of old ones. Two years ago my grapes froze off and I had over half a crop in the dormant bud, coming out the second time.

A Member: Do they ever kill down in the winter?

Mr. Davidson: One year they all killed to the ground, about four years ago. I noticed one thing the year my crop all killed to the ground. There happened to be a few vines lying on the ground that got covered with dirt two or three inches deep and those vines were living where the ends were covered. That convinced me that the killing of the grape is but a question of drying out. I don't care how much cold there is if there is four or five inches of snow I don't see how they can dry out. That first heavy freeze we had some of the white grapes killed back two feet.

A Member: Do you do much trimming in the summer season?

Mr. Davidson: I have tried that some, but I believe thorough cultivation is best.

A Member: Have you been doing that all of the time dur-

ing the season, or did you just try that this year, that cultivation?

Mr. Davidson: I was more thorough this year; once in a while in a year it gets away from me.

A Member: Did they ripen even?

Mr. Davidson: Fine, I followed Mr. Shaver's style.

A Member: Has summer manuring of plants after the crop had been harvested prevented a succeeding crop of strawberries?

Mr. Davidson: I don't think it would affect it any; in my opinion it would not prevent a succeeding crop.

Mr. Atkinson: I have tried both ways; a part of the patch was manured in the summer and a part was not manured, and I wondered if other people had had that same experience? We have gotten to be afraid to summer manure; we found twice at least a wonderful crop on that the next year.

A Member: Why is it necessary to shade strawberries?

Mr. Shaver: My experience in growing strawberries has been that some years we have an excessive amount of rain, and I can grow more strawberries to let even the weeds grow up than to keep them clean the forepart of the season, until after the picking. This is one of the reasons; if you have noticed, the largest strawberries are generally found where it is shaded. I have seen experiments where they have artificially shaded and increased the yield largely. As far as citing authorities I do not give much preference; Green is one as far north as Minnesota. I would have had a good many failures unless I had shaded some.

Mr. Harrison: You don't mean to say that the grapes keep the wind off?

Mr. Shaver: I plant my patch and I expect them to protect the strawberries from the south winds. The berries grow larger, but are a little longer in ripening.

A Member: If a strawberry plantation is right out on a knoll do you think it needs shelter?

Mr. Shaver: Yes, sir.

A Member: Is stable manure as satisfactory to mulch with as straw?

A Member: No. The best mulch in the world is prairie hay or wheat straw.

A Member: What time should manure be applied to strawberries, and what is the life of a strawberry bed?

Mr. Nation: Whenever you have time to haul it out, but since you said summer manuring killed them I have held my breath. I remember the first time I had a hired man he insisted on carrying it across the lot, so we drove it all around the fence. I have an acre and a half and I am going to manure the whole patch as soon as I can get on the ground after it dries out a little, I don't know what is the best time.

Mr. Harrison: Why don't you haul it out now?

Mr. Nation: I am on the road all the time and can not now as I am only home on Sundays, about two Sundays in the month. I don't think any particular time hurts strawberries unless you put it on too thick and kill them off in that way.

Mr. Christy: I believe with certain varieties where you manure too long you get too much nitrogen in the soil and then you get a large plant growth and a small crop of berries. They run to vines, as the soil has too much nitrogen and there is the trouble. With Senator Dunlap on the ground that never had been fertilized is where I get the berries. I have gotten the most berries where there wasn't too much manuring.

A Member: What is the best varieties of strawberries for marketing in Lincoln?

Mr. Shaver: I should say that my experience has been the Warfield and Senator Dunlap, but the Senator Dunlap turn black too quick; they don't hold their color, they are too dark and if they have to be carried over until the next day they say, "Why those berries are spoiled." They do not resist the frost as well with me as others. On this manure question, I want to say a word on that. In planting strawberries I don't

want any manure, but before I plant them I want the ground that will grow a fair crop and then I plant my strawberries. I don't want an excessive growth of berries. I use, if I can get it, stable manure without any straw in it, and put it on almost any time I can; I want it before it has heated; I want it scattered on light and at different times; I never hurt my strawberries by driving over them.

A Member: What kind of land have you?

Mr. Shaver: It is clay on the top of the hill.

Question: What is the best gooseberry for this section here?

Answer: The Houghton and the Downing.

Question: What are the three most productive varieties of strawberries adapted to the rich sandy loam in central Nebraska?

Answer: Warfield, Bederwood, and Dunlap.

President Green: This completes our list of questions, and before we close I want to call your attention to the fact that tomorrow morning at 11:00 o'clock sharp we have an election of officers. We will also have an address by Mr. Dalby of Beatrice on "Horticultural Opportunities for the Tenant Farmer." I don't think there is a man in Nebraska who has more tenant farmers than Mr. Dalby, and he certainly is in a position to take care of this subject. Then we will have an address by Professor Whitten of Columbia, Missouri, on "Recent Advancement in Horticulture." He is about as well posted on horticultural subjects as any man in the West. This concludes our program for this afternoon, and if there is nothing further to come before the meeting we will adjourn. I will say that the new edition of the Evergreens has recently been published, also the Peony monthly, and the New Iris monthly.

Mr. Christy: Our Constitution was changed so that a man who has been an annual member for two consecutive years can vote at the election; now our annual members have not been in the habit of voting, but if they have been members

for two years in succession they are entitled to vote tomorrow.

President Green: I think that has been interpreted to mean that where a member has been a member for one year and has paid his fees for another year he is entitled to vote.

Mr. Pence: I move we adjourn. Seconded by Mr. Yeager, and carried.

Wednesday, January 19, 1910, 9:00 A.M.

The Society reassembled and proceeded with its business as follows:

President Green: We will now listen to Mr. D. S. Dalby, of Beatrice, on the subject of "Horticultural Opportunities for the Tenant Farmer."

HORTICULTURAL OPPORTUNITIES FOR THE TENANT FARMER

D. S. DALBY, BEATRICE

Mr. President and Members: I feel a little bit out of place in coming before the Horticultural Society and trying to tell them anything that I know that they don't know, and I am very sure that when I am through you will discover that I don't know anything that you don't already know. I come before you as a green farmer and not as a Horticulturist, although I am especially interested in horticulture and more especially in the products of horticulture. What I have to say will be more from the standpoint of horticultural opportunities of the green farmer. I think there is nothing so desolate as a farm without fruit around it. I can not think of any place that is more lonely and forlorn and desolate than a farm without fruit around it. Among our tenant farmers there is not one out of ten that does have fruit, and when Secretary Marshall asked me to take up this question I told him that I would start it and let the discussion take care of itself.

I don't presume to make an address so I want you to feel free at any time to stop me and ask any question or to make any suggestions that come to your mind.

The reason why there are not more orchards and fruit grown on the average farms is just as much the landlord's fault as the tenants'. I think in this question of landlord and tenant that the landlord needs just as much education as the tenant. In many cases the landlord is not up on farming himself, and in his ignorance he drives the tenant to be a land or soil robber who sometimes skims the land for all there is in it. When that exists there is no chance for horticulture on that farm. Unless there is a feeling of thorough understanding between the landlord and tenant—the landlord understanding the conditions of agriculture thoroughly himself —and the tenant being a capable, honest man that you want to keep on your land for an indefinite length of time, a man who will make that farm a home for himself, with the idea of treating that land just as he would if it were his own, there is no chance for horticulture. But where that condition does exist there is no reason why the tenant farmer should not have just as good fruit on that farm as if he owned it himself. I take a pride in making the tenant farmers we have, to a man, take as much pride in the farm as if he owned it himself. I don't want any one to drive past one of our farms and say there is a tenant farmer. There is too much of that. In the county in which I live—Gage county—it does not take a practiced eye at all to pick out the tenant farmers, or farms, and that is true with the whole of the United States as a rule. There are unsuccessful landlords as well as unsuccessful tenants; if a landlord doesn't understand the phase of agriculture himself and isn't liberal minded towards the tenant he can't expect the tenant to be so towards him, and if he isn't that way he won't make that farm look like a farm, but will make it look like the average tenant farm, and that is especially true in regard to the horticultural opportunities.

The average tenant we will say, after he takes a piece of

land that has nothing on it but the house, barn and buildings necessary to run it, moves on the land and if there is no fruit around him he will say, "Well, I just guess I won't plant any trees on this man's land, I will be doing something for him or for some one else that may follow me." Unless there is some suggestion on the part of the landlord to him, that if he makes any outlay he will not have to lose it, he never will plant any trees or set out any fruit, but there is just the chance for them to get together on that question. There are lots of men farming who have farmed the same place for ten or twenty years; I know of a number who have farmed the same farm for ten years, and I know some of those men who haven't as much as a peach tree or a blackberry bush or a strawberry plant on that farm, and just think what they might have had in that length of time. I am going to illustrate what some men have done in our own case. In the spring of 1904 we had a man that went into a cornfield and built a house and barn in May while I was in Illinois. And when I came back that man, without any suggestion on my part whatever, had set out a complete fruit farm. That is from the green tenant's standpoint. He had planted peaches, strawberries, and blackberries. Different kinds and as much as the average farmer can care for. That was in the spring of 1904, and now he has all kinds of fruits, except apples. He has had peaches, cherries, grapes, blackberries, strawberries, and raspberries. He has made a home out of that place, and it is a pleasure to him. He is a farmer who has a family of children, and they feel towards that farm as though it were a home. There are other men that could have been on that same place and they would simply have had a big cornfield there yet. From the landlord's standpoint you couldn't hire that man away from us, and we do something, too, to try to balance what he has done. We say to him that we will give him a little more improvements than we do to the other man, because he shows a willingness to do his part, and we are going to help him on our part. Another illustration: Two years ago this man's

brother, it seems to run in the family, wanted to have a place and went to another place in another part of the county, and went on a farm where there wasn't any fruit or anything except the old buildings, such as are on the ordinary tenant farm. He has around him now young trees that will soon be in bearing. He is going to have a home, and aside from the dollars and cents that man will save in fruit bills and doctor's bills by having an abundance of fruit on that farm. And by having fruit on the place that is growing he can have the satisfaction of having a place that is a home instead of just merely a place to live. And the expense is very trifling in getting enough fruit trees to set out a small orchard.

There is also a chance for the fruit farmer on a large scale, although I think the average man that wants to go into the fruit business on a large scale would prefer to own his own land. One man I know, at least, would not hesitate to use any number of acres of land to get into the commercial fruit business, and let him put his experience up against the landlord's land. I don't see why a very profitable arrangement could not be made along that line. Now in order to aid him to do that comes up the question of the lease, and the more I handle farms the less I think of a lease. If you have a good man you don't need a lease, and if you have a poor man the only thing you need a lease for is to get rid of him. I have heard some men say you want to have a copper riveted lease or contract, but as I said, if you do have a good man and he is honest and industrious and a good farmer you don't need or want a lease with that man; and if you have got a poor man all you need it for is to have it strong enough to fire him. There is no chance for horticultural opportunities for the tenant farmer who is an annual mover. If a man is going to the trouble to set out fruit on any man's land he will not do it unless he is assured that he can stay there enough years to pay for his labor. We have an understanding with our men that they are there for life or on good behavior, and such an understanding enables us to get a better quality of men.

As I said before, there is as much need for education on the landlord's side as there is on the tenant's side.

Now I have intruded on the next man's time with this brief outline and if there are any questions or any discussion to come up I will be glad to do what I can to help the thing along.

DISCUSSION.

L. O. Williams: For how long a term do you make a lease?

Mr. Dalby: For five years.

Mr. Williams: Do you have a written contract?

Mr. Dalby: We have a written contract, but we do not put that into the lease, that is understood. I wouldn't have a man that didn't feel that he would do anything in the world for me. I want them to feel that way towards me. We ask the least of any man. We need the best tenants in our community. If there is a feeling of friendliness between the landlord and tenant the tenant will do a lot of things he wouldn't otherwise do.

Mr. Williams: What do you consider an equitable adjustment between landlord and tenant?

Mr. Dalby: I figure that if I buy a fruit tree, and we have four places that have nice orchards on them, I encourage them. And if they thought we wouldn't charge any rent for the land they will take a little better care of the trees and the rabbits won't eat them so bad.

A Member: Don't you find that those who are inclined to plant trees are better tenants and more willing to stay?

Mr. Dalby: Yes, that is true. We have one man on our land for ten years, and we haven't planted a thing, not even a strawberry. They know they can stay there ten years longer if they want to because they are good farmers and they fulfil the requirements we ask. We suggest to our men that it would be a nice thing to have fruit there, but outside of suggesting we don't go any further.

A Member: What do you mean when you say you exempt them from the rent?

Mr. Dalby: We don't charge them for the land. The orchard land we put that up against their trees. The only cash rent is the pasture land. There isn't anything in the lease about that and I don't know whether we would get any better results if there was. It is just an understanding we have with the tenants. The tenants themselves started it. We saw what one or two men could do and we saw what a good thing it was. If they put in an acre or two of small fruit and got returns the next year that land costs them nothing. But we haven't hardly got into that yet, as the average corn farmer don't figure that way. If he put in an acre of small fruit it cuts down his acreage for corn. I don't think a fruit farmer could be a very heavy grain farmer.

Secretary Marshall: How much do you think a family orchard and windbreak or grove will add to the value of a farm in case it is on the market?

Mr. Dalby: If you are selling it to a man to make a home out of it it will make a big difference. Of course, land in Nebraska is valued according to its productiveness. Land sells in our neighborhood with orchards and good sets of improvements for better prices than lands without these improvements. The good farmers are beginning to figure on that more now than they did before; they begin to talk about whether there is anything started on the farm, and fruit is one of the things that takes time to grow. In addition to the fruit we are growing quite a lot of catalpa trees for fence posts on the north side of the house. We have had good success thus far in having them cared for by the man that runs the farm, and he uses them for a windbreak.

A Member: Do you plant your trees pretty thick?

Mr. Dalby: I planted them 8 feet by 4, 8 feet between the rows. I did that so we could drive between the rows to cut out the posts.

A Member: It seems that if the trees are scattered they don't make posts as well.

Mr. Dalby: That is true, I haven't had much experience

in growing catalpa trees except the last two or three years. You can cultivate and grow potatoes or corn between the rows, too, if you desire. I think every one should have the common fruit briars, strawberries, grapes, blackberries, and raspberries, for it is surprising how quick the strawberries and raspberries will get to bearing fruit and how quick a man begins to get returns. Of course if he plants to peaches it takes a longer time, but these I have mentioned are the kinds of fruits the average farmer would want on his land, and result in getting his boys to help on the place. If I was a hired man I would want to work on a farm that had fruit on it and not on a place where they had only a few scarecrows on the place. If that is all, I thank you for your kind attention.

President Green: Are there any further questions that you want to ask Mr. Dalby? If there is anything you think of later you can put your questions in the question box and they will be taken care of. We have with us Professor J. C. Whitten, of Columbia, Missouri, who will speak to us on the subject of "Recent Advancement in Horticulture."

RECENT ADVANCEMENT IN HORTICULTURE

PROF. J. C. WHITTEN, UNIVERSITY OF MISSOURI

Mr. Chairman, Ladies and Gentlemen:

I don't know whether the Nebraska State Horticultural Society has a picture in their minds of hearing something this morning that will be particularly new or startling in horticulture. I shall not expect to give you anything that is especially new with regard to horticulture. I want to quote Mr. Dalby, who has just addressed you, in that respect. Our advancement in horticulture did not come by leaps and bounds; it is a thing which has had a general progress or growth. It has been said that "There is nothing new under the sun." If I could tell you something about the oldest phases of horticulture that is the best I can expect to do.

"Tell me the old, old story," is a good statement. If we can take the old, old story and tell it in terms up to date we can perhaps understand it better.

We are dealing essentially in horticulture, with the same subjects and with the same methods as our forefathers did. We can measure the advancement only as we can add to the growth of the subject in the same way as they added to the generations that preceded them. Horticulture is advancing nevertheless, and rapidly, but it is a fact that it is by gradual accretions, a growth upon those which went before means all the more to my mind and should make us feel all the more respectful for that growth if we could feel that it was something striking, because the strikingly new would necessarily be new enough; we would not have the long decades which experience has had. Horticulture is advancing in every department. Take for instance one subject that comes prominently to my mind as having been marked by very recent progress—that of spraying. Spraying has now come to be recognized by leading orchardists as a necessary part of the orchard management. Leading fruit growers are coming to realize that it has just as much a necessary part of successful orcharding as is pruning, handling of the soil, or even gathering, grading, and properly handling the fruit crop itself. There is probably no other factor connected with orchard management which has had its rise and development in so short a period of time as has spraying.

The art of grafting and budding has been known and practiced for centuries, yet leading nurserymen and fruit growers are still working out new details as to better methods.

Pruning, likewise, has for centuries been practiced, and yet even today we still find the active horticulturist still further formulating and systematizing his methods of pruning, and he adapts this work to various varieties, soils, and climatic conditions.

While methods of destroying noxious insects by means which might be called spraying have for decades been known

in a general way, still spraying orchards on the present scale for insects and fungus diseases may be said to have had its rise practically within the last two decades.

As compared with other phases of orchard management, then, spraying is a new art. While in its primitive form this practice is approximately a quarter of a century old, it is so rapidly being improved and perfected that spraying mixtures and methods of five years ago are, for the most part, now antiquated.

Probably never in the history of agriculture have so many men been engaged in research and practical experimentation upon any single agricultural problem, as have been working in our experiment stations, in the Department of Agriculture at Washington during the last two decades upon subjects relating to spraying.

A host of workers are now giving attention, for at least a part of their time, to some kind of scientific work which has to do with spraying. Trained botanists are working out the life histories of parasitic fungi in order that we may better know how to combat them, and are also studying the effects of spray mixtures upon the physiological functions of the plants. Equally skilled entomologists are studying the life histories and feeding habits of insects in order that we may better know when and how to spray for them. They are likewise engaged in a vigorous consideration of parasites and other enemies of these insects which are sometimes successfully introduced to hold the insects in control. Chemists are finding out more about the active agents in our spray mixtures, and are investigating means of neutralizing the caustic effects of spraying compounds not already perfected. The field working horticulturists of almost every experiment station, and many in the U. S. Department of Agriculture, are carrying on field experiments in order to reduce to commercial working practice the application of spraying. The up-to-date orchardist is working vigorously hand in hand with these scientific workers to apply in his own orchard princi-

ples underlying spraying which are thus being discovered. Such active orchardists may be truly said to be, in their own way, scientists in just so far as through their practice in spraying they discover factors in spraying which from year to year are useful to them.

All this activity in behalf of securing better fruit represents great progress for the better. As compared with other old practices, it may be said that the progress which has been made during the last two decades along the line of spraying has been almost phenomenal.

On the other hand, with the example right within our view of the number of leading horticulturists who profit by spraying, it is perhaps remarkable to find how many orchardists still neglect to spray. I do not know whether it is true in Nebraska, but it is true in Missouri that a large proportion of our orchardists either do not spray at all, or else fail to use the right mixtures at the right time, and do the work at best very imperfectly. Some do not even believe yet that it pays to spray.

It is my purpose not to censure the opinion or position of those who do not spray, but to try, if possible, to encourage them to adopt the practice. It is my belief that one of the greatest reasons why many orchardists do not spray is because they look to the fruit alone in judging the effects of spraying. Most of them look at a sprayed apple, and perhaps another one not sprayed, but almost as good, and do not stop to consider the effects of spraying upon the growth, vigor, and productiveness of the tree itself. We should remember, in considering spraying, that the comparative appearance of a sprayed apple and one which is not sprayed can tell, at most, only one-half of the story in favor of spraying. It is quite as important that we consider the effect of spraying upon the growth, vigor, and vitality of the tree itself throughout its life history. Many of the noxious insects do not affect the fruit, but feed upon the leaves of the tree. Some of those which mar the fruit, injuring its appear-

ance and salability, also injure the leaves of the tree. Many of our fungous diseases like "apple scab" or "skin blotch," which attack the fruit and injure its market qualities, also attack the leaves of the trees or their twigs. At times certain fungi may do more damage to the tree direct than to the fruit which is being produced by it. Perhaps a few specific examples may emphasize this point better than can be done in any other way. In my own state during the past three springs, for example, we have had prolonged cold, more or less frosty weather during the blossoming period of our apple trees. In sections of the state more or less blasting of the flowers at this season has taken place, so that buds here and there fail to set well. The almost unanimous verdict of the orchardists has been that in sections where apples failed to set, even though there was a full bloom, that the failure has been due to the fact that the blossoms were killed by cold, frosty weather.

It is my opinion that the failure of apple blossoms to set fruit, and the dropping of these small apples shortly after they set has been due more largely to the presence of "apple scab" in the orchard than to cold weather. In one large orchard adjacent to the experiment station, which is not sprayed, the blossoms of the trees were found to be quite generally affected with "apple scab." The stem of the flower or peduncle in many cases turned black, wilted, then withered, and the flower fell because the parasitic fungi, "apple scab," had a foothold in the flower cluster, and not directly because the weather was cold enough to kill the blooms through frost. Similar observation has been made in many orchards in various sections of the state. This withering and destruction of the blossoms after a cold night is now usually thought by the orchardists to be due to the cold, when, however, the flower clusters are seen to be generally affected with scab fungus; the leaves of the trees shrivel and are injured greatly by this same fungus. The indication is that the fungus disease has much to do with the killing of the flowers.

Again, when sprayed trees are compared with unsprayed trees right in the same orchard, where all experienced the same cold weather, flower clusters are mainly killed on trees that are not sprayed, and apples that are sprayed escape the cold and subsequently mature, and because the "apple scab" also is kept out of the trees. This is still better evidence that it is not the cold weather, but the "apple scab" that killed the flowers where spraying was not done.

In our experiment station orchard during the present season, a full crop of Jonathan, Ben Davis, Gano, Ingram, Winesap, and other leading commercial varieties was secured on trees which went through the same cold weather as was experienced by adjacent unsprayed trees whose bloosoms or young fruit was mostly killed before the warm weather of spring came on.

Some of the orchardists said that it was not worth while to spray, because the cold weather had killed all of the blossoms; and he had nothing to spray for. An outlaying experiment was performed on an adjacent orchard. This orchard embraces some 200 acres of Jonathan, Ben Davis, Gano, and other commercial sorts. Believing from the previous year's observations that the loss of the flowers was due to "scab" rather than to cold weather, a single acre in this orchard was sprayed carefully by the experiment station. This one acre had more good marketable fruit on it during this autumn than has all of the rest of the 200 acres combined. While the cold weather was apparently killing the blossoms on unsprayed trees (which blossoms, however, were actually being killed by "apple scab"), fruit was setting nicely on sprayed trees where "apple scab" was kept down, and a good crop was the result.

It should be further emphasized that very much of the alleged killing of apple blossoms in cold weather, rainy springs, and frosty weather is more largely due to "apple scab" in most localities than to cold wet weather.

In order to impress this point better upon the mind, it

should be remembered that "apple scab" is known by the botanist to make its best development on the trees during cold, wet, inclement weather. These are the conditions when it thrives best.

On the other hand, during such weather the tree is not making rapid or vigorous growth. It is at a standstill on account of cold weather preventing its normal functions of growth. It has about all it can do, if kept in perfect health, to hold its own during severe inclement weather. The "apple scab" then is favored in its development; it is enabled to get a strong foothold on the leaves and flower clusters to devitalize the tree, by injuring the tree and almost entirely destroying the flowers and young fruit by attacking them and preventing their development.

Observations in our experiment station orchard, during several past cold springs, indicate that spring frosts somewhat rarely kill the flowers if they are kept in good health. Apple blossoms in our experiment station orchard, when fully opened, have passed safely through a temperature of 27 degrees F., or 5 degrees below the actual freezing point of water, during a frosty night and still set enough fruit for a full crop, where kept free from "scab" by spraying. In the spring of 1908, some of our trees actually passed through a temperature which for a period of about one hour toward morning went as low as 26 degrees F., in the orchard, or 6 degrees below the freezing point of water, and still had a fair crop of fruit set. Blossoms which are not fully open may probably pass through even a lower temperature than this, if not too prolonged, and still set fruit, if the trees are in healthy condition. In our section, I would regard, ordinarily, a temperature of 26 degrees as being the critical point below which it is not safe for apple flowers in full blossom to pass, but under ordinary conditions I would regard any temperature above 26 degrees as not being necessarily fatal to apple flowers in full blossom. In fact, they will usually endure a temperature not lower than 26 degrees without anything like the full crop of flowers being killed.

Another point which needs emphasis in view of spraying for the good of the tree itself, is the fact that we may keep the leaves in good health and enable the tree to carry the leaves through autumn up to cold weather in early winter. Again, I do not know whether your apple trees in unsprayed orchards customarily shed their leaves, or have the leaves lose their green in late summer or early autumn. With us it generally happens, however, that unsprayed orchards fail to hold their leaves late enough. Even before the crop of fruit is gathered, if there is a crop of fruit, the leaves on the trees begin to fall, or prematurely lose their green color, looking dull and sickly. In some unsprayed orchards, some years, I have seen the trees almost bare before time to gather the fruit in the fall, and have seen at least fair crops of fruit harvested from trees whose leaves were all shed at the time the apples were picked. This is a condition of affairs which very seriously hinders the setting of a crop of fruit buds for the subsequent season.

It should be borne in mind that the blossom buds on an apple tree form during the summer and autumn previous to the spring when they blossom and set fruit. At least as early as June in our state, and I presume also in yours, the flowers for next year may be found to be forming down in the fruit buds of the apple tree. Thousands of sections of fruit buds by microscopic examination made by us during the last few years show that these fruit buds continue to grow and develop throughout most of the summer and the autumn. In order to protect them, it is necessary that the trees have green, healthy, vigorous foliage in order that these buds for the following spring may be developed and matured.

It is also important that the apple trees retain vigorous, green foliage throughout the season in order that plant food, largely in the form of starch, may be abundantly stored up in the buds and twigs and crowns of the tree to start it into growth the following spring and get it vigorous enough that its blossoms can set fruit. Where the leaves are shed prema-

turely early in late summer or early autumn, the plant food fails properly to develop for the following spring. If they come out into blossom at all the blossoms will be weak so that they may fall without setting fruit, and if the tree has failed during the previous summer and autumn to store up the proper plant food supply, it is not apt to give the blossoms the food material which is necessary to stand low temperature or wet weather, and set fruit during the spring. In such cases we may have a weak blossom and yet fail to set fruit.

It is a notable fact that properly sprayed orchards carry the leaves vigorous and green up to early autumn and winter, while unsprayed trees have shed their leaves too early for the proper food supply in the tree. In our own state the past year Ben Davis apples in sprayed orchards generally set a good crop and matured a good crop of fruit. In unsprayed orchards it was the complaint of the fruit growers that they had no blossoms or that they had very little blossoms in the spring, and what few came out looked small, weak, and undeveloped. As a result, they had no fruit crop to spray for, and it did not pay to spray, while as a matter of fact this was the best evidence possible that spraying should have been performed in order that the trees might have had the necessary energy to make flowers and set fruit.

Another example comes to my mind which tends to indicate why some orchardists do not spray. In my own state a leading orchardist who sprays has a very productive and profitable orchard. Just across the road from him, on similar land, another orchardist has an apple orchard of similar size and age. The latter does not spray. During the World's Fair at St. Louis, the writer had occasion to visit these orchards when the apple crops were maturing. He drove along the road between the two orchards in company with the two owners. The gentleman who does not spray remarked: "Well I do not spray, the other man does, now look at my orchard and see if it does not look just about as well as the one that is sprayed." Strange to say, it did appear

from the road to have about as good a crop of apples as the adjacent orchard. Closer examination, however, showed that from the road the fruit showed up better than it actually was in the unsprayed orchard. Most of the leaves had dropepd from the trees and those that remained were dying and wilting, and this gave opportunity for what fruit there was to shine out more vividly than did the apples on the rich green, foliage trees of the sprayed orchard. A search for show fruit, however, showed that on the trees in the sprayed orchard splendid show specimens could be secured. Search for show specimens in the unsprayed orchard revealed the fact that upon close examination almost every apple was more or less affected with "scab" or "curculio" or by "codling moth" or other insects and diseases. Hardly a show specimen could be found in an orchard, that from the road looked to be carrying a good crop of fruit. The gentleman who owned the sprayed orchard took the first prize in his own state for the best York Imperial and Gano apples. His neighbor who did not spray did not take a single premium of any kind for a single variety. The fruit was judged side by side by men who knew nothing of the orchards and nothing of the care that was given the orchards, or why the fruit in one case was superior to the other.

When buyers examined the fruit of these two orchards, the orchardist who sprayed had fruit which nearly all went into barrels, and a very small per cent of culls left. The orchardist who did not spray found one-half of his fruit sorted out as culls, and the other half could not compare in quality to the crop of his neighbor who sprayed.

It is impossible, then, by casual observation from a distance to pass by an orchard and form a correct opinion as to whether the fruit in it has profited by spraying or whether it has not.

It was not my purpose to go into the details of when and how to spray apples. Your own state experiment station has sent out excellent bulletins giving instructions along this line. The Department of Agriculture at Washington, D. C., has been equally active in sending out similar publications.

Any man who contemplates spraying should get the bulletins of this station and of the Department of Agriculture at Washington, and should read them very carefully for instructions that are adapted to conditions in his particular state.

There is another phase, that of horticultural organization. We have had for a long time organizations that gather up statistics. For instance, there is the American Pomological Society, and societies like your own that gather up statistics and put them on record, so that we become posted on much of the work that is being done, and shows the progress of the science and what ought to be done. In recent years there have been formed organizations for packing, marketing, shipping, and handling the product, and protecting the market. In our own state when the strawberry interests started, two decades ago, they were without organization and the producer did not make enough; another man would be lucky, he would strike an honest commission man and get something out of his fruit; another man knew when he waked up tomorrow morning that he had not only lost his fruit but had got nothing back to pay for the freight. In recent years they have organized, they have oversight over the methods of packing. A man has a place for his strawberries so they can be crated and they will not be shipped until they are crated. Again they are organized so they can have oversight over who the buyers are. They can sell them on track so they may know who the men are that they deal with. They can employ a man in charge of their organization who knows the markets, and knows where strawberries are plentiful and where they are needed and where they were marketed.

Again in the far Northwest you see the results of organization. Apples from the Hood River District are sold in other sections for much higher prices than growers nearer the big markets receive, because the Northwestern growers have done something that growers nearer the market have not done; they have organized and created a demand, and it gives them a definite brand of goods and when they sell them on the

market the buyer knows what the goods are going to be, and it enables them to market the fruit much easier. I understand that in some of these districts not more than 20 per cent or 25 per cent of the fruit will reach the grade that will pass the supervisors of that organization, but they will make more out of the 20 per cent or 25 per cent packed and graded and given a standard brand than they could make out of their whole crop if it were in barrels and sold on the market without being graded.

There is another thing I wish to speak of, that of the citrous industry of California, because it is so remote from the market. They have an organization for the packing, marking, shipping, and handling their fruits. Florida grows a better orange than can be grown on the Pacific coast,—that is well recognized,—yet the Florida growers have been almost driven out of the market trying to compete with the California fruit, simply because they haven't had an organization, while in California their organization has long been perfected. There is room for both, yet Florida with its better fruit never has been able to get as much money for its fruit as the California people with their organization.

There is another factor, that of cooling and refrigeration, and shipping in refrigerator cars. And the storing of fruit during the winter is another thing that we must not lose sight of. And the fruit that ripens in the fall is held so that it can be sold throughout the whole year. In my judgment we are going to see a means perfected, whereby that portion of our crop of apples capable of being held in storage until needed and then taken out from time to time so that we will not have to be without fruit the large part of the year but can market it during any season of the year.

