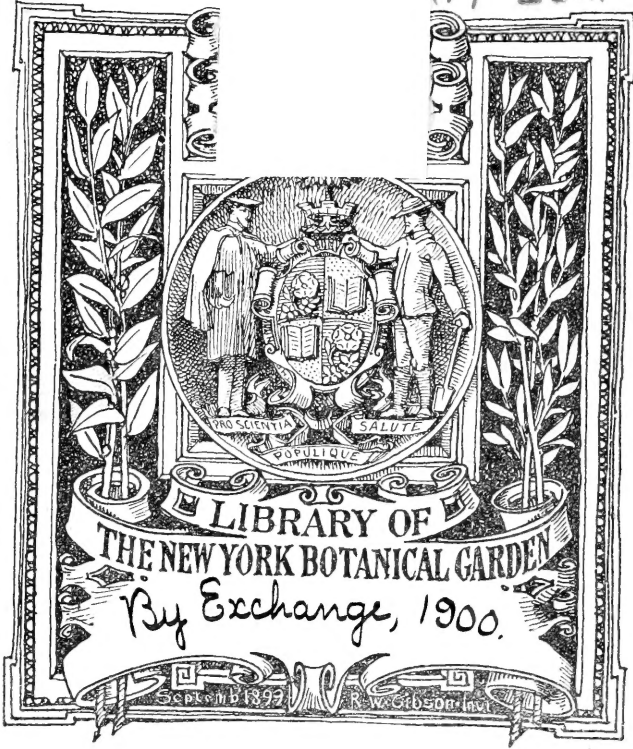


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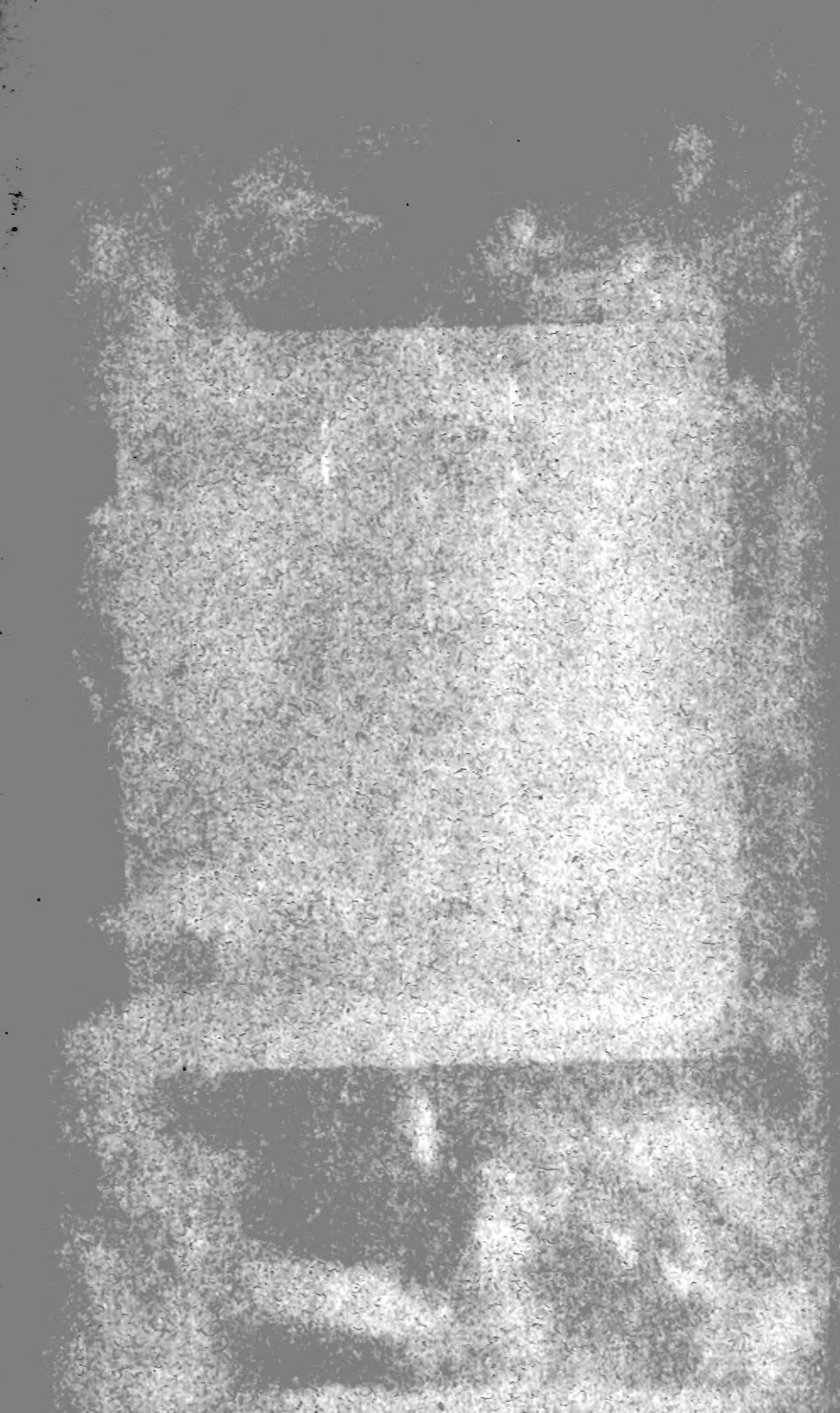


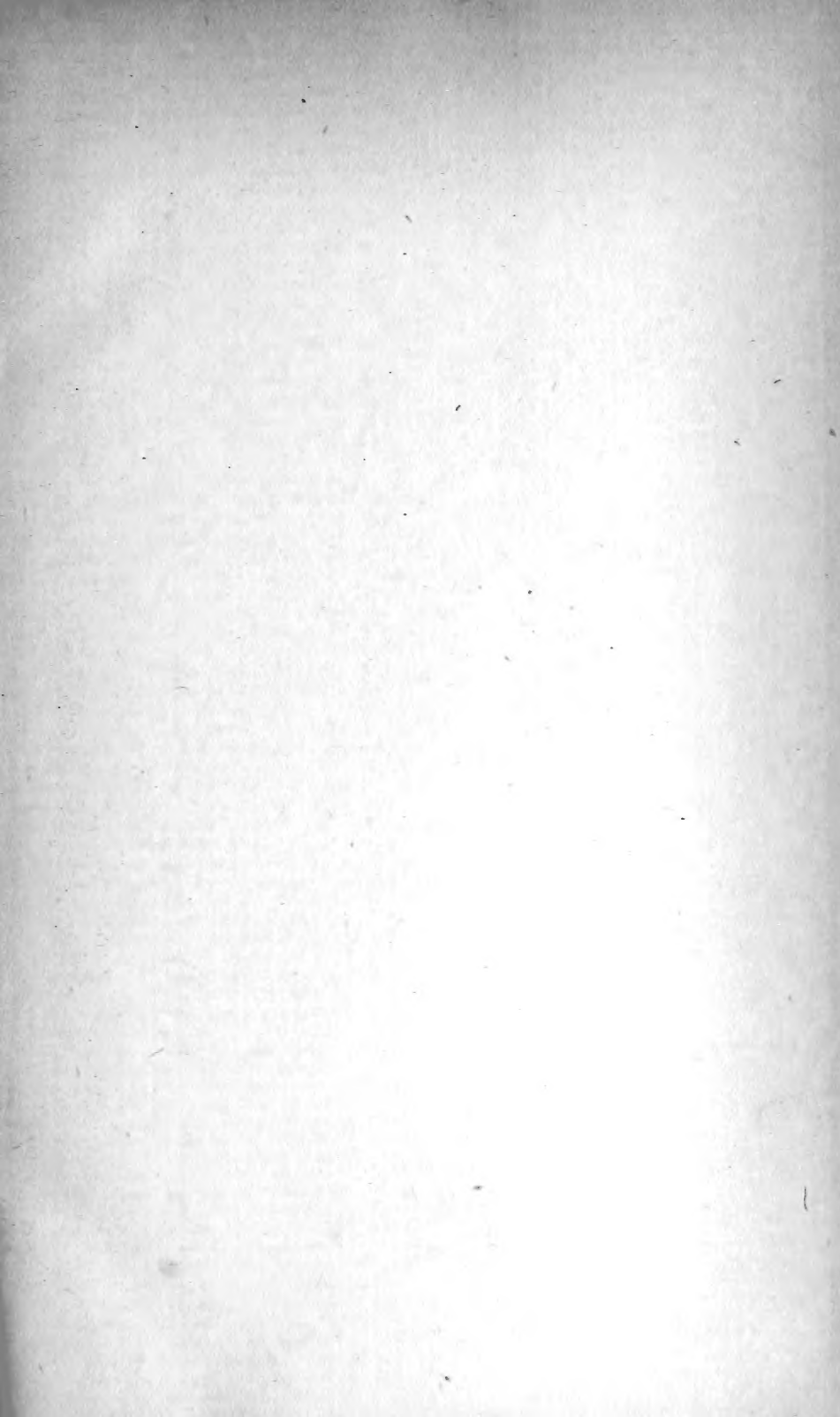
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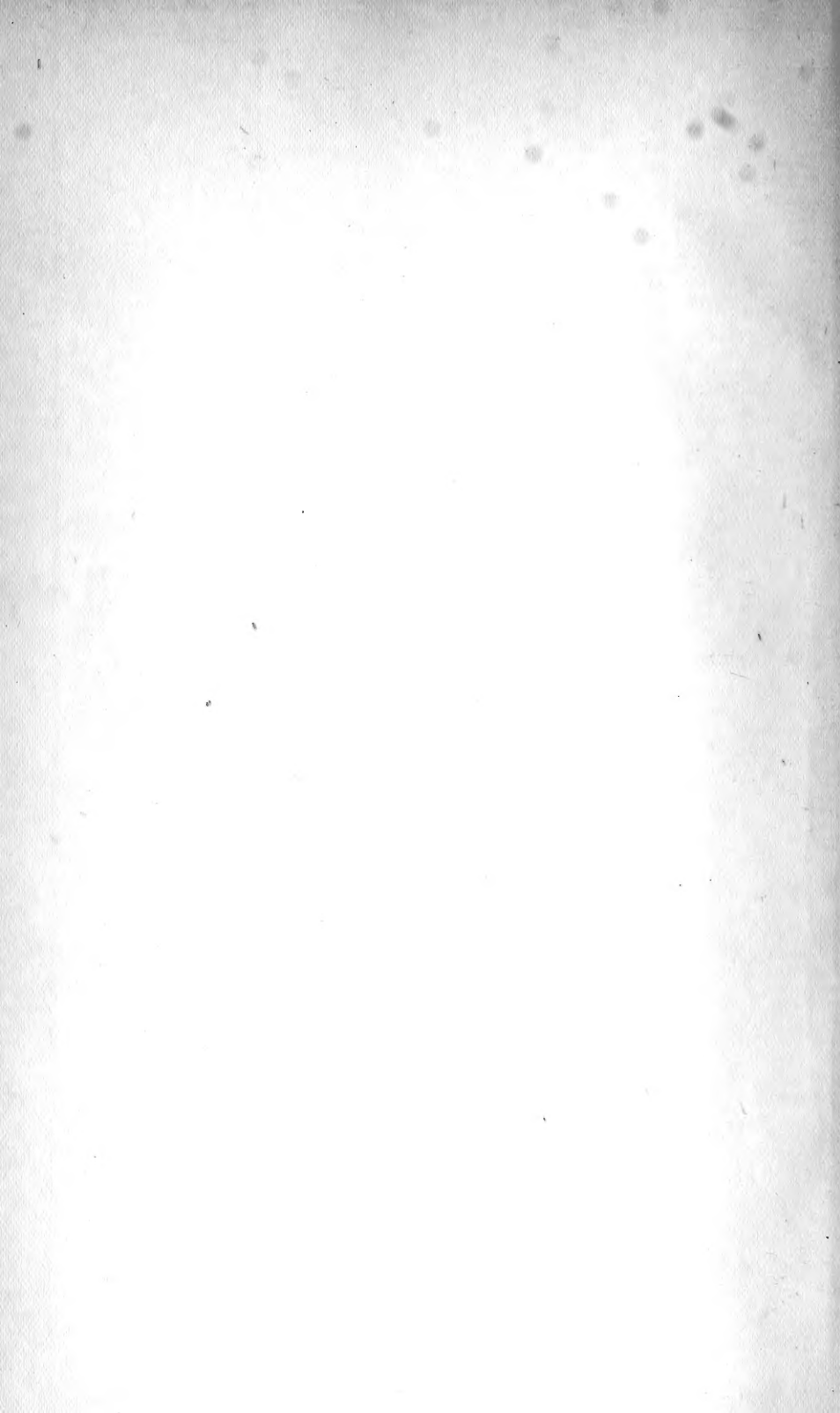
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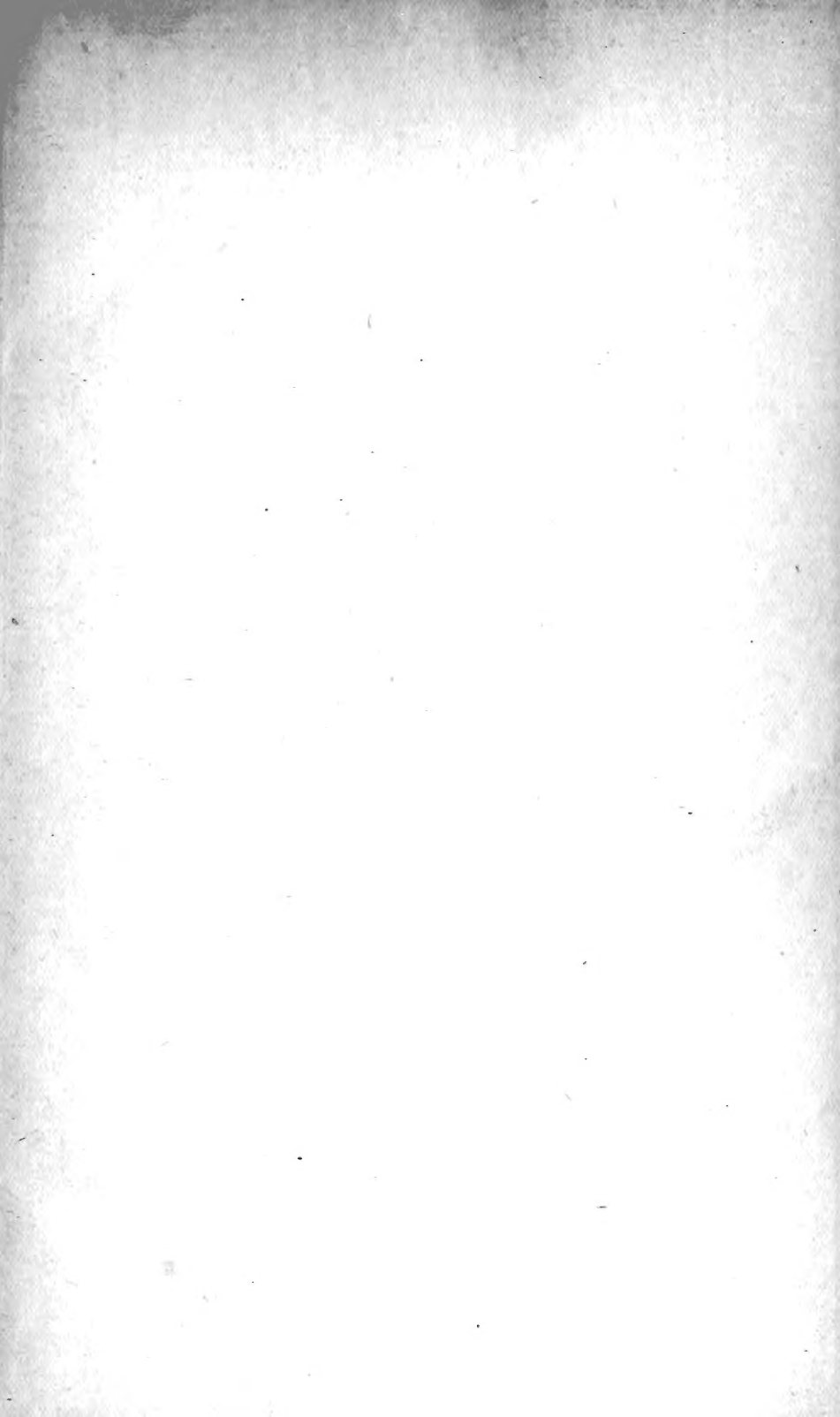
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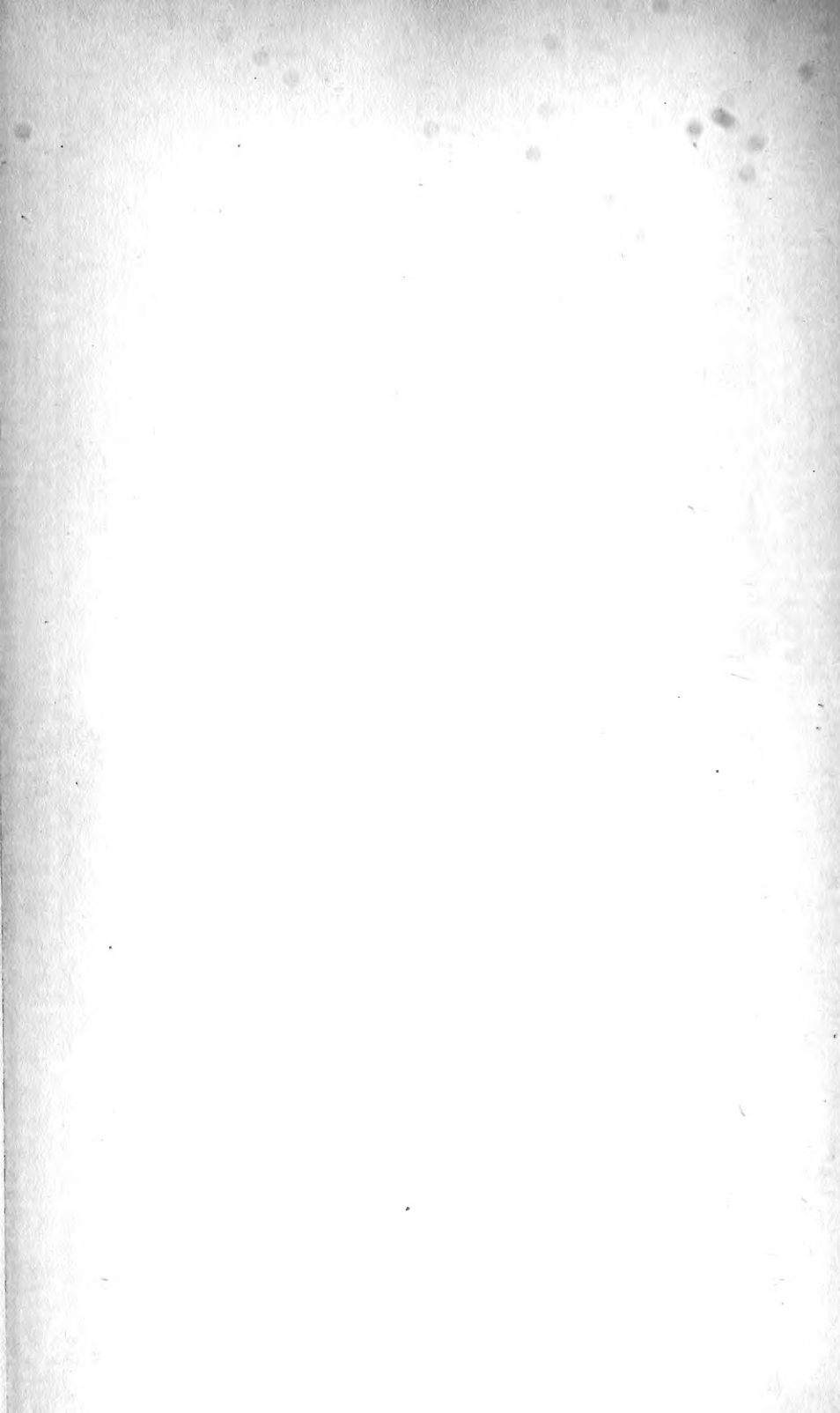
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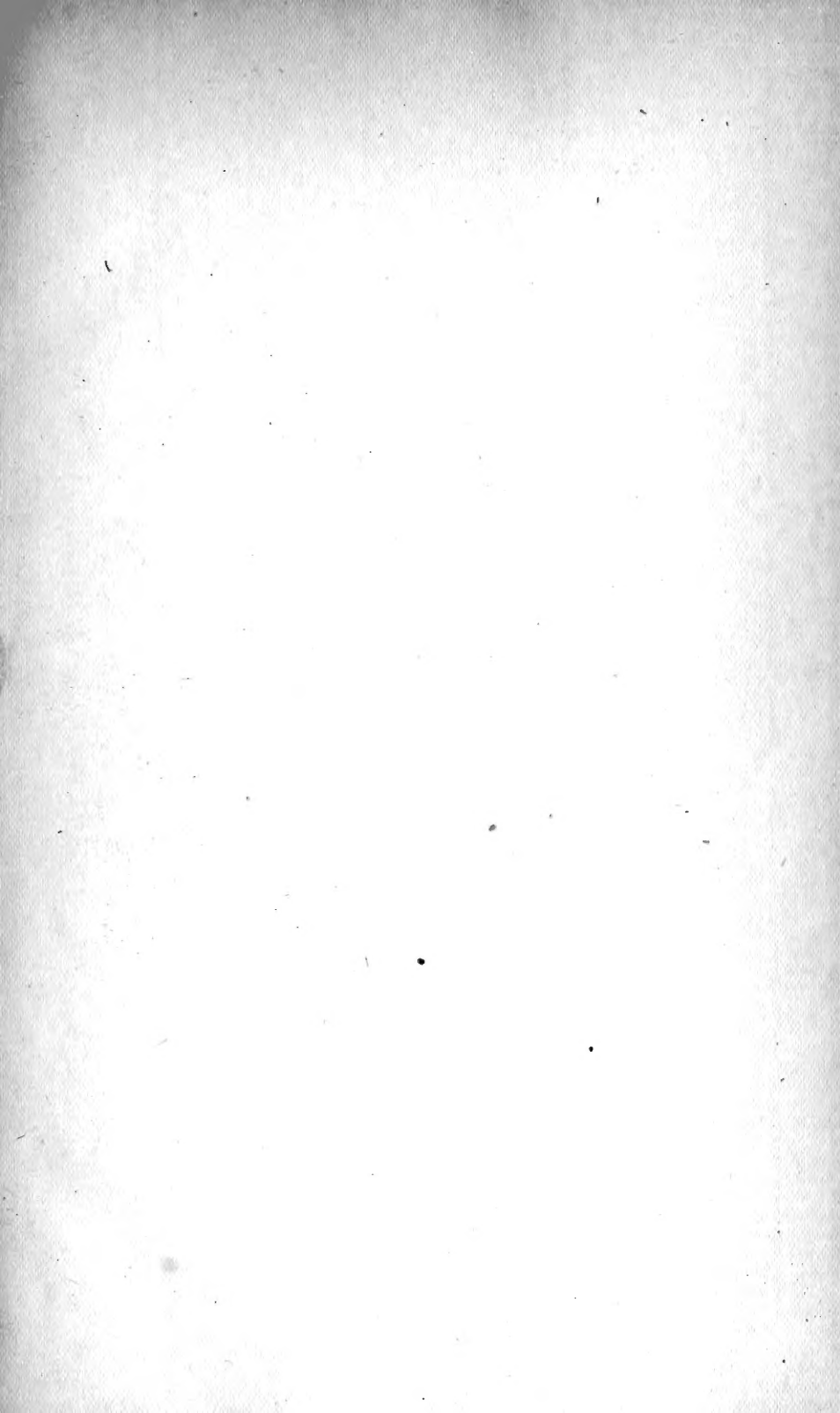


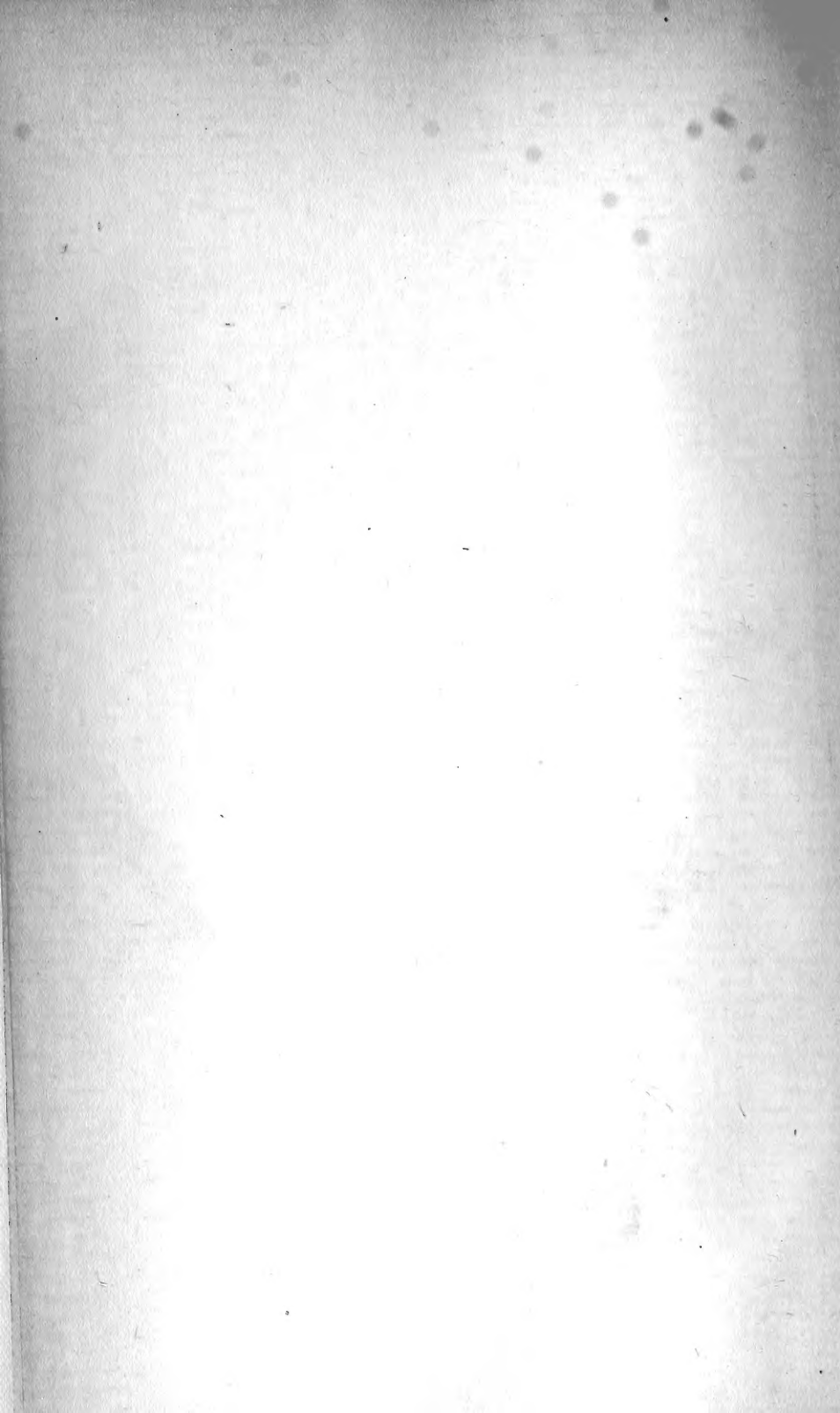












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Marshall P. Wilder

ANNUAL REPORT
OF THE
MINNESOTA STATE
HORTICULTURAL SOCIETY,

FOR THE YEAR 1887,

EMBRACING THE

TRANSACTIONS OF THE SOCIETY FROM MARCH 31, 1886, to MARCH 31, 1887;
ALSO PROCEEDINGS OF THE ANNUAL MEETING OF THE
MINNESOTA AMBER CANE ASSOCIATION,
ESSAYS, REPORTS, ETC.

VOL. XV.



Prepared by the Secretary, S. D. HILLMAN, Minneapolis, Minn.

ST. PAUL, MINN.:
THE PIONEER PRESS COMPANY.
1887.

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1887-89

LETTER OF TRANSMITTAL TO THE GOVERNOR.

OFFICE OF THE SECRETARY,
MINNEAPOLIS, March 30, 1887. }

To Hon. A. R. McGill, Governor of Minnesota:

SIR: I have the honor to submit herewith, in compliance with legal requisition, the accompanying report for 1887, with supplementary papers.

Respectfully yours,
S. D. HILLMAN,
Secretary Minnesota State Horticultural Society.

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OFFICERS AND MEMBERS FOR 1887.

PRESIDENT.

WYMAN ELLIOT.....Minneapolis.

VICE PRESIDENTS.

A. W. SIAS.....Rochester.

E. H. S. DARTT.....Owatonna.

M. CUTLER.....Sumter.

N. J. STUBBS.....Long Lake.

G. W. FULLER.....Litchfield.

SECRETARY.