Methods of certifying fruit products and making it more inviting is another factor that should be mentioned. I can not help thinking, from the waking up that is occurring, that we are on the eve of greater developments in fruit growing. We

have not in this country reached anything like the limit of our possibilities of the high price for first class fruit.

I can not help but be interested in the German and French people and the markets of Europe. If we think that $15 a box which they have gotten for their fruit is high, for some of the northwestern grown apples $6 to $8 a basket is still higher in proportion. Let us see what can be done in London. Some sell for such prices that they get 50 cents and 75 cents apiece for a single apple of a fancy grade. And to show you the difference between the money that can be made out of the best grade of fruit properly packed and the poorer grade improperly packed, I give you the figures from one German grower of fancy apples. His best grade from his orchard of 320 trees averaged in weight something like ¾ of a pound, and his fourth grade averaged just about one-half as large as his highest grade apples. His highest grade netted him for a period of years 72 cents apiece in our money in the markets of Paris, Berlin, and London, while his fourth grade apples averaging in weight less than half a pound brought him a fraction below 5 cents apiece. The apples weighing one-half as much brought him one-fourteenth as much in price. Two of the fourth grade contained the same weight as the highest grade and those two apples brought 10 cents or a fraction less, while one of the highest grade weighing as much as the two of the fourth grade brought 72 cents.

Those people have worked up the sale of the highest grade apples to a price we never dreamed of getting in this country. Who are the buyers of these apples? Most of them go to the American tourists, the most particular people on the face of the earth. They will pay 75 cents for an apple and these same people will come back home and expect to pay 75 cents a box for them. Why? Because these people have learned that if they can get a perfectly beautiful luxury they want it, and they want it in this country too.

I was down in West Virginia about a month ago in one of the leading fruit districts. In a section where oil, and coal

mining interests abound and where their advantages are rather mixed. I found men there whom I had visited some 8 years ago and who then were marketing their apples in barrels. They are now shipping from 20 per cent to 25 per cent of their best fruit through an organization. They are selling this fruit in 40 pound boxes and this year this fruit in boxes run from $7 to $8 a box. They are shipped to the large markets. In the last 8 years they have worked up a demand for that fine class of fruit, so that this year about 25 per cent of their fruit went into that class of packages. They had the other 75 per cent of their fruit to put in barrels and got just about as much for it after they had taken out the 25 per cent of the highest grade as for the whole of it before. They said they had no trouble to market the highest grade and could have sold it all at the highest price if they had had the fruit of that grade, and that they made more money out of one-quarter of their crop marketed in that way than if they had marketed the whole crop in barrels.

Another thing that was new to me; they said that when they took out that best grade of fruit they could get about the same price for it as they could have if the best fruit was in barrels, because the uniformity in size is more essential than the size. Apples to sell well should be uniform in size and in a box of apples unless they are graded the big ones spoil the uniformity. In other words if a barrel has one big apple and the others smaller they don't look so well,—it is the uniformity in size that makes them sell.

Aside from the methods of organization and shipping I want to mention another thing; any recent advancement in horticulture is due to the fruit grower himself. He has learned what to do for the first time, and he has learned that the tree is a thing of life, a living thing. I don't think we can emphasize that point too much. If you take the fruit books and journals you will find that the further back you go the more the fruit grower had a definite plan and skeleton for the shape of his tree, to secure uniformity of the limbs.

His conception was to make it just a mechanical structure; he wanted it to be just that shape regardless of its habits and life history; he had to shape it just to that idea, just as a carpenter would put in 16 inch studding just that far apart in a house, and he would have to work to that scheme just as much as the carpenter, instead of considering it a living organism. You will find that idea is being departed from in the conception of the practical fruit grower. His idea is now to look at that tree as a living tree which has a shape of its own; and the idea I wish to convey to you is that that tree is a living plastic organism, that is capable of being made different, and whenever you do anything to it the tree itself does something back in response. It is a living thing that is teaching you how it should be shaped. For example, I went through an orchard, and in going into his orchard,—he was a practical fruit grower and he studied the individuality of each tree,—each had a certain individual expression just as one horse has from another. You know their eccentricities in their character. This man could go into his orchard and look at a tree and tell just how old it was; he could look on the limbs and tell what the year's growth had been and just how it had been behaving from year to year; he could look over the buds and see whether the tree was likely to produce the next spring,—whether the bud would develop or not; he could tell whether it was improving in nourishment; he could tell about the condition the tree is in or had been for the last 10 years, by the characteristics of its twigs; he could read its life history and consequently reach the right conclusion as to what effect each year's treatment had upon its development and fruitfulness. Instead of regarding the tree as a dead structure he is giving attention to the records of a living thing whose life history he is reading by the characteristics on its twigs.

DISCUSSION.

President Green: If there are any questions you would like to ask Professor Whitten I am sure he will answer them.

Mr. Williams: In the matter of spraying to prevent injury from very late frosts, I don't understand whether that benefit was occasioned by the spraying that spring or season, or does the tree become hardier, or does the spraying of it that season cause it to resist the freezing weather?

Prof. Whitten: Both are true. I think more directly, the first spring spraying you give it just before the blossoms open is more beneficial than when they are in bloom because it keeps the fungus from growing in the flowers at that time; on the other hand, spraying on through the season makes the foliage better and it stays on the trees later in the autumn and makes them hardier. You will find that a tree has more nourishment held in solution when it holds its leaves well on into the winter. I think you can see that if a tree sheds its leaves earlier it can not store up plant food. You get, so to speak, a thicker cell sap. Clear water freezes quickly, but a little salt will check it. The more a tree takes on of the cell sap the greater cold it can withstand. That freezing effect injures these cells in the early spring and the earlier the tree sheds its leaves the less will be its capacity to withstand the cold. If you go to making laboratory experiments to show the difference between spraying and not spraying trees you will find it is related to the time just preceding the opening of the blossoms. And by holding the leaves on the trees late in the season, stronger buds are developed. Last winter the Alberta peaches had been pruned back enough to make them grow more luxuriously and in giving them better care through the season to keep them in growth up to autumn they stood 13 degrees more cold than those that shed their leaves earlier. In some degree that is true of the apples. They will also stand more cold if they are in a vigorous growing condition late and still ripen for winter. Professor Anderson has made some experiments to enable him to state how late he could keep the leaves on the trees, and he found that by keeping the leaves healthy during the summer that they would stand a long rough bad winter better.

Mr. Harrison: I think the Professor has emphasized the fact that the farmers want cleaner orchards, but I think the farmers should learn that the very best trees are oftener the homeliest. The strongest tree and the best tree is the one that holds its leaves the longest. We know if the orchard is allowed to grow up to grass and we have a late dry fall the trees will be liable to shed their leaves earlier. If they have late cultivation they will hold their leaves longer.

Professor Whitten: I would not like to recommend late cultivation of peaches for this far North. You had better talk with Professor Emerson about that. You have to know the trees and he knows your own varieties up here better than I do. From our experience where we have milder winters our peaches can stand a lower winter temperature when they have grown well up towards winter. They want to have just as late a dormant period as they can. They reach a stage when they are ready to waken up and we should then apply the heat, the earlier they shed their leaves in the summer the quicker they will become dormant and the quicker they will start in the spring. That is another reason why we say it is advisable to grow them late in the season.

A Member: How would it do to cut off the tops?

Prof. Whitten: We do that on the peaches.

A Member: What have been your observations of spraying to enable apple trees to withstand the drouth? In sections that suffered from drouth like last August, what advantage is there in spraying the orchards?

Prof. Whitten: Let me take one instance; just outside our station there is a 200 acre orchard; the owner did not spray his trees and the late frost killed the blossoms. We went into that 200 acre orchard and sprayed one acre, that was given otherwise identically the same treatment as the other 199 acres. That man has one of the best orchards around there, but he did not believe in spraying. The 199 acres shed their leaves very early and they were burnt and seared; the one acre was rich in foliage and went into the winter in good condition. That one acre had more marketable

fruit on it than all of the other 199 acres combined, and that man is going to come to Lincoln to get some of your Cushman Spraying outfits and commence spraying. That one acre stood the drouth better than the other 199 acres did.

Mr. Christy: Is there anything new on spraying for the curculio in the apple?

Prof. Whitten: The first spraying helps if you use arsenate of lead. In peach tree spraying for the curculio you are almost sure to get rid of it, and the brown rot can be controlled almost to the same degree as curculio; the entrance of the fungus into the fruit is effected through punctures, and we find that if we can spray well enough to prevent punctures we can control the brown rot very largely when we are controling the curculio.

President Green: I am sure we have listened to a very interesting and instructive talk from Professor Whitten for which we thank him.

The time has now arrived for the annual election of officers, but we will first listen to the report of our auditing committee.

Auditing committee reported as follows:

REPORT OF AUDITING COMMITTEE.

We, the members of your committee appointed to examine the reports of the secretary and the treasurer find them correct and recommend their adoption.

J. A. YAGER,
J. E. ATKINSON,
ED. WILLIAMS.

Mr. Yager moved the adoption of the report of the Auditing Committee, seconded by Mr. Harrison, and carried.

President Green: We will now proceed to the election of officers.

Mr. Harrison: I move that we waive the usual form of election and that we have the same President over, and that we authorize the Secretary to announce the election of our present President.

Mr. Beltzer: We tried that once and it was declared out of order. I object to that method of procedure, all of us have some ideas ourselves.

Mr. Brown: We have usually permitted our Vice-President to become our President, but we are going to depart from that course this time and I nominate Mr. C. S. Harrison for President. Duly seconded.

Mr. Harrison: I absolutely refuse; I am 77 years old and I may die before my term is out.

President Green: I believe the Society is entitled to have your name before it for the office of President, Mr. Harrison. I would like to entertain a motion that the rules be suspended.

Mr. Brown: I move that the rules be suspended and that the Secretary be instructed to cast the entire vote of the Society for Mr. Harrison for President, seconded by Mr. Yager and carried, Mr. Harrison voting no most emphatically. Mr. Harrison declared duly elected by the Secretary.

Mr. G. A. Marshall: I nominate Mr. W. A. Harrison for Vice-President and move that the rules be suspended and that the Secretary cast the ballot of the Society for Mr. Harrison. Seconded by Mr. Yager and carried unanimously. Mr. Harrison declared elected by the Secretary. Mr. Christy nominated Ed. Williams of Grand Island for Second Vice-President and moved that the rules be suspended and that the Secretary cast the ballot of the Society for Mr. Williams. Seconded by Mr. Yeager and carried. Ballot cast and Mr. Williams declared elected.

Mr. J. A. Yeager nominated Mr. Peter Youngers for Treasurer and moved that the rules be suspended and that the Secretary be instructed to cast the ballot of the Society for Mr. Youngers. Duly seconded and carried. Ballot cast and Mr. Youngers declared elected.

President Green: The term of office of Mr. Yager has expired as a member of the Board of Directors.

Mr. Beltzer: I move that the rules be suspended and that the Secretary be allowed to have the one great privilege of

casting another vote for Mr. Yager. Duly seconded. Ballot cast and Mr. Yager declared elected.

Mr. Beltzer: I have here a little two leafed pamphlet that is recommended in this country, on the development of fruit trees. Last summer I was out in the country and a Swede man took me out in his orchard to look at some trees that had this paint on that is here advertised and is manufactured in Mr. Yager's city. I looked at those trees. A few he had painted, and they were absolutely beauties. About two months ago I was out at the same man's place writing some insurance for him and the agent came and wanted me to buy three or four boxes to use. He claims it does away largely with spraying. Now if it is a good thing I say it ought to be pushed and I am going to get some myself and try the experiment. I want some information as to whether any one has an idea that you can use this prepared paint.

Mr. Yager: I haven't anything to do with this paint business and I am not agent for it. Some time ago I was called in by these people that they might consult with me. They tried to get me to recommend it, but I could not do that without knowing something about it. They are making some sort of a dope up there that they claim will take the place of spraying, but when they told me that, I knew it was pretty much of the nature of a fake, because up to date from the literature I have read on that subject I know that if there was anything of that kind discovered in this country we would all know about it. I don't believe there is anything manufactured in our town or any place else, that will take the place of scientific spraying.

President Green: I have come in contact with this party who manufactures this wonderful tree paint. It was brought out in the first place by an old crank who claimed to get the receipt from an Egyptian tomb.

Mr. Atkinson: It must be so dead that the Egyptians buried it.

Mr. Harrison: A good bar of cheap soap rubbed up and down on a tree will do it about as much good.

Mr. Davidson: I want to ask the members if any of them have tried whitewashing their trees with the refuse from the gas plant. Parties have told me that it is the best white wash for the trees there is and I want to know.

Mr. Harrison: Does it consist of a lime jelly?

Mr. Davidson: It is a carbide or coke. I have been told that it was a good wash and I wanted to know if any one here knew anything about it.

Mr. Williams: I want to ask whether the minutes of the last annual meeting, provided for in our Constitution, have been read and approved by this or any other meeting?

President Green: Sure, any business that was transacted at the last winter meeting should have been read and approved at that meeting. The same members and the same officers do not get back into open meeting again, and if it had been necessary for them to have been approved they should have been at that time and during that session.

Mr. Beltzer: We have an organization like this in our county and the minutes of each meeting are read and approved or disapproved at the meeting the next year.

Mr. Williams: What minutes were made of this meeting last year and when we met this year should have been read then, when we opened our meeting.

Mr. Brown: I can tell you what the former practice of the Society was. We read the report of the session, say the report of this morning's session would be read this afternoon and approved or rejected and at the close of the entire meeting we have simply a half a day's session that carries over and usually that is not a business session.

Mr. Beltzer: Have we been following that rule?

Mr. Brown: Years ago we did, I don't know whether they have been doing it lately or not. The reading of the minutes of one session are approved at the following session. That is always done while the matter is fresh in the minds of the

people. There is a great part of our work that is purely informal and nothing to be approved and those matters ought to be very easily disposed of.

Mr. Williams: The reason I brought this matter up was in regard to the appointment of committees and the powers delegated to them. We ought to have them report at this time to know what was done, to know what we did last year and whether it was properly recorded. I think we ought to hear at this meeting a general outline of what business was transacted last year.

Mr. Russell: What Mr. Williams is driving at,— he wants the minutes of last winter's meeting read. I have been slow in getting them out and I turned the work over to my son. The by-laws provide for that being done but it has not been followed for quite a number of years, although it was done years ago. We got a little slow or careless. My son was getting it ready for the printer and before the work was finished he was called away and he has the work with him now and I haven't a scratch of it now to present.

Mr. Brown: There should be a record kept of all of that work. The Executive Committee had certain proceedings yesterday and that should appear in the minutes. Where are they now?

Secretary Marshall: The reporter has all transactions recorded.

Mr. Williams: Where is the permanent record of the minutes?

Secretary Marshall: In the record book.

Mr. Russell: There never was any record book handed down to me at all. I bought that book and paid for it myself.

Secretary Marshall: This book (indicating) contains the record of the Board meetings.

Mr. Russell: Yes, sir, and the records of the annual meeting are in the annual reports.

Mr. Williams: Yes, and provision is made for it in our Constitution.

President Green: It seems to me as a simple business proposition that any mention made in regard to business matters our Secretary should have a record of it. He should take down a report of everything, like that motion of Mr. Harrison's yesterday in regard to these Auxiliary Societies. I believe it would be better, with the business transactions, for a record to be made of them just the same as any lodge secretary would record any motion that was carried.

Mr. Brown: In order to settle this matter I move that the Secretary be instructed to provide a permanent record for the business transactions of the Society at the expense of the Society. I do not think it is best to go ahead and spend the money of the Society without having a permanent record of what we are doing. Seconded by Mr. Williams, and carried.

Mr. Harrison: Wouldn't it be a good idea to have the minutes read at the morning session the next day and then we will know what occurred yesterday and if there is anything neglected we can rectify it then?

Mr. Christy: There are a few of us that can tell what was done.

Mr. Beltzer: In case committees were appointed at last year's meeting when the report is read it shows what the committee was appointed for and what their duties were and that report brings out a report of the doings of that committee. The way it is going on here now it is as Mr. Christy says, we might have some important committees appointed and wouldn't get their report; it takes but a little while to read that portion of the record that pertains to the business transacted at the opening of the meeting.

L. O. Williams: I had in mind, and the reason I called up the matter, there was a committee appointed last year referring to a certain matter, for instance, our legislation committee. We should have a report from the legislative committee showing what was done, and I don't know of any better time than now for that report.

Secretary Marshall: I do not believe one member of this committee is here now,

President Green: It seems impossible to get a report from that committee now.

Mr. Brown: There is another committee that is here that is prepared to report, and that is the committee to make the exhibit at Council Bluffs and the business end of this affair can be reported on now. I understand that Mr. Christy wants to go home at noon.

President Green: We will now listen to the report of the committee on exhibits at Council Bluffs.

REPORT OF THE COMMITTEE APPOINTED TO MAKE EXHIBITS AT THE HORTICULTURAL CONGRESS AT COUNCIL BLUFFS, IA.

BY G. A. MARSHALL, CHAIRMAN.

Mr. President, and Gentlemen:

The Society decided at last summer's meeting that we could not afford to let that Congress pass over without having an exhibit there. We felt that we would have to spend a good deal of money there and on the other hand we did not want to spend so much. So finally $200 was set aside and it was left to the Board of Directors to use its judgment how to proceed with the exhibit, and whether we should set aside more money at the September meeting. We finally decided to set aside $300 for that purpose and appointed a committee of three to look after this exhibit. This committee was Mr. Brown, Mr. Christy and myself and we engaged Mr. Barnard to gather up this exhibit and take care of it. He gathered up the exhibit and installed it, with the help of our Secretary in the latter part of the work. The largest entry was for the best State Horticultural Society exhibit. We won that prize, which is this cup here (indicating). By the way, the base of it is down at the University. The next prize won was this gold medal (indicating) for the most artistic display. The next prize was this cup (indicating). We got that for the best

home orchard collection. We feel pretty good over what Mr. Barnard did for us, or rather what he and our Secretary did for us. We were in competition with North Carolina, Maryland, Virginia, Texas and Iowa, and we came home with this cup (indicating). On state exhibits Iowa won the first prize and Nebraska the second, and Washington, Maryland, Idaho followed along. And I will say of Mr. Barnard and our Secretary,—we ought to be very proud of them. We will have to give them the credit for this gold medal, because any one could have won that prize if they had laid out the design and put up the fruit. Our boys simply took Jonathan apples, and wrote the word Nebraska on one of those large tables and then surrounded the Jonathans with Grimes Golden and Northwestern Greenings, and they may well feel proud of their work. We got a great big red feather in our cap over Idaho, Washington, and California. The committee told the boys to gather a good many Grimes Golden and Jonathan apples and kept up the Nebraska record by letting no one go away hungry. We kept giving them out and that had the right effect. At the end when we came to gather up the apples and sell them our apples went at $2 a box just as readily as any in the hall; we sold all we could spare and could have sold a good many more, I think we had the advantage over the Western states.

Mr. Williams: I heard that the Iowa men were asking $3 a box for their apples?

Mr. Marshall: I think we could have gotten $3 for ours if we had asked it. We didn't ask it. Apples that stood in that hot room 7 or 8 days were not in first class condition any more; the room that the fruit was in was warm and we felt that $2 a box was not too much. The report that Mr. Barnard gave to the committee is here and I will read it:

Report read as follows:

Receipts and disbursements in preparing and installing the Nebraska Exhibit at the National Horticultural Congress held at Council Bluffs, Iowa, Nov. 15 to 20, 1909, inclusive.

RECEIPTS.

Society appropriation	$300 00
Cash premiums	177 50
Sale of fruit	50 00
	$527 50

DISBURSEMENTS.

E. M. Pollard, fruit	$ 79 58	
E. F. Stephens, fruit	54 55	
Arnold Martin, fruit	15 75	
H. Davey, fruit	31 20	
Marshall Bros., fruit	41 25	
Frank P. Brown, fruit	10 00	
G. S. Christy, fruit	29 40	$261 73
30 fruit boxes at 21 cents	6 30	
Expert packer	6 00	
Entrance money	2 00	
Printing	1 50	
Drayage, Council Bluffs	5 00	
Membership	1 00	
Express, Council Bluffs to Lincoln	7 90	
Decorations	11 50	
G. A. Marshall, expenses	9 00	
C. G. Marshall, expenses	35 40	85 60
C. H. Barnard, salary and expenses		136 93
To check balance cash on hand		43 24
		$527 50

Mr. Marshall: I will add that we got 30 plate premiums, first, second, and third prizes; we got first prize on a number of our standard apples.

Mr. Yager: How much was the total expenditure?

Mr. Marshall: It isn't added up, but it is about $480.

Mr. Yager: I move the adoption of the report and that

the committee be discharged, seconded by Mr. Harrison, and carried.

Mr. Beltzer: I would like to know who all that property belongs too? (Indicating the prize cups etc.)

Mr. Marshall: It belongs to the Society.

Mr. Beltzer: I want to know what we are going to do with it?

President Green: I suppose the place to keep it would be in the office of the Secretary of the Society.

Mr. Beltzer: I move that those cups, one of them be voted to the incoming President, for him to have the privilege and care of and put in some conspicuous place and bring it back here at our next meeting.

Secretary Marshall: This is just a suggestion on my part, —my idea is that these cups be displayed in some business house window in Lincoln. Other Societies display their prizes in the windows, most of them in Rudge & Guenzel's or Miller & Paine's windows. They are always willing to put up a sign and set these cups in front of them, and we can get a great deal of advertising for the Society; I think the cups should be put together in a place where the most people would see them. I don't think they should be shipped around over the state, unless for some special meeting because they are apt to be damaged.

Mr. Williams: I think, as long as they are the property of the Society, they ought to be in the hands and care of the Secretary there at the State House and that a glass case should be provided for them and their safe keeping and then at the time of the State Fair they could be brought there.

I move that our Board of Directors be authorized to provide a suitable case and make provisions for the care and display of those trophies.

Mr. Barnard: I would like to add to that motion the medal also that belongs to the Society.

Mr. Williams: I accept the amendment and include that in my motion. Motion duly seconded.

President Green: The motion then would be that the Board of Directors be instructed to provide a proper case for the cups and medal which have been won by this Society. Motion as amended carried.

Mr. Yager: I move we adjourn. Seconded and carried.

Wednesday, January 19, 1910, 2 P.M.

Society reassembled and proceeded with its program.

President Green.: We will have first the reports of the district directors who are present.

The following reports were given:

REPORT FROM DISTRICT NO. 1.

COMPRISING OTOE, JOHNSON, NEMAHA, PAWNEE, AND RICHARDSON COUNTIES.

Beginning with the strawberry, the first fruit to ripen, the crop was very short but the high price helped considerable on receipts. The short crop was caused by the dry weather in 1908, causing a very poor stand of plants. Late frosts also added to the shortage. Raspberries were seriously damaged by anthracnose and winter killing and the crop was light. Blackberries did better, but a light cane growth in 1908 prevented the possibility of a good crop. Cherries were abundant, and very fine. The cherry crop was better than it has been for several years. The ravages of the shothole fungus a few years ago killing a great part of the cherry trees is the only thing that prevented an over production of cherries this year. Pears were badly hit by a late frost and a very light crop resulted. Prices were $2 per bushel. There were only a few seedling peaches of very poor quality, selling at 50 cents to $1 per bushel.

Our apple crop this year was an enigma. Frost was usually blamed for the failure in so many orchards, but one thing

seems strange, the frost passed over the orchards that were sprayed in 1998, and in Nemaha county less than 10 per cent of the orchards were sprayed, yet the sprayed orchards furnished nearly 50 per cent of the merchantable apples sent out of the county. One orchard (less than 40 acres), sold for $6,000. Another orchard sold for $5,000 but I do not know the size of the orchard. The highest returns reported were from Grimes Golden, $25 per tree or $1,000 per acre, at 40 trees per acre. Then there were hundreds of acres that did not pay taxes this year; but the value of the work put on the orchards would not pay taxes so they gave in returns as much as was expended on them.

G. S. Christy, Director.

REPORT FROM DISTRICT NO. 2.

COMPRISING THE COUNTIES OF WASHINGTON, SAUNDERS, DOUGLAS, AND SARPY.

I did not write out a report but I will say that we had a splendid crop of cherries, plums and strawberries, and an average crop of currants and gooseberries. We had an average crop of grapes and more than an average crop of apples. We didn't have an average crop of peaches as it was too cold in the winter and anyway we haven't a very good peach country up there.

Our quality of fruit was above the average. The apple orchards that were cared for produced very good fruit. I think there was something like 200 carloads of apples sent out of the county I live in. I don't know how much there was sent out of the other counties. The little town of Arlington sent out about 50 cars and we have only 2 or 3 commercial orchards. The orchards that were sprayed were a sight to behold,—beautiful and free from blemish. The orchards that were not sprayed lost their leaves very badly. You understand that the farmers' orchards are small 50 to 100 trees

and they never lose their leaves as bad as the commercial orchards because it is smaller,—like a small bunch of hogs or chickens are usually healthier,—but the orchards that were not sprayed lost their leaves, and those that were sprayed did not lose their leaves and they look fine now. The raspberry, blackberry and strawberry bushes look fine and seem to be in fine condition for a crop for another year.

Mr. Beltzer: I believe you said the strawberries were in number 1 condition now.

Mr. Marshall: Yes, sir.

Mr. Beltzer: Have you seen them lately?

Mr. Marshall: I haven't seen them, but on our place we have a cover of snow over them.

Mr. Beltzer: You didn't cover them at all this year did you?

Mr. Marshall: No, sir, but we hope to have a chance to cover them before spring; after the snow goes off before it freezes up. But if the snow does not go off I don't suppose we will cover them at all.

REPORT FROM DISTRICT NO. 4.

COMPRISING LANCASTER, GAGE, SALINE, AND JEFFERSON COUNTIES.

The season of 1909 opened fairly well with some loss by freeze, but on the whole, the conditions were a little above the average.

Since there are very few commercial orchards within the district, very little spraying has been done. The average farmer has not as yet acquired the habit of spraying his orchard either to control fungous diseases or to guard against codling moth and other insect enemies. Most of our farmers are still drifting in the old way, expecting that because in an early day they were immune from insect enemies and fungous diseases, they will continue immune.

The month of June and the very early days of July were

unusually wet. Weather of this character leads to prevalence of fungus diseases. These diseases affected all orchards that were not thoroughly sprayed and coupled with the severe drought lasting from July 7 until into September, caused the fruit in many orchards to be small and caused quite a percentage to drop from lack of needed moisture.

Cherries were fairly good crop, peaches about one-fourth, grapes where properly sprayed were best crop in years, but where not sprayed were subject to some fungus diseases and in some vineyards as much as half. The E. T. Hartley orchard north of Lincoln has been leased for a term of years to Chas. Dickinson and very favorable crop is reported. Mr. Dickinson did a great amount of pruning in the orchard in the winter of 1908-09, orchard was sprayed 3 times with following result: expense of lease, pruning, spraying, picking, cost of barrels in which to pack and deliver the 5,500 barrels in town was little over $6,000. His fruit, therefore, cost him a little over $1.20 per barrel, 70 per cent of the fruit sold for $2.50 to $3.50 per barrel and a portion of the crop yet on hand is doubtless worth $4 a barrel, returning to Mr. Dickinson a very handsome and substantial profit of about $100 per acre, over and above all expenses of lease and management.

E. F. Stephens, Director.

REPORT FROM DISTRICT NO. 5.

COMPRISING CLAY, FILLMORE, NUCKOLLS, AND THAYER COUNTIES.
P. A. MURPHY, EXETER.

The apple crop in the Fifth District was the best in the history of the District. We had the largest number of varieties we have had for several years. There was little, if any, scab or rust and such varieties as Winesaps and Missouri Pippins were at their best. Cherries, we had a very good average crop with Early Richmonds in the lead. The ex-

treme heat in August was not very good for our peach crop. All small fruits, with the exception of strawberries gave a good grade and price and the demand was good for all kinds of fruit. It was never better.

P. A. MURPHY, Director.

REPORT FROM DISTRICT NO. 6.

COMPRISING HAMILTON, POLK, YORK, BUTLER, AND SEWARD COUNTIES.

I can speak more especially for Hamilton county, although I know Seward county crop was quite good. There were a great many apples and some were shipped to New York, something that hasn't happened for a number of years. Taken as a whole we had the best we ever raised. I think the apple belt is moving West. I believe the center of the commercial orchards will be found in Hamilton county at the present time. The dry hot weather in August hurt our apple orchards, especially where they were not cultivated, but where they were cultivated they stood the dry hot spell very well. Our peach crop was another failure, outside of the seedlings. Some of those were of a good grade. I think there is no doubt but we had the best grape crop we ever had. They were of a good grade and we got good prices. In regard to the strawberries there are some grown but there are very few specializing in strawberries. The crop does not cut much of a figure with us. Now for myself, I had about half a crop of currants; I have about a quarter of an acre of currants and I think I had a good half crop. I have some Snyder blackberries. They were the best I ever had. I raised some as fine as a man ever saw.

REPORT FROM DISTRICT NO. 9.

COMPRISING HOLT, ROCK, BROWN, KEYA PAHA, AND BOYD COUNTIES.

It was but a few years ago that the counties in this horticultural district were thought to be too far north to permit of successful fruit growing within their borders; but facts have demonstrated that by the use of methods suitable to the soil and climate an abundance of fine fruit can be produced in these counties. Last fall a gentleman from one of the eastern counties of Iowa said to me that he saw more apples in one orchard in Holt county than there was in his whole county in Iowa. I received a letter recently from a gentleman who is now in York this state, who has a farm in this county, which is his home. He writes in regard to his orchard here, " I much wish you could have seen my fruit trees and small fruit last summer; I think I could have shown you something worthy of your notice; I am well pleased with my efforts so far with almost all kinds of fruits; I have tried both large and small." This man's farm is right in the sandhill region. I visited his place a few years ago and was surprised at the wonderful growth his trees had made; they had not come into bearing yet not being old enough, but the prospect was good for a very productive orchard. I have in some of my reports referred to Mr. Peter Greely whose orchard of fifteen acres has brought him from a thousand to fifteen hundred dollars annually for a number of years. A farmer near Chambers sold four hundred dollars worth of apples in one year from four acres. I might multiply instances of successful fruit growing in this district, but this is sufficient to show what can be done by proper management. Some years ago an honored member of our society and a leader in horticultural instruction in the state visited the Chambers Experiment Station and was looking over a young orchard, being asked what he thought of the prospect as compared with an orchard in a certain other locality, casting up his eyes and looking over the orchard, said: "I see some brush." Last

year that brush produced twelve and one-half bushels to a tree of very fine fruit. One of the trees produced an apple measuring thirteen and one-half inches in circumference.

I have spoken of the successes in fruit production in this district. I might mention many failures; these failures have been mainly because of a lack of care and proper management, which will result in failure anywhere.

SOME METHODS RESULTING SUCCESSFULLY IN THIS DISTRICT.

While in some cases fruit of various kinds have been produced within the bounds of this district in spite of bad treatment, yet not in such quantity and quality that it could be called successful fruit raising. There are some things which can not be omitted if we expect full crops of good fruit.

FERTILIZING.