S. D. HILLMAN.....Minneapolis.

TREASURER.

J. T. GRIMES.....Minneapolis.

EXECUTIVE COMMITTEE.

The President, Secretary and Treasurer *ex-officio* and

J. S. HARRIS, Chairman.....La Crescent.

J. M. UNDERWOOD.....Lake City.

F. G. GOULD.....Excelsior.

DITUS DAY.....Farmington.

ISAAC GILPATRICK.....Minneapolis.

ENTOMOLOGIST.

PROF. O. W. OESTLUND.....Minneapolis.

LIBRARIAN.

E. A. CUZNER.....College of Agriculture, Minneapolis.

SUPERINTENDENTS OF EXPERIMENTAL STATIONS.

PROF. EDWARD D. PORTER.....	University Farm, St. Anthony Park.
PETER M. GIDEON.....	Excelsior.
M. PEARCE.....	Minneapolis.
G. W. FULLER.....	Litchfield.
A. W. SIAS.....	Rochester.
R. M. PROBSTFIELD.....	Moorhead.
F. J. SCHREIBER.....	Moorhead.
ANDREW PETERSON.....	Waconia.
CHARLES LUEDLOFF.....	Carver.
UNDERWOOD & EMERY.....	Lake City.
B. TAYLOR.....	Forestville.
FRED VON BAUMBACH.....	Alexandria.
E. H. S. DARTT.....	Owatonna.
L. E. DAY.....	Farmington.
J. S. HARRIS.....	La Crescent.
O. M. LORD.....	Minnesota City.

GENERAL FRUIT COMMITTEE.

SIDNEY CORP.....	Hammond.
D. K. MICHENOR.....	Etna.
J. C. KRAMER.....	La Crescent.
O. E. SAUNDERS.....	Granite Falls.
O. F. NORWOOD.....	Balaton, Murray county.
M. C. BUNNELL.....	Newport.
N. J. STUBBS.....	Long Lake.
WILLIAM MCHENRY.....	St. Charles.
O. M. LORD.....	Minnesota City.
CLARENCE WEDGE.....	Albert Lea.
GEORGE E. CASE.....	St. Peter.
M. CUTLER.....	Sumter.
G. W. FULLER.....	Litchfield.
L. E. DAY.....	Farmington.
CHARLES LUEDLOFF.....	Carver.
W. E. BRIMHALL.....	St. Paul.
M. T. DUNCAN.....	Fergus Falls.
J. H. LUDLOW.....	Worthington.

* The members of the General Fruit Committee are expected to report separately on all matters of interest in horticulture, but more especially to bring to the notice of the Society new and improved fruits.

COMMITTEE ON LEGISLATION.

WYMAN ELLIOT.....	Minneapolis.
PROF. E. D. PORTER.....	St. Anthony Park.
J. T. GRIMES.....	Minneapolis.

COMMITTEE ON SEEDLING FRUITS.

J. S. HARRIS.....	La Crescent.
A. W. SIAS.....	Rochester.
G. W. FULLER.....	Litchfield.

COMMITTEE ON APPLES, PEARS AND PLUMS.

J. S. HARRIS.....	La Crescent.
CHAS. A. KEFFER.....	Minneapolis.
ISAAC GILPATRICK.....	Minneapolis.

COMMITTEE ON NATIVE FRUITS.

O. M. LORD.....	Minnesota City.
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J. O. BARRETT.....	Browns Valley.

COMMITTEE ON RUSSIAN APPLES.

CHARLES LUEDLOFF.....	Carver.
A. W. SIAS.....	Rochester.
A. PETERSON.....	Waconia.

COMMITTEE ON GRAPES AND SEEDLINGS.

T. BOST.....	Excelsior.
M. PEARCE.....	Minneapolis.
A. W. LATHAM.....	Excelsior.

COMMITTEE ON EXPLORATION FRUITS AND
FLOWERS.

PROF. E. D. PORTER.....	St. Anthony Park.
S. D. HILLMAN.....	Minneapolis.
A. W. SIAS.....	Rochester.

COMMITTEE ON FORESTRY.

C. L. SMITH.....	Minneapolis.
J. W. BOXELL.....	St. Paul.
M. CUTLER.....	Sumter.

COMMITTEE ON EVERGREENS.

J. T. GRIMES.....	Minneapolis.
O. F. BRAND.....	Faribault.
H. R. HUNTER.....	Sioux Falls, Dak.

COMMITTEE ON DECIDUOUS TREES AND SHRUBS.

PROF. D. R. MAGINNIS	St. Paul.
S. M. EMERY.....	Lake City.
M. J. HOAG.....	Rochester.

COMMITTEE ON FRUIT BLOSSOMS.

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J. S. HARRIS.....	La Crescent.

COMMITTEE ON GREENHOUSES AND HOTBEDS.

R. J. MENDENHALL.....	Minneapolis.
E. A. CUZNER.....	Agricultural College, Minneapolis.
SMITH & DARLING.....	Winona.

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MRS. C. O. VAN CLEVE.....	Minneapolis.
MRS. F. G. GOULD.....	Excelsior.
MRS. ANNA B. UNDERWOOD.....	Lake City.

COMMITTEE ON NOMENCLATURE.

E. H. S. DARTT.....	Owatonna.
A. W. LATHAM.....	Excelsior.
O. F. BRAND.....	Faribault.

COMMITTEE ON SMALL FRUITS.

PROF. L. ASIRE.....	Minneapolis.
F. G. GOULD.....	Excelsior.
E. M. CHANDLER.....	Minneapolis.

COMMITTEE ON VEGETABLE GARDENING.

WILLIAM LYONS.....	Minneapolis.
JOSIAH ALLEN.....	Red Wing.
WILLIAM H. BRIMHALL.....	St. Paul.

COMMITTEE ON MARKETING AND NEW HORTICULTURAL APPLIANCES.

F. G. GOULD.....	Excelsior.
WILLIAM H. BRIMHALL.....	St. Paul.
N. J. STUBBS.....	Long Lake.

COMMITTEE ON HONEY AND SYRUP.

J. G. BASS.....	St. Anthony Park.
L. E. DAY.....	Farmington.
SETH H. KENNEY.....	Morristown.

COMMITTEE ON BREAD AND CAKE.

MRS. WILLIAM H. BRIMHALL.....	St. Paul.
MISS M. ESTELLE PORTER.....	St. Anthony Park.
MISS MARY GRIMES	Minneapolis.

COMMITTEE ON PICKLES, PRESERVES AND
CANNED GOODS.

MRS. E. J. STAGER.....	Sauk Rapids.
MRS. O. C. GREGG.....	Minneapolis.
MISS M. LYONS.....	Minneapolis.

COMMITTEE ON ENTOMOLOGY.

PROF. O. W. OESTLUND.....	Minneapolis.
R. J. MENDENHALL.....	Minneapolis.
J. S. HARRIS.....	La Crescent.

ANNUAL MEMBERS.

ACKERMAN, J. H.....	Young America.
ALLEN, JOSHUA.....	Red Wing.
ARMOUR, MAGWOOD.....	Stonewall, Man.
ARNOLD, JAMES.....	Hammond.
BARRETT, J. O.....	Browns Valley.
BOXELL, J. W.....	St. Paul.
BLAKELEY, CAPT. RUSSELL.....	St. Paul.
BOST, T.....	Excelsior.
BRAND, O. F.....	Faribault.
BRIMHALL, WM. H.....	St. Paul.
BROWN, A. L.....	Brownton.
BROWN, C. F.....	St. Peter.
BUNNELL, M. C.....	Newport.
BUSCH, FRED.....	Richfield.
BUSH, A. K.....	Dover.
BUSSE, H. F.....	Minneapolis.
CANNON, WILLIAM.....	Fort Abraham Lincoln, Dak.
CHANDLER, E. M.....	Minneapolis.
COMBS, WM. S.....	St. Paul.
COOK, DE WAINE.....	Windom.
COOK, M. W.....	Rochester.
CORLETT, JOHN E.....	Farmersburg, Iowa.
CORP, SIDNEY.....	Hammond.
CRAWFORD, MATHEW.....	Cuyahoga Falls, Ohio.
CROSBY, HON. F. M.....	Hastings.
CROSS, MRS. E.....	Sauk Rapids.
CUTLER, MILON.....	Sumter.

CUZNER, E. A.....	Minneapolis.
DANFORTH, WILLIAM.....	Red Wing.
DARTT, E. H. S.....	Owatonna.
DAY, DITUS.....	Farmington.
DAY, FRANK A.....	Fairmont.
DAY, L. E.....	Farmington.
DEVOL, W. S.....	Columbus, Ohio.
DOUGHTY, J. COLE.....	Lake City.
DWINNELL, R. C.....	Sumter.
EMERY, S. M.....	Lake City.
FRANKLAND, THOMAS.....	Stonewall, Man.
FULLER, G. W.....	Litchfield.
GILPATRICK, ISAAC.....	Minneapolis.
GOULD, F. G.....	Excelsior.
GREGG, O. C.....	Minneapolis.
GRIESE, C. H.....	Cleveland, Ohio.
HARRINGTON, GEO. W.....	Plainview.
HARRIS, EUGENE E.....	La Crescent.
HARRIS, FRANK I.....	La Crescent.
HILLMAN, S. D.....	Minneapolis.
HUBBARD, T. S.....	Fredonia, N. Y.
JACKSON, E. D.....	Minneapolis.
JEHU, GEORGE.....	Hastings.
JENKINS, J. W.....	Champlin.
KENNEY, SETH H.....	Morristown.
KNAPHEIDE, RUDOLPH.....	St. Paul.
KRAMER, J. C.....	La Crescent.
LABBITT, GEORGE.....	Lake City.
LATHAM, A. W.....	Excelsior.
LEAVENWORTH, FRANK H.....	Detroit, Mich.
LITTLE, JOHN.....	Granton, Ont.
LUEDLOFF, CHARLES.....	Carver.
LYONS, WILLIAM.....	Minneapolis.
MACKINTOSH, WILLIAM.....	Langdon.
MAGINNIS, PROF. D. R.....	St. Paul.
MENDENHALL, R. J.....	Minneapolis.
MCHEMRY, D. A.....	St. Charles.
MILLS, L. D.....	Garden City.
NOBEN, O. O.....	St. Cloud.
NOBLE, J.....	Sumter.
NORQUIST, JOHN.....	Red Wing.
OWEN, S. M.....	Minneapolis.

PARKER, W. L.....	Farmington.
PARTRIDGE, SAM.....	Moorhead.
PERKINS, WM. R.....	South Troy.
PETERSON, ANDREW.....	Waconia.
PORTER, PROF. EDWARD D.....	St. Anthony Park.
PRESTON, W. O.....	Luverne.
PUFFER, DR. F. L.....	Bird Island.
ROBERTS, AUSTIN J.....	Leandro, Cal.
ROGERS, GEORGE.....	Money Creek.
ROGERS, T. R.....	Red Wing.
RUNNING, S.....	Menomonie, Wis.
SALZER, JOHN A.....	La Crosse, Wis.
SELBIE, WILLIAM.....	Deadwood, Dak.
SHERREN, P. C.....	St. Paul.
SLACK, H. W.....	St. Paul.
SOLEM, ANDREW.. ..	Spink, Dak.
SOLEM, O. A. Th.....	Halstad.
SOMERVILLE, WILLIAM.....	Viola.
STAGER, MRS. E. J.....	Sauk Rapids.
STONE, I. N.....	Sioux City, Iowa.
STUBBS, NATHAN J.....	Long Lake.
TAYLOR, BARNETT.....	Forestville.
TERRY, ALFRED.....	Slayton.
UNDERWOOD, ANNA B.....	Lake City.
UNDERWOOD, J. M.....	Lake City.
WARD, C. W.....	Sumter.
WEBSTER, HIRAM.....	Lake City.
WEDGE, CLARENCE.....	Albert Lea.
WHITEHEAD, JOB.....	Pipestone.
WOODRUFF, PHILO.....	Faribault.
YOST, E. B.....	Minneapolis.

HONORARY MEMBERS FOR FIVE YEARS.

GEORGE J. KELLOGG, from 1882.....	Janesville, Wis.
G. P. PUTNAM, from 1882.....	Ash Ridge, Wis.
EDSON GAYLORD, from 1886.....	Nora Springs, Iowa.
J. E. CORLETT.....	Farmersburg, Iowa.
B. S. HOXIE.....	Evansville, Wis.
H. R. HUNTER.....	Sioux Falls, Dak.
C. H. BRETT.....	Henry, Dak.

HONORARY LIFE MEMBERS.

HON. MARSHALL P. WILDER (deceased)	Boston, Mass.
DR. JOHN P. WARDER (deceased)	North Bend, Ohio.
DR. P. A. JEWELL (deceased)	Lake City.
HON. L. B. HODGES (deceased)	St. Paul.
D. W. HUMPHREY (deceased)	Faribault.
HON. N. J. COLMAN	St. Louis, Mo.
GEORGE P. PEFFER	Pewaukee, Wis.
J. C. PLUMB	Milton, Wis.
J. M. SMITH	Green Bay, Wis.
E. WILCOX	La Crosse, Wis.
PROF. J. L. BUDD	Ames, Iowa.
CHARLES GIBB	Abbotsford, Quebec.
A. G. TUTTLE	Baraboo, Wis.
F. K. PHOENIX	Delavan, Wis.
J. W. MANNING	Boston, Mass.
MRS. J. W. MANNING	Boston, Mass.
MRS. WM. PAIST	Hersey.
CHARLES Y. LACY	Fort Benton, M. T.
COL. J. H. STEVENS	Minneapolis.
J. S. HARRIS	La Crescent.
R. J. MENDENHALL	Minneapolis.
TRUMAN M. SMITH	San Diego, Cal.
L. M. FORD	San Diego, Cal.
WYMAN ELLIOT	Minneapolis.
CHARLES HOAG	Minneapolis.
J. T. GRIMES	Minneapolis.
A. W. SIAS	Rochester.
PETER M. GIDEON	Excelsior.
MRS. WEALTHY GIDEON	Excelsior.
M. PEARCE	Minneapolis.
COL. D. A. ROBERTSON	St. Paul.
R. L. COTTERELL	Dover.
CHARLES LEUDLOFF	Carver.
OLIVER GIBBS, JR.	Ramsey, Dak.
MRS. C. O. VAN CLEVE	Minneapolis.
MRS. JAMES BOWEN	Minneapolis.
MRS. IDA E. TILSON	West Salem, Wis.
MRS. H. B. SARGEANT	Lake City.
MISS SARAH MANNING	Lake City.