While most of the land in north central Nebraska will bring fruit trees to bearing age with but little or no fertilizing, yet when the age of fruit bearing arrives they require more plant food than is found in the soil of most localities in this region.

SPRAYING.

We find that the insect enemies of fruit trees and of fruit manifest their presence very soon after the trees come into bearing so that spraying is indispensable. Our method has been to spray once soon after the petals fall with pyrox, using a rather coarse spray with all the force we can give it and cultivating twice in July and once in August, being careful to move all the earth clear up to the body of the trees. In this way we virtually protect all our fruit from worms. Our women folks have only found five wormy apples in all that two families have used (about 24 bushels).

CULTIVATION.

The best results seem to be obtained in this part of the state, especially on level and sandy land, by plowing under

the cover crop with a common stirring plow as early in the spring as the ground can be worked, then follow the plow with the disk. (An extension disk is the best.) And the disk with the common drag continuing the clean cultivation until about the first of August. Then sow a cover crop, or let the weeds grow. Some have seeded their orchards to clover, but the clean cultivation seems to produce the best results.

VARIETIES.

There were exhibited at the Chambers fair last fall about forty-five kinds of apples besides pears, plums, and peaches. If a list of the varieties which will do well in this district were made it would be much longer than has been generally supposed. I would advise orchard planters, however, not to plant too many kinds and but few summer apples. The Yellow Transparent and Duchess for summer, the Wealthy and Maiden's Blush for autumn, the Genet, Ben Davis, N. W. Greening, Winesap, and Roman Stem for winter. This latter kind in this district keeps well until after the holidays and it yields a crop annually.

I have confined my report to the apple this year because it is the most important of all the fruits. Perhaps another year I will report on other fruits.

All of which is respectfully submitted,

J. L. Coppoc, Director.

REPORT FROM DISTRICT NO. 11.

COMPRISING BUFFALO AND HALL COUNTIES.

Our district is not considered as a very good fruit district. Nevertheless, last year was a very favorable year for different kinds of fruit. It would have been a little better if the frost had held off a little longer. We had a short crop of apples, but I believe in the general results we have done a little better than the average for our district. There is more fruit being planted from year to year. I notice a considerable change

in the last few years. People are putting out orchards and making permanent homes.

ED WILLIAMS, Director.

REPORT FROM DISTRICT NO. 13.

COMPRISING FRONTIER, GOSPER, RED WILLOW, AND FURNAS COUNTIES.

Our fruit crop in this district was very light this year owing to frost in the spring. It caught most all of the peaches except a few of the Russell and Crosby. The cherry crop was just fair, not a full crop. Apples, owing to dry weather through July and August, were pretty small. The best varieties were Utter's Red, Yellow Transparent, Whitney, and Genet. On account of spring frosts and dry weather in the summer the crop was shortened considerably.

The plum crop was injured more by drouth than from any other cause, making the fruit very small.

S. C. KING, Director.

REPORT FROM DISTRICT NO. 17.

COMPRISING CHERRY COUNTY.

Apples were a fair crop where on low land and ground water near. Plums were also a good crop. Cherries and plums were good on high dry land where cultivated and also a few apples in such places. The growing season was a dry one and hail storms were numerous. The recommended list of fruits for this district is good from my observation. However, I would take from it the Virginia Crab. It is a good grower but too shy a bearer.

C. M. VANMETRE, Director.

REPORT FROM SANDOZ EXPERIMENT STATION.

HAYS SPRINGS.

Gentlemen: I am pleased to report that the year 1909 was a favorable one with the trees in western Nebraska. The ones at this station were loaded with fruit, a few kinds of which I have brought to the show.

I have now about 6,000 trees doing well and have tried every variety of fruit usually sold by nurserymen, and will, from now on, only have to try the newer varieties as fast as introduced.

I recommend for planting in the west part of the state for home or sale: Cherries—Dyehouse, Early Morello, Wragg. Plums—Sandoz, Larsen, Klondike, Wyant. Apples—Florence, Duchess, Yellow Transparent, Longfield. Pears—Flemish Beauty, Warner, Birkett, and claim that west Nebraska is even better adapted to cherries, plums, and pears than the eastern part, while only the earliest kinds of apples ought to be planted in the west, on account of the heavy September frosts.

A great industry could be built up in the west in raising Wragg cherries which ripen here August 15 to be sold at fancy prices at Omaha and Chicago after theirs are gone.

I wish the Society would go on record in favor of the proposed parcel post, as no other convenience would so help to develop the west, and enable farmers off the railroad to get their mail. I need it every day.

There is room in western Nebraska on unoccupied lands for one million farmers and fruit raisers and I think the government ought to discontinue giving away 640 acres of land to persons who will never use one acre, and ought to give the land to our new emigrants, Italians, Greeks, and Austrians who are now coming, and they would help build up the west, like the Germans did 30 years ago for the east.

The newcomers can not find our free lands, and our government ought to make provisions to show them the free land

to enable them to settle down and become land owners and good citizens, instead of putting secret service men on their trail hunting for anarchists.

JULES A. SANDOZ, Director.

President Green: This completes the reports of the districts. We will now listen to Mr. Louis Henderson, of Omaha, on the subject of Decorating.

DECORATING.

L. HENDERSON, OMAHA.

Mr. President and Members of the Nebraska State Horticultural Society:

To decorate from a florist's standpoint to arrange plants and flowers suitable for various occasions may be easier done than to explain.

To be a successful decorator you must cultivate a love for Nature in its luxurious form, whereby you may be able to express or impress a pleasing effect suitable for the various occasions, whether it be a reception, a brilliant wedding, or some other floral decoration.

My first recollection of decorating was some forty years ago in a sod house on one of these western prairies. The occasion being my birthday, tropical house plants then not being plentiful, but my mother a lover of Nature's beautiful flowers gathered native prairie flowers and cottonwood branches and with these decorated the sod walls of our humble home, making it look to me as a palace of beauty.

However this simple decoration has impressed me many a time in the years since gone by, that it is not always the choicest or swellest of flowers that make the longest or best impression.

Use what available flowers and green that are in season, arrange them to the best of your ability, establish a confidence in yourself that you are a master of the art.

In arranging avoid stiffness, place things in the most natural position in the way most pleasing to the eye. Always decorate for effect having in mind the object of your decoration, whether it be a home decoration in honor of some friends, a church affair or a ballroom, a wedding or some national event.

The first impression in entering a decorated place makes the most lasting effect and as you advance further it ought to be followed up with various vines, bowers, groups of plants, and tropical foliage and clusters of flowers as if to say within these walls no cold winds shall ever strike our bower.

Now for a parlor decoration, will say for a wedding, first see the rooms if possible and arrange for the style and tone of the decoration as well as the price.

In decorating you must govern yourself some according to the price and style of the decoration.

For an ordinary wedding place a group of tall palms at each side where the bridal party is to stand, with a light background of plants, arrange them in such a way that all pots are covered, making a natural display of foliage.

You can also if wanted place a canopy made of asparagus plumosus or smilax over where the bridal party is to stand, making it a complete bower between the two groups of plants which makes a very fine effect.

Or if desired you can make a floral bell, a love knot or a horse-shoe suspended draped from the ceiling with festooning of asparagus or smilax fastened back to the walls in the shape of a canopy.

If there is a mantel you can bank the same with ferns standing tipped or laid down, making a complete bower of green, place a bank of cut flowers in front of the mirror and cover the shelf with greens of asparagus or smilax.

In front of the mantal place a few palms on each side with a few ferns and some blooming plants in front of the fireplace.

What plants you now have left you can place in various

places, in corners of the house on some pedestals or grouped in banks according to the room.

You are now through with the plant decoration, see that the chandeliers are festooned with asparagus or smilax.

If there are some large open doors or arches they can be improved on by some drapery of asparagus, also the stairway draped with the same material fastened to the railing in loops which can be improved on with a few bows of white chiffon or ribbon.

Now to the dining room table which may be a small round or square table more used for the ornamental part than the serving. This table can be decorated very nicely with a center piece of roses, carnations, or any other flowers in season the top or corners of the table can be draped with smilax or asparagus a few candelabra placed at various places will improve the same as well as a few bows of chiffon ribbon all of course to be the same shade and colors keeping in harmony with the shades of flowers or shaded lights of the rooms.

If a large table, you can place a mound of roses or carnations in the center in somewhat the same manner as the smaller table with additional smaller vase of flowers placed at the various corners of the table where it makes the most pleasing effect, if plates are laid for the serving of the guests a small bouquet or boutonniere at each plate is very appropriate.

This form of table decoration can be applied as well to a reception or any other banquet and also the parlor decoration by leaving out the bridal stand.

In decorating you should always place the main decoration around or about the center attraction of the function. If in a hall, around the speaker's platform, as well as in a room of a debutante or a party receiving callers, a pulpit or altar of a church.

Always place the flowers and plants in the most natural position in a way to avoid obstructing any of the views of

the center attraction to the public; at the same time place all plants in such ways that all pots are covered, leaving nothing but a pleasing effect and an inspiring tone of these silent messengers of Nature's most beautiful growing emblems of life and health. And later on in life when we have finished our toil and our spirits have gone to the realms beyond and our bodies to be placed in the last resting place it is very appropriate to decorate the same with these beautiful flowers that we have so cherished, loved and toiled among during our life by placing a wreath or bunch of flowers on the last resting place, but until then let us always remember that it is far more pleasant and pleasing to scatter the flowers while our friends are living than to wait until death has parted us.

A little decoration now and then here and there brightens the eye, cheers the heart, and gives us more courage and inspiration for the advancement of the beautiful.

DISCUSSION.

Ed Williams: Mr. Henderson left out one article, one of the best things we have for home decoration, the wild smilax. With that exception I believe I will agree with him.

Mr. Henderson: I agree with you but we do not have very much wild smilax around here. However, it is very appropriate.

President Green: We will now have a paper by Mr. Irwin Frey on the subject of Commercial Carnations.

COMMERCIAL CARNATIONS.

IRWIN FREY, LINCOLN.

Some growers here will perhaps take exception to the list of strictly commercial carnations which it is my pleasure to present to you here this afternoon, but I wish to say that my endeavor will be to select leaders only in their respective colors, omitting many so-called "just as good" varieties. For I believe most of us are growing too many varieties, while if

we would occupy our bench space only with the best, our customers would know, when ordering a certain color, just what they were going to receive.

Suppose one of us were to order a thousand white carnations in Chicago today, not knowing the condition of the market. What would he get? If the supply is large, he will likely receive fine White Enchantress or White Perfection. If the market is short, he will get a mixture of perhaps five or six varieties, from White Enchantress down to short-stemmed White Lawson.

Why grow all these varieties when they find a market only when the best are out, and then are not satisfactory to the buyer? I think practically all of you will agree with me that the Enchantress family, consisting of Enchantress, White Enchantress and Rose Pink, stand preeminently at the head of commercial carnations in commerce at the present time. White and Rose Pink Enchantress show considerably more vigor of growth with us than does the original variety.

White Enchantress also has the advantage of being the best keeper of the three,—a cardinal point to be considered when choosing a commercial carnation. Rose Pink, while not having the best of keeping qualities, is invaluable for retail trade on account of its size and pleasing color, but from a wholesale point of view this is a drawback which cannot be overlooked.

In red carnations we have Beacon and Victory, either of which could not have attained the commercial success it has without the other, for this reason: Beacon is very prolific during December and January, and the bulk of the crop comes at the holiday season when red is in greatest demand and brings the largest financial returns. As to Victory, you can depend upon the first flowers cut being of saleable quality, and while the bulk of the crop is over by Christmas, they pay well for their room until the latter part of February, when they are in crop again to stay until thrown out to make room for young stock, the quality remaining

good. Thus the two varieties give first-class bloom through the entire growing season, while either one without the other would scarcely be considered a success. We are still waiting for a commercial dark pink carnation, and for lack of a better one will continue to grow Aristocrat, which really belongs to the fancies, not being prolific enough to grow in commercial quantities. May Day, one of the introductions of 1909, I believe will be grown quite largely when it becomes better known. It is a beautiful shell pink, very prolific, and blossoms placed in a mixed vase of carnations were in fair shape three days after the others had gone to sleep.

Methods of growing carnations vary greatly in different sections of the country, and I do not presume to tell you that our method would be successful under different climatic conditions or in different soil, etc., but will endeavor to tell you in as plain words as possible our methods, beginning with the propagation of young stock. There is a wide diversity of opinion as to the use of bottom heat in propagating carnation cuttings. Some growers claim the bottom heat has a weakening effect upon the cuttings, and I believe this is true if carried to extremes, but the only difference I can see between cuttings rooted in a temperature of 50 degrees overhead and a sand temperature of 58 degrees, and cuttings rooted in a temperature of 52 degrees, both in the sand and overhead, is that the space is occupied from ten days to two weeks longer without the bottom heat, in which time another batch would be well on the way to rooting. After the cuttings are well rooted, which usually takes about twenty-one days, they are potted rather firmly in two-inch pots, using ordinary black prairie soil with a little sand added, but no manure.

We commence propagating about the first of December, starting with those varieties which we wish to greatly increase in stock, and in this way our plants are not robbed of any great amount of strength at any one time. The earlier potted plants, after they become well rooted and

before growth stops, are turned out of their pots and heeled in on the bench, using only clean soil. Care must be taken to select a bench free from any drip, for should fungus get any start while they are in these crowded quarters it would soon cause great ruin. In handling plants in this way, growth never stops. Cuttings potted after the tenth of February are planted direct to the field from the pots, being careful to see that all have been topped back before removing them. We plant in the field as early as the season will permit; usually about the 15th to 20th of April. Last year we handled six thousand plants in this way, and during the present year the number will greatly exceed this.

After the plants are in the field they should be gone over once a week, topping back any which have a tendency to produce buds. If this is not neglected from the start there will be no danger of cropping later—something which we try to avoid.

The soil is cultivated just as often as its condition will permit. We have had our greatest success with early planted stock, therefore about the first of July we commence to get the houses in condition to bring the plants inside. Every vestige of the previous season is removed. The benches are washed off thoroughly with the hose and given a coat of hot lime wash. Over this we put a covering of rotted manure about one inch thick, which settles to about half an inch after the soil is in; then the benches are filled level full of soil. We have used with equal success both top soil and what we term "second plowing." Upon this we add half an inch of well rotted cattle manure, then this is worked over, using spading forks, being careful to break all lumps while doing so, and not turning deep enough to remove any manure from below, as this is for the plants later in the season. This gives us about four inches of soil and one inch of manure—from only one-half of which, however, the plants derive immediate benefit. By planting thus early no extra shade is required on the glass to prevent wilting.

The distance apart in planting varies according to growth of different varieties. Victory and varieties which do not make large plants are planted 9x11 inches, while for such varieties as Enchantress or Beacon, 10x14 inches is about right.

The plants are kept well sprinkled until the bench is full, when it is given a thorough watering, and this is usually all the soil will require for five or six days, but the plants are sprinkled two or three times daily if the weather is bright, for the first two weeks. After this once a day will prevent wilting, except on very hot or windy days.

Before the plants make much headway in their new quarters they should receive their first tying up. We use the wire and twine system, running No. 18 galvanized wire lengthwise between the rows, and cross-tying with twine. Two to three tiers are put on in this way, according to the height to which the variety grows.

Keeping the soil clear of weeds, maintaining an even temperature, watering and ventilating carefully, and disbudding, are the main requirements until early in the new year, when the beds are given a top dressing of cattle manure, preferably not too well rotted. In about two weeks this is worked into the soil. As the days lengthen the plants grow much more rapidly and require large quantities of water.

About the first of March a coat of rather coarse manure is given, which runs the plants through the balance of the season.

DISCUSSION.

Mr. Henderson: If any one present can tell about out doors variety called Her Majesty I wish they would do so; and then there is a red one about half the size of Her Majesty that blooms the first year; what I want to get at is the pinks that will grow out of doors and will yield a good crop of flowers, something that people can raise without being dependent upon the greenhouses, as a great many farmers want

to raise their own flowers. Can anyone give us any information on this subject? I secured one after a good many years search, but whether it is biennial or triennial I can not say.

Mr. Frey: We have never found any hardy pinks that are steady bloomers out doors. They will shed their crop in June but they are not continuous throughout the season and they are not to be compared with the carnation grown in the greenhouses.

Mr. Henderson: Those I refer to bloom in June and July and then take another spell in the fall.

President Green: Our next subject is Ornamental Trees, by Mr. W. L. Adams, Superintendent of Parks, of Omaha.

Mr. Adams not being present his paper was read by the Secretary, as follows:

ORNAMENTAL TREES.

W. R. ADAMS, SUPERINTENDENT OF PARKS, OMAHA.

This at first glance, seems an easy subject to speak on, but as there are many men of many minds, it is needless to say that there may be a great divergence of opinion on what is, and what is not, an ornamental tree. For my part, any tree with a good habit and giving a desirable amount of shade may be classed as ornamental. Certainly some are more highly prized than others,—for a difference it may be of foliage, flowers or fruit, or it may be a combination of all three, yet each has a beauty of its own, and an appropriate place in the grand scheme of making this world more habitable and certainly more beautiful.

We have here in Nebraska quite a number of deciduous trees, many of which are decidedly capable of beautifying the landscape. We have ash, elm, oak, hackberry, linden, sycamore, honey locust, yellow locust, walnut, coffee bean, hickory, box elder, iron wood, mulberry, hawthorn, cottonwood, red bud and willows, all native. And have added to these

ailanthus, black cherry, catalpa, sweet chestnut, birch, larch, alder, horse chestnut, magnolia, ginko, sugar maple, soft maple, several poplars, Russian mulberry, osage orange, Russian olive, Vergilia lutia, weeping and other willows, also the tulip tree.

To the foregoing list of deciduous trees, we have introduced the following list of evergreens, which are highly ornamental, especially in winter, adding, oh, so much to the apparent warmth of the landscape: Austrian pine, Scotch pine, White pine, Red pine, Mugho pine, Bull pine, Norway spruce, white spruce, blue spruce, Douglas fir, balsam fir, Rocky Mountain green spruce, Engleman's spruce, Abies, Concolor or silver spruce, hemlock and arborvita. All of these do well when once established, making a wonderful growth in a few years, and on poor soil. We have trees of white pine, Austrian and Scotch pine twelve years transplanted, 20 and 25 feet tall, and spruce the same age 15 feet in height.

The soft elm is conceded to be one of our finest and most desirable avenue or boulevard trees.

The Sycamore is a tree of quick growth and adaptable to low and high land. It is of pyramidal form, with good foliage.

The Ash, a tree of dense green foliage and compact growth, is desirable on the lower grounds.

The Hackberry, a tree of good form and dense shade is a quick grower in good soil.

The Linden, a desirable tree, both for its shade and bloom.

The Pin Oak, a symmetrical tree, and highly prized for its upright habit and clean cut appearance, and also for the beautiful coloring of its leaves in Autumn.

The Red, and other Oaks, such as the White and Black and Mossy cup, all make excellent trees for park or homestead planting.

The Sugar Maple is a most desirable tree of dense and compact growth, although not a very fast grower.

The Soft or Silver Maple is a quick grower, but requires lots of room for its proper development.

The Sweet Chestnut, a good tree of rather commanding appearance, and will make a very desirable addition to our Nebraska aboriculture.

The Cucumber Tree (magnolia accuminata) makes a good, and also a reliable tree in Nebraska, although not generally planted.

The Catalpa we all know, with its semi-tropical appearance, has its advocates, and for a short period each year, is very beautiful.

The European Larch, a deciduous conifer, is a distinguished looking ornamental tree. It is also useful as a forest tree,—its wood having more tenstile strength than pine, and should be more generally grown.

The Ginko, or Maidenhair, a Chinese tree, with peculiar leaves and of columnar growth, is sometimes grown as a street tree. Its branches often are curiously contorted, giving it a weird appearance.

The Horse chestnut, both American and European, makes compact trees, and when in bloom has a charming effect, especially the European variety.

The Honey Locust, a pinnate-leaved tree, of good appearance, the light green of its young growth contrasting with that of the older dark green leaves, giving to it a charming effect.

The Ailanthus, or Tree of Heaven, makes a good ornamental tree, with its frond-like leaves, and later on its bunches of yellow seed vessels amongst the leaves, give a unique effect.

The Virgilia, or Yellow Wood, is another of the pinnate-leaved trees, with pendant flowers, something like the Locust.

The Yellow and Black Locust, apart from their desirability as fence post timber, are very ornamental, when loaded in Spring with their pendulous white bloom.

The Red Bud of Judas Tree is very effective in early Spring, either massed or as an individual specimen.

The Hawthorns, American and European, are very desirable, both for the delicious fragrance of the flowers, and the effective appearance of the fruit in Autumn.

The Mulberries, American and Russian, make compact trees when planted apart, and make desirable medium sized trees. Their fruit is very attractive to our feathered friends.

The Osage Orange, with its glossy green leaves, its compact growth and orange-like fruit, is very ornamental.

The several varieties of Birch, with their semi-weeping and graceful habit of growth, are also very desirable.

The Black Cherry is desirable, both for appearance and from the quantity of fruit borne, which attracts the birds in great numbers.

Some of the Willows make desirable additions to the appearance of our landscape, notably, the weeping varieties, overhanging our pools and water courses, and the Laurel with its large and shining leaves glistening in the sunlight.

The Russian Olive, with its grey-green foliage standing against a dark background, makes a very effective tree.

The Evergreens should not be overlooked, and this snowy weather makes them stand out even more prominently. As ornamentals in winter, believing that nothing we can plant, adds more to the material comfort and appearance of the homestead, than a shelter of pines, even a few choice evergreens add so much to the looks of a place that I am convinced that each should endeavor to have some.

The Austrian pine, Scotch pine, White pine, Engleman's spruce, Norway spruce, Douglas spruce make good shelters.

For individual specimens nothing can be better than Abies Concolor, with its silvery green or Picea Pungens (Colorado Blue spruce), or the drooping Hemlock (Tsuga Canadensis Pendula), any, or all of which of these add much to the ornamentation of the home, giving it that appearance of individuality and care, so conducive to the feeling that we do not live for the mighty dollar alone, but strive to help make the world more beautiful.

DISCUSSION.

President Green: If there are any questions you would like to ask on this subject, write them out and they will be taken care of in the question box.

Mr. Harrison: I want to say with regard to this last subject that we have several different climates in Nebraska and the parks are sheltered in Omaha, and as to the yellow white Vergilia lutia it may be satisfactory in Omaha, but it is not satisfactory in York and further West; the Tulip is not satisfactory in this climate except in sheltered localities; the Magnolia is rather doubtful, and if you move west the Hemlock must have shelter from the afternoon sun.

President Green: Our next subject is Ornamental Shrubs and Plants, by Mr. W. H. Dunman, of Lincoln.

(Mr. Dunman read his paper which is as follows:)

ORNAMENTAL SHRUBS AND PLANTS.

BY W. H. DUNMAN, LANDSCAPE GARDENER, UNIVERSITY OF NEBRASKA.

In preparing this list of ornamental shrubs and plants, I have endeavored to name only such varieties, with one or two exceptions, that have been planted on the University Farm campus, and are adapted to our variable climatic conditions.

The spirea family is first on my list on account of their delicacy and exquisite beauty. They are the earliest shrubs to bloom in the spring, continuing till late summer. They should be divided into two classes, spring and summer flowering. Spirea Van Houteii is universally acknowledged to be the best for freedom of bloom and beauty of form. This shrub is often mutilated by pruning its lower branches to make room for the lawn mower. Spirea prunifolia, or bridal wreath with its small double white flowers is very effective.

Arguta, one of the earliest to flower, is very good. Sorbifolia is beautiful for its foliage as well as for its flowers. The summer flowering kinds, Billardi and Anthony Waterer, should be planted by themselves, as the color of their flowers does not harmonize with other plants. Physocarpus opulifolius, or Nine-Bark spirea, is attractive with its clusters of white flowers, followed by red seed-pods.

Second only to the spireas are the Philadelphus, syringa, or mock orange family. The tall robust kinds are Coronarius, Gordonianius, Grandiflorus, French Mammoth, and Læyheri. The dwarf types are Mantle of Ermine, Mont Blanc, and Avalanche. The flowers of these are not as large as the taller varieties.

Deutzias are very desirable shrubs for locations where a finer growing plant is desired on the front lawn. Lemoine is of dwarf habit, and Pride of Rochester are the hardiest varieties to plant. For late summer blooming nothing can equal the hydrangeas. For massing against a background of shrubs they are very effective, more so than if planted in isolated positions on the front lawn. The most popular variety is Paniculata grandiflora.

A great favorite on account of its holding its foliage well into the winter, and the ideal hedge plant, is the Ligustrum or privet. Of the six or seven varieties grown, the Californian would be my choice, were it not for its tendency to winter-kill. Ibota is a good strong-growing variety, but the best and hardiest for all purposes is the Polish. The Ligustrum ibota regelianum is best adapted for single specimens on the lawn with its drooping habits.

The Bush Honeysuckles are valuable for screens. The flowers and berries are very showy. Lonicera tartarica grandiflora is a robust, upright grower. Lonicera morrowi has a broad spreading habit and is a very prolific bloomer.

Althea rosea sometimes winter-kills, but it flowers so profusely and comes in early fall when there is a lack of flowering shrubs. This should be given a trial, and if successful a person is well repaid for his efforts in growing it. Weigelia

is another variety of shrubs that is tender till it gets established. The variety, Eva Rathke, for its profuse bloom and long blooming period, should be planted.

The viburnums are a remarkable group of ornamental shrubs and should be more widely grown. Hardy in growth, excellent in foliage which in fall changes to purple and later to red. The white flowers are borne in clusters, followed by panicles of fruit which cling to the bush during most of the winter. Viburnum sterile is an old garden favorite and very ornamental with its globes of white flowers which appear about Decoration Day, making it valuable commercially for decorating. Viburnum opulis (high bush cranberry), with its scarlet fruit, makes it one of the best for general planting. Puxnifolium (black haw), a tall native shrub with black fruit, and Dentatum with its dark green foliage, are very good. Rhodotypus kerrioides, a shrub from Japan with its beautiful foliage, white flowers, and black berries, is quite hardy and satisfactory.

Euonymus atropurpureus, or Wahoo, a native, is good for planting in the background. Euonymus alatus, Europoeus, and Radicans variegata are barely holding their own. There is nothing to equal Berberis thumbergii for a low ornamental hedge,with its crimson leaves and bright red fruit in autumn. The purple leaved barberry or Vulgaris atropurpurea is a stronger grower and very useful for foliate effects. Caragana arborescens (Siberian pea tree) is distinct from other shrubs with its yellow blossoms and acacia-like foliage. Chionauthus virginia (white fringe) is very attractive all summer with its fringe-like blossoms. When planted as a screen for out-buildings or unsightly places no better shrub can be found than Tamarisk amurensis with its feathery foliage and pink flowers lasting from July to September. It is not harmed by freezing back since the young shoots are better than the old ones.

The syringas or lilacs should not be overlooked. Vulgaris, the purple, and Alba, the white, varieties are old-fashioned kinds, but are still worthy of a place for orna-

mentation. Rothomagensis and the Persians make very desirable single specimens with their delicate foliage. Villosa, a Japanese variety, is valuable because it blooms two weeks later than vulgaris, thus escaping late spring frosts. There are many hybrids; a few of the best we noted were Marie Legraye, a dwarf variety, White Madam Lemoine with immense leaves, La Tour d'Avergne violet, Charles the Tenth deep purple, Bertha Damman—this form bears longer clusters than any other variety in cultivation—and Alphonse Lavalle blue. This year among these hybrids the borers did considerable damage.

The Japanese quince is a fairly hardy shrub and can be used as a hedge plant. For cheering up the winter landscape Cornus sibirica with its brilliant red bark is very attractive. Native shrubs, such as Symphoricarpos occidentalis, racemosus, and vulgaris with their red and white berries, the sumacs with their bright autumn colors, and the wild roses are not to be despised for ornamental effects.

Cultivated roses are rarely good for ornamental effects. However, there are some exceptions, as in the case of some of the hybrid teas, the rugosas, and climbers. The hybrid perpetuals are best planted in straight rows and on one side of the grounds to get the best results. For bedding, Gruss An Teplitz is very effective where red can be used. Baby Rambler fades a little in the open when exposed to the hot sun. Killarney, Kaiserin, and white and pink Maman Chrochet are very good. For climbers we are all acquainted with Baltimore Belle, Prairie Queen, and Crimson Rambler. The objection to the last named is its susceptibility to mildew. A much better variety and not susceptible to this disease is the Dorothy Perkins, a pleasing shade of pink.

I am sorry that I cannot recommend very highly any of the evergreen shrubs. The Mahonias seem to have done fairly well, also a few plants of box and the Japanese Azalea Mollis. Rhododendrons did not do very well. All these plants had protection from evergreen trees on the south and west.

I believe the Japanese maples could be made to grow, and

think they should be given a fair trial, as they are very attractive with their exquisite forms and great diversity of colors. Give them a sheltered position from the biting winds of early spring to protect their tender shoots and young leaves.

DISCUSSION.

President Green: We have some personal interest in this last subject, the ornamental shrubs and plants that Mr. Dunman has told us about, because they belong to us. They are right here on these grounds and I am sure if you wish to ask any questions Mr. Dunman will be pleased to answer them.

Mr. Atkinson: I should like to ask if anyone has tried this hardy Hydrangea that comes from the East instead of taking the Jap or Arborescens?

A Member: We have a few plants this year but they didn't hold on very well.

Mr. Atkinson: I want to know because it has called so many people's attention to it and I want to know if it is safe to plant them?

Mr. Harrison: We had them down at York but they are little plants well stocked with the largest flower we have. I want to say in regard to the Lilacs we have a new deal up there. We are grafting Lilacs on native Ash, just as you would graft apples in the winter and we are having wonderful success with them. The Ash is a hardy tree and you graft the Chinese tree Lilac on it and it is very striking. Then you take the vulgaris family and graft them and they will patronize the stepmother for a little while and then disregard her entirely. Now we have 50 varieties of the Lilacs and I want to call your special attention to the summer bloomers the villosa, the Dr. Bailschneider, the Emodi and the Josikuia, four kinds with very broad leaves, not quite as broad as my hands. You wouldn't think they were Lilacs until you saw them in bloom. They take very well to the

Ash root, better on the Ash root than they do on their own. Then these tree Lilacs, the Chinese and Japansee, grow just about as high as our own Ash, the Japanese is a stockier sort of tree. They grow 50 feet tall and are a foot through at the base in Japan. These are not to be forgotten. We have a good many to draw from. There are 50 kinds so we have quite a collection and they are propagated on the Ash. I want to tell you one thing, the demand for ornamentals is increasing.

Mr. Beltzer: I want to know whether there is more than one species of that Weigelia?

Mr. Harrison: I did not mention that, it is a very common one, the Rosea is the hardiest.

Mr. Beltzer: I want to say that about 15 or 18 years ago I got the shrub in my yard and people are just beginning to find out what it is. It was very hard to start; I started it in prairie sod and today I don't believe I ever saw a prettier shrub in my life. It stands about 6 feet high and looks just like a balloon. I can take my shears and trim it and it is just loaded with bloom each year.

A Member: It is not in bloom now is it?

Mr. Beltzer: I did not say so. It grows slow when it is first started. I wanted to know whether there was any other name for it?

President Green: What color is it?

Mr. Beltzer: White and pink.

President Green: There is the Rosea variegata, there is another the variegata Alba. We have both that bloom about the same time as the Peony.