OFFICERS
OF THE
MINNESOTA STATE AGRICULTURAL SOCIETY

FOR THE YEAR 1887.

PRESIDENT.

WM. R. MERRIAM.....St. Paul.

VICE PRESIDENT.

IGNATIUS DONNELLY.....Hastings.

SECRETARY.

H. E. HOARD.....Hamline.

TREASURER.

F. J. WILCOX.....Northfield.

BOARD OF MANAGERS.

JAMES McHENCH.....Fairmont.

JOHN F. NORRISH.....Hastings

CLARK CHAMBERS.....Owatonna.

JOHN COOPER.....St. Cloud.

A. N. JOHNSON.....Benson.

L. H. PROSSER.....Wykoff.

The next annual fair will be held on the State Fair grounds between Minneapolis and St. Paul, Sept. 9 to 17, 1887. No effort will be spared to make it the best agricultural and horticultural exposition of the year.

Liberal premiums offered in every department. For further information address the secretary, as above.

CONSTITUTION

OF THE

MINNESOTA HORTICULTURAL SOCIETY.

ARTICLE I.

NAME.

This Society shall be known as the Minnesota State Horticultural Society.

ARTICLE II.

OBJECT OF THE SOCIETY.

The object of this Society shall be to improve the condition of pomology, horticulture and arboriculture, by collecting and disseminating correct information concerning the culture of such fruits, flowers, trees, and other productions in horticulture as are adapted to the soil and climate of Minnesota.

ARTICLE III.

MEMBERSHIP.

Any person may become a member by paying to the secretary or treasurer an annual fee of one dollar, or a life member by the payment of ten dollars. Honorary members, for a time stated or for life, may be elected at any annual meeting by a two-thirds vote of the Society, and shall be entitled to all the rights and privileges of membership; provided, that honorary life members may pay a fee of ten dollars, in two equal annual payments of five dollars.

ARTICLE IV.

OFFICERS.

Its officers shall consist of a president and one vice president from each congressional district, a secretary, treasurer, and an executive committee of five, and a librarian.

ARTICLE V.

DUTIES OF PRESIDENT AND VICE PRESIDENTS.

The president shall preside at and conduct all meetings of the Society, and deliver an annual address, and in his absence the vice presidents, in their order, shall perform the same duties. They shall also have a general supervision of the horticultural interests in their respective districts, and make a written report to the Society at its annual winter meeting; in consideration of which the Society shall pay their traveling expenses to the same.

ARTICLE VI.

THE SECRETARY.

The secretary shall record all the doings of the Society, collate and prepare all communications, etc., for the public press, and pay over all moneys received from members or otherwise to the treasurer on his receipt; receive and answer all communications addressed to the secretary, establish and maintain correspondence with all local, county, district and state horticultural societies, and secure by exchange their transactions, as far as possible; to aid the president as an executive officer in the dispatch of business relating to the meetings of the Society, notices of horticultural and similar meetings of general interest, and report to the annual meeting of the Society an abstract of the matter that has come into his possession, which, with its approval, shall become part of its transactions of the current year.

ARTICLE VII.

THE TREASURER.

The treasurer shall collect and hold all funds of the Society, and pay out the same only on the order of the president, countersigned by the secretary. He shall make up a report of all

the receipts and disbursements of the Society, and present the same at the annual winter meeting, or at any other time when called upon to do so by the executive committee. He shall give bonds in such sum as the Society may direct, to be approved by the president and secretary, and the bond when so approved shall be filed with the state auditor.

ARTICLE VIII.

ELECTION OF OFFICERS.

The officers shall be elected separately and annually by ballot, and hold their office until their successors are elected.

ARTICLE IX.

MEETINGS OF THE SOCIETY.

The Society shall hold annual sessions on the third Tuesday of January, and other meetings at such time and place as the Society may direct.

ARTICLE X.

THE LIBRARIAN.

The librarian shall have charge of the library and report its condition at each annual meeting.

ARTICLE XI.

AMENDMENTS.

By-laws and alterations of the constitution, for the purpose of meeting the further wants of the Society, may be enacted by a vote of two-thirds of the members present at any regular annual meeting, and on one day's notice of the same being given.

BY-LAWS.

1. The president, at each annual meeting of the Society, shall appoint a general fruit committee, consisting of two members from each congressional district in the State, and it shall be the duty of each member to make a written report annually upon the fruit crop, and a limited list of fruits best adapted for general cultivation in their respective districts.

2. The president, secretary and treasurer shall be members *ex officio* of the executive committee, who shall have charge of all matters pertaining to the interests of the Society.

3. The executive committee may call a meeting of the Society at any time they may deem advisable, giving at least thirty days' notice through the public press.

4. The executive committee shall appoint a committee on seedlings, on nomenclature, on forestry, on fruit blossoms, on Russian apples, on gardening, on small fruits, and on floriculture.

5. The five members of the executive committee, not including the president, secretary or treasurer, shall be a committee on finance, and it shall be their duty to audit all bills before they shall be ordered paid by the president and secretary.

6. The executive committee shall see that a program is issued for each meeting of the Society, at least one month before the winter meeting and ten days before the summer meeting.

7. Every member shall be entitled to one copy of the transactions as often as published, on which postage shall be paid; but in the distribution of all other copies the party receiving the same shall pay the postage; where several copies are sent to auxiliary societies it shall be discretionary with the secretary to pay the freight.

8. *Quorum*—A quorum shall consist of nine members of the Society, or a majority of the executive committee.

MINNESOTA
STATE HORTICULTURAL SOCIETY.

TRANSACTIONS 1886-7.

THE SUMMER MEETING, 1886.

[NOTE.—*This Society will not be held responsible for individual opinions which are found in this report.—Secretary.*]

The twentieth semi-annual summer meeting of the Minnesota State Horticultural Society, in accordance with the action taken by the Society at its annual session in January, was held at the state farm, near St. Anthony Park, Thursday, June 17, 1886.

Following is the announcement of the meeting, premium list and rules:

In accordance with previous arrangements by the Society, at its last annual session, the summer meeting will be held on the grounds of the state university farm, situated nearly midway between St. Paul and Minneapolis, one mile north of St. Anthony Park and near the state fair grounds.

An opportunity will thus be afforded members of the Society and others to visit the state farm and to carefully observe the practical methods there employed for the advancement of the science of horticulture, agriculture and experimental work being conducted there, under the management of Prof. E. D. Porter and the board of regents of the state university.

The location of the farm is convenient to both St. Paul and Minneapolis, trains leaving hourly from the Union depots of each city over the St. Paul, Minneapolis & Manitoba Railway.

Conveyances will be provided for the transportation of delegates and others to and from the station at St. Anthony Park, to the farm. Trains leave the depots of each city at 8:30 A. M. and hourly thereafter during the day.

It is to be hoped that there may be a full attendance of members, and all others interested in the advancement of the cause of horticulture, agriculture, and especially the experimental work being conducted at the state university farm. The ladies are cordially invited to be present and participate in the exercises of the day.

It is expected that exhibitors will be prompt and place all their exhibits on the tables by 10 o'clock A. M., so that the judges to be appointed can make their awards and report thereon by 12 o'clock.

While entries are being made and the judges are engaged in their duties, the visitors and members of the Society will be conducted over the farm, and an opportunity afforded them to examine the state buildings, and to visit the orchards, vineyard, gardens and other objects of interest about the premises. The location of the farm is a sightly one, affording a fine view of the surrounding country. The grounds and buildings are very pleasantly situated, and well adapted to the comfort and convenience of all who may see fit to attend the meeting.

After the awards of premiums have been made, the strawberries on exhibition will be appropriated for the purposes of the informal basket picnic, to be served at 1 o'clock. This will not be the least attractive feature on the program.

The meeting will be called to order by the president of the Society at 2 o'clock P. M.

A paper upon the subject of "Small Fruits for Market and Home Use," by J. S. Harris, of La Crescent, will then be read, to be followed by a short but sharp discussion.

Members in attendance at the meeting from a distance will be provided by the secretary, on application, with certificates which will enable them to return to their homes over the various lines of railway at one-fifth the regular rates, they having paid full fare coming to the meeting.

The annual report of the transactions of the Society for 1886 will not be ready for delivery till about July 1st.

S. D. HILLMAN, *Secretary,*
Minneapolis.

WYMAN ELLIOT, *President,*
Minneapolis.

PREMIUM LIST.

 PROF. E. D. PORTER, Superintendent of Exhibits.

STRAWBERRIES.

	1st Prem.	2d Prem.
Best general collection of not less than five named varieties, one pint each.....	\$5 00	\$3 00
Best four varieties, one quart each.....	3 00	2 00
Best Minnesota Seedling, not before exhibited.....	3 00	2 00
Best quart Wilson's Albany.....	2 00	1 00
Best quart Countess.....	2 00	1 00
Best quart Charles Downing.....	2 00	1 00
Best quart Crescent Seedling.....	2 00	1 00
Best quart James Vick.....	2 00	1 00
Best quart Manchester.....	2 00	1 00
Best quart Glendale.....	2 00	1 00
Best quart Prince of Berries.....	2 00	1 00
Best quart Sharpless.....	2 00	1 00
Best quart Windsor Chief.....	2 00	1 00
Best quart Seth Boyden.....	2 00	1 00
Best quart Green Prolific.....	2 00	1 00
Best quart Capt. Jack.....	2 00	1 00
Best quart Col. Cheney.....	2 00	1 00
Best quart Daniel Boone.....	2 00	1 00
Best quart Kentucky Seedling.....	2 00	1 00
Best quart Old Ironclad.....	2 00	1 00
Best quart Cumberland Triumph.....	2 00	1 00
Best quart Minnetonka Chief.....	2 00	1 00
Largest fruit of any variety.....	2 00	1 00

The same premiums may be awarded upon other varieties of equal merit.

VEGETABLES.

Best collection, not less than six varieties grown by ex- hibitor.....	\$5 00	\$3 00
Best 3 bunches of asparagus.....	1 00	50
Best 6 beets.....	1 00	50
Best 6 carrots.....	1 00	50
Best 6 onions.....	1 00	50
Best 6 radishes.....	1 00	50
Best 6 turnips.....	1 00	50

Best 6 stalks pieplant.....	\$1 00	\$ 50
Best 6 heads lettuce.....	1 00	50
Best 3 heads of cabbage.....	1 00	50
Best 3 heads of cauliflower.....	1 00	50
Best $\frac{1}{2}$ peck green peas.....	1 00	50
Best $\frac{1}{2}$ peck of string beans.....	1 00	50
Best $\frac{1}{2}$ peck of new potatoes.....	1 00	50
Best 6 cucumbers.....	1 00	50
Best 6 summer squash.....	1 00	50

FLOWERS.

Best collection cut flowers.....	\$5 00	\$3 00
Best collection of roses.....	2 00	1 00
Best hand bouquet.	2 00	1 00
Best collection of pansies.....	2 00	1 00

RULES.

The awarding committee shall close their labor and report to the Society at 12 o'clock M. They shall have power to recommend special premiums for seedlings, and articles of merit, not provided for in the schedule of premiums. They shall not award premiums to contributions unworthy of exhibition, even if there is no competition.

Competition shall be open to all, but the annual membership fee of \$1 will be deducted from premiums awarded to persons who are not members of the Society.



PROCEEDINGS AT THE SUMMER MEETING.

THURSDAY, JUNE 17, 1886.

The purpose had in view in holding the summer meeting of the State Horticultural Society at the state farm was to afford the members of the Society, and others, an opportunity to observe the practical in horticulture, and to take some notes concerning the methods pursued in the various departments of agriculture, horticulture, floriculture, etc., conducted at the experimental farm of the Minnesota State Agricultural College.

The day was very pleasant, and everything conduced to an enjoyable occasion. There were nearly one hundred persons present at the meeting during the day, among the number several from a distance. The forenoon was devoted to making entries of articles for exhibition, and taking observations of the progress made in horticultural work, and experiments being conducted upon the farm, under the management of Prof. Porter. About sixty entries were made for premiums.

APPOINTMENT OF COMMITTEES.

President Elliot announced the following committees:

On Fruits—Ditus Day, Farmington; W. B. Quinn, Rose Town; John T. Blaisdell, Minneapolis.

On Vegetables—W. E. Brimhall, St. Paul; J. G. Bass, St. Paul; J. F. Gilmore, Richfield.

On Flowers—Mrs. W. G. Hendrickson, St. Paul; Mrs. Isabell L. Blaisdell, Minneapolis; Mrs. Lizzie S. Smith, St. Paul.

On Resolutions—H. H. Young, St. Paul; J. W. Boxell, St. Paul; F. G. Gould, Excelsior.

The total amount awarded in premiums was \$51.50. Following is the list:

AWARD OF PREMIUMS.

STRAWBERRIES.

Best four varieties, William Lyons, Minneapolis, first premium, \$3.

Largest fruit of any variety (Crescent), W. G. Hendrickson, St. Paul, first premium, \$2; Geo. S. Woolsey (Windsor Chief), Minneapolis, second, \$1.

Best Minnesota seedling not before exhibited, William Lyons, Minneapolis, first premium, \$3.

Wilson's Albany—W. H. Brimhall, St. Paul, first premium, \$2; W. E. Brimhall, St. Paul, second, \$1.

Countess—William Lyons, Minneapolis, first premium, \$2.

Crescent—W. G. Hendrickson, St. Paul, first premium, \$2; William Lyons, Minneapolis, second, \$1.

James Vick—William Lyons, Minneapolis, first premium, \$2.

Manchester—M. C. Bunnell, Newport, first premium, \$2; W. J. Hopkins, Bloomington, second, \$1.

Glendale—W. E. Brimhall, St. Paul, first premium, \$2; H. F. Busse, Minneapolis, second, \$1.

Windsor Chief—William Lyons, Minneapolis, first premium, \$2.

Captain Jack—Geo. S. Woolsey, Minneapolis, first premium, \$2.

Jersey Queen—H. F. Busse, Minneapolis, first premium, \$2.

RASPBERRIES.

Crimson Beauty—Truman M. Smith, St. Paul, first premium, \$2.

CURRANTS.

Fay's Prolific—J. F. Gilmore, Richfield, first premium, \$2; also second premium on Stewart's Seedling, \$1.

FLOWERS.

Collection Roses—Mrs. M. S. Gould, Excelsior, first premium, \$2.

Hand Bouquet—William Lyons, Minneapolis, first premium, \$2.

Collection of Pansies—Geo. S. Woolsey, Minneapolis, first premium, \$2; William Lyons, Minneapolis, second, \$1.

VEGETABLES.

Asparagus—J. T. Grimes, Minneapolis, first premium, \$1; William Mackintosh, Langdon, second, fifty cents.