Mr. Beltzer: I think people are just beginning to find out about them.

Mr. Williams: What have we in the way of lilacs—early bloomers that are the most successful, but are late enough to escape the late frosts? That is where we are falling down on our lilacs.

Mr. Harrison: There are those four kinds of summer bloomers that escape every time.

Mr. Dunman: The Hydrangeas are quite attractive.

Mr. Yager: I have here a resolution I wish to offer:

Whereas, a bill has been introduced in the United States Congress by Representative McLaughlin of Michigan for the purpose of appropriating $10,000 annually to the Agricultural College of each State and Territory of the United States, to be used for purposes of agricultural extension, in Farmers' Institute schools, in the operation of demonstration farms, and other work similar to the work now carried on by the Farmers' Institute movement of this State; be it

Resolved, That the Nebraska State Horticultural Society assembled in Lincoln, Nebraska, January 19, 1910, heartily approves House Roll No. 15,422, and that we ask our Senators and Representatives in Congress to vote for this bill and to work for its passage in the present Congress.

Mr. Yager: I move the adoption of the resolution. Seconded by Mr. Williams and carried.

Washington, D. C., January 24, 1910.

Mr. C. G. Marshall, Secretary,
The Nebraska State Horticultural Society,
Lincoln, Nebraska.

Dear Mr. Marshall:

I am today in receipt of a copy of the resolutions passed at a meeting of the Nebraska State Horticultural Society, favoring the passage of House Bill 15,422 introduced by Representative McLaughlin.

In reply permit me to say that I shall be glad to present the same to the Senate with the request that it be referred to the Committee on Agriculture who will have charge of the bill when it reaches the Senate. I shall be most pleased to give it my hearty support and sincerely trust that it may become law during the present Session.

Very truly yours,

NORRIS BROWN.

Washington, January 24, 1910.

Mr. C. G. Marshall, Secretary,
Nebraska State Horticultural Society,
Lincoln, Nebr.

Dear Sir:

I have yours of the 22nd inst., sending me a copy of the resolution passed at the meeting of the Nebraska State Horticultural Society favoring the passage of the McLaughlin Bill, appropriating $10,000 annually to aid agricultural colleges in extension of farmers' institutes, schools, etc.

Thank you for calling it to my attention, and I assure you I will be glad to give it my support and assistance when it reaches the Senate.

Very truly yours,
E. J. BURKETT.

Washington, January 27, 1910.

Mr. C. G. Marshall, Secretary,
Lincoln, Neb.

Dear Sir:

I am in receipt of the resolutions adopted by the Nebraska State Horticultural Society relative to the appropriation of $10,000 to the Agricultural Colleges of each state and territory, which you mailed me on the 22nd instant. When this matter is before the House I will give the appropriation my very careful attention.

Yours very truly,
JAMES P. LATTA.

Washington, February 9, 1910.

C. G. Marshall, Secretary,
Nebraska State Horticultural Society,
Lincoln, Neb.

Dear Sir:

I am in receipt of your resolution passed by the Horticultural Society January 20th in which support is asked for the McLaughlin Bill appropriating $10,000 annually for

Farmers' Institutes in each state and territory. While I have not examined this bill, still I am in favor of liberal appropriations for agricultural education purposes. I believe that no work is doing more for the farmer of Nebraska than the Farmers' Institute. This is evidenced by the numerous requests from every part of the state for these institutes and the inability of those in charge because of insufficient funds, to comply with these requests.

I am referring your resolution to the proper committee.

Very truly yours,

JOHN A. MAGUIRE.

Washington, D. C., January 27, 1910.

Mr. C. G. Marshall, Secretary,
Nebraska State Horticultural Society,
Lincoln, Nebraska.

My Dear Sir:

I am in receipt of your letter of January 22 enclosing copy of resolution passed by your Society. I am in hearty accord with the same and have today written the Secretary of the State Board of Agriculture that I would be glad to do anything that is in my power to secure the passage of the bill referred to.

Yours very truly,

G. W. NORRIS.

President Green: The Florists met last night and organized a society and Mr. Williams has a report of that Society to make.

Report read by Mr. Williams:

THE NEBRASKA STATE FLORISTS SOCIETY.

At a meeting of florists belonging to the Nebraska State Horticultural Society held Tuesday evening, January 18, 1910, at the Delavan Hotel the following rules and by-laws were formulated for the Nebraska State Florists Society;

C. H. Green, temporary chairman. Ed Williams, temporary secretary.

The purpose of this society shall be to promote the floricultural interests of Nebraska. The name of this society shall be the Nebraska State Florists Society. This society shall be an auxiliary to, and be composed of florists who are members of the Nebraska State Horticultural Society. The president of this society shall be an ex-officio member of the official board of the Nebraska State Horticultural Society. The officers of this society shall be a president, vice-president, secretary, treasurer and three directors and the term of office shall be for one year. The election of officers shall be held at the time of annual meeting of the Nebraska State Horticultural Society. The duties of the officers shall be the same as like officers in similar societies.

These by-laws shall be subject to the approval of the Nebraska State Horticultural Society and may be amended at the annual meeting of this society by a vote of two-thirds majority, of the members present.

The annual dues shall be 50 cents per member.

The following officers were elected for the ensuing year:

President—Irwin Frey, Lincoln.

Vice-President—Louis Henderson, Omaha.

Treasurer—J. E. Atkinson, Pawnee City.

Directors for one year—C. H. Green, J. A. Simanton, and W. A. Dole.

The following florists are the charter members of this society:

C. H. Green
Irwin Frey
W. A. Dole
J. R. Simanton
Ed. Williams
L. Henderson
J. K. Hiltner
G. E. Berthold
H. A. Pence
J. E. Atkinson

Mr. Williams: I move that this report be accepted and referred to the Board of Directors of this Horticultural Society to make a report on the same. Seconded by W. A. Harrison and carried.

Mr. Harrison: There is nothing to prevent this Society from joining us, and we shall have a meeting before long and there will be no trouble about that.

Mr. Ed. Williams: The florists as a rule have not taken an interest in the Horticultural Society, and in this instance a few of us got together and thought the thing over and thought in this manner: We could draw them together more and work more harmoniously, still they could be members of the State Horticultural Society, and the two societies could work together. They have to be members of the State Horticultural Society before they can become members of the Auxiliary Society. I think they ought to be allowed to come into the Auxiliary Society first and then into the Horticultural Society.

President Green: This Florists Society is a part of the Horticultural Society and is not a distinct body in any way. The proposition of membership is first, to belong to the Horticultural Society and then the Florists Society.

President Green: I wish to announce that there will be a meeting of the Board of Directors at the Delavan Hotel tonight at 7:30. I wish also to announce that the committee on revision of the premium list is G. A. Marshall, W. A. Harrison and Ed. Williams.

Moved by Mr. Yager, seconded by Mr. Ed. Williams that we adjourn to 9 o'clock tomorrow morning, and carried.

Thursday, January 20th, 1910, 9:00 A.M. Meeting called to order by President Green, and Vice-President W. A. Harrison called to the chair.

Vice-President Harrison: The first thing on our program is the subject of How We Grew and Marketed 12,000 Bushels of Apples, by Mr. G. A. Marshall, of Arlington.

HOW WE GREW AND MARKETED 12,000 BUSHELS OF APPLES.

G. A. MARSHALL, ARLINGTON.

Mr. Chairman, Ladies and Gentlemen:

I have the same old excuse, I did not get my paper written. But I made a few notes and I will try to follow them along. The care of our orchard, as it is compared with the care a good farmer gives his corn, I expect would cause us to blush and say that it was not very good. All we did was cut the weeds down in the orchard and prune the trees just a little; we didn't give them the pruning they should have. There is a good deal of care our orchard might have had that it did not have. It is true we kept it free from weeds and pruned it some but we can easily see where we could improve it but we have never spent much money on the care of our orchard. On the other hand I don't think it takes a great deal of money to care for an orchard. I believe we have made some people believe it takes a good big bank account to care for it. It simply needs willingness and good horse sense. It does not require the attention some other crops do. There is a long season that you can do the pruning and removing the brush and if you don't happen to be able to cultivate the orchard this week you can wait until the next week,—it won't ruin the crop like it would a crop of corn. If you will attend to it when you get a chance I will guarantee that you will grow as big an apple orchard in this section of the country as easily as anywhere in the United States. After we have considered that we must remember that we can not expect returns without care. Do not misunderstand me that I recommend we should not give the orchard proper care. I am speaking as

to how easily it is. After cutting out the weeds and pruning, spraying 3 times constituted the care this year. We sprayed the first time just before the blossoms opened with a 4-4-50 mixture of Bordeaux and in spraying that time we aimed to use the power sprayer, but we broke one of the engines and lost a day or two; therefore we had to take two small Moreley pumps and spray with hand power, so almost a third of our orchard was sprayed the first time with a hand sprayer. The second spraying was begun a little after the blossoms fell. A part of this spraying was done with a hand pump, but it was not satisfactory at all. We got our results where we used our power sprayer. We kept the pressure up pretty well.—from 160 to 200 pounds. The University boys looked after that, we didn't spray any with less than 160 pounds pressure. The 3rd spraying was applied about 3 weeks after the second. We intended to spray again the latter part of July, but could not find any worms or any indications of them so we dispensed with that spraying, going on the cheap plan like the Nebraska people nearly always do. I suppose we would have had a little better fruit if we had sprayed again, yet when it came gathering time we found less than 2 per cent of worms and not enough scabs to mention. We had some defective apples because we had a hail storm, of fine hail. They were not damaged badly, but were pecked just enough to keep them off the fancy market.

What we noticed in spraying led us to believe that we had better watch the varieties for scab. We noticed that the Winesap needed more Bordeaux and fortunately it was harder to injure them with Bordeaux than the Ben Davis. We noticed that the Grimes Golden was more easily injured with Bordeaux and did not need so much. It seems that we could not hurt the Winesap but could easily hurt the Grimes Golden with the mixture and the Grimes did not need as much. For the second spraying we used Bordeaux on the Winesaps only, using a 3-3-50 formula with 2 pounds of arsenate of lead. On the balance of the orchard we used 2 pounds of

arsenate of lead to 50 gallons of water, omitting the Bordeaux. For the third spraying we used a 3-3-50 formula of Bordeaux and 2 pounds of lead arsenate. This was in cloudy, wet weather, and the boys who tried this almost died with fright a week later because the orchard looked like a field of yellow roses and it knocked off half of the leaves, but it came out all right and the balance of the leaves stayed on the rest of the season and the trees seemed to ripen up splendidly. As an experiment one of the best rows in the orchard was sprayed but once. We got between 400 and 500 barrels from that row and it was sprayed just once with arsenate of lead 2 pounds, to 50 gallons immediately after the blossoms fell. That row looked about the best of any in the orchard until rather late in the fall when it weakened down a bit and some of the trees were almost destitute of foliage. When we came to gather the apples we found the apples on those trees were pretty badly hurt by the early freeze up in that country, but we got results there that have been worth something. We do not think we will try leaving any of the trees in the future without at least one spraying of Bordeaux.

In selling the apples we sold No. 1 and No. 2 to a firm in Chicago, agreeing to pick and hauled the apples to town. The culls were thrown in baskets by the graders and we loaded them in bulk and sold them to a Kansas firm. Our picking force consisted of 7 or 8 nursery boys that stay with us the year through and a bunch of pickers that were hired by the bushel. We picked up mostly prospective corn huskers and would have had no trouble in getting 25 or more just as easily. A good corn husker makes a good apple picker. He can make about as much picking apples as husking and is therefore slow to leave. They averaged between 65 and 70 bushels per man, some averaging 80 and 90 bushels.

A Member: How much did you pay a bushel?

Mr. Marshall: We paid 4 cents a bushel, or 3 cents and board. We had a boarding house there and most of them picked for 3 cents a bushel and board.

A Member: How did you measure them?

Mr. Marshall: In bushel baskets. The graders followed the pickers through the orchard and the baskets were dumped on the grading tables. The Chicago firm furnished the graders. We told them how many bushels we would pick per day and they said they had plenty of graders to take care of them. The graders could not take care of them and they gave us the privilege to take the rest and store them in a storehouse where they would be out of the way and protected. We got 400 soft stave baskets and we turned them into the baskets and the foreman of the graders checked them up before they were hauled to the storage or to the grading table. We generally had one set stacked in the orchard and the balance were hauled to the shed. They didn't grade near as fast as we picked them and we had 5,000 bushels in the shed at one time. Our expense was between 29 cents and 30 cents a barrel for gathering and getting them to the cars. We added some expense on that that should have been added the bulk apples and we can cut that down probably 10 per cent another year.

I discovered that when the apples were scattered on the trees the pickers would want more money. Last year we had a great many scattering apples, the trees didn't bear at all or only just bear on one side and the pickers would object to that very much, but generally those apples were large and fine.

A Member: What kind of ladders do you use?

Mr. Marshall: The ladder we liked best was the Niagara. It is broad at the bottom and slopes in from the bottom and slopes in to a point with a stick in the top so that you can easily push it through the trees. You want a ladder tall enough to reach to the top of the tree. You would think a ladder 24 or 26 feet high would be tall, but we have trees as tall as that and you must have that high a ladder. You want a ladder for every picker. The picker does not get so tired as he does when you have one man pick on the ground or in the

tree all the time. That would tire both of them, they like to pick on the ground a little while and then climb on the ladder part of the time. A good picker will start at the bottom of the ladder and pick up as he goes. In organizing your force it is best if you can arrange for checking them up at night so that each one knows how many bushels he had picked. You can do that where you don't want to scatter them all over and let each boy have a rope to fasten to the half bushel basket and snap the other end on the rod of the ladder. Each man's name is on the ladder, you want that too and when he has his basket full he calls the overseer and he drops the basket down and the overseer unsnaps it and snaps on another and he takes one of these little punches and punches out the ticket and then each boy knows how much he has picked. We raised our average 10 bushels a day the first day we adopted that plan. All the overseer has to do is to see that the apples are not bruised and the trees are picked clean. He don't have to spur them up; he has to hold them down and see that they don't bruise the apples.

I would recommend having a cushion in every basket. It protects the apples and encourages the boys to be careful, and causes them to realize it is meant for them to be careful if they have everything protected.

A Member: Do you pick in sacks that way?

Mr. Marshall: I believe we picked a little in sacks. The picking jackets we never tried. The hanging baskets that have a hook on that he hooks to the limbs are the best, and the overseer must see that the boy does not toss the apples. I dont like the jacket, for one reason you can't swing off to one side. I believe the picking jackets have some merit, other people use them and I would like to hear what they have to say.

A Member: How do you cushion the baskets?

Mr. Marshall: About all we have done so far is to have a regular picking basket. We experimented a little with cushioning, but what I am going to do next year is to take some

old garden hose and split it and put it right over the top edge of the basket and put a gunny sack in the bottom. Did you cushion your baskets, Mr. Mincer?

Mr. Mincer: Yes, I lined them all.

Mr. Marshall: What was your plan?

Mr. Mincer: We lined our baskets with a double thickness of burlap. We took about 3 thicknesses and tacked on the top edge of the basket.

A Member: Did you try it with rubber?

Mr. Mincer: I didn't try it but I know a grower who did. He said he had very good luck with it. It seemed like as nice a cushion as you could get, of course anything soft is a cushion.

Mr. Dickinson: What kind of a basket did you use?

Mr. Marshall: We used just a common round bottom basket. A little half bushel basket with a bail.

Mr. Dickinson: Then you didn't use the regular crescent shaped basket made for picking. Yours was not crescent shaped, just a little half bushel basket?

Mr. Marshall: Yes, sir.

Mr. Dickinson: There is a picking basket crescent shaped and that is the kind we thought you used.

Mr. Marshall: This one we used is the same kind of a one that they use at Hamburg and Chillicothe. We got them from that section. It is a regular apple picking basket.

Mr. Davidson: It is not a crescent shaped basket where you hitch a strap over your shoulder and the basket stands right in front of the man?

Mr. Marshall: No, our boys put a wire hook on them. I believe a fellow could pick a little faster in one of those baskets. A fellow might pick a little faster in one of those jackets. But our men had no trouble at all, some picking 80 bushels a day. A good many didn't run over 60 bushels a day, and some went down as low as 40 bushels, but those fellows, of course can't pick apples. We had some old men there that were afraid to climb on the ladders and we had some

fellows there that couldn't do anything only draw their pay, they looked for the other fellows to do the work. We worked the average up because the good pickers we would keep and would let the others go. I don't believe we could have gotten our apples picked in time with the amount of men we had if we hadn't organized them that way. I was in some orchards where they didn't know how many bushels a man had picked, and they seemed to have about as much trouble in keeping them from getting bruised as we did. Our men were somewhat careless but as our apples were sold, on account of being hail injured, as a kind of a commercial grade they were not graded up as close against bruising as they would have been if they had been sold for real fancy apples. We had to watch them right along. I don't care how you have them picked, if you never say a word about bruising the pickers will get to bruising them. If you don't say anything about picking the trees clean the pickers won't pick them clean. I don't believe you have to pay any more attention to this in hiring them this way than any other way.

A Member: How do you get them to market?

Mr. Marshall: We hauled them in a spring wagon. It cost about $6 or $8 to buy a pair of springs and we got some 16 foot planks and put them on the springs.

Mr. Williams: How long a season does it take to pick your winter apples?

Mr. Marshall: I don't know. We got done about the 1st or 2nd of November, but I can't remember just when we began. We only had about 10,000 bushels of that late picking: less than 10,000 bushels after the Jonathans were picked and I don't think we were more than 10 days in picking.

A Member: About how long was it safe to leave the orchards before picking?

Mr. Marshall: Ordinarily I would not be afraid to leave it until the 1st of November, but this year the freezing was so hard it froze the small Winesaps clear to the core and injured the apples. We had a hard wind the day they thawed

out and it reduced the yield some. They were pretty heavily loaded. The University boys, Mr. Howard and Prof. Emerson left 9 trees that they did not spray at all and they lost their leaves, putting it in a rough way I would say that 8 trees didn't have any more leaves on them than should be on two trees, and those apples were pretty badly hurt. I looked at them on the ground and I know our graders would not have taken very many of them. The shells were badly collapsed and I think they would have been classed as bad apples in 60 days.

A Member: When was that freeze?

Mr. Marshall: The 12th or 13th of October; it was the worst freeze I ever saw on apples in this country. I don't think we would expect such a freeze very often. The small winesaps were frozen clear through. I examined them and a good many never did come out just right; 150 miles northwest of us they said their apples were nearly all ruined by that freeze. I saw some apples down below Hamburg, Ia., that were hurt by that same freeze.

Mr. Davidson: What was the experience with the apples going through the freeze?

Mr. Marshall: That didn't show.

Mr. A. A. Lash: I would not want to chance them in cold storage very long, not over 60 days.

A Member: What time do you aim to get your apples picked?

Mr. Marshall: If you want good apples you must let them get ripe. This season they were late, they started late. They were fully two weeks late in the spring in getting started.

A Member: Did you pick your Jonathans before the rest?

Mr. Marshall: Oh, yes, we picked the Grimes first and then we followed on the heels of the Grimes with the Jonathans, and then there was a little intermission between them and the Ben Davis. There ought to be, hadn't there, Mr. Lash?

Mr. Lash: Oh, yes. And the Winesaps ought to be picked by the 10th of October.

A Member: The Winesap is gathered before the Ben Davis, is it?

Mr. Marshall: It ought to be.

A Member: Does that always happen?

Mr. Marshall: Not always. Our apples do not ripen even at all, the last picking is in November.

Q. If they are ripe will they get on the ground?

A. Well, they will if there is a wind, they just commence to get loose.

Mr. Howard: You haven't told us how you disposed of your wind-falls.

Mr. Marshall: We sold them to a Kansas firm.

A Member: You used your regular men, then, in picking them up?

Mr. Marshall: That didn't take very many, the graders put the culls in the baskets and the wind-falls were picked and placed in piles. Another thing in orchard work you should have is some tarpaulins. They will save you hustling around to protect apples left in the orchard.

Mr. Atkinson: Did you haul the bulk apples in baskets?

Mr. Marshall: Yes, sir, the picking and hauling to town is really all there is to it. If you put them on the ground it costs something to pick them up and you don't have to do that if you have baskets enough. I will tell you another thing, you couldn't expect to dispose of, every year, cull apples so easily. It worked this year all right, but we wouldn't count on it next year. We would put those cull apples in a car and run them out West and sell them with apples that had not been sprayed. They are just about like them, and we get them out where they have always been buying such apples.

Prof. Emerson: I want to say that the apples that were culled out would compare with the apples shipped from south-eastern Nebraska, where the whole crop was taken and sold from the orchard.

A Member: What price did you get compared with the better apples?

Mr. Marshall: We got from 50 to 75 cents per 100 pounds for the culls.

Mr. Williams: What did you get for your best apples?

Mr. Marshall: I never measured the orchard, but I expect there is about 40 acres. In the items of expense there appeared one power sprayer, and I think our net return was a little more than $3,500.

A Member: How many acres are there?

Mr. Marshall: Well, between 40 and 50 acres, but part of the orchard is only 11 years old. The bulk of it is over 11 years old,—from eleven to sixteen years. We didn't have a half a crop of apples this year, we got 12,000 bushels; we got 6,000 bushels off of 8 acres that was sixteen years planted, they were planted in 1893. There was about 575 or 600 trees on that 8 acres, while there were acres of ground that did not have over 50 bushels to the whole acre. Mr. Howard has been in the orchard and he knows that tree after tree did not have an apple on it at all. The youngest orchard only yielded 1,300 bushels and there is eleven acres in that, and the fruit was all on certain trees.

Mr. Atkinson: Did you spray the third time, whether they had apples on or not?

Mr. Marshall: No, we sprayed all of them the second time.

A Member: What was it Professor Whitten told us about that curculio?

Professor Whitten: Most of our orchardists did not spray. They did not give much care to their orchards. We have some men who do, and those men who take care of their orchards find that they can kill the curculio by spraying very well. You see you will get some of the curculio on the first spraying. I think you ought to use the arsenate of lead for the first spraying, two pounds to 50 gallons of bordeaux.

A Member: Is that after the petals fall?

Professor Whitten: No, before, and with the next spray-

ing about two or three weeks later. If I was going to poison the curculio with only one spraying I think I would put the poison on with the second spraying. We handle the curculio very well that way, and you don't have much trouble with it.

Professor Emerson: I want to say a word about the frosts injuring the apples. At Tecumseh we noticed injury first on trees that were not sprayed, and we noticed there also that the leaves were hurt worse on the unsprayed trees. The work at Tecumseh was done with Mr. Scott of the United States Department of Agriculture and he noticed that particularly. He noticed that the leaves hanging on the unsprayed trees were killed and that the trees that were sprayed came through all right from the frost.

Another thing, a question was asked when apples ought to be picked. In our experience where there were sprayed and unsprayed trees we found it was difficult to gauge the picking time and get the best results. If we picked all at once, the unsprayed apples were ripe and the ones that had been sprayed had not finished coloring up yet. And while we were waiting until they were all ripe the apples from the unsprayed trees would be on the ground. At Blair we had that experience and they were practically worthless except for culls. I remember Mr. Marshall's apples when they were picked, when those from the unsprayed trees were ready to be picked, if we picked from the sprayed trees the men complained that they were hard to pull off.

Mr. President: Our next topic is "Guarding Against Frosts and Freezes with Smudges and Heaters," by Mr. C. E. Mincer, of Hamburg, Iowa.

GUARDING AGAINST FROSTS AND FREEZES WITH SMUDGES AND HEATERS.

C. E. MINCER, HAMBURG, IOWA.

Mr. President and Ladies and Gentlemen:

When I was assigned by your Secretary to say a few words in regard to this subject I prepared a few remarks based upon some little experience I had had myself and upon the experience of a number of people I have had the opportunity to meet during the past year. The things I shall be able to tell you will come more from people I have come in contact with than from my own experience. Since preparing that paper I had the pleasure of seeing Professor L. W. Powers, who read a paper at the Missouri meeting on the same subject and which was very exhaustive. I shall turn this paper over to the Society here to use in your report, as I consider it very valuable, but I wish to give him full credit for anything I may copy from him, right at this time. Although this subject was limited to the protection from frosts and freezes by the use of smudges and heaters, the remarks the gentleman just made about apples being frozen in the fall differing from those that were not frozen on account of the care that was given them, there was nothing said about coming through the blooming time.

In our section we have proved successfully that the trees that are sprayed will stand the frosts of the spring better than those not sprayed. This is not an experiment. So it is really very wise to guard against frosts and freezes outside of using smudges and heaters. The experiments in protecting orchards against frosts and freezes extends back quite a while. In France they used to build screens and vines and then they tried to stretch wires on poles and cover them with cloth. There have been methods tried in irrigated countries of turning water in the ditches, which produces moisture in the air. In other places they laid pipes through the orchard

to produce spraying of water, something like the spraying we have been hearing about today, with a spraying pole between every tree. This has been successful, but it proved too costly to carry out and too difficult to manage. A few years ago in California they commenced to experiment with oil, with coal oil heaters. There is a distinction between the protection by smudges and the protection afforded by heaters. We all know that on a cloudy night there is not much danger of anything being injured by frosts because the clouds hold what heat there is in the atmosphere close to the ground. This same result is produced by smudging, which forms a dense smoke over the orchard and holds the air to the ground, which is about the only beneficial effect to be gained by smudging. In the use of heaters of the various types for coal oil the results are derived from the amount of heat they will produce. It has been said that by the use of heaters the temperature can be raised from 2 degrees to 12 degrees. In many places where they have crops destroyed by frosts the raising of the temperature 3 or 4 degrees would have saved those crops. In California and Colorado they have saved a good many crops. One of the principal heaters now used and going to be used, especially in this section of the country, is the oil heater. They will hold from 3 to 10 gallons of oil, there is a 5-gallon one burning outside the building now, and they will burn about ten hours. It is necessary, in many parts of the country, only to burn them a few hours to protect the fruit. An oil heater is built so you can govern the heat. This smudge oil can be furnished for about 3 cents a gallon. If necessary to burn the pot all night it would take about 15 cents to run one pot all night, 100 pots to the acre would be about $15 per acre per night, and the pots themselves cost 20 cents—from 20 to 50 cents, depending on their size. If you had a frost that only occurred one night it would only cost you $30 to $50 an acre for that protection. If you were in any other business you could not afford to lose $1,000 for the sake of refusing an outlay of $50. Another thing that you

have to do—as soon as you get them they want to be dipped in crude oil and they will last for years without rusting. You are at no loss outside of the original investment, even if you don't use them.

In many parts of the country smudging has been tried by burning manure. We tried smudging one year and saved a crop of peaches. We didn't have the only peaches, but we had about the only peaches on the same level and many others on that same level were killed. It was conclusive to us and we were satisfied to invest in enough oil heaters to equip our orchard. One should be placed between every four trees filled with oil and a cover or shield laid over it, so that when the time comes when you need it you will be ready. If you wait for the time to come you are not going to do it. The lighting of the pots is accomplished by a man taking a burning gasoline torch, like those used for burning off paint, or a blow torch. Three or four men can light 1,000 pots in a very short time. A little instrument which the fruit growers of Colorado are using is an automatic thermometer which can be placed at various parts of the orchard connected with a telephone in your own house which will ring a bell; the cost is not very great, about $10, for the apparatus. This will give you absolute warning of any local conditions; oftentimes you can not get the weather reports soon enough.

A Member: Have you the address where this can be gotten?

Mr. Mincer: Peter Henderson Company, Courtland Street, New York City. The more detailed apparatus is imported, but if you will correspond with them you can get all the information you require; these people are well known. They are advertised by different firms in the florists' papers.

I don't believe in planting things in certain phases of the Moon, but I have noticed that there is not much danger from frost to the trees in the late of the moon, and we have had some severe frosts.

We have used manure in smudging by putting a pile be-

tween every four trees and wet it and then it produced a dense smoke so that the manure has a beneficial effect by forming a cloud of smoke above the orchard retaining the heat that might be there, but there is very little heat that results from the manure pile. It is far better to burn the oil than the manure because the manure it too valuable for the rest of the land. Another thing, a couple of years ago we tried to save something by burning the manure and we had a continual frost and we run out of the stuff when we needed it the most. If a person is equipped with oil it is easy to place it in the pots procured especially for that purpose.

A Member: How do you store the oil?

Mr. Mincer: We are preparing at this time to put in a tank holding about 6,000 gallons, and we will haul it from the storage and put it in these tanks until it is used. Now if you have any questions or if there is any phase I haven't touched on if you will ask the questions I will try and answer your questions.

Prof. Emerson: What weight or type of crude oil do you use?

Mr. Mincer: It is a type designated by the Standard Oil Company as smudge. It is a grade with the gasoline and lighter oil removed which the gas companies use.

Mr. Dickinson: Do you use any waste to start the fire?

Mr. Mincer: Our orchard has never been equipped with oil heaters, we only had just a few, our only practical experience has been with manure. We have had a few pots around a few trees.

A Member: About how extensive were your experiments?

Mr. Mincer: We protected about 12 acres of apples and a good many acres of peaches, probably 20 acres.

A Member: With oil heaters?

Mr. Mincer: No, only about 20 trees with oil. Part coal and part oil. We raised the temperature 6 degrees.

A Member: How many did you have to the acre?

Mr. Mincer: On 20 trees we had a heater for every tree,

since that time I have been in an orchard near Chicago where 10 acres were equipped with heaters and they allowed 120 pots to the acre and they raised the temperature 10 degrees and this result was accomplished in about 30 minutes from the time of lighting the pots.

Mr. Dickinson: How many heaters could a man light in an hour?

Mr. Mincer: I should say a thousand, easily. It is simply a matter of getting to the heaters. If there is a danger of frost and you are in a hurry,—the orchard that I saw equipped I helped the man light them up, there was a heater between every 4 trees we were provided with a gasoline torch and we didn't have to stop.

A Member: Are these heaters equipped with a little waste?

Mr. Mincer: No sir, nothing.

A Member: Just provided with pure oil?

Mr. Mincer: Yes sir.

Mr. Dickinson: I did not think the heat was intense enough to light the pure oil.

Another Member: Were the heaters on the ground?

Mr. Mincer: Yes sir, we filled the heaters and placed the seal over them to prevent the rain from getting in before the time of using them.

Mr. Youngers: In reference to storing oil, in California it was stored in cisterns, in some places they would run it right from the car into the cistern with a hose.

Mr. Mincer: My reason for storing it in a tank is that we have a bank right near our orchard and I am going to put the tank on that bank. I can run it right from my wagon tank into the tank and I wont have to lift it then.

A Member: Has it been successful running water through the orchard to keep the frost off?

Mr. Mincer: There has been some of that done very successfully in Colorado.

A Member: Do you know of any reports?

Mr. Mincer: I can not give you the number of the Colorado

bulletin but if you write to the Experimental Station you can get it.

Mr. Williams: We sometimes have a hard freeze with a high wind, how do you control smudges in that case?

Mr. Mincer: In preparing your places to smudge in you have to protect them from the wind as much as possible.

A Member: About how far apart would those heaters be placed in your orchard?

Mr. Mincer: Between every 4 trees we placed the manure and brush that we smudged with.

A Member: That would be in every row?

Mr. Mincer: Every other row, in the neighborhood of 60 feet apart.

President Green: Practically a heater for every tree?

Mr. Mincer: We expect to have more than that, one for every tree each way in a row. Between the trees each way would be a heater.

President Green: A man would have to go pretty lively to light 1,000 wouldn't he? He would have to travel between 11 and 12 miles in an hour.

Mr. Mincer: He wouldn't have as much difficulty as you would suppose for if you were going down a row, here would be 2 trees that you could light the heater, there would be three right there together. In the little orchard where I saw the practical demonstration of raising the temperature there was 1,000 heaters on 10 acres, 100 to the acre and we were considerably less than an hour in lighting them.

President Green: How do you control your smudge in a high wind?

Mr. Mincer: You have to arrange your brush or heaters over the orchard. At Grand Junction they raise the temperature by lighting fires on the windward side of the orchard.

A Member: Isn't it feasible to pile brush there to be used for that purpose?

Mr. Mincer: If a freeze would come along for a few hours one night only your brush piles would save you, but if

you are depending on that and it lasted all night and the next night and the next night too you would be out of fuel.

A Member: While you are lighting one side of your orchard and they are burned out on the other side you are only partially protected at a time?

Mr. Mincer: That is what occurred with me when I tried it. We couldn't get them all lighted in time, and after we did get them all lighted the ones on the flat burned out and we couldn't keep the fire going.

Mr. Dickinson: How do you manage the oil pots in windy weather?

Mr. Mincer: There is no difficulty, the wind probably wouldn't be strong enough to blow them out. If you desire to put them out lay a flat piece of tin on the pot and that will do it.

A Member: How do you protect them?

Mr. Mincer: There is a shield that fits right over the top. There is a blow pipe of iron bent in the form of a V. Down at the University of Missouri Dr. Howard told me that he had conducted a number of experiments on peach trees there. We experimented with brush, but the greatest difficulty we had was to maintain a fire long enough. We did get some absolutely certain results when we used oil heaters, they could be depended upon.

Professor Emerson: There is one of these heaters burning now at the South end of this building and you can put it out in the wind and see how much it would stand, how much it would take to blow it out.

Mr. Howard: I want to ask Mr. Mincer if he isn't a little high in his estimate of the cost of heat. I understood him to say $15 an acre per night with 3 cent oil?

Mr. Mincer: Yes sir.

Mr. Howard: We have a burner here burning the kind of oil of your standard burner, and we find that one of these heaters will burn 6 hours without any trouble, and for 6 hours

you can do it with at least $3 an acre with this kind of oil with 100 pots per acre.

A Member: What price do you have to pay for oil?

Mr. Howard: They quoted oil to me yesterday at $2.65 per hundred f. o. b. cars Jackson County, Missouri, and I asked what the freight would be on a car this far, and he said $76 a car in tanks. It don't matter about the size of the tank, from that place to Lincoln it is $76 a tank plus $2.65 per hundred for that kind of oil. In answer to a question as to how readily it would ignite,—we used a little excelsior on it and used the blow torch and the fire from that will produce heat enough to start it all right. They claim they are not making anything on the oil; that everything has been taken from it and they are simply disposing of it this way at just about cost.

Mr. Williams: There was a man in Colorado at Grand Junction, that heated for 6 or 7 nights, and it cost him between $11 and $12 per acre for those 6 nights and that included wear and tear on his machinery. That is he took the first cost,—what he paid for his tanks and heaters,—and divided that by 10 and included in that his oil that he used and that $10 or $11 included the wear and tear on his machinery too.

Mr. Mincer: The type I expect to use is larger and has several apertures so you can control the use of the oil, the chances are that you would not need that much.

Mr. Howard: With that kind of a heater you can regulate the amount of your burning surface.

Mr. Mincer: The type I refer to are regulated by a cap on top of the heater. If it is very cold you can take the cap clear off and burn the heater the whole size of the top. That is a Troutman heater.

Mr. Howard: Have you ever used the Hamilton heater?

Mr. Mincer: No sir. I don't think it makes much difference what kind you use.

Mr. Yager: What has been your observation of the effect

of these heaters on small fruits like strawberries and fruits of that kind?

Mr. Mincer: I have made no observations of that kind at all.

Professor Emerson: I saw an account of an experiment in Colorado and this indicated that they were of very little value for small fruit, its value depending upon the thickness of the stand of trees, in young orchards there was less protection than in older orchards where there is more top to hold the heat. This statement came from some one around Grand Junction.

Mr. Davis: I guess there never has been found anything that would help. The only benefit ever received from the smoke is that the smoke will scatter over the fields and make a cloud, but as far as the heat is concerned I can not learn that they ever invented anything that will help that any.

Mr. Mincer: No matter what kind of fuel you burn it forms a cloud above the trees and what heat there is is held to the ground and the temperature would be a great deal higher than it would be up from the ground.

President Green: Our next topic is Nebraska at the Horticultural Congress of 1909, by Mr. C. H. Barnard, of Table Rock, Nebraska.

Mr. Barnard read his report as follows:

THE NATIONAL HORTICULTURAL CONGRESS OF 1909.

C. H. BARNARD, TABLE ROCK.

At the last summer meeting of this Society a committee was appointed and an appropriation of $300 made to make an exhibit at the National Horticultural Congress to be held in Council Bluffs, Iowa, November 16–20 inclusive. The writer of this article was selected to gather and install the exhibit.

Owing to the limited amount of money at our disposal it was necessary to use the most rigid economy in getting the fruit. A price per barrel was decided on at the State Fair and our members who had a fruit crop this year responded very generously, although the money paid for the fruit, considering the necessary selection, care, and packing, was less than the regular market price for the same quality of fruit.

To the following members of the Society we are indebted for prompt and generous exhibits:

Marshall Bros., of Arlington.

Isaac Pollard & Son, of Nehawka.

E. F. Stephens, of Crete.

R. H. Davey, of Blair.

T. P. Brown, of Florence.

G. S. Christy, of Johnson.

Arnold Martin, of DuBois.

These members packed and shipped the fruit to the Bloomer Ice and Cold Storage Company of Council Bluffs, where it was cared for until the opening of the congress free of charge. It is worthy of note that in all cases where fruit was put in in good condition it came out and stood the week of the congress, and part of the exhibit was repacked and shipped to Lincoln Cold Storage for this meeting.

In selecting fruit for this meeting we were handicapped by not having the permanent premium list, as they sent out an early prospectus of the meeting, and the one we showed under was not issued until all fruit for exhibition purposes was gathered and in cold storage. For instance, one of the trophies was given for the best 25 boxes of five varieties, five boxes of each. Had we known this we might have added some to the premiums we were able to take and given a little more advertisement to the Nebraska fruit growers. As it was we showed in as many places as was possible for the Society to get in and won some premiums.

We received an award of a gold medal for the most artistic display, which was a table about 40 feet long with the word

TROPHIES WON BY NEBRASKA AT THE NATIONAL HORTICULTURAL CONGRESS, COUNCIL BLUFFS, IOWA, 1909.

The large trophy in center of picture and the smaller one on the left were awarded to the Nebraska State Horticultural Society. The one on the right was awarded to the fruit-judging team from the School of Agriculture.

"Nebraska" spelled out in colors, the lines of the letters in red apples, the lower part of the letters in green, and the upper part and border of the table in yellow, making a very pretty effect and one which showed to all that Nebraska was on the map.

We also received the trophy offered by the Grape Growers' Association of Council Bluffs for the best exhibit made by any state horticultural society. Also a silver loving cup for the best eight varieties for continuous season on the farm. These with about $175 in cash, which came very handy in helping to defray the expenses of the exhibit, were the awards which our exhibit was awarded.

While noting the awards the Society took we must not forget the fruit-judging team from Nebraska which won the trophy offered for the best fruit judging team. Nebraska, Kansas, and Iowa were competitors, with our boys first. This trophy has to be won twice out of three times before it becomes the property of the winners, consequently it will be necessary for the next team to again win in order to hold the trophy.

In the exhibits at Council Bluffs one thing was especially noticeable, all the exhibits were put up by scientific exhibitors —there were none of the amateur exhibits that we so often see at our state and county meetings and all of the fruit showed for itself that it had been grown under the best conditions possible as to cultivation, pruning, spraying, selection, and packing.

The representation was from Maine to Idaho and from Iowa and Nebraska to Texas and Mississippi with Maryland and North Carolina on the southeast, so that all sections of the United States were represented.

The value of such a meeting is the question that all are wont to raise, Does it pay and how?

Nebraska with her red Jonathan and her fancy Yellow Grimes made a hit with every one who examined our exhibit, and many who tasted our fruit were thoroughly convinced

that Nebraska was easily the home of these two choice varieties.

We were well supplied with these two varieties and were quite liberal in distribution, so that it was a common saying, "Go to —— to see, but come to Nebraska to eat."

Another question was the package. Our fruit growers have been packing choice fruit in barrels which sold for from two to three dollars per barrel. Our friends who had packed in boxes were getting from two to three dollars per box of 50 pounds each, making quite a difference in the revenue derived from the orchard.

This of course would only apply to the choice varieties and choice fruit of the variety, but as we grow much of this kind of fruit in Nebraska it behooves the fruit men to take notice.

The quality of our fruit was shown in the single plate exhibits. Nebraska took second on Grimes in competition with those grown under irrigation, Colorado only beating us on size.

A school of instruction in the packing of boxed apples was one of the features of the congress which drew quite a lot of attention. An expert packer demonstrated the different kinds of packs during the meeting and assisted any one who wished to learn.

This, I think, would be an attractive feature to add to our state fair meeting, as the fair is just before the time when the fruit crop is ready to harvest.

There is some effort being made to pack in paper boxes similar to fillers for egg cases only the filler holds six or twelve apples and these boxes put in a wooden box, but I am of the opinion that these are too expensive for our market.

In conclusion—drawn from the exhibitors' experiences—it is necessary that we cultivate, prune, spray, and then use the package best adapted to your market. Then he who follows these lines and does it the most thoroughly will mark success at the foot of his orchard account.

Before closing these rambling remarks I wish to thank our

Secretary and Mr. G. A. Marshall, who so ably helped install the exhibit and care for it during the exposition.

Mr. President: The next topic on our program is a discussion of the fence posts of the future.

Mr. Youngers was called for and spoke as follows:

THE FENCE POSTS OF THE FUTURE.

I didn't know that I would be called upon, and I wasn't expecting to speak on this subject. I believe it is a good idea to plant for fence posts and I don't believe it is very material what kind of a tree we plant. I want to say that when I was at St. Louis a few years ago I had the pleasure of viewing a lot of experiments by the Government. They used the willow, maple, and cottonwood. They had tested them by burying them six or seven years under the ground and those posts were taken up and used there in that experiment. They were perfectly sound at that time. It did not seem to make much difference what kind of a tree you used, whether it was the willow, ash, maple, or cottonwood, provided you got the material thoroughly saturated. The catalpa seems to be a good kind of fence posts. We have records in Indiana where that tree has been used for forty to sixty years, and the fence posts are still solid without any form of treatment.

Mr. Brown: In the Government tests were the posts buried completely under the soil?

Mr. Youngers: Some of them. The tender point of the fence post is right at the ground. Some of the posts were completely covered, others were not. They had different experiments on them.

Mr. Stevens: Some years ago I saw planted two miles of catalpa trees on contract, and I had to carry with me to show samples of fence rails that had been in use for forty years—sections of trees from southeast Missouri. In our own planting we found that west of North Platte the tree is liable to grow up rapidly and don't know when to quit in the fall of

the year and sometimes the frost catches the tree unripe and the tops are injured. The tree never dies, but the tops are injured. The plantations that I am acquainted with in the eastern portion of the state have not suffered very materially from freezing. They have grown well and are doing well. On good soil those trees are doing well, and are large enough now for telephone poles. On thin land in our county the growth is rather slow and the results are not as satisfactory. Indications are that those trees ought to be planted on soil reasonably fertile and be given room to develop in. Under such conditions I would regard it as the most favorable tree to plant for fence posts and telephone poles.

A Member: What kind was that?

Mr. Stephens: The Speciosa. It is generally agreed that we should have the Speciosa. Some years ago Honorable Robt. Douglas had a plantation at Arlington, Kansas. He was not particular with his seed at first and gathered it largely in the middle districts where these trees grow too late in the fall, so they killed back and he plowed them up and began over again, giving particular care to the seed. All the nurserymen of my acquaintance are very careful in their selection of seed; they are all endeavoring to plant Speciosa. I understand that there is a hybrid which is known by having a great many pea-like pods.

DISCUSSION.

Mr. Marshall: We have one of the leading fruit growers from Hamburg, Iowa, here and I want to call for Mr. A. A. Simons, of Hamburg, Iowa, to speak to us.

Mr. Simons: Mr. President and Members: If I had known what I should get here I should probably have gone down stairs. I don't know what I can give you in the way of information. We have been in the fruit business for the last fifteen or sixteen years and have made enough out of it for our bread and butter. There is no trouble at all to make a good living out of it. This season we had very good success,

but the last two seasons preceding the frost destroyed a large part of our crop. This year our crop was full with the exception of the orchard that was full in 1908. The only way to raise fruit is to go after it. I don't think much can be done in the way of fruit growing without spraying. A fruit grower can't stop for expenses when he starts in. If you have any questions to ask I will try to answer them.

A Member: What was your plan of picking and packing apples and where did your apples go to?

Mr. Simons: In picking the apples we did not have as good luck as Mr. Marshall, we picked by the day. I think another year we shall follow Mr. Marshall's plan and pick by the bushel; I think that is the only way. Our pickers didn't pick anywhere near as many as Mr. Marshall's men did and it cost us in the neighborhood of 6 cents a bushel to get our apples picked. In regard to selling the crop, we didn't have much trouble with that. We usually try to sell our own crop to the dealers in Nebraska. In 1907 and this last year, 1909, we sold to our home packer our No. 1 and No. 2 grades and delivered them on the track there.

Mr. Yager: It is always a pleasure to have men from the adjoining states with us, and I move that Professor Whitten, Mr. Simons, and Mr. Mincer be made honorary members of the Society for the good services they have rendered us. Seconded and carried.

President Green: Our next topic is the report of standing committees. Are there any committees to report?

Mr. Marshall: In regard to the appointment of a committee on the revision of the premium list, there wasn't any committee appointed.

Mr. Williams: Isn't this the proper time to hear the minutes of our meeting this forenoon read and approved?

Secretary Marshall: I haven't the business written up in shape to read, but I can give you the details of it.

Minutes of the forenoon session read by the Secretary.

Mr. Marshall: Are we empowered to have the premium lists fixed up and printed without having it adopted by the Society?

President Green: As I understand it that is all you are empowered to do.

Mr. Marshall: I always thought we revised the lists and brought it in here to be approved by the Society.

Mr. Yeager: Referring again to the matter of taking care of our medals it seems that a number of our medals are in the hands of the Historical Society, and in order that our Secretary may have authority to go and ask for them I would suggest that he have instructions to that effect from the Society. He should be authorized to secure them for our use and put them on exhibition in his office in the Capitol, and I move that our Secretary be instructed to obtain the medals of the Society. Seconded by Mr. Youngers and carried.

Mr. President: I wish the members of the Board to take notice that there will be a meeting of the Board immediately after this meeting adjourns.

Mr. Brown: There is another matter that has always been settled at our meetings and that is either to fix a place of meeting ourselves or empower our Board of Directors to fix the place for our summer meeting. That matter has not been brought up here and it should be attended to. If we don't do it the Board should be empowered to do that.

Mr. Stephens: I move that the Board of Directors be empowered to arrange for the summer meeting place of the Society. Seconded by Mr. Brown and carried.

A Member: What time will the members and others receive the report of the proceedings of this meeting?

Secretary Marshall: This meeting's and last summer meeting's proceedings will be published in what we call the 1910 report. The bids that are let by the State Printing Board will be submitted to the printers for them to bid on in May or June, and of course after these bids are accepted we can go to press any time with the report. Heretofore the reports

have been submitted to the Governor about the 1st of August and then it takes all the way from 60 to 90 days and sometimes longer for the printers to get through with them.

Mr. Davidson: So that we may expect these reports probably by State Fair time or a little later?

Secretary Marshall: Yes, sir, probably by State Fair time.

A Member: When do we get them this year?

Secretary Marshall: It is in the press now, but has been held up on account of some of the papers Mr. Russell could not get hold of.

Mr. Davidson: This 1909 report is over a year behind. It should have been out last fall, in September, and I think this delay deprives us of 50 per cent of its worth.

Secretary Marshall: I think that is so, but I am not responsible for the previous reports. I am going to try to get out this one for this year on time, but the printers have the advantage of us. The law says they have 60 days from the time the last proof is returned to them before they have to deliver the books; they can hold up the books. We usually do not send in all the material at one time, and they can hold it up for any length of time they please until the last proof is turned in and then they have 60 days beyond that if they want it and they can keep putting us off. The man who printed the 1909 report is anxious to get it off his hands. It was over 100 days from the time the last proof was turned in until we got the first copies of the 1908 report. They were about 50 days over the limit of 60 days, and then they would deliver from 50 to 100 reports a week. I called the company up very often, nearly every day for two weeks to ask about it, and it was several weeks before we could get enough reports to supply the members. I would send out a few one week and the next week would get 50 or 100 more. We have received about 2,000 reports up to this date, but we are ahead now and will have several hundred reports on hand from now on. I want to say for Mr. Davidson's benefit that the report probably always will be delayed some, but this bulletin system gets out the best of it a little quicker.

President Green: I have a letter here from an old member, Mr. W. J. Hesser, which I will ask the Secretary to read:

Pasadena, California, December 12, 1909.

Mr. C. G. Marshall, Secretary, Lincoln, Nebraska.

Dear Sir: I was greatly surprised and pleased Thursday to receive the report of the Nebraska State Horticultural Society. I assure you I love the old Society, of which I have been a member for most forty years, and while I am far away I love to hear from the dear old Society that I so long met with. But for over five years I can only be with you in thought, but when I receive a program of a meeting my thoughts are with you during the days of the meetings. I am well and stout and happy all the time in this land of palms, flowers, and beautiful plants.

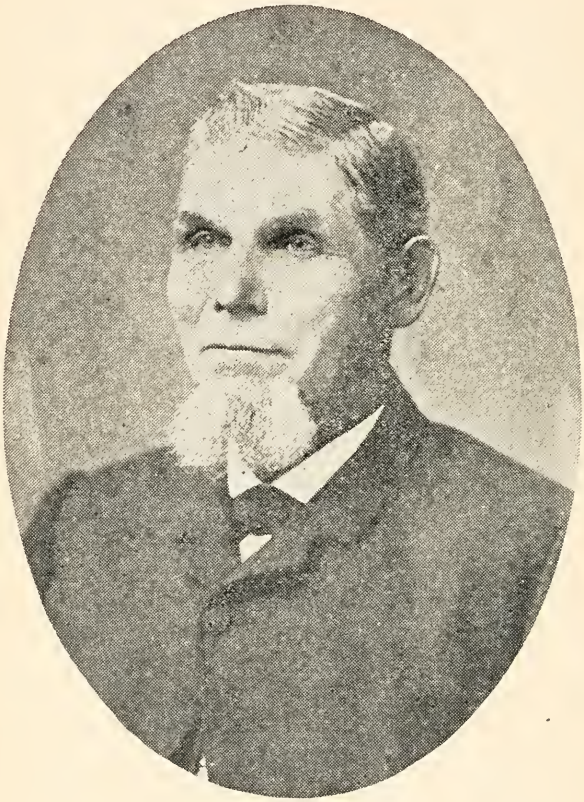
With kind regards to all members,

Very truly,

W. J. Hesser.

Mr. Yeager: I move that we adjourn. Seconded by Mr. Brown and carried.

Meeting adjourned.



J. H. MASTERS

IN MEMORIAM

J. H. MASTERS

Died June 10, 1909. Age, 89 Years.

Hon. James Harris Masters, the pioneer nurseryman of Nebraska and first president of this Society, was born in Warren county, Kentucky, ten miles from Bowling Green, August 15, 1819. In 1828 the family moved to Springfield, Illinois. At the age of eighteen he learned the carpenter's trade, which he followed in Illinois until 1853, when he moved to Atchison county, Missouri, where he grew seedlings and root grafts for the purpose of starting a nursery in Nebraska as soon as the government should open the land for settlement. In 1854 he moved to Nebraska and settled in Otoe county near Nebraska City, where he operated a nursery for a number of years.

Mr. Masters was a charter member of the Nebraska State Horticultural Society, having allied himself with the Society at the time of its organization in 1869. He was its first president and served in this capacity for eight years. He was active in the work of the Society for many years and furnished much fruit from his orchards for exhibits made by the Society at its meetings and at expositions outside of the state.

Mr. Masters was a member of the state legislature in 1872. He was a member of the Masonic order and a life member of the American Pomological Society. He was an influential member of the Methodist church, of which he was trustee and steward for many years. He was married three times and was the father of six children, five of whom survive him. He passed away at Syracuse, Nebraska, June 10, 1909.

FRUIT JUDGING CONTEST.

The apple judging contest was held in Horticultural Hall at the University Farm, Thursday afternoon, January 20. Fifty-five men and four women took part in the contest, thirty-eight winning premiums.

The following plan, adopted by the Board of Directors of the Society, was used in conducting the contest:

(1) The Society offers $100 in prizes for an apple judging contest, to be held at the University Farm in connection with the annual meeting and fruit show of the Society.

(2) The contest shall be open to any regular annual or life member of the Society in good standing who has not been a member of the Society for more than three years.

(3) The prize money shall be prorated to the contestants scoring above 70 points, according to the total number of points above 70 scored by the several contestants. (For the method of determining the score, see paragraph 9.)

(4) A special exhibit for the contest shall be prepared by the Secretary of the Society. It shall consist of four plates each of ten varieties of standard winter apples, each plate to contain five specimens. Each plate shall be correctly labeled with the name of the variety except as provided in paragraph 5; and the plates shall be numbered consecutively from 1 to 40. By standard variety is meant any variety of winter apple recommended by the Society for any district of the state.

(5) In case of not less than four nor more than eight plates, the exact number to be unknown to the contestants, there shall be substituted for the variety named on the label some variety not readily distinguished from it, to try the contestants' knowledge of varieties.

(6) Three judges appointed by the Secretary shall pass upon the exhibit before the contest begins and rank each plate as first, second, third, or fourth, according to its merit, except that in case a plate contains a variety substituted for the variety named, as provided in paragraph 5, that plate shall

be ranked fourth without regard to its merit, or if two such plates occur in any one variety they shall be ranked third and fourth, according to their respective merits.

(7) In ranking the plates the judges shall be governed by the following score card, though they need not necessarily score each plate. The number of points assigned each quality in the score card is to be regarded as perfection for that quality.

Uniformity	30 points
Soundness	30 points
Size	15 points
Shape	10 points
Color	15 points
Total	100 points

By soundness is meant freedom from fungous or insect marks, bruises, withering, or other blemishes. As regards size and color, no plate shall be marked down on account of too large or too highly colored fruit.

(8) The contestants shall rank the 40 plates after the judges have finished and hand the Secretary a copy of their rankings on blanks furnished by him. They shall also note all cases of substitution of varieties by number of the plate concerned, and give the correct name of the variety. They shall be given three hours in which to rank the plates and prepare their report; provided that the Secretary may extend the time at his discretion. The contestants shall not be allowed to consult with each other nor with other persons, but may refer to any standard work on descriptive pomology, and may, if they choose, use the score card given in paragraph 7.

(9) The Secretary shall, as soon as possible after the contest, compare the rankings of plates made by each contestant with the rankings given by the judges and mark off for each plate as many points as there is difference between its ranking by the contestant and by the judges. For instance, if a

contestant ranked the plates of a certain variety as 4–3–2–1, where the judges had ranked them as 1–2–3–4, he would be marked off 8 points, the largest number possible for one variety, making 80 points off the maximum possible for any contestant.

The Secretary shall also mark off a maximum of 20 points in case a contestant fail to identify any plate substituted as provided in paragraph 5, and a proportionate number of points for failure in case of any of the four to eight plates substituted. In case a substituted plate is identified but not correctly named, one-half the proportionate number of points shall be deducted.

The score made by any contestant shall be determined by subtracting from 100 the number of points found against him.

THE IRIS.

C. S. HARRISON, YORK.

Literature on the iris is meager. With the exception of an elaborate and somewhat expensive work of R. J. Lynch, of England, which is rather too scientific for the ordinary reader, there appears to be no work on the Iris. It is our wish to bring the subject down to the reach of all and to introduce them more fully to these remarkable flowers. J. W. Manning, of Massachusetts, gave the horticulturists of that state a fine paper on the subject, probably the fullest that has been given in America.

A VERY LARGE FAMILY.

There are about 170 native sorts. They belong mostly to the Northern Hemisphere. You find them in Russia, Siberia, in the Himalaya mountains, in France, Germany, England, with numerous sorts growing wild in North America. In New England, in Minnesota, and in Northwest Canada you see them in large quantities in their native condition. They

are by far the most numerous of all the hardy perennials. There are about 30 kinds of original peonies and nearly 50 kinds of columbines, while there is quite a variety of the native phloxes. Though of so many species and varieties the

THE IRIS.

iris have not received as much attention as others. Peonies have been improved and multiplied till we now have about 3,000 named sorts with a great host to follow. For years experts have been at work on the phlox with gratifying success. A new interest is being awakened for the iris, and cheering

results have been secured. Sir Michael Foster, of England, has been an enthusiast with this flower and has produced some fine crosses. Mr. C. G. Van Tubergen, of Holland, has also had splendid success. W. J. Carparne, of the Isle of Guernsey, has had encouraging results in hybridizing the early Alpine dwarfs with later and stronger varieties.

Probably no one in America has done more to propagate and introduce the iris than B. H. Farr, of Wyomissing, Reading, Pa. He has originated some very fine ones and has hundreds more on the way.

THE ROOT SYSTEM.

These flowers may be divided into three classes, the rhizomatous, with rhizomes reaching out from the plant in every direction. These are the German and others nearly allied to them. The bulbous have bulbs like tulips. These belong to three families, the English, Spanish, and June irises. The English are called xiphioides. They grow about as tall as tulips, often bearing two or three flowers to a stalk. There are some fine sorts among them with quite delicate and pleasing blossoms.

The Spanish, called xiphium, are taller and stronger. These grow about two feet high and are more showy than the English. Among these are numerous varieties. Some of these are natives of Italy, Algiers, and other parts of Africa. We have tried both of the above species, and while they produce delicate and charming little flowers they are not at all satisfactory. If left in the ground the bulbs deteriorate, and when we are searching for hardy perennials we want something that will take care of themselves. We would not advise any one to bother with them when there are far more hardy and beautiful types.

The June irises also belong to the bulbous class. This is quite a numerous family, with tall and dwarf as well as stemless varieties. We never have tested these and would not advise any one to do so unless they have ample means and have

the iris fever so badly that nothing save a world's collection would satisfy them. These are mostly from a different climate than ours, being natives of Mesopotamia, Persia, and Africa.

We would say incidentally that there are other sorts we would not recommend though in themselves they may be very fine. California irises have been pronounced a failure by English experts. They are all right in their own habitat but do not do well away from home. The most beautiful iris in the world is called Oncocyclus from Palestine. Fortunes have been spent on them. They are very particular and especially sensitive. They must have their native conditions. They must be grown in frames, must be watered while flowering, and as in the hot, dry climate they came from, they are baked in the solid earth, they must have like conditions or they will die. One writer says the beds must be very hard and firm. "The Oncocyclus irises never grant any pardon for an omission of duty regarding them, and we try to leave them no excuse for being sulky on our hands. When the compost for the irises has been prepared it is thrown into the frames and then it is beaten down with spades with all the force at our command, and lest this should not be enough the whole surface of the beds is covered with boards and I get men to stamp on them and in this way compress the soil as much as possible."

If you want to buy lots of trouble you can get these fussy, dilettante, particular flowers and exhaust yourself finding out their caprices and whims. Of course they are supremely beautiful, but it doesn't pay, and you would stand nine chances out of ten for a failure. If one is raising flowers one of the most important things is to learn what not to do and then not do it.

THE RHIZOMATOUS GROUP.

These belong mostly to the German and allied families. The rhizomes spread out just under the surface something like

potatoes. They separate very easily. Of course some kinds increase more rapidly than others. Sometimes they seem quite ravenous and reach out and devour all the nutriment within reach. The center will sometimes be starved to death and there will be a vacant space, while the outside foragers will push out further and further for more nutrition. This shows the need of frequent transplanting.

IRIS WITH TUFTED ROOTS.

These are of the Siberian and Japanese type and others of a kindred nature. They also increase rapidly. The Blue Siberian is one of the hardiest in the world. We know of no plant which understands multiplication better. After growing two years you have a strong clump with heavy tops. You pull these apart by main strength, and they subdivide into individual plants. There are other sorts with roots somewhat peculiar, but these three classes embrace the most of them.

HYBRIDIZING.

There are two methods of securing new varieties—the natural and artificial or scientific. Nature sends out her call to the bee for help. Now the bee is a faithful servant and gives ready answers. Beauty and sweetness are the lure which calls the insect. It is not the nectar alone which attracts. The beautiful color of the flower is the flag which invites, telling where the sweets are hidden. The wanderer sees and answers the signal. Did you ever watch the great bumble bee as he goes from one columbine to another and creeps into the flower for the nectar. He seems almost intoxicated with delight. As he goes into this storehouse he brushes off the pollen with his rough coat and carries it with him as he enters the next flower. Thus he fertilizes it. He seems to gather a tint from one and a shade from another, and when you sow the seed thus fertilized you have charming results. We have seen as many as fifty different kinds from the same seeding.

Many of them of rare and wooing beauty. It is so with the iris. The bee is one of nature's most faithful assistants. However, though this mode of crossing may give you just as good results, you can not give the parentage unless the offspring shows some clearly defined characteristics.

The scientific method is to remove the anther of the flower just before it opens to spill out the fertilizing dust, and then shake it over the well-laden anthers of another flower. After this thin muslin is bound over it to keep out any insect which might bring any other pollen. The record is kept and the originator knows just what he is doing. Thus the beautiful Queen of May is a hybrid of three, Palida, Sambucina, and Variegata. The resplendent Madam Chereau has for her parents Palida and Sambucina. One florist is crossing the early Alpine with the later flowering sorts, and he expects to prolong the flowering season at least six months.

In looking over our vast collection of over 100 varieties we are amazed at the progress which has been made, and linger with delight on these new creations of the florist. One of the charms of floriculture is the fact that any one with little care and a good deal of enthusiasm can not only raise the established sorts, but can also originate new ones, and no one can tell what glorious things he can call out of the unknown.

SEE HOW IT WORKS.

A little money secures one or two irises of a kind. A little attention gives rapid increase. A single root soon becomes a great clump. This is divided and you have quite a bed. Soon your dime grows to dollars and the dollars to eagles. Then you can plant the seeds and so enlarge your number of varieties. It does not take much time or much hard work. It will be a delight. And you can combine beauty and utility. The world is restless for more home adornment. Each year there are louder calls for fine flowers. You can take advantage of it, and many a woman with meager income can increase it in a large measure while she improves her health, reaping con-

stant joy from her employment, while she is helping to make a fairer and more attractive earth.

PROTECTION.

Whenever grown in the cold North, out on the Plains, or in the South, the iris should have protection. It is so ethereally beautiful and so delicately fragile it should not be subjected to rough usage and the buffeting of the storms. Whenever seen in its native state it has chosen some quiet spot, some sheltered space near some pond or in one of nature's silent places where it can make that beautiful toilet without molestation. It is not found growing naturally in a bleak and windswept spot. In fact, all flowers should be protected. They can not be at their best when crippled and bruised by the fierce storms which sweep over the land. It is asking too much of them to go from an embowered, secluded home out into the vast bleakness of the naked prairie.