Beets—Early Egyptian, A. Rowe, Minneapolis, first premium, \$1.

Carrots—Henderson, A. Rowe, Minneapolis, first premium, \$1.

Onions—Silverskin, J. S. Gray, Minneapolis, first premium, \$1.

Cabbage—A. Rowe, Minneapolis, first premium, \$1.

Cauliflower—A. Rowe, Minneapolis, first premium, \$1.

Green Peas—A. Rowe, Minneapolis, first premium, \$1.

Cucumbers—A. Rowe, Minneapolis, first premium, \$1.

The fruits on exhibition were appropriated for the purposes of the picnic, which was spread upon ample tables arranged in a grove near the farm buildings. There was an abundance of provisions for all, including strawberries and cream.

The meeting was called to order about 2 o'clock, P. M., by President Elliot. After the reading of the list of awards made by the committees on premiums, the president announced the discussion of the subject "Small Fruits for Market and Home Use." The discussion was opened by the following paper:

SMALL FRUITS FOR MARKET AND HOME USE.

By J. S. Harris, La Crescent.

MR. PRESIDENT: If I am to open this discussion upon the subject of fruit for market and home use, I will say in the first place that I am one who has always firmly believed in having an abundance of fruit for home use; I also think we should have fruit to supply the market, enough to give away, fruit to send everywhere throughout the United States, and fruits to send to the foreign parts of the world. I have always said it would be done some time—which shows my "greenness," perhaps—but I have always said we could raise fruit in this country and we were bound to do it. I believe the necessities of mankind are such that they will have fruit. It it was not designed that man

was to have fruit why was it that Mother Eve should be tempted by that probably beautifully colored sour "crab," give it to Adam and cause him to bring toil and sweat upon the race.

There are a great many in Minnesota who do not believe we can grow fruit, and there are those who have predicted that we never would be able to grow apples successfully. But there are some here who have seen Minnesota grown apples. Still, admitting that we have not made a perfect success in the growing of the larger fruits as yet, we are making some progress in that direction. And there are other fruits equally as important as articles of commerce, as essential to health and happiness as the larger fruit.

STRAWBERRIES.

Among small fruits the strawberry does, as it should, stand at the head of the list. It ought to be grown by all people who have the land, in quantities sufficient for home use. No fruit is so easily raised, or grows so universally in every part of the world as the strawberry. It is found in the snowy regions of the North, and the sunny plains of the South. It grows in the valley and upon the hilltop, the forest or the meadow, and it is a favorite with all races of men. In its season it is more eagerly sought for in the market, and more largely used by all classes but the farmer, than any other fruit, and farmers are every year taking more interest in them. On suitable soil and with the right management, strawberries are immensely productive. Four hundred bushels are reported to have been taken from an acre of ground in one season, and one hundred and fifty bushels ought to be only an average crop. They are fond of a moist rich loam, somewhat sandy, and thrive best in seasons of frequent showers, or where they have plenty of water.

They may be set in the spring or autumn, but ordinarily, in this State, the best success will attend setting in the spring. Before setting a strawberry bed, the ground should be plowed or dug deep and made mellow; and if not already rich enough to bring a good crop of garden vegetables, should have some fine compost worked in. I usually set them in rows three feet apart and about eighteen inches in the rows. Rows of beets or bunch beans may be grown between them the first season, but it is better to keep eighteen inches of the centre between the rows open to facilitate cultivating, and let the plants cover the balance of the ground. Market gardeners often set what they term double

rows, fifteen or eighteen inches apart each way, then leave a space three and one-half or four feet, and then set another double row, and so on until the plantation is finished, and allow the plants to fill the intermediate space and about one foot on each side. This allows much of the work to be done with a horse and cultivator. For setting, select nice thrifty plants of the previous year's growth, and never set plants that have borne fruit.

It pays well to pick off all the blossoms the first season and give the plant the entire strength and growth within itself. All weeds should be kept down and the young plants encouraged to their best. In the fall the spaces left vacant for cultivating should receive a dressing of manure, and the plants are best to be covered with leaves, clean straw from bottom of stack, bagasse from cane mill, or brush from the woods. The latter, where convenient, is the best protection of all. In the spring, after the ground is done freezing and the plants have started, remove the covering and go over the bed and destroy every weed and grass that has heretofore escaped notice; and it will pay to scatter over the bed a coating of fine manure, that of neat cattle being the best. Go over them frequently, to destroy all the weeds, but disturb the roots as little as possible until after the fruit is gathered.

After the fruit is gathered go through all the spaces that were left vacant, and with spade or fork dig them deeply, rake down level, putting them in fine condition for the runners to make new plants, and with a spade dig out the old plants of last year, leaving about two feet between what is left to facilitate passing through and cultivating. If the weeds are kept out and an occasional dressing of manure given, the bed will last about three years, when the whole bed should be plowed under, and a crop or two of something else should be taken off before the ground is again used for strawberries. Unless this course is pursued it will pay the farmer better to set a bed every spring in rows about two feet apart, keep them clean and let them run at will, and the next season after the crop is off, dig or plow them under. This method requires two plots, as it is too late to set plants after the picking season. The first crop is always the best, except with the Charles Downing, and old beds are usually very troublesome to keep free from weeds and more liable to be troubled with the "white grub." The hill system is not as safe in this State, and not as well adapted for farmers.

GROWING FOR MARKET.

Where strawberries are to be grown principally for market and on a large scale, I recommend planting in long rows three to four feet apart, according to varieties; plants one to one and a half feet in the row. Cultivate frequently to keep the weeds down and the surface of the soil mellow, using for the purpose a strong, sturdy horse and a level-headed driver, an adjustable wheel hoe; or a cultivator frame, filled pretty thickly with one-half inch steel drag teeth. After runners start, contract the width of the cultivated space until it does not exceed fifteen to eighteen inches, and all plants that appear in these spaces treat as weeds, the covering and mulching to be the same as for home use. In the spring remove the bulk of the covering from over the plants, and unless the soil is very rich, give a dressing of the manure and ashes mixture, but do not hoe or cultivate until after the crop is harvested. If weeds or grass appear, pull them out by hand.

I consider it most profitable for the market gardener to take but one crop of fruit from the bed, and as soon as the last picking is made, plow the vines under, which method necessitates making a new plantation each spring. The market grower should invariably every spring set a bed of each variety that he intends to grow, expressly for growing the plants for the next spring's planting and keep them from fruiting, but always correctly labled to prevent mistakes; by this method stronger plants are secured and varieties are less liable to run out.

VARIETIES FOR HOME USE.

Downer's Prolific is one of the hardiest and longest enduring varieties. Charles Downing is a larger and better flavored variety, but not as productive. The Wilson, upon all rich, loamy soils, is a great favorite. The Kentucky, Glendale and James Vick are later varieties, and will prolong the season of fruit. The earliest of all is the old Ironclad; hardy and productive. All of the above produce perfect flowers. The Crescent seedling is a female, or imperfect flowering variety, but when properly fertilized is much more productive than any of the perfect flowering varieties. The plants are hardy and adapted to a great variety of soils.

FOR MARKET.

There is more money in the Crescent seedling than any other variety that has been thoroughly tested. Next to the Crescent, upon strong soils, stands the Wilson, then Downer's Prolific.

For a profitable plantation of Crescents, it is best to use two or more varieties for fertilizing, say the old Ironclad, Wilson, Captain Jack, James Vick, or Glendale.

In making the plantation, I usually set one row of perfect flowering, two to three of Crescents, one of perfect flowering, and so on until the bed is full. The experience of the present season has shown that some varieties resist drought better than others. Upon my place I find a new variety called the Hintgen Seedling to stand the best; James Vick, second; Crescent, third; Wilson, fourth.

HARVESTING AND MARKETING.

The strawberry harvest makes a busy time, and no other fruit so pushes the grower, or allows so little rest at night or day while they last. After the berries begin to ripen rapidly they should be picked every day, and care taken that no ripe fruit is left upon the vines to work into the next picking and mould or sour the package.

I have never found the common practice of having the berries picked for a rate per quart to prove entirely satisfactory. The expert picker will frequently make from two to three dollars per day in the busy season, and then quit work as the berries become thin. This tends to demoralize all of the pickers engaged, and not unfrequently causes a strike or the acceding to demands that are ruinous to the grower. The best plan, in my opinion, is to engage enough pickers some time before they are wanted, agreeing to pay a certain per cent of the price weekly, retaining a portion of the compensation to be forfeited by those who do not remain the season through. Another good method would be to pay a certain sum per hour or day of not exceeding eight hours. Whatever method of employing pickers is adopted, every grower should have a set of printed rules, of which each picker should be furnished a copy, and every picker violating the rules should be discharged at once and kept from the field.

Women make the best and quickest pickers, girls next, and boys next; old men the poorest of all. It is well to have a fore-

man to superintend the picking, following close behind and seeing that each one picks clean and fills the boxes properly. Boys and girls do not work well together. Old men are too slow to make wages.

Every picker should be provided with a picking rack holding from four to nine full quart boxes or baskets, and one box in each tray reserved for receiving the small and inferior berries. It pays well to assort the fruit, even if the poorest is thrown away. Then it is profitable to use only clean new boxes or baskets and attractive crates, and have the name of the grower stamped upon each box or crate. Two varieties should never be mixed together in the same box, and the grower's name should be a guarantee that the top berries are no better than they run through the box. There is no harm in placing the top berries so that the stems and hulls are concealed, provided they are no larger than they run through the box. The strawberry man should have the privilege that others enjoy of showing his goods to the best advantage.

Snide boxes are used by some growers. To do so ought to be a misdemeanor, and meet with prompt punishment. The law requires that berries be sold by dry measure. Every fourth or fifth quart is gained by selling in snide boxes, or by shoveling them into quart cups with a shingle.

RASPBERRIES.

The raspberry ranks in importance next to the strawberry. It delights in much the same soil and as it does very well in a partial shade, it may, where grown only for family use, be planted upon the north or east side of the garden fence. If the ground is naturally good when the planting is made, the fertility may be kept up with mulching and hop dressings. The rows should be set six or more feet apart, and the plants in the rows three to four. Where grown for commercial purposes it is economy to have long rows and use a horse in cultivating. Heavy mulching saves in expense of cultivating and tends to keep the soil moist and cool, which are favorable conditions for the raspberry. If when the canes reach the height of three and a half to four feet the top is pinched out it will make them grow more stocky and save the expense of tying up. For the convenience of keeping the fruiting canes upright and the fruit off the ground, a row of stakes may be set each side of the rows of plants, say 16 to

20 feet apart and a No. 8 wire stretched along say $2\frac{1}{2}$ feet from the ground, with short wire across between each hill. The canes growing up between squares thus made obviates the necessity for tying.

All red varieties propagate by suckering from the roots and all surplus suckers must be kept down by treating them as weeds, or the plantation will soon become unfruitful.

BLACKCAPS.

There is more money in the Doolittle Improved, taken one year with another, than any other variety I have tested. The fruit of the Gregg is large and showy, but the plants are not hardy enough for this climate unless winter protection is given them. The Turner is the hardiest variety among the reds; the fruit is superior in flavor and appearance and a favorite in the market and at home, is also very early. The Philadelphia is more productive when given winter protection, but the fruit is not as salable. The Cuthbert is promising to take the lead as a late berry. The fruit is large and showy and ships very well, while the quality is second only to the Turner. I have not tested the newer varieties sufficiently to recommend them.

BLACKBERRIES.

The cultivation of the blackberry is beginning to assume an important place in the horticulture of Minnesota.

As I commenced the preparation of this paper last night, I did not have time to complete it, and I wish to say a few words further in regard to blackberries. Their culture is attracting the attention of farmers throughout the State, and is more particularly attracting the attention of market gardeners, who are finding it to be a fact that they can be grown as successfully here as in any other state. Like the raspberry, they should be put on rich soil. They should be pinched back when they are to the proper height. Keep them in hills, and do not allow them to spread over the ground, keeping all superfluous shoots trimmed out. The plants should be given protection by covering in the fall. A spadeful of earth may be removed on one side of the plant, bending the plants down till the top touches the ground, then fastening down with a little earth, and pass to the next hill. The canes may then be covered with earth, corn

fodder, brush, or anything most convenient. Where they are put down in this way, the blackberry has proved to be a successful crop to raise in Minnesota. I have never heard of a single failure. It is very prolific; its fruit comes at a time when our Southern friends are enjoying the luxury of peaches, and which, when they send up here, smell so strong of money that we can not afford to enjoy very many of them.

It is said that a crop of blackberries may be covered at a cost of from five to eight dollars per acre and that they can be grown about as cheaply as an acre of corn. The profit upon an acre of the fruit would be great, because the lowest prices we could expect to get would be, say, eight to ten cents a quart, and the profits should amount to from two to four hundred dollars per acre; therefore it must be a crop that will pay commercial gardeners to grow. It will pay them, at least until so many get to raising them as to bring down the price.

MARK YOUR BOXES.

An important matter in growing fruit is to mark your boxes, so that when a person gets a quart of your berries, he will want to buy of you again. One thing that has hurt the market gardeners and the fruit dealers is, that they have not stood up to law and reason. They allow a man to come into the market, whom you might call a "shark," or a "pirate" (that is a better name), who will take the berries that are shipped in from a distance and place them in boxes among the berries that you have brought in to sell, with your name on the boxes. The customer is thus imposed upon, and it hurts your reputation the whole season. There ought to be a pretty severe penalty attached for a man's using his neighbor's boxes without his consent.

Another thing is, a great many dealers purchase good, honest quarts in these boxes, and immediately dump the berries out and measure them in quart cups. Now, I will venture there isn't a legal quart cup in use in Minneapolis or St. Paul that will hold the quantity of berries contained in a legal strawberry box.

These are two things that should be changed: The taking of poor berries to market, and letting them be sold in honest men's boxes, and the shoveling them up with a shingle into quart cups; both tend to bring the price of strawberries down; that is to say, the retail dealer gets his berries a great deal cheaper, and the

consumer does not get the benefit. It is a fraud upon the grower and the consumer, and there ought to be a law to protect those two parties. The middleman will protect himself. Commission men usually sell to retail dealers, in the original packages, and are therefore not subject to this criticism.

DISCUSSION.

Mr. T. M. Smith. In protecting the blackberries and covering them for winter, wouldn't it be as well to use a fork as a spade?

Mr. Harris. I would just as soon use a fork; but I am supposed to be talking to farmers.

President Elliot. You haven't named the variety of blackberries that would succeed here.

Mr. Harris. There are but two varieties that I would recommend for this State; first, what is known as the Ancient Briton, and next the Snyder. The Ancient Briton will produce more berries, but the Snyder might stand when the Ancient Briton would kill down. And it is perhaps a week or ten days earlier than the Ancient Briton.

Mr. Jackson. I would like to inquire about a berry found in old pastures in Wisconsin known as the Dewberry. Is it hardy?

Mr. Harris. I have had no experience with it but know that it is being cultivated to some extent. The difficulty in the varieties found in this State is that they are not productive. In Virginia they have found two or three varieties that are immensely productive. The advantage in raising that berry would be that it is still earlier than the Snyder, the fruit is larger and I think it is better in flavor than any other species of the blackberry, and being of a trailing habit it is very easily protected in the winter, and in some seasons would perhaps need little or no protection. They grow them some in our locality and they do not winter-kill.

Mr. C. L. Smith. They are growing right here in the garden.

Mr. Jackson. One question in regard to raspberries. Is there any well-recognized variety of raspberries grown without prickles on the vines?

Mr. Harris. Davison's Thornless has few if any briars on the canes. It produces very well some years. But I do not think there is much difficulty in that regard with the thorny kinds where they are properly trained on wires; it makes very little

difference in picking. I did not go into a regular discussion of the manner of raising them in the paper. Of course you should remove the old canes; those are what hurts one's conscience. I have found that the Cuthbert wants winter protection. The Turner will endure the cold winters better than the Cuthbert.

Mr. T. M. Smith. I don't think you can raise the blackcaps without covering, but you may the reds. Davison's Thornless did well with me, but in three or four years it would kill out.

Mr. Harris. I think the Gregg is better but it is a tender variety. The Ohio is promising to be very good.

Mr. T. M. Smith. The Tyler is also a very good variety.

Mr. Harris. The Mammoth Cluster has not borne well with me.

Mr. C. L. Smith. The Mammoth Cluster bore better than any other variety I had. The berries are worth twenty cents a box for all I can get of them.

Mr. Jackson. I am glad that Mr. Harris has brought up this question of short measure in berries. I think it is one of the growing tendencies in both cities here; we have got to meet it and it ought in some way to be brought before the people. I am aware that I am being cheated when I buy my berries, but I hardly know how to help it. I find the berries will fall short every time where they pour them into one of their quart cups.

Mr. Harris. They put them in too loose.

Mr. Jackson. You are getting doubly cheated and it is worse now than it was last year. The boxes are smaller and the bottoms are nearer the tops.

Mr. Woolsey. I tried for four or five years to give a good dry-measure quart and they didn't like it. I found that people generally would pay more for the small boxes. They want to be cheated, and so now I want to cheat them. [Laughter.] Now I buy the smallest boxes there are in the market. I have found grocerymen shaking berries from large boxes into smaller ones, and when I have asked what they were doing they have replied they were making more quarts, and since I have found out that the American people love to be swindled I love to swindle them.

Mr. Gray. I notice two places in the essay where Mr. Harris recommends, in putting on manure in growing strawberries, to put on unleached ashes. All through my life I have been connected with agriculture, and this is the first instance where I have heard a man recommend putting ashes and manure together, at any one time. I had supposed it had become a settled fact

long since, that by putting unleached ashes wherever there was manure, it had the tendency to take from the manure the ammonia, so that the greater part of the manure is lost. I don't know why I have been misled all these years; if I have been, I am glad to learn something from Mr. Harris.

Mr. Harris. I would state that you are correct. I don't approve of it. I got up this paper in a hurry, and that got in unbeknown. [Laughter.]

Prof. Porter. In connection with that matter of using wood ashes and manure, I would say that there is no harm done where they are mixed together, if they are immediately put in the ground. Then there will be no loss, because the best absorbent is the soil itself. If it is to be allowed to stand for a week or two, you had better not mix them, as the wood ashes will at once liberate the ammonia.

Mr. Gray. You don't advocate its use for a top-dressing?

Prof. Porter. No, sir; unless mixed with earth or some other absorbent.

Mr. C. L. Smith. If it is mixed with dirt it makes a good top-dressing.

Mr. Harris. We often put hen manure with ashes to spread on the ground where it is to be plowed under immediately, and it is a good plan; but I don't believe in doing it where the mixture is left on the surface.

REMARKS BY PROF. PORTER.

Prof. Porter being called for came forward and said:

MR. PRESIDENT: You have called upon me to make a few remarks and in complying with your request I wish to say that I am very glad to see so many of the representatives and friends of the State Horticultural Society here to-day. It was of course an experiment to have a meeting of this kind at this place, and I think has proved to be a very successful one so far as numbers are concerned. And I am very glad that you are here at this time because you have an opportunity to see our experimental farm when it is in the initiative stage. As you see we are just commencing work here.

If you come out here annually, as I hope you will do at this season of the year, you will be able to observe whether we make any substantial progress or not in our work.

If you had come here three years ago you would have seen quite a different state of things. The underbrush was so dense that a blackbird could scarcely have gone through it; you would have found the farm grown up to weeds and grass, with hedge rows about four rods wide; not a panel of good fence on the place; not a farm building, except an old shanty; an old stable large enough for three horses and two cows. One hundred acres of this farm we have been in possession of but two years, although of the upper part, consisting of about one hundred and fifty acres, we have had possession of for three years. We commenced three years ago this spring.

We are now just commencing our real educational and experimental work. And perhaps it will be well enough for me to state what the object of this farm is. It is called the "Experimental Farm," and it is called the "University Farm;" and it is called the "State Farm." It is neither the one nor the other. It is really a practical school, a practical farm, a place to train and educate the young men that we expect to have in the department of agriculture, in the practical details of farm life. That is really the object of the farm. It is not a model farm. A model farm is one in which you never have any weeds, one where there are no bugs, where there is no very dry weather, no very cold weather, or anything else that is not just right, but where everything is "perfect" and where you get the very best results from the least expenditure of money. That is a model farm! I say this is not a model farm, for we have weeds and bugs, etc.

This is not an experimental farm. An experimental farm can not be run by common labor. It can not be run by the kind of labor that we get at twenty-five dollars a month. When you establish such an experimental farm as is desirable in all departments of grain, and stock and fruit and flower and vegetable, it will require for its superintendence, and management in all its details, men who will cost you perhaps \$3,000 a year. This will be necessary in order to have it of practical value and benefit. Thus far we have had no money for that work. Many of the leading states of the Union are pushing this experimental work, and I do not know of a state where anything is being done that does not receive less than \$5,000 for that work; the state of New York receiving \$15,000 to \$20,000. We have not reached that point yet.

It is true this line of work promises the best results to the farmers of this country at the present time. It is worth a good

deal more than the agricultural work, and worth a good deal more than model work; it is worth a good deal more than a practical school; the work of experimentation, the solution of a thousand and one problems that present themselves to the practical farmer, stockman and horticulturist, but that requires money, and we have not had the money as yet to appropriate to that purpose.

The time and the money that have been expended thus far have been employed in the purchase of this farm, the erection of our buildings; in its equipment so far as it has gone, and the money has come from the university, and has been secured through the manipulation of the old farm, which cost, as many of you perhaps do not know, about \$8,000. That \$8,000 has been converted into this splendid farm, worth to-day \$300,000, by careful manipulation, and not a dollar of money has come from the State of Minnesota.

And so you see this is not the state experimental farm; it is the state university farm; and we expect to make this the experimental station of the University of Minnesota, whenever the State makes an appropriation to carry on the work. At present our means are limited to what the university can spare.

At the present time we are endeavoring to make this a practical farm, an illustrative farm, and trying to do as much for the work of experimentation as our time and funds will permit. After we have it fully established we do propose to make it also a model farm.

I do not wish to occupy much of your time, but I would like to point out a few lines of work that we are now conducting, which you may notice as you pass over the grounds, that you may know what the lesson is to be this year. You may see some bare places here, and a mistake over there, where the boys didn't plant deep enough or too deep. What are the lessons? Next time they will be more careful. And remember that quite as much is to be learned from failure as from success. We want to know what to avoid, as well as what to imitate.

In that field of wheat we are experimenting with two varieties; there are three sets of experiments. We have laid off the ground into exact quarter-acre strips, in the first series, we are testing the merits of deep and shallow seeding in the first plat, putting the grain in to a depth of an inch and a half, the next is 2 inches, the next $2\frac{1}{2}$, the next 3, the next $3\frac{1}{2}$, and the next 4 inches. You can see the result to some extent now; and at har-

vest time it will be harvested and threshed, the grain carefully weighed and measured and the results reported. Then we tried the experiment of thin and thick sowing. We have strips sown with a bushel, a bushel and a peck, a bushel and a half, a bushel and three pecks, and two bushels to the acre. Then we have another set, illustrating the effect of medium, early and late seeding. One set, I think, only seeded about ten days ago. Then, in this strip up here, you will find two or three rows containing samples of the leading varieties of spring wheat. Among them are twelve hybrids obtained from Prof. Blount, of Colorado. You know his wheat took the gold medal at New Orleans.

Now, to show the effect of thin seeding; as you pass over the ground you will see that it is in some places completely covered, while in others it is almost bare. One can see at a glance the practical results.

You pass over here in this corner and you find three hundred and sixty varieties of potatoes; you will find plenty of potato bugs, also.

In the other corner of the field you will find an orchard of Russian apples. We planted these trees a year ago, from a supply of such Russian varieties as were found by Prof. Budd and Mr. Gibb. We have duplicates of these growing from root grafts, in the nursery. The idea is that if there is found to be anything of value when they come into fruiting, we can duplicate them, by the hundreds, in the nursery. These varieties of apples will be grown for distribution among the farmers and horticulturists of the State. We have attempted, also, to grow the different kinds of strawberries, etc., with what success you must judge after a visit to the grounds.

We propose to grow small quantities of everything in the shape of fruit, flower and vegetable, of grain and grass, and of stock, that can be successfully grown in the State of Minnesota. We will do this, in order that our students may know the difference between a cabbage and a turnip, a beet and a parsnip, by actual contact with them.

Prof. Porter here referred, at length, to the experiments being conducted in the line of feeding stock, etc. Continuing, he said:

In stock we expect to have on the place illustrations of all the leading breeds of animals; as yet we have only two breeds of cattle, the Holstein and the Shorthorns. And if any of you will remain here until between four and five o'clock you will have an opportunity of seeing them brought up. We have about sixty

head of horned stock on the place and about two hundred sheep. A part of our sheep you will find in that field are thoroughbred Shropshires; they were imported. The others are common scrubs that we picked up anywhere we could last winter to eat up the feed and to get grade lambs from. Those will all be turned off to the butcher by the first of September. We will keep a few of the leading breeds for illustration. We shall do this so that the young men who come here can distinguish the difference between the different breeds of sheep as well as between an Ayreshire, a Jersey, and a Shorthorn. We want them not only to look in a book to learn what a cow is, but to sit down and milk her, feed and take care of her. That is the way to make practical farmers.

Not to detain you too long, I wish to say that we have just made a commencement; we have a vast amount to do. There are buildings to be erected and fences to be built, and fields to be cleaned, and we don't want to do it all at once. If we do it all to-day there will be nothing to show these boys next year. But when you come out here next year we want to show you some improvement. We want to have you come and will be glad to see you at any time, except on Sundays, when our gates are not open. Thanking you for your attendance, we hope to see you again another year.

I would be very thankful to the representatives of the horticulturists and farmers of Minnesota for suggestions, assistance and advice. This farm is established in your interest. If you have new plans, new ideas and new stock, I shall be very glad to have you indicate your views in order that we may put your suggestions into the line of experimentation and report upon the same. We expect after a little to issue a quarterly bulletin that will give the results of experiments on the farm. These will be scattered broadcast, and sent out to the newspapers of the State. We invite suggestions and honest, legitimate criticism. But we don't want anybody to say, "Why don't you do this, and why don't you do so and so?" unless you can show us a better way.

Mr. Jackson. Mr. Chairman, I have been deeply interested in the remarks of Prof. Porter. I want to say that you are doing a work in this State Horticultural Society that is wider than the State of Minnesota. I was at Bismarck a few days since and I found people there who were anxious to know what you are doing down here in the way of raising fruit. There was with our

party a gentleman by the name of Marshall, from Alleghany City, who had been traveling considerable and had resided in Asia for five years, who stated that he found the climate and the soil here to be very similar to the country visited by him in Northern Asia, where, he said, they were able to grow all kinds of fruit, such as apples, plums, and cherries, and even figs. Of course it is hardly necessary to allude to this among the older members of this Society who have its reports, but it may serve as encouragement to younger members to know that it is possible to raise apples, and all of these tender fruits that are so much to be desired, in these prairie countries. I think I voice the thoughts of those present, when I say we are doubly thankful for the privilege of meeting here, and I think it will be a silent educator for us to hold our summer meetings here; it seems to me a happy thought. Here we have an opportunity to learn from observation, which is the best way to learn. We are doing work for the benefit of a vast empire; for there is a vast territory to the west and tributary to these two cities, and I trust what is brought out here will prove of advantage and profit to many.

Mr. Harris. Mr. President, I see with us to-day Col. D. A. Robertson, of St. Paul, who had something to do in setting the ball in motion in establishing the Minnesota State Horticultural Society. Since he last met with us he has traveled some in Europe, and I believe we would all be interested in hearing a few remarks from him.

President Elliot. It gives me great pleasure to have Col. Robertson spoken of, and I hope he will favor us with some remarks.

Col. Robertson. Mr. President, I came here because I desired to come; am glad to see the old faces again and to see the work that is going on, and to hear about what I will call the experiment farm, what they would call in Europe a botanical garden. I have been very much gratified with your remarks, professor, and I agree with you perfectly as to what should be considered the paramount purpose of investments in such an undertaking as you have commenced here. You embrace many departments of work, but what I regard as of the greatest importance of all, is to have everything begun here that could be of use to the people, to be introduced for experiment, for demonstration, and for the instruction of the people of the State. Here are men whom I see around me who have devoted much attention to horticulture; here are those whom I have known for many years. These men can not afford to establish botanical gardens; experi-

mental establishments to discover what can be grown in Minnesota; and I think you will all agree with me in this statement, that there is only one truly successful way under heaven to acclimatize a plant to any country, and get the best result from that species, and that is from the seedling. I have found in my studies, both at home and abroad, that it is a universal fact without exception. Further than that, I have found, as a result of much study, travel and reflection, that the only possible chance for improvement in plant growth, for proper adaptation of growth, for the promotion of longevity of plant growth, is by going back to the seed.