A SUITABLE PROTECTION.

After searching for more than thirty years for some hardy, quick-growing, and beautiful shrub which would both give ornamentation and protection, we have decided on the Loniceras or Bush Honeysuckles. The spireas are beautiful when in bloom, but they are not tall enough. Lonicera Marrowi is very popular in the East as well as in the West. It is quick-growing and is covered in springtime with a flood of sweet-scented flowers, followed by masses of bright red berries which lengthen out its attraction a long time. It is, however, of a weeping or sprawling habit which takes up a good deal of space. It is much used in rough places to cover rocks or unsightly spots, and is not so desirable for a hedge.

RUPRECHTA.

This is a compact, rapid-growing bush from Manchuria, and is fast coming into favor. It also is covered by a blanket of light-colored flowers, followed by masses of berries. It

would take but a short time for a splendid shelter. But we think the very best is Grandiflora Rosea Tartarica. This is of upright habit, a rapid grower with large bright red flowers striped with white. The blooms are deliciously fragrant, the flowers followed by large bright red berries. We can not emphasize this matter too strongly. Every spring you will note the great difference between the protected and unprotected flowers.

We have a clump of Festiva Maxima peonies south of the house on which we have counted 65 large flower buds, all striving to open and cover the plant with a mantle of purest white. Out in the windswept field we have 500 of the same kind, and it takes on the average 3 clumps to produce one flower. This is on account of the full sweep of the fierce northwest wind which nips the flowers in the bud. Irises open all right in the open, but they are so ethereally beautiful; the wind soon despoils them of that exquisite delicacy and fragile loveliness we so much admire. A royal family would not think of buffeting the fierce storms out in the open in full court dress. Your hedge will be in full leaf and bloom about the time many of the flowers open.

First come the columbines, such an immense family—all striving to see which can attract the most attention. Like a troup of merry little girls, each coyly inviting inspection of her pretty dress, and without saying it rather hinting that hers is the finest. In that secluded spot they grow taller and the blooms are larger and more beautiful than in the open. We have had them grow four feet tall under good protection, when without it they would not be over eighteen inches. In fact, a flower to do her best should have the very best chance. Here are the bleeding hearts and how they do enjoy this quiet. Then come the glowing oriental poppies (perennials) wonderful flowers, some of them nine inches across—a bed of them like a sea of fire. They do not like such heavy headgear to be buffeted by the winds any more than a girl with her two-bushel hat would like to be caught in a windstorm.

Then come the resplendent irises. One looks at them, especially the newer sorts, in their quiet beauty, and language fails. They are so winsome and ethereally delicate. They give a hint of both worlds, presenting us with the fairest this earth affords, and at the same time there is something prophetic about them of beauty not yet revealed.

This place is their paradise. They can put on their resplendent garments without the rebuke of the storms. Here they unfold all their charms. The lure of their beauty is indescribable. While in bloom you hover over them and see that veining, interweaving, and blending of tint and shading you can not describe. That iridescent glow we imagine is the smile of the dazzling goddess from which they are named. They hold and fascinate you and throw a spell over you. You go and come again. You linger and ponder in delightful reverie. You are seeing them at their best. They much prefer to make their toilet in seclusion than to dress in all out of doors. Here the peonies begin to bloom until that large bed is overwhelmed with them. There are the lilies, the platycodons, the phloxes, the stately Bocconias and Lupines. You have a full menagerie of loveliness all your own.

While the flowers are at their best, the hedge seems to say, "Now I will take a hand in this myself," and lo, it is covered with a mantle of fragrance and beauty, each bush in courtly dress keeping guard over the charming wards within. The honeysuckle is very fragrant—the perfume fills the arena, mingling with the sweet breath of the flowers and filling all the surrounding air.

And you have done all this yourself. You got four hundred cuttings and planted that space and filled it with beauty. You stand there with a higher appreciation of yourself and of your possibilities. The trouble with the average man is he uses but a small part of himself. Let him work up all his powers and reach out and take his own and he will wonder who that fellow is and he will feel like taking off his hat to himself.

PROPAGATION.

These flowers grow readily from seed. These should be gathered as soon as ripe. Some authorities say they should be sown immediately. We usually plant them early in the spring. If kept too long they appear to lose their vitality. The Japanese iris grow very rapidly and we have no trouble in raising them by the thousand. Of course they never come true to name. You get something different all the time, yet you have a chance to secure some fine ones at little cost. When you can do so it is better to plant where you want them to stand. They will usually flower in three or four years.

When you want plants true to name you must divide the roots. Planted in good ground they increase very fast. You separate the rhizomes, planting one in a place as you would potatoes. If you have plenty of room put the rows three feet apart and a foot apart in the row. Your ground should be in the best of condition. Plant the top bud about two inches below the surface. If too deep they will not do so well; if too shallow the winter may injure them.

TIME OF PLANTING.

Some tell us the best time is right after they have bloomed. We have tried this with fair success; only the ground should be very moist so they will go right to growing. We have planted in September and in all the fall months with success. We have had them in a box of moss for six months and then planted them with but little loss. But this is not the best way. If planted in the fall cut at least half the tops off. Never plant iris after iris any more than you would plant potatoes on the same ground year after year. Peonies following peonies become dwarfed and diseased. We have seen most disastrous results by highly fertilizing and replanting in the same place.

The rapid increase of the iris is greatly in its favor. Even the choicest varieties are seldom over fifty cents apiece, and

fine common sorts can be had at from ten to twenty-five cents each. For twelve dollars you can get fifty kinds, two of a kind. In a little while one becomes a large clump, and then a divided clump becomes a mass. With peonies it is different. The best kind are expensive. We have paid from three to ten dollars a root for them, and if they will double every year they will do well. Many kinds of the iris will increase five times as fast. Take those standard sorts, the beautiful Chalcedonia, and you will often get thirty from one in two or three years.

Some people are born faddists. They take to one thing and want nothing else. One is an expert with the roses. Another goes into raptures over the dahlia, until you ask him about its fragrance; another wants nothing but peonies; another finds phloxes all he needs. But we want them all. A well-balanced flower garden will have the best the world affords, and it will be incomplete if any of the successful standard flowers are wanting. And a person does not need many things that must be nursed and coddled all the time. He wants flowers that are interested in the matter themselves—that will not be too sensitive or sulky if things don't go exactly to their liking. Yet all plants have their idiosyncracies or individuality. One needs to study their likes and dislikes and tries to find out their preferences as he would the wishes of invited guests. There is an education which no one can have except he is in close touch with his plants. It will help some to read up about them and he may get some information from others, but the very best information he can secure is from the flowers themselves. Here he gets his knowledge first hand. For instance, a man plants a fine lot of phloxes. He puts them on a ridge. There comes a dry time. He has not cultivated the ground and he finds them drying up. He goes over to a neighbor and finds his are all right. Phloxes are shallow-rooted plants and his neighbor has planted them rather deep and in a depression instead of planting shallow on a ridge. Then the ground was well cultivated so the moisture was re-

tained; and these were enduring dry weather all right. A man must watch things. I visited a friend in Chicago. He was trying to raise grapes. Said he, "They are not doing well; I took the very best care of them; I had a load of manure put in each hole and then had the grapes planted on it." Poor things, they were dying with dyspepsia. He would have been sick himself if he had to eat a whole ox at a meal. We get choice things and want to do the best we can by them and overdo it.

A gentleman in Minnesota bought a lot of peonies. A year later he asked me to see them. I went. They were poor, dwarfed, sickly things. Said I, "I know just what you did. You dug a trench, filled it with manure, fresh at that, then put in the roots and covered them with manure in winter. You have surfeited them. This fall take them up and put them in a fresh piece of ground that has not been enriched lately and you will save them." I dug up one poor thing. It had the club foot. It could not possibly throw out any young roots. All the sustenance had to come through absorption from the old diseased root.

In the case of irises a man will find the tops wilting and falling off the rhizome. What is the cause? Wet feet probably and too much manure. Yet these perennials are hardy, and when you understand their needs and keep on the right side of them you are all right. You have two neighbors, one on each side of you. You wish to be on the best of terms with them, but they are entirely different and what would please one would not please the other. But you soon find out their peculiarities and treat them accordingly. Some irises, like the Japs, want wet feet at blooming time. The same treatment would not suit the German varieties. The Achorus family and many of our wild native sorts will bloom in water, a condition which would rot other kinds.

SOME OF THE BEST KINDS FOR BEGINNERS.

We would not advise the most expensive sorts to begin

with. I give a list of some that are of exquisite beauty, which multiply rapidly, and which you ought to get of reliable nurserymen for two dollars per dozen.

Upright petals are called standards and the lower ones are falls.

Aurea Chalcedonia.—Very robust flower of purest gold. Of rare beauty. Very healthy and a rapid multiplier. Standards light purple, inner petals of delicate lighter shade. Falls of striking beauty, radiant glowing purple, veined with white, very satisfactory.

Celestial Leonidas.—A delicate flower of soft sky blue. Standards with blue shading, beards yellow. Falls the most delicate velvety purple with exquisite tracery. A very winsome flower.

Florentina.—Very fragrant white bloom. This gives the orris root of commerce much used for toilet powder, having a delightful perfume.

Nymphea.—Standards lilac and lavender, golden beards. Falls purplish with deeper colored edgings.

Purple Queen.—Very early and a very prolific bloomer. Radiantly beautiful.

Parensis.—Has immense blue flowers. A very robust plant.

Queen of May.—Soft rosy lilac. Very attractive color. Very rich, early, and a prolific bloomer.

San Souci.—Standards clear vivid yellow. Falls veined with chocolate.

Madam Chereau.—Standards of purest white, beautifully edged with lavender. Very delicate and of ethereal loveliness. It is very tall and queenly in appearance.

Siberian Blue.—One of the hardiest and most robust of all. Flowers of intense blue, highly prized by florists. The rich deep blue reticulated with light tints makes it exceedingly attractive.

Siberian White.—Though small is very attractive.

Snow Queen.—Belongs to the Siberian family and makes

one of the best cut flowers. It is yet rare and the demand can not be fully supplied.

Japanese Mixed.—Gives you a splendor of bloom and carries the flowering time nearly to August.

SUGGESTIONS FOR THE CARE OF TREES AND PLANTS.

BY E. F. STEPHENS, CRETE.

THE ORCHARDS.

The old orchard, that is, trees twelve to fifteen years old and older and already in bearing, will be benefited by heavy applications of stable litter or other fertilizer. To the extent that stable litter can be procured, we have been in the habit of using about 500 pounds for each tree of the age of fifteen years and upward. This litter distributed about the tree, never in contact with the trunk, increases the stock of humus in the soil, lessens the winter evaporation and injury from dry freezing.

In the last two years we have hauled in some three million pounds of stable litter or manure from the town stables and stock-yards. Careful observation for thirty years indicates a benefit of $1 per load for each of the first two years following the application, and that the beneficial effect is not wholly lost during a period of eight years. We prefer to use stable litter rather than straw to the extent that we can secure the same. An application of three inches of stable litter is better than ten or twelve inches of straw.

Where stable litter can not be had in sufficient quantities to mulch the row to a width of eight or ten feet, straw stacks may be used to excellent advantage. The hauling of stable litter and straw is suitable work for the months of December and January. Where the application of litter and straw is confined to the width of eight or ten feet, and the remaining portion of the ground between the rows kept under annual

cultivation, the roots of the trees are not brought to the surface as would be the case if the entire surface of the orchard was heavily mulched and this mulch allowed to remain on year after year.

RABBITS.

Rabbits usually do little harm to an orchard after it has attained the age of eight or ten years, but orchards recently planted and orchards up to the age of perhaps eight years should receive protection. In our branch orchards we have used about 25,000 wooden veneers. These veneers, costing $5 per thousand, can be tied about the young trees and form a fair protection against rabbits during the first three or four years after planting. If the veneers are of excellent quality they may perhaps last four years.

Where it is not convenient to secure veneers, we have protected thousands of trees by the use of cornstalks. Cut a suitable number of cornstalks of a length of 24 to 30 inches. Tie top and bottom to the trunk of the tree. The gradual decay of the cornstalk allows the tree room to expand, and it is rarely necessary to take the trouble to go around and cut them loose, as they will ordinarily rot out and drop away. We have also used slough grass and rye straw.

In case the number of fruit trees to be protected is so large that it is not convenient to tie up each tree, then it is well to remember that the rabbit has a sensitive nose and can be kept away by applying a combination of blood, soap, and tobacco juice, using a swab. Sometimes we have added red pepper, crude carbolic acid, or any other offensive ingredient. The use of a slight amount of flour in the combination makes it more adhesive and less liable to wash off.

The cheapest tobacco can be procured in the form of leaf stems from the cigarmaker. We steep these tobacco stems and then to that add the blood, soap, and any other ingredients convenience may suggest to use. This will be less disagreeable to apply, if used while warm, otherwise it is a cold job on a chilly day.

Many thousands of trees are annually lost from the depredations of rabbits, and trees can be protected at a less cost than 1 cent per tree.

PRUNING.

While the commercial orchardist will commence work during the sunny days of December, because he has so many trees, it will take the whole winter to prune his orchard, yet the farmer or planter who has only a family orchard should defer pruning until March, the reason therefor being that if pruning is done just before active circulation of sap starts in the spring, the cut surface dries and checks less and the wound heals over more quickly.

In pruning, in the case of young trees, start the tree with a sufficient number of branches to make a rather open head. From season to season prune sufficiently to keep the head of the tree well balanced and reasonably open. A tree with an open head can be sprayed more thoroughly than when the tree is allowed to grow at will. It is usual to cut out the suckers or water sprouts, the dead wood, and the broken branches.

It should be remembered that the cherry tree requires very little pruning. The cherry is more sensitive to the loss of wood or the cutting away of any portion of its top than other varieties of fruit trees and rarely requires more pruning than to remove the branches which interfere with each other by crossing.

Plum trees require comparatively little pruning. In the case of young trees, shorten in the strongest shoots which outgrow the others to the extent of unbalancing the form and symmetry of the tree.

Considerable amount of pruning might be done in the month of June, if there were at that season of the year time for the work. The average planter, however, finds the season crowded so full of duties that he must prune in winter or not at all.

THE VINEYARD.

While the grapevine is reasonably hardy throughout southern Nebraska, yet the aridity of our winters is such that there is a lessened evaporation, and a stronger and more vigorous vine if, in our trying climate, it can receive some winter protection. In case the winters should be very, very dry, there is danger of root killing. In the vineyards belonging to the late ex-Governor Furnas at Brownville, some years ago, ten thousand vines were lost by root killing; this by reason of a severely cold and very dry winter. Therefore, we have found it well to trim our vineyards each autumn. The fruit next year is formed on the new wood of the present season's growth. The object of pruning is to shorten the new growth, leaving approximately the amount of fruiting wood which the vine can safely carry. It will be found wise to shorten the laterals to three, four or five buds, depending on the varieties and to some extent on the age and vigor of the vine. The buds left on the laterals develop next season's fruit. The main canes are shortened to suitable length, depending also on the age and vigor of the vine.

After pruning, we cut the vines loose from the trellis, drop them on the ground, put two or three forksful of straw over each vine and over that place sufficient amount of soil to keep the straw from blowing away.

We would figure the expenditure of three cents per vine as being sufficient for pruning, hauling the straw, covering and protecting the vineyards for winter.

MULCHING THE SMALL FRUIT PLANTATION.

Currants, gooseberries, raspberries, and blackberries should be very heavily mulched before winter. Stable litter is usually the most convenient for mulching currants and gooseberries. For many years we have used straw in the raspberry and blackberry plantations. In these plantations we allow the straw to remain on the rows the entire season, with the

result that it checks the growth of weeds, and retains the moisture for the benefit of the plantation. Since adopting this method we have never failed to secure a crop of fruit. About the time the ground commences to freeze, the strawberry plantation should be thoroughly covered with old hay. Why? Because old hay is free from weed seed. A covering of an inch is sufficient. In very windy districts it is sometimes necessary to confine this covering by occasional weights lest it should be blown off by high winds, but after it is matted down it usually sticks the winter through. We have oftentimes used stable litter, preferably litter from stables where prairie hay was fed. Not wise to use litter from stables where clover is fed, since it is liable to result in a considerable amount of clover springing up within the plantation. Failing to get either hay or stable litter, use straw, selecting that which is as free as possible from weed seeds.

HOME GROUNDS, ORNAMENTAL SHRUBBERY.

At this season of the year it is not difficult to collect a great quantity of leaves. Leaves have been blown into ditches and sheltered places and can be gathered very rapidly. They will be found very useful as a covering about ornamental shrubbery, roses and bulbs, one of Nature's own and best protections.

A heavy mulch of leaves or fine litter will be found a great protection to the root system of ornamental plants. In Nebraska our winters are likely to be very dry and this soil cover lessens the soil evaporation and the danger that the ground will freeze dry during the winter.

ROSES.

Tea roses and half hardy roses may be protected by first making a mound of earth, sod or other material over which to bend the rose bush. Over this florists usually cover with soil. In many places sods can be procured, and a covering of sods will not blow away.

Tea roses may also be cut back half, leaving them perhaps 12 to 18 inches in height. They may then be boxed in and covered with leaves or fine chaffy straw or old hay. With this amount of protection they usually winter safely.

An excellent method of growing tea roses is to make a border 4 to 6 feet in width by 6 to 8 feet in length, according to the grounds. A border of this character will contain 15 to 20 roses, giving a choice assortment of varieties. This border may be surrounded by boards 12 inches high and filled in with leaves or short straw, giving adequate protection.

In exposed and trying locations it is oftentimes judicious to take down climbing roses, wrap in burlap, or cover on the ground with leaves, old hay, or litter to lessen the trying evaporation of our wintry winds. It is apparent to any one that the animal which has a comfortable stable during the winter comes out in better condition in the spring than the one exposed to winds of winter.

While our hardiest varieties of roses may endure the evaporation of our trying winters, they will, however, come through stronger and give better results the coming season if they can receive a fair measure of protection during the winter. In the springtime the soil protected by a suitable mulch will be found in much better condition than that which has been exposed to the evaporation of our trying winters.

THE LAWN.

The lawn needs shelter during the winter. First it should have a considerable growth of its own grass allowed to remain through the winter instead of being cut late in the fall by the lawn mower. Second, a mulch of any vegetable matter, leaf mold, leaves, rich manure, applied in early winter, will protect the grass roots from the trying, arid winter's cold and bring the lawn through in condition to give a much more vigorous growth of grass the coming season. I noticed today that about our office where the grass has never been cut short late in the fall that we have a much better sod than about the

residence where the lawn mower has been run a month or six weeks later than is judicious.

FALL PLANTING.

It sometimes happens the planter has more leisure for planting in late autumn than in early spring, during which season he is rushed with the seeding of farm crops. In case the ground has a suitable amount of moisture, or water can be conveniently secured to make it sufficiently moist, then certain varieties of small fruits may be planted in late autumn. We have found that grapevines planted in early November, after the wood was well ripened and matured, made a stronger growth the succeeding season than when planted in the springtime. We, however, always take the precaution to heavily mulch, cover, and bury each vine so planted.

Raspberries and blackberries may be planted at the same season and the currant also, if heavily mulched and thoroughly protected.

It is rarely wise in Nebraska to plant fruit trees, shade trees, or forest trees in the fall, since under ordinary orchard or field conditions there is too great risk that the trees may suffer from drying out before the opening days of spring.

It is legitimate, however, to dig the trees in the fall of the year and bury them root, body, and branch, carrying them over the winter in readiness for early spring planting. Tens of thousands of trees are lost every year by planters who receive trees and simply heel them instead of burying the tree root, body, and branch. In the case of fall planting or fall burying of trees it is wise to have trees and plants properly and thoroughly ripened before digging.

IN MEMORIAM
W. F. JENKINS

Died April 21, 1910. Age, 65 Years.

William Francis Jenkins was born in Clyde, New York, November 17, 1844, and in August, 1862, when not quite eighteen years old, he enlisted to fight for his country in the Civil War, actively engaging in thirteen battles, and was with Sherman on his march to the sea.

Mr. Jenkins had many good stories to tell of his experiences as a soldier, and was becoming distinguished as an author, the National Tribune of Washington, D. C., having published a number of his war stories. Though he was only a boy twenty-one years of age when peace was gloriously restored, Mr. Jenkins's services were appreciated and he was made a corporal.

On June 23, 1867, he married Angeline E. Clark, widow of Lieutenant Clark, who was killed in the Civil War. Mr. Jenkins lived in the state of Michigan until January, 1879, when he moved to Nebraska, where he homesteaded, and has ever since lived on the land now known as the "Arcadia Fruit Farm," where he, as the result of unceasing toil, has built up one of the finest orchards and one of the most beautiful homes in Nebraska. He has demonstrated that by persistent effort and close application, together with wise selection and proper care, a high quality of fruit can be grown on the bleak prairies of central Nebraska, and his horticultural work here will be his imperishable monument. The biblical "By their fruits ye shall know them" is certainly doubly applicable in this case.

It has always been his endeavor to improve the welfare of his community. In 1894 when famine was threatening, Mr. Jenkins went east and by unceasing efforts secured donations of carloads of grain, clothing and food for the people of this locality. He has taken great interest in the culture of fruit, having been twice elected vice-president of the Nebraska Horticultural Society.

He leaves a widow, three children, two sisters, eleven grandchildren, and one great grandchild to mourn his loss.

SPRAYING IN NEBRASKA.

C. G. MARSHALL, LINCOLN.

The aim in preparing this circular is to place in the hands of farmers and others who are growing fruit for the home supply a simple guide to follow in fighting the more troublesome of the insects and fungus diseases that infest our Nebraska orchards.

It is not necessary at this time to go into detail as to the life histories of these pests, or to take up and discuss at length the advantage of fighting them. The fact that our orchards are infested with these pests confronts us and the question is how to successfully combat them with the least trouble and expense. We are not so much concerned about how they came into the country and how they are perpetuated as we are about how and when they work and the sprays to use in fighting them successfully. A few suggestions, however, as to the objects of spraying and the results to be obtained may not be amiss.

The necessity of making this phase of the orchard work a part of the plan in carrying out the details connected with growing of good fruit has been emphasized by the many experiment station publications and by the agricultural press in general. It is recognized by the up-to-date fruit grower and farmer as a feature of the work connected with successful fruit culture that is just as important as cultivation and pruning. In fact, the commercial apple grower in many sections would rather dispense with, for a single season, either cultivation or pruning or both than with spraying.

It has been proven beyond a question that apples may be kept almost absolutely free of insects and fungus diseases by proper spraying when fruit on adjoining rows not sprayed will be practically worthless as a result of the presence of worms and scab. The fruit on properly sprayed trees last season was from 90 to 98 per cent free of worms, while on unsprayed trees the percentage of wormy fruit was almost as

large. A Nebraska orchardist who harvested and sold more than 10,000 bushels of apples reports but 2 per cent of wormy apples from sprayed trees.

The result of spraying on the yield and quality of the fruit is also an important item. The following, although previously published by this Society (bulletin No. 16), is well worth being repeated at this time, as it gives the comparative yield and value of fruit to be expected from sprayed and unsprayed trees. The sprayed and unsprayed trees were in the same rows or in adjoining rows, and in each case had exactly the same treatment other than the spraying.

The results of the spraying demonstrations in 1907 are seen from the following summaries:

ARLINGTON—ORCHARD OWNED BY MARSHALL BROS.
Trees Sprayed Four Times.

	Number Trees	Yield Fruit	Value Fruit	Yield Per Tree	Value Per Tree	Cost of Spraying	Net Value Per Tree
Sprayed	20	80	$77 48	4 bu.	$3 88	29c	$3 59
Unsprayed	10	19	10 16	1.9 bu.	1 02		1 02

Gain per tree due to spraying $2.57.

BLAIR—ORCHARD OWNED BY McCORMACK & KOOPMAN.
Trees Sprayed Five Times.

	Number Trees	Yield Fruit	Value Fruit	Yield Per Tree	Value Per Tree	Cost of Spraying	Net Value Per Tree
Sprayed	71	251 bu.	$201 66	3.5 bu.	$2 84	40c	$2 44
Unsprayed	30	53 bu.	22 05	1.7 bu.	74		74

Gain per tree due to spraying $1.70.

It will be seen from the above tables that in each case there was a gain from spraying over and above the cost of spraying. Spraying paid for itself and a handsome profit per tree besides.

By spraying the grower not only produces clean fruit, but he keeps his trees in a healthier condition. Apples do not drop immaturely as a result of diseased stems, and a full crop is matured. The fruit when stored keeps much better, being comparatively free of disease germs that cause rot, and there are few insect and disease blemishes through which these germs may enter the fruit should there be any present. It is also noted that sprayed trees resist late spring frosts better than unsprayed trees. Regular spraying keeps the trees in a healthy, vigorous condition so that stronger and more mature fruit buds are formed. Then at blooming time applications of spray mixtures seem to aid the buds and flowers in resisting frosts.

In corroboration of the above conclusions the following is quoted from an address by Professor J. C. Whitten, horticulturist at the University of Missouri, before the Nebraska State Horticultural Society:

"At times certain fungi may do more damage to the tree direct than to the fruit which is being produced by it. Perhaps a specific example may emphasize this point better than can be done in any other way. In my own state during the past three springs, for example, we have had prolonged cold, more or less frosty weather during the blossoming period of our apple trees. In sections of the state more or less blasting of the flowers at this season has taken place, so that buds here and there fail to set well. The almost unanimous verdict of the orchardists has been that in sections where apples failed to set, even though there was a full bloom, that the failure has been due to the fact that the blossoms were killed by cold, frosty weather.

"It is my opinion that the failure of apple blossoms to set fruit, and the dropping of these small apples shortly after they set, has been due more largely to the presence of 'apple scab' in the orchard than to cold weather. In one large orchard adjacent to the Experiment Station, which is not sprayed, the blossoms of the trees were found to be quite gen-

erally affected with 'apple scab.' The stem of the flower in many cases turned black, wilted, then withered, and the flower fell because the parasitic fungi, 'apple scab,' had a foothold in the flower cluster, and not directly because the weather was cold enough to kill the blooms through frost.

"Again, when sprayed trees are compared with unsprayed trees right in the same orchard, where all experienced the same cold weather, the flower clusters are mainly killed on trees that are not sprayed, and apples that are sprayed escape the cold and subsequently mature, and because the 'apple scab' also is kept out of the trees, this is still better evidence that it is not the cold weather but the 'apple scab' that killed the flowers when spraying was not done.

"In our experiment station orchard during the present season a full crop of Jonathan, Ben Davis, Gano, Ingram, Winesap, and other leading commercial varieties was secured on trees which went through the same cold weather as was experienced by adjacent unsprayed trees whose bloom or young fruit was mostly killed before the warm weather of spring came on.

" . . . An outlying experiment was performed on an adjacent orchard. This orchard embraces some 200 acres of Jonathan, Ben Davis, Gano, and other commercial sorts. Believing from the previous year's observations that the loss of flowers was due to 'scab' rather than to cold weather, a single acre in this orchard was sprayed carefully by the Experiment Station. This one acre had more good marketable fruit on it this autumn than all of the rest of the 200 acres combined. While the cold weather was apparently killing the blossoms on unsprayed trees (which blossoms, however, were actually being killed by 'apple scab') fruit was setting nicely on sprayed trees where 'apple scab' was kept down, and a good crop was the result."

COST OF SPRAYING.

The cost of spraying depends chiefly on the age and size of the trees to be sprayed. In blocks of apple trees in Nebraska

orchards containing from 30 to 150 trees (about the size of the average home orchard) ranging in age from 12 to 30 years, where the cost of all material and labor used in spraying has been accounted for, the total cost per tree for each application was from 4 to 8 cents. These trees were sprayed four or five times, making a total cost for the season of from 20 to 40 cents per tree. All labor and team hire was charged at the rate paid for such services in the locality.

According to the above figures, the cost of spraying the average home orchard of 100 trees five times would be about $30. Of this cost the material for making the mixtures would amount to $12 to $15 and the labor in mixing and applying to from $15 to $18. Where the owner does not hire the work done the actual outlay of money should not exceed $18 to $20. The actual time consumed by two men in mixing and applying the sprays should not exceed one day for each application. Large orchards can be sprayed proportionately, considerably cheaper.

One and sometimes two of the five applications, according to the prevalence of insects and fungus diseases, may be dispensed with in Nebraska. This, of course, would cut the cost down accordingly.

COST OF MATERIAL.

Recent quotations from manufacturers and jobbers of bluestone and arsenate of lead are: for bluestone $4.50 to $5 per 100 pounds; for arsenate of lead, in quantities, 7 to 9 cents per pound. Where this material is bought of the local dealers in small lots the purchaser will usually be asked to pay from 25 to 50 per cent more than the prices quoted above. Lime is quoted at $1 to $1.25 per barrel of 200 pounds.

SPRAYING MACHINERY.

The barrel pump outfit is probably more widely used and gives better satisfaction on the small and medium sized orchards than any other type. A complete outfit consists of a

pump, two leads of hose 30 to 40 feet long, two extension rods 8 to 10 feet long, a nozzle for each lead of hose, and a 50-gallon vinegar or kerosene barrel. Brass working parts and fittings are essential to all pumps. All other parts that come in contact with the spray mixtures, if iron, should be galvanized, as iron is corroded by the spray mixtures. Such pumps with the necessary attachments are sold at from $15 to $25, according to the size and make, and may be obtained from any of the leading dealers.

The best gasoline power outfits are to be preferred for large commercial orchards. Spraying on a large scale may be done much cheaper and more timely with a power outfit than with hand pumps. Power outfits can be bought for from $200 to $300.

PREPARING BORDEAUX MIXTURE.

Bordeaux is made by combining a solution of bluestone and of lime, each properly diluted. Mixtures of varying strengths, depending on the trees and plants to be sprayed and the stage of development of buds, leaves, and fruit, are used.

A standard formula for Bordeaux is:

Bluestone (sulphate of copper)	4 pounds
Unslaked lime	4 pounds
Water	50 gallons

Where only a small amount of Bordeaux is needed the bluestone may be dissolved in warm water and enough water added to make 25 gallons; and the lime slaked in a separate vessel and diluted to 25 gallons. The two solutions should then be combined by running a stream of equal volume from each into a separate vessel, or by dipping with pails from each solution and pouring both into the third vessel at the same time.

When a considerable amount of Bordeaux is needed it is well to make up stock solutions of bluestone and lime, which will keep indefinitely if kept covered, to prevent evaporation

of the water. These may be prepared in the following manner: Place 30 or 40 pounds of bluestone in a flour sack and suspend, slightly below the surface of the water, in a barrel containing as many gallons of water as pounds of bluestone used. In another barrel place an equal amount of water and add as many pounds of unslaked lime as gallons of water are used. Keep it well stirred while the lime is slaking.

To make 50 gallons of Bordeaux of a 4-4-50 formula stir the stock solutions thoroughly and take 4 gallons from each, placing it in separate half-barrels. Add water to fill each half-barrel and combine the two solutions by pouring them simultaneously into a third barrel, which may be the "spray barrel." When the mixture is placed in the "spray barrel" or tank it should be strained through a fine screen to catch all particles that might clog the nozzles.