The most valuable product of France is the vine; not for the table alone, not for dessert, but for life-saving, wine; pure wine, sir. We have very little pure wine in this country. But pure, unalcoholized wine, such as was made in the time of the old Hebrews, pure wine, containing nothing but the juice of the grape. That is one item; then again, here is a fact that our people have to learn: We see that the value of species will wear out, and you must commence anew. Where are our old varieties of oats? Where are our peachblow potatoes, or all those other fine varieties of the potato that we used to have? All gone; and how? By fungous growth; from what they call "blight" or "dry rot" and all sorts of names; and so we must prepare to introduce new varieties all the time, and at the same time study to have climatic adaptation.

In fruits we will have to go back to Asia Minor, which has been spoken of, where they have every variety of climate. We will have to go back there, as the Greeks and Romans did, to get the wild plants and to commence anew. That is what we have got to do here; and so with regard to wheat and every other kind of crop; for improvement, that is the only thing we have to do; we must get the plants that can be grown with perfection here, the best kind for the climate, and then make this climate the best we can make it.

Do you believe it is possible to improve this climate?

Mr. Harris. I do.

Col. Robertson. I am sure it can be done. Before I started for home I saw a method tried in France for the protection of plants by means of a fence some six feet high. There, although the climate is almost semi-tropical, is a cold wind that comes down from the Alps, along the Mediterranean, the fence will protect the gardens situated a hundred miles to the north

of Marseilles. The same plants are destroyed every season without such protection. It is not the cold of winter but it is in the spring the harm is done. I mention that fact to show what may be done by very slight protection. Again, we find that heavy storms may be prevented, or the destruction arrested; they may be stopped in their progress,

Last season while I was in Switzerland, at a time when the crops were in fine condition there came these storms; all along the different valleys, from south to north, in every direction; about Lucern, and to the north of us that great grape region, where the destruction amounted to millions of francs for that season, and I suppose to two or three millions of dollars in fact. It is proven by the fact now demonstrated that wherever vineyards were protected by trees of any extent, the storm took the same direction as it did here, northeast, or easterly, and the vineyards escaped; where not so protected the vineyards were destroyed, or the crop for the season.

There has been great alarm in the vicinity of St. Paul about cyclones, as they are called; tornadoes, if you please; great alarm. People around here and in other localities in Minnesota, rushing into their cellars. Have you never heard of that before?

Prof. Porter. Yes, sir; every time a cloud comes up.

Col. Robertson. Every time. Now, as I was about to remark, this is what I am interested in. I have investigated the subject as far as possible for the last quarter of a century to ascertain if ever a cyclone or tornado ever got over our big woods; that's the point!

Mr. T. M. Smith. We have had them at St. Paul.

Col. Robertson. No, sir; never one!

Mr. Smith. I saw the time when the storm took down a hotel.

Col. Robertson. I saw that. But you don't know my nomenclature, but I remember the storm very well which was so severe in Kittson's addition to St. Paul; I was here at the time in 1853. It was a building yet unfinished on the "balloon" style; but it was no tornado, or cyclone. You mean one of those funnel-shaped things that comes down with a spout to the ground. I mean to maintain, sir, that you are entirely mistaken, that there was no such storm as that. The name cyclone we borrow from the Indian Ocean; the hurricane from the West India Islands. And when they reach here the spout is lost, as it must be in the big woods to get here. We have never seen a tornado this side of them; they never get this side; I have the record of

them from the different accounts. That storm referred to was not a tornado, but a "tempest." [Laughter.] It was no tornado or cyclone, and there is the distinction.

Mr. T. M. Smith. How about Sauk Rapids?

Col. Robertson. There it was a tornado, but it was not a cyclone according to the correct definition. I did not intend to go on at this length, but I want to say that there is little danger of the tornado in this locality. I believe that forestry is the most important object we can pursue here now in the State of Minnesota to ameliorate our climate. If the big woods were to be destroyed you would have a wondrous change in the climate of this State. I thank you for your attention, although I did not expect to speak at all.

Mr. Young, from the committee on resolutions, presented the following, which, on motion, were adopted by a rising vote:

THE RESOLUTIONS.

Resolved, That the members of the Minnesota State Horticultural Society take this occasion to express their gratification with what has been done and is being done at the experimental farm of the State Agricultural College, and their conviction that the results attained here, from this time forth, will be of the greatest advantage to the farmers of the State generally, in that it will give them the full benefit of costly experience, without subjecting them to the expense and labor of individual experiments.

Resolved, That the present condition of the farm, as compared with what it was three years ago, when the work was started, shows a praiseworthy degree of energy on the part of the management, and the display of a high order of practical ability in planning and developing the work; and that we find everything in the different branches of farm industry in as forward condition as seems possible for them to have been brought in the time and with the means the manager has had command of.

Resolved, That the farmers and citizens generally of the State owe to the superintendent of the farm, who is understood to have planned and executed this work, their sincere and hearty support and encouragement, and we hope that he will be unanimously sustained by them in carrying it to completion.

Resolved, That in our opinion, a monthly or quarterly bulletin, reporting progress in the development of the farm and the results of experiments completed, ought to be published by the management and circulated throughout the State for general information.

Resolved, That the thanks of this Society are due, and are hereby tendered, to Prof. E. D. Porter and family for the cordial reception and kind entertainment extended to us; and also to the railroad companies of the State for their liberal reduction of fares made to members attending the meeting.

H. H. YOUNG,
J. W. BOXELL,
F. G. GOULD.

Mr. C. L. Smith stated that he had just returned from a trip to the Red River Valley, in Dakota, and found the people eager to learn how to grow strawberries. He asked for fifty copies of the last report of the Society for 1886, for distribution throughout the valley.

On motion, the request was granted. The editor of the *Farm, Stock and Home*, who was present, volunteered to distribute the books free of expense to the Society.

President Elliot. Friends, this is our first visit here to the State University Farm, as a society, and I hope and trust it will not be the last. I trust that another year we shall come with our wives, our daughters, and our friends, and make a still larger circle, and see if we can not encourage our friend, Prof. Porter, in the good work which has been begun.

The meeting then adjourned.



MINNESOTA STATE HORTICULTURAL SOCIETY.

TWENTIETH ANNUAL MEETING

AT THE STATE CAPITOL, ST. PAUL, TUESDAY, WEDNESDAY,
THURSDAY AND FRIDAY, JANUARY 18, 19, 20, AND 21, 1887,
IN JOINT SESSION WITH STATE AMBER CANE
ASSOCIATION.

Following is the circular sent out announcing the annual meeting of the Society :

The twentieth annual winter meeting of the State Horticultural Society, will be held at the capitol, St. Paul, on Jan. 18 to 21 inclusive, 1887, the State Amber Cane Association occupying the time for its tenth annual session, on the afternoon of Wednesday, January 19th.

The public are earnestly invited to attend the meetings, which are *free to all*. Ladies are very cordially invited.

Members are specially urged to be present, and all others interested in the objects of the meeting. Local societies are requested to send delegates and participate in the proceedings. It is desired that this may be one of the most interesting and profitable sessions yet held in the history of either association.

Reports from individual members of committees are expected in person, or by manuscript. Let none be negligent in this respect, to the end that we may know whether fruit culture is making that progress it should throughout the State. Give concise reports of varieties cultivated in your immediate neighborhood, with names of persons having the greatest success with fruits, flowers or vegetables, and the names, as far as possible, of varieties under cultivation succeeding best; especially of hardy, new varieties, or seedlings that may be more fruitful or better adapted to your location than old and tried varieties; stating character of soil, exposure and protection, if any.

Members of committees and others are requested to send or bring sample products of fruits, flowers and vegetables, in order to make an attractive and

instructive exhibit. Liberal premiums will be given, but not on inferior or unworthy articles, even if there be no competition.

The following lines of railway will return delegates at one-third fare on the certificate of the secretary, to-wit: Chicago, Milwaukee & St. Paul Railway, Chicago, St. Paul, Minneapolis & Omaha Railway, Minneapolis & St. Louis Railway, St. Paul & Duluth Railroad and Minnesota & Northwestern Railroad. The Minneapolis & Pacific Railway, St. Paul, Minneapolis & Manitoba Railway and the Northern Pacific Railroad return delegates at one-fifth fare. Those coming over the last two lines mentioned, on purchasing tickets, must also procure receipts, showing they have paid full fare one way.

Members in attendance from a distance will be provided with entertainment by the local committee on arrangements.

For further particulars, address

S. D. HILLMAN, *Secretary*,

MINNEAPOLIS.

WYMAN ELLIOT, *President*,

MINNEAPOLIS.

State Horticultural Society.

EDWARD D. PORTER, *Secretary*,

RUSSELL BLAKELEY, *President*,

ST. ANTHONY PARK.

ST. PAUL.

State Amber Cane Association.

PROGRAM.

The following order will be adhered to as near as circumstances will permit, but may be varied from time to time as the Society may deem best:

FIRST DAY — TUESDAY, JANUARY 18TH, AT 10 A. M.

Opening Exercises. Arrangement of Exhibits and Reception of Members.

Appointment of Committees. Committees on Revision of Fruit List; on Award of Premiums; on Publication; on Final Resolutions; on Obituary.

Question Box.

AFTERNOON SESSION — AT 2 P. M.

Address of Welcome. Prof. D. R. Maginnis, of *Farmer*, St. Paul.

Response to Address of Welcome. S. M. Owen, of *Farm, Stock and Home*, Minneapolis.

Reports from Local Societies. Hennepin County Horticultural Society, J. E. Northrup, secretary, Minneapolis; Olmsted County Horticultural Society, M. J. Hoag, Rochester; Minnesota Valley Horticultural Society, A. B. Regester, Granite Falls; Lakeside Horticultural Society, A. S. Crossfield, Browns Valley; McLeod County Horticultural Society, H. I. Corson, Glencoe; and others.

Correspondence, etc.

Cold is King; How Modified in the Cold Northwest. E. H. S. Dartt, Owatonna.

Reports of Assistant Superintendents at State Fair. On Fruits, F. G. Gould; Vegetables, J. T. Grimes; Bread, Pickles and Preserves, Ditus Day.

Russian Apples at State Fair. Chas. A. Keffer. Experimental Farm.

EVENING SESSION — AT 7 P. M.

President's Annual Address. Wyman Elliot, Minneapolis.
Grape Growing for Farmers. J. B. Rogers, Milburn, N. J.
Pruning and Training of the Grape. With Illustrations. M. Pearce, Minneapolis.

Discussion on same.

SECOND DAY — WEDNESDAY, JANUARY 19TH, AT 9 A. M.

Report of Seedling Commission. John S. Harris, La Crescent; G. W. Fuller, Litchfield; A. W. Sias, Rochester.

Our New Seedlings. Peter M. Gideon, Excelsior.

Report of Committee on Russian Apples.

Discussion on same.

Report of Committee on Vegetables.

AFTERNOON SESSION — AT 2 P. M.

Tenth annual meeting of the State Amber Cane Association.

PROGRAM.

Minutes of the Last Meeting Read.

Reception of Members.

Report of Secretary and Treasurer.

Election of Officers.

Appointment of Committees.

President's Address.

Paper. By Hon. Seth H. Kenney, Morristown, Minn.

Reports from Growers and Manufacturing of Amber Cane.

EVENING SESSION — AT 7 P. M.

Hon. N. J. Colman, United States Commissioner of Agriculture, Washington, D. C., or one of his assistants, is expected to be present and address the convention Wednesday evening.

Recollections of Fifty Years with Small Fruits. J. M. Smith, President Wisconsin State Horticultural Society, Green Bay, Wis.

Volunteer Reminiscences of Pioneer Horticulturists.

THIRD DAY — THURSDAY, JANUARY 20TH, AT 9 A. M.

Annual Report of Secretary.

Annual Report of Treasurer.

The New Strawberry. G. J. Kellogg, Janesville, Wis.

Report of Finance Committee.

Birds in Horticulture. Eugene E. Harris, La Crescent.

Discussion on same.

Notes by the Wayside. C. L. Smith, Minneapolis.

AFTERNOON SESSION—AT 2 P. M.

Ad Interim or District Reports, by Vice Presidents of the Society. A. W. Sias, Rochester; E. H. S. Dartt, Owatonna; M. Cutler, Sumter; F. G. Gould, Excelsior; G. W. Fuller, Litchfield.

Discussion on same.

Annual Election of Officers, by ballot.

Propagating and Perpetuating Species by Grafting, Budding and Layering. J. S. Harris, La Crescent.

Entomologist's Report. Prof. O. W. Oestlund, Minneapolis.

Amateur Flower Garden. Frank H. Carleton, Minneapolis.

Rose Culture. F. G. Gould, Excelsior.

A Pretty but Inexpensive Flower Garden. C. L. Smith, Minneapolis.

EVENING SESSION—AT 7 P. M.

Report of Committee on Floriculture. Mrs. C. O. Van Cleve, Minneapolis; Mrs. Anna B. Underwood, Lake City; Mrs. M. S. Gould, Excelsior.

County Fairs. O. C. Gregg, Minneapolis.

Relation of Education to Agriculture. Lecture by Cyrus Northrup, L. L. D., President State University, Minneapolis.

FOURTH DAY—FRIDAY, JANUARY 21ST, AT 9 A. M.

Reports from Experimental Stations:

PROF. E. D. PORTER, St. Anth'y P'k.	CHARLES LUEDLOFF, Carver.
PETER M. GIDEON, Excelsior.	UNDERWOOD & EMERY, Lake City.
M. PEARCE, Minneapolis.	B. TAYLOR, Forestville.
G. W. FULLER, Litchfield.	FRED VON BAUMBACH, Alexandria.
A. W. SIAS, Rochester.	E. H. S. Dartt, Owatonna.
R. M. PROBSFIELD, Moorhead.	L. E. DAY, Farmington.
F. J. SCHREIBER, Moorhead.	J. S. HARRIS, La Crescent.
ANDREW PETERSON, Waconia.	O. M. LORD, Minnesota City.

Report of General Fruit Committee:

SIDNEY CORP, Hammond.	CLARENCE WEDGE, Albert Lea.
D. K. MICHENOR, Etna.	GEORGE E. CASE, St. Peter.
J. C. KRAMER, La Crescent.	M. CUTLER, Sumter.
O. E. SAUNDERS, Granite Falls.	G. W. FULLER, Litchfield.
O. F. NORWOOD, Balaton.	L. E. DAY, Farmington.
M. C. BUNNELL, Newport.	CHARLES LUEDLOFF, Carver.
N. J. STUBBS, Long Lake.	W. E. BRIMHALL, St. Paul.
WILLIAM MCHENRY, St. Charles.	WM. CANNON, Fort Lincoln, Dak.
O. M. LORD, Minnesota City.	

Discussion on same.

Native Plums. O. M. Lord, Minnesota City.

Reports of Special Fruit Committees.

Report of Committee on Award of Premiums.