A handy strainer can be made by fitting a short piece (6 to 10 inches long) of one to two inch gaspipe in a hole bored in the bottom of a large wooden pail. This pipe should be fitted to one side of the center of the bottom and extend up into the pail about an inch. Window screen folded to four thicknesses should then be placed in the pail, the edges of the screen extending upward against the wall of the pail on the inside, leaving the screen concave in shape with the center resting on the bottom of the pail.

Bordeaux is not effective against insects, but is used against plant diseases. Where a spray effective against both diseases and insects is desired, as for apple orchards, a combination spray is made by adding some form of arsenic to Bordeaux. Arsenate of lead is found to be the most desirable poison to use on apple trees.

SPRAYING THE APPLE ORCHARD.

The apple is by far the most important of the fruits grown in Nebraska. It is also the fruit that is the most persistently attacked by insects and fungous diseases, principally codling-moth and "apple scab." For these reasons the suggestions

and recommendations set forth in this paper have been directed more particularly to the apple and to the pests mentioned. The following suggestions as to the mixtures to use and the time to make each application are as given by those who have done considerable spraying in Nebraska.

First Spraying.—The first application is made when the cluster buds open, but before the individual flower buds have opened (usually late in April or early in May). This application is directed mainly against apple scab and a 4-4-50 formula of Bordeaux should be used. Should there be present any leaf-eating caterpillars at this time poison may be added to the Bordeaux. In applying, a high pressure should be maintained so that the spray material is transformed into a fine mist. The Vermorel type of nozzle does good work. Care should be exercised to see that every part of the tree is coated with the mixture.

Second Spraying.—This application is made just after the petals fall (usually from the 10th to 15th of May). If the orchard is large it is well to begin this spraying as soon as the ground begins to appear white from falling petals. This is really the most important application against apple scab and the very most important against codling-moth, the parent of the "apple worm." A 3-3-50 formula of Bordeaux with about 2 pounds of arsenate of lead is used. It is important that this spraying be done immediately after the petals fall and before the calyx closes so that the poison may be encased in every calyx cup. A large percentage of the worms enter the apple through the calyx end, and by applying the poison before the calyx lobes close together the poison is held intact until it is reached by the worm starting to enter the apple. A high pressure should be maintained and a somewhat coarser nozzle used, giving the tree a thorough drenching. At this time most of the calyx cups extend upward, and for this reason the mixture should be directed downward as much as possible.

Mix the arsenate of lead in a small amount of water until it

has the appearance of milk, when it may be added to the Bordeaux.

THIRD SPRAYING.—The third application should be made about three weeks after the second (usually early in June). It is directed against codling-moth, scab, and leaf diseases. It is not considered so important as the first two applications or as the fourth. Although each of the four applications is essential for the very best results, if any are to be omitted this should be the one. It probably is of more benefit to the tree than to the fruit. The same formula as for the second application should be used.

FOURTH SPRAYING.—This spraying is made from six to seven weeks after the third spraying (late in July as a rule). As the second brood of codling-moth is emerging from the eggs about this time, this application is considered very important, especially for the winter varieties. A weak formula of Bordeaux (2-2-50) with the usual amount of arsenate of lead should be used.

FIFTH SPRAYING.—A fifth application is not always necessary. If the former applications have been thorough and the tree and fruit are apparently free of insects and diseases this spraying may be dispensed with without serious results. However, if heavy rains fall shortly after the fourth spraying has been made, it is advisable to make the fifth application, usually about three weeks after the fourth. Bordeaux may be omitted, using 2 pounds of arsenate of lead to 50 gallons of water.

REMARKS.

While in the foregoing discussion codling-moth and apple scab are the only pests mentioned, they are by no means the only pests that our orchards are infested with, and not the only ones held in check when spraying is done as recommended. Rusts, rots, mildews, etc., are to a great extent either prevented or kept down by the Bordeaux, although it is directed mainly against apple scab. And the lead arsenate

intended mainly for the codling-moth is also effective against curculio and other chewing insects.

The date to make each application varies with the seasons, and the grower should be governed by the development of the tree and bloom rather than by any dates mentioned.

The directions for spraying as set forth, if carefully carried out, are sufficient ordinarily to insure healthy trees and clean fruit in Nebraska. Occasionally other insects and diseases, not controlled by these mixtures, make themselves sufficiently troublesome to demand attention, and different sprays are required. The grower is then requested to apply to this Society for directions for fighting the particular pest.

NOTES FROM THE YORK EXPERIMENT STATION.

BY C. S. HARRISON.

ORNAMENTAL HEDGES.

In this wind-swept country it is necessary to have protection as soon as possible both for the vegetable and flower garden. It is pitiful to see peonies, columbines, oriental poppies, phloxes, and irises buffeted, cuffed, and lashed by the fierce, drying winds which sometimes tear along in their malice at the rate of forty or fifty miles an hour.

Plants and flowers seem almost human in their efforts to beautify the home and please the owner. They should have protection as well as the horse and the cow.

"Back to the land" is the cry, and it is a good healthy cry, too. People, instead of being cooped up in cities, long for the freedom of God's out-of-doors, and so thousands of people are starting suburban homes. Of course they will have hard times for the first few years. The drying winds mark them for their prey, and they are subjected to the persecution of the storms.

A few years make a great difference to a man who tries to protect himself. You would hardly know the place. The

home is inclosed with beautiful windbreaks. Inside of them is the quiet of a forest. Flowers bloom in all their beauty. Their fragile petals can open in all their delicacy and wooing loveliness without fear of bitter persecution.

WHAT SHALL WE PLANT FOR HEDGES?

If you want something coarse and strong as well as defensive you can take the osage orange. But that needs a good deal of pruning to keep in shape. Once established, however, it is a good protection both against animals and storms. A good many use the Russian mulberry. This will do for a few years, but a strong growing tree confined to narrow limits soon becomes cramped and enfeebled. This also needs severe trimming to keep it in shape.

English buckthorn is hardy and makes a good windbreak. This, however, needs constant attention to keep it in shape. Russian olive is the best tree for a windbreak out in the semi-arid regions. It endures the drouth the best of anything except the honey locust which is the best tree known for a dry country with alkali and gumbo soils. This is also used for protective hedges.

THE PRIVET.

Of late years this has been very popular where you need simply a low ornamental border which can be kept closely trimmed. This is very beautiful. It stands shearing well, and is very popular and in great demand. It retains its foliage until late in the fall which gives it additional attraction. But unfortunately it is not hardy. Some winters it kills to the ground and will often be killed out, root and branch.

Here at York we have had the vulgaris, silver edge, golden, Swedish, ibota, and regal and California types. The ibota has been heralded as the hardiest of all. With us it is absolutely worthless—the most tender of all. Ours is a trying climate on account of the winter drouth. Some things perfectly hardy in Manitoba kill to the ground here. Our dry

winters often pounce onto these hardy things and wipe them out. The silver edge privet is of delicate beauty, as it opens the first year from its importation. That delicate silver tracery interwoven with that charming foliage is very attractive, and you say, "We have found it now—the most beautiful thing on earth for ornamental hedges." But hold on, you don't understand our climate. It won't have anything that puts on style. I have tried a great many spotted and striped leaved plants so exquisitely beautiful in the East. They open all right the first year. The hot sun goes for them and they all revert to the green. They must do it or die.

The *golden privet*, which is one of the most beautiful shrubs on earth, proves to be the hardiest, by far, of the whole family. It is a spory or variation of the California type. This is not a native of California, but was introduced from Japan. Next to this comes the Swedish juniper, which has been raised for over twenty years at Boulder, Colorado, where it is often trimmed into posts, archways, and other fantastic shapes.

One of the most attractive of the whole family is Regal's privet with its broad, fan-shaped branches. This is of no account for hedges, but as a single specimen it is very attractive with its fine foliage, fragrant white bloom, and great masses of rich purple berries. The golden privet will make one of the most beautiful border hedges in the world. It is rare and it is hard to get them. At this station we are making every effort to get up a good supply. It is propagated by cuttings and divisions.

THE LONICERASOR TREE HONEYSUCKLES.

We have been testing six kinds of these. They are very satisfactory. They are very hardy, resisting extreme cold and our trying winter drouths. They are beautiful in their fragrant bloom and very attactive when loaded with fruit. Some have golden and others red berries. If you want something for a quick growing hedge to give speedy returns take

the Ruprechtiana from Manchuria. It is a strong, upright grower of extreme hardiness—beautiful in bloom and fruit. Then we have Tartarica grandiflora with very large flowers, whitish in color, striped with pink. This has the best tree form of all, and must have a great future as a protector for the flower garden.

THE SPIREAS.

Anthony Waterer is a favorite for low-border hedges. It kills to the ground in winter, but springs up and blooms every spring and keeps at it all summer. It is a dwarf and never can be used for protection. The Van Houteii is the best of all the spireas. It is very hardy and very attractive with its mantle of white flowers in springtime. It can be trimmed if need be. But as the plants generally grow to a uniform height they might as well have their own way.

We thus give the best shrubs for this important work of protection for the flower garden and the home grounds.

NEBRASKA AT THE NATIONAL EXPOSITION.

Great Plains State Made a Splendid Showing of Beautiful Fruits and Won Many of the Large and Desirable Prizes.

(From The National Horticulturist, April, 1910.)

Reference to the newspaper literature of more than half a century ago which was devoted to the description of the new "Territory of Nebraska" shows that there were two things that impressed most strongly the minds of the writers—the boundlessness of the ocean-like expanse of the prairies and the enormous quantities of wild fruit that grew in prodigal profusion along every watercourse in the eastern half of the new territory. The pioneers found that the wild plums, grapes, crabapples, raspberries, blackberries, strawberries, etc., which grew in such abundance were finer flavored, larger, and in every way better than the wild fruits found in other

sections of the country. The varieties were also very much greater.

Such men as General J. C. Fremont and General G. M. Dodge, the real original pathfinders for the western pioneers, noticed this indication of natural and favorable conditions for fruit development, and referred to it in their early writings. General Fremont said:

"The best indications of the richness of the Nebraska river (Platte river) country is the luxuriance and prodigality of wild fruits, found growing wherever there is the slightest protection of trees. Our men gathered and enjoyed more than twenty different varieties of plums and grapes, all very much finer than any we had ever before seen. There were also many varieties of blackberries, raspberries, dewberries, and other kinds of berries that were new to us."

General Dodge, in one of his reminiscences of the building of the Union Pacific railroad, said:

"We were seldomly without an abundant supply of some sort of wild fruit during the time we were working in Nebraska, throughout the season from June till September, and from the Missouri river to the Rocky mountain foothills. The rich lands produced the finest wild fruits we had ever seen, with the richest flavor and in the greatest varieties."

That the promise held out to the pioneers that Nebraska was peculiarly adapted to fruit culture has been fully realized was indicated by the splendid display of fruits made at the 1909 exposition of the National Horticultural congress. A glimpse of a portion of this exhibit is shown in the accompanying photograph, which reveals some of the long tables covered by Nebraska-grown apples.

The view was taken from the balcony, looking down upon the tables more than 100 feet away. The distance reduces the size of the magnificent apples displayed, but shows the unique method of ornamentation. On one of the tables, with a background of Greenings, plates of brilliant red Jonathans were arranged to form the characters in the state's name, and

Exhibition of the Nebraska State Horticultural Society at the National Horticultural Congress, Council Bluffs, Iowa, November, 1909.

"Nebraska" stands out in big, bold red letters nearly two feet tall.

None of the table exhibits at the exposition attracted more attention than those comprising the Nebraska entries. The fruit was piled on the tables with such prodigality that little of the white cloth covering could be seen in a side view. Clearly defined color schemes were followed in the arrangement of the displays on all of the tables. On the central one, showing the name, a deep border of light Grimes Golden and Greenings served as a frame for the fruit mosaic it surrounded. Unfortunately the number of prizes possible to be awarded was greatly reduced by the sacrifice of varieties to carry out the beautiful artistic color scheme designed by the artists who arranged the exhibit. Nebraska might easily have added a hundred varieties, all prize winners, but the many colors would have spoiled the beautiful picture. If the judges had been guided by the opinion so universally expressed by the delighted visitors, the Nebraska exhibit would have won many more of the big prizes than were accorded. Each apple was a perfect specimen of its kind, without a blemish, and colored by the subtle chemistry of the sun into the richest offering that a well-cared for tree could give its master. A comparison of all of the varieties shown indicated that they measured up fully to the best rating for same varieties grown under the perfect conditions and skillful care of the world's standards from the northwestern apple districts, proving that Nebraska apple growers can produce as fine grade fruit, in favorable years, as the best grown elsewhere.

The principal exhibits were made by the Nebraska State Horticultural Society and were awarded some of the best prizes offered by the national congress. These included the beautiful solid silver cup offered by the Council Bluffs Grape Growers' Association for the best general display of fruit made by any State Horticultural Society. The cup was one of the most elaborate of the many valuable trophies offered, and cost at the factory more than $300. It was won not alone

by the splendor and beauty of the apple display, but by the profusion of horticultural wealth emptied so lavishly upon the tables. The exhibit fulfilled most completely the promise held out to the old pioneers. The Nebraska Society also won the second prize for the best state general display of fruits, $150 in cash. In all, the Society was awarded ten first prizes, eight seconds, and twelve thirds. These included a first prize gold medal for the most artistic display of fruits, first prize for the best home orchard collection in district No. 4, which comprised the states of Iowa, Nebraska, Missouri, and Kansas, a beautiful solid silver cup, and many firsts, seconds, and thirds for the plate displays. There were many individual and county displays, including a splendid exhibit made by C. Sorenson, of Florence, who won many prizes in the plate contests, and by George Christy, of Johnson, whose exhibit was covered with blue, red, and white ribbons.

The Nebraska state exhibit was in charge of Hon. C. H. Barnard, of Table Rock, C. G. Marshall, of Lincoln, the Secretary, and G. A. Marshall, of Arlington. The Society appropriated funds early in the season and managed systematically every portion of detail connected with the exposition. Their work is worth many thousand dollars to the state. All of the officers of the Society and multitudes of Nebraska fruit growers visited the exposition.

REPORT OF THE METEOROLOGIST.

G. D. SWEZEY.

THE ROLE OF WATER IN PLANT LIFE.

Every horticulturist realizes that, next to sunlight, water is the most important factor in plant life. But perhaps we do not realize that water is also, in many ways, a most peculiar and almost unique substance among the constituents of our globe. Let us note some of these peculiarities:

1st. Its Amount.—When the cooling and shrinking earth

finally settled into its present corrugated surface of mountain, plain, and ocean basin, and the waters of the globe rested in the depressions thus formed, there proved to be enough water to fill these basins to a depth of six miles in the deepest places and to cover just about three-quarters of the surface of the globe. Now if there had been a little more water in the make-up of our planet, so as to give a depth of seven miles in place of six, the habitable regions of our planet would have been reduced to a few islands in the mountainous regions of the earth; if there had been still a little more, no life could have developed on the earth of a higher type than that of the deep-sea fishes.

If, on the other hand, there had been a little less water, the earth would have been an extended land surface with only here and there an inland sea, and the greater part of it would have been an arid waste like certain inland districts of the larger continents today.

2d. The points of melting and evaporation for water happen to lie within the ordinary range of terrestrial temperatures, so that water is continually changing back and forth from liquid to vapor and from vapor to liquid again, a most admirable device for supplying water to crops of continental extent. Prof. Percival Lowell, who has made so extensive a study of the planet Mars, and who has urged so strongly its probable habitability, points out the fact that on Mars it is apparently very difficult for water to reach the point of condensation, that precipitation is therefore difficult and rare, and for this reason the water problem for vegetation on Mars is a serious one.

3d. Water is one of the few substances in nature that expands a little just at the point of solidifying; hence in the process of freezing the crystals formed become slightly lighter than the water in which they are immersed. They therefore float instead of settling to the bottom, and the ice crust thus formed protects the water below from being deeply frozen. If water did not thus expand in freezing, the ice crystals

would settle to the bottom as fast as they formed, all our lakes and rivers and much of the ocean would freeze solid from bottom upwards, and, once frozen, would only melt a little at the top during the warmer months of the year, to be again quickly frozen solid when the cold nights of autumn returned.

4th. Water has great specific heat, the greatest of all known substances; that is, it requires more heat to raise a pound of water one degree in temperature than it does for any other substance; and conversely, the cooling of water requires it to yield up a corresponding amount of heat energy. Hence lakes and oceans heat and cool but slowly, thereby greatly moderating the climate of adjacent lands. The Great Lake region, although much farther north than Nebraska, and its average temperature considerably lower, is a fruit-growing district because its extremes of temperature are almost never great.

5th. Water has great latent heat of vaporization. It takes 966 times as much heat to vaporize a mass of water, that is, to change it from water at 212 degrees Fahr. to vapor at 212 degrees as it does to raise it from 211 degrees to 212 degrees. Hence evaporation keeps temperature down even much more than the mere presence of water does. Conversely, the condensation of water vapor into water requires the surrender of an equally large amount of heat; otherwise rain would fall in torrents over and near the ocean, but would rarely get very far from it. Even as it is, our inland position gives us none too large a share of the world's rainfall.

6th. Water has great latent heat of melting. It requires 143 times as much heat to change it from ice at 32 degrees Fahr. to water at 32 degrees as it does to raise it from 32 degrees to 33 degrees. Otherwise ice on every warm winter day would melt almost instantaneously and would rush away in torrents.

In view of these six facts it is not too much to say that if our chief fluid on the earth were not water, our weather would be a series of catastrophes.

It is in view of facts like these that the problems of agri-

culture and horticulture in an inland region like Nebraska are somewhat peculiar. Our range of temperature is great and our extremes of temperature inconstant and uncertain; our rainfall is apt to be scant and our constant of evaporation high; our atmospheric humidity is small and often strains to the utmost the ability of the plant tissues to pump up water from the soil fast enough to meet the demands of the lungs of the plant. How different must be the problems of the farm, the garden, the orchard, and the park in Nebraska from what they are, for example, on the California coast, where, as at San Diego, the average temperature of the six months of summer differs from that of the other six months by only eight degrees. Evidently each region must work out its own salvation. There is no use in trying to do the impossible, and fortunately there is no need of it; there are plenty of things that we can grow and we must find out what they are. It is all very well to consult the catalogs of eastern nurserymen and florists and to enthuse over the glowing descriptions of bloom and fruitage on their home grounds. We would all like to fill our front yards with the moisture-loving shrubs and flowers that we learned to love in our old homes farther east; but for the most part our labor would be in vain. Sometimes a tenderfoot can become inured to the West and make a valuable citizen; but we must test him carefully before we trust him very fully.

In this problem of the West, it seems to me that science and experience must cooperate. The horticulturist should study somewhat attentively the facts and truths which meteorology has to present. Our Experiment Stations should, I think, give more attention than they are doing to the relation of atmosphere and water, heat and cold, sunshine and evaporation, to the particular fruits and crops which we are trying to select as the best for a particular locality. And by meteorology I do not refer merely to the gathering of climatic data, for this has already been pretty thoroughly done, but to distinct lines of experimentation such as might point the

way to improved methods of agriculture and horticulture. Meteorology has often pointed out new fields of conquest. I well remember, when the question of Nebraska as a possible sugar beet country was first mooted, how Professor Nicholson came down to Doane College, which was then the headquarters of the Nebraska Weather Service of volunteer observers, to find out by consulting our weather records whether or not our climatic conditions resembled those of regions like southern France where the sugar beet was known to thrive. It was found that they did, and so an important new industry was added to our somewhat meager list. So should the work of the meteorologist in observing and studying our atmospheric conditions, and the work of the grower in testing the behavior of new varieties under these conditions, go hand in hand.

PROTECTING ORCHARDS AGAINST FROSTS AND FREEZES.

W. L. HOWARD, PROFESSOR OF HORTICULTURE, UNIVERSITY OF MISSOURI.

The problem of protection from frost is as old as fruit growing. It will be of interest to briefly review a few of the methods employed in the past.

In Italy and also in France cloth screens have been extensively used to protect both trees and vines from frosts. The screens were strung on wires stretched on poles. Twelve to fifteen years ago screens made of laths were used to cover trees in Florida. Although the laths were an inch and a half a part, they afforded considerable protection from frost by confining the warm layer of air to the earth.

In California sprinkling devices have been fitted to the tops of 50-foot poles and by this means the air was filled with a very fine spray. This extra moisture in the air, in almost every instance, proved to be a sufficient protection against frost. On the same principle fruit trees have been protected

from frost by turning water into the irrigation ditches during the night.

SMUDGING.

In European countries, particularly in France, it has long been a custom to fight expected frosts by creating a dense smoke which was allowed to float over the vineyards. This method of frost protection is known as smudging. A smudge fire may serve a double purpose. Owing to the fact that on cloudy nights radiation from the earth is so reduced as to prevent the formation of frost, it was thought that an artificial obscuration of the sky by means of dense smoke would be a successful means of protection.

Besides preventing the radiation at night, of the heat absorbed by the earth during the day, a smudge, if made of damp material, may add considerable quantities of moisture to the air. Such smudges are made by burning a mixture of damp straw and stable manure, sacks of manure alone, bales of wet straw or excelsior, the prunings from trees and vines, etc. Smudges of this kind are said to be better than those made of tar, crude petroleum, and other dry materials for the reason that, in addition to creating a dense smoke, they add to the atmosphere a considerable amount of evaporated water, which, though invisible, serves to retard the radiation of the heat.

In making the dry smudges for the value of the dense smoke alone, the citrus fruit growers of California used burning coal extensively. The fuel was placed in wire baskets and fired by various devices. Crude petroleum was used for the same purpose. About ten years ago they discovered that by using from 20 to 50 coal burners per acre enough heat could be generated to actually raise the temperature in the orchard from 2 to 5 degrees, which was sufficient to save the crop.

This discovery marked the real beginning of practical orchard heating. The California growers found that to equip an orchard with 50 baskets per acre represented an outlay of

a little more than $5. The fuel per night cost from $2.50 to $3, but it was unusual to have more than two or three nights in a season when fires had to be used. Crude oil was also used for the same purpose, but at first coal was the more popular fuel and is still preferred by many.

ORCHARD HEATERS.

Beginning with the spring of 1907, the use of oil and coal for heating orchards of apples and other deciduous fruits has become very popular in Colorado. At some of the more famous centers of that state, notably at Grand Junction, the temperature at the time apples are in bloom will sometimes fall several degrees below the freezing point. By the use of orchard heaters, burning either coal or crude oil, it is claimed that the temperature can be raised eight, ten, or even twelve degrees. To accomplish such results it is necessary to use the burners at the rate of 100 to the acre and to heat large areas at the same time. Dangerous cold there often sets in as early as nine or ten o'clock in the evening, and may last until daylight or even sunup the next morning.

However, with all these odds against them, the fruit growers during the past spring (1909) united and combatted the elements all night for five nights, and every newspaper reader is familiar with the details of their brilliant success in saving their crop of apples, amounting to almost 4,000 cars. In this instance both oil and coal burners were used. It is becoming popular to speak of these as "smudge pots," but this is misleading. While the burners do furnish a great amount of smoke which has considerable worth as a smudge, their chief value lies in the heat that they generate. The fires actually warm the air, and it is only by keeping them going that it is kept warm. However, if there is a slight movement of the air, the smoke will drift along at no great height, and in such an instance helps to prevent the escape of the heat, and thus the smudge feature becomes useful.

The oil pots in common use hold from one to five gallons. A gallon of oil will burn for about four hours. A coal burner holding one-fourth bushel will last about three hours.

The devices for burning coal are really stoves of the simplest design. They are often made with an oil basin at the bottom which is first lighted and of course burns quickly and rapidly. In this manner heat is generated quickly, and by the time the oil is burned out the coal is well ignited.

The oil pots are of different makes, but all are essentially the same in principle. The pots are made of stovepipe iron and the smaller ones of from one to two gallons capacity are six to ten or twelve inches in diameter, a foot or so deep, and fitted with three legs or rest on a rim. Each kind claims some superior point of merit. For example, one kind that is extensively used has an open tube extending from top to bottom of the inside of the pot much like an old-fashioned cake pan, which is for the purpose of carrying a current of air into the center of the flame. This additional supply of oxygen causes more perfect combustion of the oil and results in greater heat being generated.

Oil pots holding a gallon of oil cost about $15 per hundred f. o. b. shipping point. By the thousand they would come cheaper.

EXPERIMENTS IN SMUDGING.

For many years the Experiment Station at the University of Missouri has been testing devices for protecting fruit trees from late spring frosts. Beginning ten or twelve years ago smudging was employed on several different occasions. Smoke was generated by burning tar, barnyard manure, and other refuse. As a rule it was impossible to get the smoke to hang over the orchard for a sufficient length of time to have any appreciable effect in preventing the escape of heat radiated from the earth. Fires were built on the windward side of the orchard when there was any movement of the air, and when it was quiet the fires were started on all sides, as the

area under experiment was small, consisting of only an acre or two. At other times movable fires were made by piling earth in a wagon and building upon the mass a fire of smouldering material. By moving from place to place the smoke was distributed where it seemed to be most needed.

By the most conscientious work it seemed impossible to raise the temperature more than a degree or two, even under the most favorable conditions.

Three years ago a test was made of the value of refined oil (kerosene) as a means of creating a smudge and for generating heat for warming the orchard. Porous bricks were soaked in the oil, and when stood on end and lighted would burn for almost an hour. Not enough smoke was formed to be of any practical value as a smudge, and the flames produced by the burning bricks were too small to exert much influence upon the temperature. However, by using the burning bricks at the rate of about 100 per acre there was a raise in the temperature of one or two degrees, but only for a short time, as it was found impossible to keep a sufficient number of bricks burning lively at the same time and continued long enough.

This experiment was tried in the apple orchard and our best efforts could not prevent the formation of frost.

On the next night when there was a still heavier frost an attempt was made to protect a peach orchard. On this occasion coal tar was used to supplement the kerosene. Various devices were resorted to to generate heat and smoke from the two combustibles mentioned. By pouring tar over excelsior a dense smoke was created and considerable smoke was formed. But perhaps the best success attended the use of tar in tin cans which were set upon the kerosene-saturated bricks. The latter upon being lighted furnished enough heat to boil the tar, which soon ignited and burned fiercely. These fires were kept up during the hours of early morning, and for the most part where the fires were well distributed the fruit was saved. At this time the peaches were half an inch long and

at their most tender stage. Owing to the irregular distribution of the fires and the limited area over which they extended at all systematically, it was impossible to secure any reliable temperature readings. At points where trees were surrounded by fires the temperature at times was raised as much as five or six degrees, but it did not remain constant.

ORCHARD HEATING EXPERIMENTS.

Last spring we experimented for the first time with a patent orchard heater. We used the Troutman oil pots holding one gallon each. The fuel was what is known as fuel oil. Where seventy of these pots to the acre were used in an apple orchard, the temperature was raised as much as three and one-half degrees, but where 100 to the acre were employed, the air was made as much as eight degrees warmer than other parts of the orchard where there were no heaters, but the trees in the latter case were planted much closer than in the former.

This experiment showed that the pots were of practical value, and that the temperature in an orchard under ordinary conditions could be raised materially. However, it should be remembered that results secured from heating small areas are not to be compared with the results that might be obtained where large areas are heated, because the more heaters that are used in a district at the same time the easier it will be to keep up the temperature. The effect is cumulative.

The fuel oil used was donated by one of the big oil companies, and the price quoted for the material was six cents per gallon in barrel lots f. o. b. St. Louis. Later, quotations were secured from another oil company at five cents per gallon f. o. b. Kansas City to be delivered in the company's tanks. It is very probable that it could be secured at much better figures if the demands were sufficient.

In Colorado the fruit growers use what is known as a "smudge oil," which is the crude product with the gasoline

removed. This costs them from 2½ to 3½ cents per gallon in tank cars.

Under Missouri conditions it will be necessary to use on the average one-half gallon per pot per night or with 100 to the acre, a total of 50 gallons of oil per night. This will be sufficient for protecting against the ordinary spring frosts where the temperature only falls to the danger point late in the night. Sometimes, however, severe freezes occur in late spring, when it will be necessary to light the fires as early as 11 o'clock in the evening. In this event it would require a gallon of oil and sometimes more to last during the remainder of the night. It will seldom be necessary to use the heaters more than two or three nights in the year. In an abnormal season it will be necessary to use them three or four nights. If they were used for two nights during the first year the total cost for the pots and oil would amount to only about $20 per acre. The pots should last at le st five years, so that the subsequent cost per year per acre would be very light when compared with the value of saving a crop.

The figures quoted assume that the fruit growers will know when to light the fires and that they will not be lighted unless necessary. If the fires were lighted when it is unnecessary there would be a considerable waste of oil. In fact some instances have come under my own observation where fruit growers attempted to use smudges made of brush and refuse and they invariably started the fires too soon, and as a consequence the fuel was all consumed and the heat and smoke lost before the danger point of cold was reached.

TEMPERATURE DANGER POINTS FOR PEACHES.

In the life of the peach bud there are four stages at which the crop may be lost because of injury from cold. The first stage is that of the fully dormant buds as we find them in early winter. At this time under normal conditions they can safely withstand a temperature of eight or nine degrees below zero F., but if the temperature should remain at nine degrees

below for some considerable time there might be some injury. But it should be remembered that the average peach tree contains about 25,000 buds, whereas 1,000 peaches to the tree would constitute a heavy crop. It will thus be seen that a large number of buds may be killed and yet a full crop remain. At a temperature of zero or a little below, many of the weaker buds may perish and at eight or nine below there will be a wholesale slaughter, so to speak, although there is no reason why a sufficient number may not remain under normal conditions to furnish a full crop of fruit.

The second stage when injury may occur is from the time growth in the buds begins until they are fully open. This is a critical period, as severe weather is apt to occur at this stage. At this time the buds are much more tender than when fully dormant. The temperature that will kill at this time will depend upon the stage of development of the buds.

The third stage is the time which intervenes between the opening of the flowers and until the petals fall. This is the time when late frosts are apt to occur. They are now very tender. At this point the danger point lies somewhere between 26 and 30 degrees above zero F.

The fourth and last stage begins after the fruit has set and lasts until all danger of cold weather has passed. Just after the fruit has formed and at the time when the "shuck" or calyx is beginning to fall, the young fruits can stand a temperature of 32 degrees, and beyond this stage the larger the peaches are the less cold they can withstand without injury. It may be repeated that the farther along the peaches are in their development the more tender they are.

Briefly summarized, fully dormant peach buds can stand 8 or 9 degrees below zero. When they are appreciably swollen zero is the danger point. When the buds are showing pink they can stand 15 degrees above zero. When the buds are almost open, 25 degrees is the danger point. When they are newly opened about 26 degrees would be the point of danger. When the petals are beginning to fall, 28 degrees above

zero is cold enough to cause uneasiness. When the petals are off they can stand 30 degrees above zero. When the "shucks" (calyx tubes) are beginning to fall off 32 degrees above zero is the danger point.

The above figures will serve as a guide to the fruit grower as showing the proper time to light the fires in the orchard. It was said that many persons light the fires too soon and in such cases it is not only a waste of fuel, but it does no good whatever in any way unless they have plenty of material on hand to keep the fires going afterwards until all danger from the cold is passed.

Most people who have lived in the country very long know weather conditions well enough to have a pretty good idea when there is danger of a heavy frost. Generally it may be said that if other atmospheric conditions are favorable for the occurrence of frost as a rule, frost may be expected when the temperature falls to a point 8 or 10 degrees above freezing, that is, when the thermometer reads from 40 to 42 degrees F.

PREPARING THE HEATERS AND FUEL.

In using oil heaters everything should be in readiness for lighting the fires weeks in advance of the time they are expected to be needed. The pots must not only be distributed, but they must be filled with oil. One method of filling is to pass along the row with a barrel of oil on a sled. By means of a suction pump and a piece of hose the oil is quickly transferred to the pots. Another way is to have an open barrel of oil and fill the pots with a bucket. After being filled the pots should always be covered so as to prevent rain or dust from falling in them. Lids are made to fit all of the different sizes of heaters and these should be purchased along with the pots.

When the heaters are filled a wick for lighting should be provided. Since the pots are plain, open vessels, a wick is best made by using a small roll of grass or straw which touches the oil and hangs over the edge of the heater. In

lighting the pots by means of a gasoline torch the lids may be knocked off and the wicks fired as fast as a man can walk.

A very considerable item of expense in using the oil heaters is in providing storage for the oil at convenient points. This usually is done by constructing cisterns in the orchard, or, better still, by providing tanks which are filled by force but emptied by gravity.

On account of the first expense of installing facilities for handling large quantities of oil, some prefer to use coal as a fuel for orchard heating. The price of coal will vary considerably in different communities. Where it costs 14 cents per bushel or $3.50 per ton, the expense is about equal to three gallons of oil at five cents per gallon. Thus one bushel of coal will fill a burner four times and each filling will last for three hours. Three gallons of oil will fill a small burner three times and each filling will last four hours.

The objection to coal is that it is slow work filling the heaters and when first lighted some time elapses before much heat is generated. The oil burns fiercely within a minute after lighting. It is also objected that much coal is lost by being scattered upon the ground about the heaters and in continuing to burn after frost danger is past, while the oil can be extinguished at any time by merely putting the lids on the pots, thus saving the remainder of the fuel.

WHEN TO HEAT APPLE ORCHARDS.

The discussion so far regarding the danger point of cold has been for peaches only. For apples the conditions would be different up to the time the buds began to swell. During the dormant state in the winter time, apple buds are capable of withstanding any temperature which will not kill the trees themselves. Unlike the peach, apple buds when dormant do not contain all of the parts of the flower fully formed and ready to open up with the appearance of the first few warm days. When the dormant apple buds do begin to grow in the spring they first push out a tuft of leaves, which are followed

by a cluster of blossoms. The apple buds are not influenced by a little warm sunshine like the buds of the peach, and consequently they do not begin growing until after there has been considerable warm weather.

We find the peach buds opening in central Missouri in a normal year along about the 24th of March, while the apple will be about two or three weeks later. Apple buds require a high temperature before they begin to grow appreciably. Peach buds, on the other hand, particularly in late spring, are apt to respond to a single day of warm sunshine by making some growth.

Because the apple blossoms come out one to three weeks later than peach buds open, they are much less apt to be in danger from frost. Under Missouri conditions orchard heating will be needed for the peach crop far more often than the apple. There are seasons, however, as was the case in 1907, and again in 1908, when frosts and even freezes came early in May, when all the orchard fruits, including apples, were so far advanced that they were practically all destroyed by the low temperature.

If the fruit grower has both peaches and apples it will be necessary to provide heaters for both the orchards. While the peaches may require protection a week, two weeks, or three weeks, and in some cases as much as four weeks before the apples are in danger they will need to be protected again later on, if the temperature is sufficiently low to endanger the apples.

When the apple buds have grown sufficiently for the petals to begin to show, they can stand a lower temperature than it is popularly supposed. At this time they could possibly withstand from 10 to 13 degrees of freezing. From this stage onward their resistance to cold becomes less and less as growth progresses. When the petals are well emerged but have not opened up they could stand from 4 to 6 degrees of freezing, and as soon as they are open but not yet fertilized there would be great danger of injury if the temperature fell as low as 2

or 3 degrees below the freezing point. Just at this stage the apple is perhaps in more danger than the peach, apparently for the reason that the fruit is borne on long stems which seem peculiarly susceptible to injury from cold. From now on after the flowers have been fertilized, with the petals dropped, and the young fruit increasing in size, the slender stems which support the apples are unable to resist a temperature lower than the freezing point. At this stage it is a curious fact that the apples seem to be more hardy than their stems, but if the latter are injured of course the fruit also suffers.

In giving danger points for the various stages of development in both the peach and apple the writer has tried to be conservative. Experience in artificially freezing thousands of peach buds has shown that in the various stages mentioned they will often withstand lower temperatures than those given as danger points. However, so far as the practical fruit grower is concerned, the figures will serve him as a guide as to when the fires in the orchard should be lighted.

PRACTICABILITY OF USING ORCHARD HEATERS UNDER MISSOURI CONDITIONS.

The good results which have been attained by the use of the orchard heaters in Colorado have almost always been in the valleys. A great many of the orchards in Missouri, both peach and apple, are planted on high ground which is often rolling. Since cold air is heavier than warm air, and therefore has a tendency to drain away from the high ground to the lower levels, the orchards located on high ridges and hilltops would be much less apt to be endangered from frosts, and hence there would be less necessity for heating. Warm air being lighter has a tendency to rise, and great loss of heat from the fires which are kept burning in the orchard results because the air when warmed may quickly rise above the level of the trees. This is particularly true of still, cold nights when frosts are likely to occur. When the wind is blowing

the warm air does not rise but is carried off in a horizontal direction. On this account more success will attend the heating of orchards when the air is slightly in motion than when perfectly quiet. Furthermore, when the air is moving rapidly conditions are unfavorable for the formation of frost.

Thus it will be seen that cold, still nights are the ones the fruit grower dreads because of the danger from frost and the greater difficulty of heating the orchards. In Missouri there are not many orchards of much consequence that are planted in low ground. However, judging from results obtained in Colorado, it would be quite possible to heat the valleys to a sufficient extent to save the flowers or young fruit from being frozen. But if the area were small and consequently only a comparatively small number of heaters used, it would be quite difficult or even impossible to raise the temperature high enough. With an area of twenty to forty acres in a block in a valley, properly heated throughout, there would be very few times, if any, when the crop could not be saved. Upon high ground, as has been seen, even though the surface be rough, the heat will not flow down hill, but escapes upward or is carried off along the ground by the wind.

In Missouri there will be few seasons, indeed, when raising the temperature as much as five degrees would not save the crop. Of course the higher the ground where the orchard stands, the less the danger from frosts and the fewer the number of degrees it will be necessary to raise the temperature to save the crops. For example, there have been many times in south Missouri when, if the temperature could have been raised two degrees on the hilltops, the crops might have been saved. On the same occasions it would have been necessary to raise the temperature perhaps five or six degrees on adjoining land with an elevation of one hundred feet less.

By using from 75 to 100 oil pots per acre, if the orchard is fairly well elevated, it should not be difficult under conditions that usually prevail in Missouri to raise the temperature from two to four degrees. This will generally save the crop.

I would advise that the oil pots be placed as near the trees as it is possible to get them without injury from the flames. If the trees are headed high it will be possible to place the heaters beneath the branches and in some cases even to suspend them from the limbs. In this way, even though the heat goes straight upward and is lost, a new supply is constantly supplied and the interior of the trees kept warm. Apple trees should not be planted thicker than 70 to the acre, and on rich soil they will be still farther apart, so that if conditions will permit of heaters being placed beneath the branches, one to a tree, the number that will be necessary per acre can be quickly determined.

THE FARMER'S GARDEN.

VAL KEYSER.

A plat of ground one hundred feet square lying near the house should be reserved for the vegetable garden. The average farmers should pay more attention to the growing of a good garden. A garden properly arranged, planted to the right varieties, and kept well tended should be worth $100 each year in the saving of groceries to the family.

Fence the garden with some chicken tight, woven wire fencing at least five feet high. On the average farm where poultry and live stock are kept, there is always some danger of the stock getting out, and the first place they head for is the garden. The wire and posts, allowing for two gates, will cost not to exceed $25, and should last for ten to twelve years.

In most parts of the state the garden will respond better if fertilized with barnyard manure and plowed in the fall. The ground can then be worked down early in the spring with a disk or harrow. This retains the moisture, forms an excellent seed bed, and puts the soil in proper shape for planting.

In the plan for planting, small fruit and perennial vegetables are included. A privet hedge allowed to grow five feet high is suggested for protection from the south. This will

be an ornament to the place and lessen the effect of hot winds from the south. There should also be permanent windbreaks provided for the west and north. It is likely that the orchard can be used for this purpose, though evergreens afford most perfect protection. It will be necessary to rotate the annual crops suggested in this plan, as it will not do to plant potatoes after potatoes. It is also much better to change cabbage, tomatoes, and most of the root crops as it lessens the danger from diseases. The strawberries can also be changed by allowing new plants to fill the space between the rows, and plowing out the old rows every third year. Most of the vegetables suggested are for use during the summer. For this reason we put a few rows of potatoes in the garden to be used as new potatoes. It saves time, especially where the main crop is grown on another part of the farm.

The carrots must be dug and stored in the cellar or cave after the first frost in the fall. Twenty-five to thirty feet of the row of parsnips may be left in the ground to be used the next spring. If dug early as soon as the frost is out of the ground, they will be tender and crisp, and answer as a new early vegetable. When the peas are off, which is usually about the middle of June, this space may be seeded to turnips or rutabagas, or possibly a row of late cabbage may be set in the space between the rows and in the rows of the small fruits when young. This space may also be used for planting most of the annual vegetables.

A few suggestions as to planting the rhubarb and asparagus. Try the following plan: Dig a trench one foot deep and from a foot to eighteen inches wide, filling the bottom of the trench six inches deep with well-rotted barnyard manure; then fill in with two inches of dirt, and set the roots, leaving the ground hollow, to be top dressed with more well-rotted manure.

The top of the asparagus crowns should be planted two and one-half to three inches below the surface, rhubarb level with the surface. Horseradish planted in this manner will also

produce much finer quality and more roots. The ground upon which the small fruits are grown should be top dressed lightly each fall or spring. In some portions of the state it is better to mulch with straw or manure later in the season.

The following table, giving time of planting and depth of planting may be of service to those inexperienced in garden making. Most people plant vegetable seeds too deep. The depth of planting is, however, regulated by the physical condition of the soil and the amount of moisture present. If the soil is properly prepared by manuring, then fall plowed and harrowed early in the spring, as above suggested, it should furnish a fine seed bed with moist soil within an inch of the surface.

PLAN FOR PLANTING FARMERS' GARDEN.

	Space between row
5 rows sweet corn—(Early Minnesota) requires 15 ft.	3 feet
4 rows potatoes—(Early Ohio) requires 12 ft.	3 feet
2 rows cabbage—(Sure Head) set 2 ft. in row.	3 feet
1 row tomatoes—(Stone) set 3 ft. in row.	3 feet
1 row tomatoes—(Dwarf Champion) set 3 ft. in row.	4 feet
1 row beans—(Stringless Green Pod) drilled.	3 feet
peas—(Notts Excelsior) drilled, 75 feet; beans 25 feet.	2 feet
peas—(Notts Excelsior) drilled, 75 feet; lettuce 25 feet.	2 feet
beets—(Eclipse) drilled, 75 feet; radish 25 feet.	2 feet
carrot—(Ox Heart) drilled; onions—(Prize Taker) 50 feet.	2 feet
parsnip—(Hollow Crown) drilled	2 feet
rhubarb—row 50 feet long; horseradish, row 15 feet; asparagus 35 feet; bed 18 in. wide.	4 feet
strawberries—(Senator Dunlap) matted, row 18 in. wide.	4 feet
strawberries—(Crescent) matted, row 18 in. wide.	4 feet
grapes—(Concord) set 6 feet in row.	4 feet
grapes—(Elvira) 50 feet; (Moore's Early) 50 feet.	6 feet
gooseberry—(Downing) 50 feet; currant—(Victoria) 50 feet.	6 feet
raspberry—(Cumberland) set 4 feet in row.	6 feet
raspberry—(Kansas) set 4 feet in row.	6 feet
Privet Hedge—Plants set 15 in. apart.	6 feet

DATE AND DEPTH OF PLANTING.

Radishes, lettuce, and onions should be planted from a half inch to an inch deep. If the soil is in proper condition with plenty of moisture below, it is sometimes advisable to press a board six to eight inches wide over the row to hasten the

germination. Cabbage seed for plants may also be handled in this way. A short row six to ten feet in length will furnish an abundance of plants. As a rule these seeds should be planted about April 1; they are cheap and if caught by a freeze can easily be replanted. The peas should be planted about three inches deep about April 1. Carrots, parsnips, beets can be planted from an inch to two inches deep, should be sown in drills April 1. As a rule it is not safe to plant beans and sweet corn before the first of May, and from the 15th of May to the first of June is often early enough for beans. Two inches is sufficient depth to plant beans. Sweet corn should be planted from three to four inches deep. The cabbage can be set as soon as the plants are large enough. Tomatoes may be planted out any time after the first of May, as they can be protected in case of a late freeze. Use dibber in setting cabbage and tomato plants; it saves time and does a better job. The potatoes are usually planted from the 20th of March to the middle of April. If small potatoes are used they may be planted whole. The average size potato should be cut in four to six pieces and planted three to four inches deep, about fifteen inches apart in a row. Make all rows straight. Use a string or wire for a line, and the hoe, or one-wheel marker, for all smaller vegetables. Work out a plan for arranging varieties in the garden before planting them, as it saves much time and trouble.

A garden planted according to the plan suggested can be tended with a one-horse, five-shovel, adjustable cultivator. If the season is not too wet and cultivation is started early in the season, it is comparatively easy to have a garden of this kind. People should eat more vegetables. The carrots, parsnips, and onions can be used for making nutritious soups. They are easily kept over winter if stored in the cellar or cave. A garden of this kind will pay well for the time taken to tend it. It should produce at least $100 worth of fruit and vegetables if sold at the average market prices. The pleasure of having plenty of good fresh vegetables during the summer

and some to store for winter use is a treat the average family can not afford to miss.

FLOWERS, PLANTS AND ORNAMENTALS.

(Read before National Nurserymen's Convention, 1910).

BY C. S. HARRISON.

There is a forward movement all around us; you can feel it in the air and hear its tread on the earth. Utility is giving way to refinement and beauty. Farm and home adornment are coming to the front. The whole land is in the throes of a new birth, when symmetry is going to take the place of deformity. Too often the home has been an unsightly carbuncle on the face of nature instead of a fair picture in harmonious framework matching the splendor of the sky, the freshness of the forest, field and the lake which flashes like diamonds pinned to the bosom of Mother Earth.

The whole world begins to feel like the little girl who went from the unkempt, unadorned farm home to visit some friends who lived in a fine house with a spacious lawn hemmed in with charming trees, with attractive flower beds, and everywhere there was the touch of taste and refinement. These things woke up the soul within her. Her whole being was thrilled and when she got home and was saying her evening prayer she added, "Oh, Lord, can't you give us a little more style?" And that simple petition has broadened out into a mighty importunity which is reaching to heaven and bringing answer down to earth.

KEEPING UP WITH PROCESSION.

It is strange when the mission of the nurseryman is to proclaim through all the land the evangel of beauty you will find him lagging in the rear. He does not keep up with the procession or keep step with the age and with God. He doesn't raise choice flowers and plants and fine ornamentals; he says

there is no call for them. He is mistaken. The calls last spring took most of the stock, and what is left doubled in value. If there was no call it is his business to make one. That is what he is here for.

It is a shame to let the average Tom, Dick and Harry run the nursery business and set the pace for the grandest calling on earth and raise only what they call for. Horticulture should have a higher mission than to secure the dollar, and yet there are dollars in decency, refinement and improvement. Let your motto be, "Beauty is wealth, therefore raise a lot of it and be rich."

Don't be the tail of the kite. Be the kite itself and let others do the wagging to keep up with you.

Too often the nurseryman waits for others to write things up and create an interest; then after a while he follows on to reap where others have sown, often buying the cheapest and selling at the prices which belong to the best.

Seedsmen and florists are often at fault. I know of one firm who buys peonies at from 5 to 10 cents apiece and then push them up to $1, the price of choice ones.

On the grounds of every nursery in these days of progress there should be the finest collection of ornamentals and perennials the world affords which are adapted to the soil and climatic conditions. The nurseryman should stay with them, get acquainted with them himself, have his salesman understand them. They should be grown where the visiting neighbors can see them.

Perennials have come to stay. We, in springtime, find the west is located at the busy end of the world. We are in the center of a maelstrom where tremendous activities are surging all around us. We can not bother with annuals. We must have perennials—something that will stay planted.

REST FOR THE TIRED WIFE.

Providence has kindly marshaled for us a procession of beauty reaching from early springtime until the hard frosts

of autumn. The tired wife can rest herself every day in companionship with the finest behaved and best dressed company the earth affords. She can take a vacation in an Elysium of her own, which is far better and cheaper than a vacation in an asylum or a longer one in the cemetery. The soul of a woman is starving for communion with beauty. Let her have it. Don't defraud her of her own.

I can not go into details over propagation and cultivation, as we have manuals which give needed information.

First come the crocus, narcissus, tulips and hyacinths, harbingers of coming splendor. There is the lovely family of columbines. These use all the tints of the rainbow in making their garments. The coerulea, state flower of Colorado, is a photograph of the fleecy clouds and the intense blue of the mountain skies. The chrysantha is a flower of pure gold from the Yellowstone park. There are fifty native sorts, with hundreds of hybrids, many of which surpass the parents. It is hard to find a more beautiful spectacle than a great blend of color in a mass of columbines. Why don't people plant in abundance and so match God's great out of doors? It is a shame to expect two or three little flowers to adorn the farm or home.

STRICKEN WITH STINGINESS.

People spend thousands on their dwellings, but when they step out of doors they are stricken with a stinginess which fairly withers them. If they have to pay more than a quarter for anything to adorn the yard they are terribly abused. A thousand-dollar picture in a ten-cent frame seems to be their ideal.

Oriental poppies are like flames flashing in the sunlight. A bed of them like a miniature sea of fire. They will bloom from the same plant for twenty years. Take a single flower, look within and see the delicate skill bestowed on that great seed ball and the tremulous stamens that guard it—all done up in jet.

Here are the glorious peonies. While at their best they are peerless. There is nothing to match them. Here are 50,000 in hundreds of varieties. You go out to visit them. You are welcomed like a god. You wade in billows of fragrance that float all around them. How they are making their toilet. Never a beautiful maiden preparing for her nuptials put on fairer garments. Tens of thousands smile upon you, vieing with each other to please you. How winsome the lure of these beautiful flowers. While they last you want to be with them. And here are thousands of seedlings. Some of them of superior beauty which will have a future.

Here are pyrethrums. None but the Divine Artist could paint those delicate petals.

The boltonias have their place in late summer when most needed. Polygonums and bocconias have their place in some background, but don't give them too much leeway, for they want the earth if they can get it.

The platycodons, the white, blue and double, are among the hardiest of our perennials and are very satisfactory.

The gaillardias, stokes asters, digitalis and shasta daisies are fine, but they need especial winter protection. The lupinus would be superb, but it will damp off badly.

GREAT FAMILY OF PHLOXES.

The great family of phloxes reach from early spring until late in the fall. The subulata, or creeping variety, cover the ground with bloom in early spring. The suffruticosa come next, with the stately Miss Lingard in the lead, but in the main this family is not satisfactory.

Then comes the paniculata, often called decussata. This great family is the real thing. They are natives of America. Growing and thriving in the wild like a robust Indian maiden, they were taken to Europe and underwent such a transformation that they came back to us in garments fit for the courts of kings.

In the early stages of transformation there is a tendency

to reversion. The progeny wants to get back to the parents, reminding us of the song, "But she is young and can't leave her mother." But age makes a great difference. Now these flowers, like the dahlia, have wandered so far from the originals they break out in a riot of voluptuous beauty. And here is where you come in. We are just beginning to find the possibilities of this flower. For years we have produced new ones of great hardiness, and you will find in the Phlox Manual, which has the kindliest endorsement from highest authority, the simple process by which a child can evolve new and charming varieties.

The iris has been rather late in coming into notice, but it has come to stay. The different varieties bloom from March until August. There are 170 native sorts and the hybrids reach probably into the thousands. I found an undescribed one in the Black Hills last August growing on stony bluffs, exposed to 40 degrees below zero. It belongs to the Siberian type. This family now has thirty varieties and is increasing every year.

THE IRIS.

Oh beautiful! Beautiful flower!
The ward of the sunbeam and shower
In garments of woven delight,
Of the sunset, Aurora, and light.
While over thy beauty there plays
Such delicate tinting and rays,
Such blending of color and shade,
Well becoming a heavenly maid.
Ethereal, lovely, and sweet,
Thy presence we joyously greet.

Thy Mother, fair Iris, in beauty supreme,
Took all her rich garments of loveliest sheen,
The robes of the rainbow, flower garden of air,
Of bewildering beauty, resplendently fair,

And made for her child such a dazzling dress
No daughter of royalty e'er could possess.

Though her form seems so fragile, yet wondrously brave,
Away in the Northland where fierce tempests rave,
She wakes from her sleep in her cradle of snow
And beams on the world with a radiant glow.
Away on the plains in the drouth and the heat,
She is cheerfully waiting admirers to greet.
To her fairy presence must ever belong
The tributes of praise and the rapture of song.

We are not to forget the stately and imposing delphiniums. These give us all the shadings of the blue. We see some of immense size. The Boston shows often exhibit those of rare merit. It would take a strong imagination to suggest an improvement. The main stem straight and tall and the branches packed with splendid blooms, some single and some double. In the west if planted in exposed places in the full sweep of the winds they will need staking.

ALL PERENNIALS NEED SHELTER.

All perennials need shelter from the cruel blasts which often sweep at the rate of forty miles an hour. You can produce a calm by planting a hedge around your flower garden. If you want something tall, the flowers of which will add to the attractiveness of the whole display, take grandiflora tartarica or the Manchurian honeysuckle. The silver tamarisk, charming both in bloom and foliage, makes an excellent hedge. This is the best of ten sorts which we have tested at York.

Brothers, do you know your own power? You can take a dull and somber piece of earth and make an elysium of it. You can take the mantles of the stars, the splendors of the sunsets, and the colorings of the rainbow and weave them into a jeweled carpet fit for the touch of angels' feet.

Beauty has a mission. God might have made apples of the color of cobblestones and given the strawberry and cherry the drab of gravel instead of those appetizing tints which are the despair of the artist.

On earth there is beauty everywhere, from the prodigal blooms of the tropics to the vast profusion of flowers in the frozen tundras of the north.

THE PROPHECY OF GLORY.

This world is only the porch of another. Flowers and gems are the prophecy of the glory to be revealed. How superbly the great landscape artist laid out this world of ours. What a land He gave us before it was marred by the greed of men. Did you ever think that this same Artist who laid out this earth along the lines of harmony and beauty also has landscaped the universe? When you get through your schooling down here and have faithfully proclaimed the great evangel of beauty; when you have passed away you will leave a path lined with radiant forms of loveliness. It will be said of you, "He passed this way and these are his footprints."

Then you are to stand as victor under that arch on which is written, "All things are yours." There you are to receive the salutations of the universe and the eternal beauty is yours. As the land of promise rose in wondrous mirage to the vision of Moses on Tabor, so will the broad fields of light rise to your gaze and behold the universe itself is one great flower garden. Who can describe the clustered glories, the harmonious mingling of colors of the milky way sown thick with immortelles? How amazing the vastness! Tremendous abysses of distance illumined by the smile of Jehovah. He drove his plowshare through the fields of azure and all the furrows were flowered with stars, Orion and Pleiades, great bouquets held in the hand of the Creator. The constellation gardens of surpassing splendor.

So remember that the beauty of earth is a prophecy of that opal sea, jeweled walls, and the great gardens of God. Let

the hither shore give some promise of the further shore. We spend a few moments down here. Most of our life is over there. So pull down a section of paradise and be prepared for the eternal beauty.

HORTICULTURE IN EASTERN NEBRASKA.

BY C. G. MARSHALL, LINCOLN.

The growing of horticultural crops in eastern Nebraska has been, up to the present time, largely of secondary importance among farm operations. The climate and soil are suited to the growing of a wide range of crops, including those of a horticultural nature, but owing to the large acreage of each farm the desire for quick cash returns from the crops and the favorable conditions for stock growing, not a great deal of commercial growing of things horticultural has been attempted.

Then there are comparatively few men in eastern Nebraska who are experienced in the growing of horticultural crops. The majority of those following agriculture in this section have either been reared here on our farms or have moved from states to the east of us where general farming is practiced largely, and consequently they are not trained horticulturists. Many of these farmers, although primarily grain and stock growers, wish to maintain a small home orchard as an adjunct to their main lines of work for the purpose of having a home supply of good fruit, and to protect and beautify their farm home by growing windbreaks, shade trees, and ornamentals. There is a proper place for such planting as well as for the strictly commercial aspects of horticulture, and the encouragement and development of this phase of horticulture, is one of the most important problems to be solved in connection with development of the horticultural resources of this section.

There are today a few well tended home orchards in eastern Nebraska that are furnishing an abundant home supply for

the owners and there are many more home orchards not so well tended which do not only fail to justify their existence, but are a source of grief to the owners and an eyesore to the farm and community. Lack of information on the part of the owner in the selection of varieties and the management of growing trees and plants which tends toward neglect is largely where the cause for the last mentioned conditions lie. He becomes somewhat discouraged and gets the idea that the growing of good trees, fruits, and flowers is something which is too difficult and expensive for him to undertake. And because of the fact that he can grow corn, wheat, and stock in sufficient quantity to enable him to live without making a very deep study of the principles governing the growing of these things he turns his attention almost entirely to them and horticulture suffers.

The conditions just described exist not only in eastern Nebraska but in almost all of what is known as the grain belt. But a change is taking place. As land becomes more valuable and farms grow smaller more attention is paid to horticulture. People are awakening to the fact that unless trees and plants receive as much attention and in some cases more attention than field crops that it does not pay to plant them. It is also being demonstrated by the more progressive and wideawake farmers and fruit growers that with the proper care and culture every farm home may be made homelike and attractive and an abundant supply of fruit for the home may be supplied with a small outlay of money.

Commercial fruit growing is also being looked upon with more favor in this section. From fifteen to twenty years ago many orchards of from five to twenty acres in extent, and a few covering as many as forty and eighty acres, were planted. The majority of the owners expected large yields of good fruit with little or no attention and expense in connection. They were disappointed. Adverse weather conditions at blooming time followed later in the season by increased numbers of codling moth and curculio and more scab and other fungous

diseases as a result of more moisture during the summer months, made the limited supply of fruit of inferior quality and almost unmarketable.

Owners of many of these orchards gave up in despair and the orchards have received practically no attention since. Some cut down the trees and planted corn. Others set to work to overcome the difficulties by more careful pruning, tillage, and spraying. A few of the more progressive are now equipping their orchards with heaters to ward off late spring frosts and freezes as is done so successfully in some of the fruit districts of the West.

It is not often, however, that our fruit crops are seriously damaged by late frosts. Records show that western New York, where more apples are grown annually than in any other state, has been visited by late frosts and freezes as many times during the last twenty-five years as has eastern Nebraska. But one crop saved will more than pay for the expense of equipping the orchard with a means of protection and to the commercial grower this saving means profit.

The results obtained by these orchardists who have a persistent and optimistic nature have been very encouraging. Even during the last few seasons of unfavorable weather conditions many commercial orchards and small fruit acreages have paid handsome dividends.

Of the fruits grown in eastern Nebraska the apple is by far of the most importance both for the home and commercially. The upland soil of practically all of this section is well suited to the apple and some of the very choicest varieties to be found anywhere in the Union, such as the Jonathan and Grimes' Golden, which have a national reputation for their quality, are well adapted to a large part of this territory.

Reports received by the writer from orchardists in Saline, Washington, Nemaha, and Otoe counties make mention of the fact that single trees of Jonathan the past season (1909) yielded from twenty to thirty bushels of hand-picked apples. One man reports Grimes' Golden yielding more than thirty

bushels per tree and several speak of yields of from twenty to twenty-five bushels per tree.

A Nemaha county apple grower tells of one and one-half acres of Jonathans returning him $331.55 per acre and a fraction of an acre of Grimes' Golden yielded at the rate of $1,000 per acre. He goes on to say that his Gano returned $958 from three and three-fourths acres and his Winesap $560 from four and one-half acres.

A Washington county grower reports $5,000 from a fifty-acre orchard, only a part of which bore well this season. A Valley county orchardist reports $2,500 received from a twenty-five-acre orchard and the purchasers picked the fruit. An orchard of twenty-two acres in Antelope county four miles from the edge of the great sand hill district returned to the owners $2,000 last season.

The cherry, while it is not grown commercially to any great extent, is to be found on almost every farm in eastern Nebraska. The sour cherries are grown almost exclusively and such varieties as Early Richmond and Montmorency do exceptionally well when given attention. Many trees of later varieties have died out during the last eight or ten years as a result of a fungous disease of the leaves, but the varieties mentioned have been affected but slightly.

Grapes can be grown very successfully in practically all of the eastern part of the state. They are found growing on almost every farm and there are also a number of commercial vineyards. The grape blooms so late in the spring that it is seldom injured by frosts, and consequently is one of the surest of fruit crops. A number of varieties withstand the winters south of the Platte without protection, while most varieties require a slight protection in northern Nebraska. Well tended vineyards near good markets pay handsome dividends. One and one-half acres five miles southeast of Lincoln returned to the owner $725 last season and about the same the season of 1908.

Strawberries are another important fruit crop in this sec-

tion. Few home gardens are without a strawberry patch. The strawberry is grown commercially to some extent over the whole of eastern Nebraska, but in the vicinities of Omaha, Fort Calhoun, and Blair it is grown quite extensively. A number of instances may be cited where returns of from $700 to $800 per acre have been received in one season. A Blair grower reports the sale of one day's picking from four acres for $561 last season.

Plums, peaches, raspberries, blackberries, and other fruits are doing well where properly cared for and are important horticultural crops in this section.

The returns mentioned above are not an average by any means for this section. Many home orchards as well as orchards of larger proportions have never given profitable returns, but on the other hand the owners of these unprofitable fruit plantations in most cases are to blame. They do not know the business or are negligent. Nature, with the proper assistance of the owners, will produce returns equally as good in almost all parts of eastern Nebraska, and if she is assisted in growing these things, as the orchardist of the much advertised fruit sections of the West assists her, she will even do better by them. Although most of the plantations from which the indicated returns were received have had far better care than the average in this section, the care given them is very limited compared with that given commercial orchards in the West.

The writer is of the opinion that if the truth was known, with the same amount of intelligence, labor, and expense applied to the orchards and fruit business in this section, that returns would compare quite favorably with those of some of the far-famed fruit districts of the Pacific coast. The attainment of the very best results, however, requires special horticultural knowledge and even to succeed fairly well in this section the grower must keep himself well informed on new horticultural ideas and put into practice those that will be of advantage to him.

The people of this section are becoming more and more interested each year in the horticultural setting of their homes. More shade and ornamental trees are being planted as well as shrubbery and flowers. It was but a few years ago that the nurserymen of the state sold hardly enough ornamental trees and plants to pay them to carry these things in stock. But the demand for ornamentals has grown steadily until now this part of the nursery business is one of the most important. The effect of this ornamental planting is making a wonderful change in the appearance of the farm homes of eastern Nebraska. They are transformed from bleak, lonely barren places of existence to pleasant and attractive places to live. Let the good work go on.

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