Report of Committee on Nomenclature.

AFTERNOON SESSION — AT 2 P. M.

Laws Governing Hardiness of Plants. J. O. Barrett, Browns Valley.

Report of Committee on Forestry. J. T. Grimes, Minneapolis.

Discussion on same.

The Grasses. E. D. Jackson, Minneapolis.

Reports of Special Committees.

Report of Committee on Final Resolutions.

Place of Next Meeting.

Miscellaneous Business.

Final Adjournment.

PREMIUM LIST.

WM. E. BRIMHALL, ST. PAUL, SUPERINTENDENT OF EXHIBITS.

APPLES.

(All Plates to consist of five specimens).

Best collection of Minnesota apples, including hybrids, first premium, \$5; second, \$3; third, \$2.

Best display of Wealthy, first premium, \$3; second, \$2; third, \$1.

Best plate of winter apples, any variety, first premium, \$2; second, \$1.

Best plate of winter varieties, Russian apples, first premium, \$2; second, \$1.

Best plate of hybrids, first premium, \$2; second, \$1.

GRAPES.

Best display of grapes, in good condition, first premium, \$5; second, \$3; third, \$2.

Best plate, any variety, first, \$3; second, \$2.

Best display of fruit in glass jars, first premium, \$5, second, \$3.

PLANTS AND FLOWERS.

	1st Prem.	2d Prem.
Best display ornamental and flowering plants.....	\$5 00	\$3 00
Best display of roses in pots.....	2 00	1 00
Best display geraniums.....	2 00	1 00
Best single plant in bloom.....	2 00	1 00
Best display begonias.....	2 00	1 00
Best display carnations.....	2 00	1 00

CUT FLOWERS.

Best and most artistically arranged design, first premium, \$5; second, \$3.

Best collection roses, first premium, \$3; second, \$2.

Best hand bouquet, first premium, \$3; second, \$2.

Best cultivated cranberries, provided a history of their cultivation be furnished, first premium, \$5; second, \$3; third, \$2.

VEGETABLES.

	1st Prem.	2d Prem.
Best display.....	\$5 00	\$3 00
Best half peck early potatoes.....	2 00	1 00
Best half peck potatoes for winter and spring.....	2 00	1 00
Best half peck onions.....	2 00	1 00
Best half peck turnips.....	2 00	1 00
Best half peck beets.....	1 00	50
Best half peck parsnips.....	1 00	50
Best half peck carrots.....	1 00	50
Best Hubbard squash.....	1 00	50
Best bunch celery.....	1 00	50
Best winter cabbage.....	1 00	50

SEEDS.

Best display of Minnesota garden seeds, first premium, \$5; second, \$3.

PANTRY STORES.

Best display canned fruits, \$3; second best, \$2.

Best display jellies, \$2; second best, \$1.

Best jar mixed pickles, \$1; second best, 50 cents.

Best sample home-made vinegar, \$1; second best, 50 cents.

Best sample comb honey, \$1; second best, 50 cents.

Best sample strained honey, \$1; second best, 50 cents.

WORKS OF ART.

Collection of paintings, fruits and flowers, first premium, \$5; second, \$3.

Best single fruit painting, \$3; second best, \$2.

Display garden tools and horticultural implements, certificate of honorable mention.

Exhibitors are expected to make their entries the first day. All exhibits must be in place by 10 o'clock A. M., the second day.

Competition shall be open to all, but it is expected that the annual membership fee will be contributed unless exhibitors are members of the Society.

MINNESOTA
STATE HORTICULTURAL SOCIETY.

ANNUAL WINTER MEETING

AT THE STATE CAPITOL, ST. PAUL, TUESDAY, WEDNESDAY,
THURSDAY AND FRIDAY, JANUARY 18, 19, 20, AND 21, 1887,
IN JOINT SESSION WITH STATE AMBER CANE
ASSOCIATION.

The twentieth annual winter meeting of the State Horticultural Society, held at room No. 16, state capitol, St. Paul, convened on Tuesday morning, Jan. 18, 1887. The meeting was called to order at 11 o'clock, by the president, Wyman Elliot, of Minneapolis.

Prayer was offered by J. S. Harris, of La Crescent.

President Elliot announced the following committees:

Committee on Award of Premiums: Prof. D. R. Maginnis, St. Paul; C. L. Smith, Minneapolis; J. S. Harris, La Crescent.

Committee on Final Resolutions: A. W. Latham, Excelsior; J. T. Grimes, Minneapolis; E. H. S. Dartt, Owatonna.

Committee on Obituary: J. S. Harris, La Crescent; Peter M. Gideon, Excelsior; W. H. Brimhall, St. Paul.

Committee on Hall: Prof. D. R. Maginnis and Capt. R. Blakeley, St. Paul; C. L. Smith, Minneapolis.

President Elliot stated that it was thought desirable to make a change in the program, to have the lecture of President Northrup delivered on Wednesday instead of Thursday evening, and the committee on hall were requested to ascertain if the hall of the House of Representatives could be secured, and to

invite the members of the legislature to be present on that occasion.

The balance of the forenoon was devoted to the arrangement of exhibits.

On motion, the meeting adjourned until 2 o'clock P. M.

AFTERNOON SESSION.

TUESDAY, JAN. 18, 1887.

The meeting was called to order by President Elliot at 2 o'clock P. M.

ADDRESS OF WELCOME.

Prof. D. R. Maginnis, of the St. Paul *Farmer*, was introduced and delivered the following address of welcome:

Gentlemen of the State Horticultural and Amber Cane Associations of Minnesota:

Through the courtesy of your committee I am here to-day to welcome you to the capital city of Minnesota; a city in whose greatness and substantial prosperity, as with its younger but equally vigorous sister, Minneapolis, we all take a just pride; if only because they are a reflex of the causes which make them; for the nature of the country to which cities are tributary determines their growth as inflexibly as the forces which limit our existence. By a skilful adaptation of means to the end success has often crowned the efforts where conditions are not in the highest degree propitious, and difficulties seemed insurmountable. The very features of our climate, which fit it in such an eminent degree for the growth of the cereals and for the physical well being of our kind, do not offer the most favorable conditions for certain of our larger fruits, but who shall say that Minnesota will not yet send coals to Newcastle by exporting apples to Michigan and pears to the Golden State. I see before me the faces of men who have devoted years of painstaking observation and patient experiments to the origination of new and acclimatization of known varieties of fruits, and your work has surely not been in vain, for although the unprecedented cold of the last three winters has blasted many a promising orchard,

and with it the hopes of the owner, still the few varieties of trees which have passed through the frigid ordeal unscathed clearly demonstrate the fact that apples can be grown in Minnesota. Surely the people of the State owe a liberal meed of gratitude to your society and to its individual members who, ignoring money considerations, have given time and energies to a work often full of discouragements and disappointments, and every success of which is general benefit to the whole people.

Gentlemen of the Amber Cane Association: Untimely frosts have occasionally nipped your crops of cane but not your enthusiasm for your work. Your mission is to fix the carbon furnished by the sun, through the stalk of cane and transmute it successfully into the sugar and syrup of commerce. Recent experiments in the new diffusion process at Fort Scott, Kan., with which you are no doubt familiar, make it probable that this country may yet produce the bulk of the sugar which it consumes, and the syrup made from the amber cane already has an enviable reputation in the market. Our warm summers and rich soils offer more favorable conditions of growth than the sugar districts of Europe and resolve the question into one of the proper plant and right kind of appliances to effect the desired result.

Gentlemen, we welcome you to St. Paul, and trust that your deliberations may be appreciated by the public in the manner which their importance demands.

RESPONSE TO THE ADDRESS OF WELCOME.

S. M. Owen, of the *Farm, Stock and Home*, Minneapolis, responded on behalf of the Society. He said:

Mr. President, Ladies and Gentlemen:

The formal acknowledgment, in mere words, of so hearty a welcome as the one just given us, would seem to be a work of supererogation. The proper place for the true response to such cordiality should be in the heart, and not upon the tongue. There may seem to be an incongruity of flowers, fruits and sweets in a realm of winter carnival. It may, however, be appropriate for me, as the present mouthpiece of this Society, to briefly refer to some of its characteristics and labors, which inspired the pleasant words just said of it.

Horticulture, the best, the finest, the most intelligent cul-

ture—the belles lettres of agriculture, is something vastly different in a region of antipodal extremes—in a region where tropical heat is displaced by polar cold from what it is in more congenial climes. This Society came into existence at a time when the belief was almost universal that fruit growing was one of the impossibilities of this region. It was said that nothing of the fruit kind would grow here, save insignificant berries, which could mature under sun-protecting leaves and grasses; and crab apples and plums sufficiently bitter and sour to excite the contempt and disgust of Jack Frost. This verdict of man seemed to be warranted by the evidences of nature, so that it may well be said, the obstacles which confronted the infancy of the Society were really appalling.

It shall be no part of my mission to tell in detail what the Society has accomplished during the last quarter of a century. The story of its successes is more eloquently told in the luscious fruit, fragrant flower, thrifty orchard and succulent vegetable than any mortal tongue can tell it. In a region where the heat of summer is always as great an obstacle as the cold of winter, something more than mere planting, tilling and pruning has been required; the work of hands alone could never have materialized into the grand results of to-day; it had to be supplemented by the work of brains; thought has guided the hand, and thought itself has been cultivated and strengthened by your annual meetings like this; meetings where experiences have been exchanged, discoveries disclosed, lessons taught and learned, and where, by friendly intellectual controversies, you have been made stronger and better for your future work.

I feel warranted in likening this meeting to a council of war. Since your last council you have been doing active campaign work. Each one of your experimental stations a fort; each farm where fruit growing was attempted an outpost; every worker in the cause a soldier and hero. Another season of aggressive warfare with the powers of earth and air has closed. You have retired within your fortifications, are entirely upon the defensive. Your tenderly cared for plants are now prone upon the cold, but not unkind, bosom of Mother Earth, getting, you feel sure, sufficient protection to enable them to reward you during the coming season; your trees are protected by your prayers, all you can do for them, and now, while the habitations of the children of your labor and solicitude are being assailed by the "cavalry of the winds, and the infantry of the snows," while

your "dearest foe" is doing his worst, you come together to rejoice over successes, deplore failures, consult as to ways and means of tempering the tree to the fierce wind and cruel frost; about adding a choicer sweet to the product of the vine, greater size to the berry, a richer blush to the cheek of the apple, and carrying your conquest a little further towards the realms of eternal snow; you are here to be told of successes which will delight you, that is human; to be told of failures which will sadden but not dishearten you, that is heroic!

You certainly will not accuse me of flattery when I characterize the labors of this Society as heroic. The highest type of heroism is a persistent struggle towards a definite end — which is to be fruitful of good to humanity — regardless of failures, disappointments and losses. You who have never experienced the pang, can have no conception of what it is to lose — by some sudden climatic freak — a favorite fruit tree; one which you tenderly planted, carefully nursed, solicitously watched; a tree that with each succeeding year bore a richer crop of hope, as it neared the time for bearing the more material product; then came the full fruition, the red-ripe gift from Pomona, plucked from the gracefully bending boughs, the first born of the holy wedlock between your intelligent labor and patient waiting. As the first lisped "papa" or "mamma" is the mystic password which admits your babe into hitherto unoccupied recesses of your heart, so does the taste of the first fruits of the tree you have planted, tended, watched, introduce you to sensations new and strange, and inspires you with an affection you never believed you could bestow upon an inanimate and so commonplace a thing as a tree. As time goes on, the tree flourishes, grows in size, beauty and fruitfulness; you begin to regard it as a part of yourself; with much satisfaction you contemplate that each additional wrinkle on your aging face has its fellow in an annual circle within the trunk of your favorite tree. You feel that it is not only going to be a solace to you in your old age, a comfort and a joy to your posterity but a monument to yourself, of which you will be vastly more proud than of the tallest shaft of richest marble.

But now comes a frost — "a killing frost" — and when you think, good easy man, full surely your tree is an "ironclad," nips its root and falls, as do your hopes, and the well-directed labors of a lifetime. Who can blame you if you exclaim, as did Wolsey, "vain pomp and glory of this world, I hate ye!"

Or, if like Lear, for one awful moment, you rebel against Omnipotence, and curse the elements! But the faithful, sturdy horticulturists of this "frozen North" are made of "sterner stuff" than this. The fate of the one tree I have noted has been duplicated in thousands of instances; the effect upon the heart, the sentiment and the resolution has been multiplied innumera- bly, yet it did not discourage, did not daunt the spirit of many of the old soldiers of the orchard, vineyard and garden, who had enlisted for the war and knew not the bugle call of retreat, nor recognized the sensation of defeat. Old men, whose whitening hairs and failing strength proclaimed the probability of their never tasting the fruits of their present labor, again planted with the enthusiasm of youth, thankful if they could have it said of them after death: "He was one of the grand old workers to whom we are now indebted for our glorious heritage of fruit, in a region where the elements had evidently denied such a boon.

Now, in conclusion, I want to say that such devotion to a cause, such persistent effort in the face of disappointments and failures, such indomitable courage, such intelligently directed labor, such patient waiting, and unconquerable energy can never find full, complete, entire fruition until we see the north pole festooned with fruits, flowers and vegetables *grown on the spot*.

REPORTS FROM LOCAL SOCIETIES.

The secretary then read the report of the secretary of the Hennepin County Horticultural Society and Market Gardeners Association.

REPORT OF THE HENNEPIN COUNTY HORTICULTU- RAL SOCIETY AND MARKET GARDNERS ASSOCIATION.

To the Secretary of the Minnesota State Horticultural Society:

There has been little in the transactions of the Hennepin County Horticultural Society and Market Gardeners Association during the past year to elicit any special comment. The meetings have been well attended. Papers bearing upon many of the subjects which form the aim of the society have been read. Several of these papers have been of unusual interest, and it is to be hoped will find a place in your report, as the facts therein stated should be

placed as prominently before the public as possible. Notable among these papers are the following: G. S. Woolsey in an article entitle "The Propagation and Cultivation of the Strawberry." Another by C. L. Smith on "Strawberries and their Cultivation." One by N. H. Reeves on the "Formation and Management of Hotbeds." One by J. J. Nudd upon the "Successful Raising of Celery in Minnesota."

The weekly meetings of the society have been well attended. In order to reawaken the society to increased usefulness, the matter was broached of having a meeting of the society during the latter part of January and securing as speakers for the occasion men of wide reputation in the branches in which the society is particularly interested. With that end in view the secretary corresponded with several gentlemen who were unable, however, to accept the invitations on account of the pressure of other duties. The object of this endeavor was to stimulate the public to new interest in the pursuits of the Horticultural Society and Market Gardeners Association of this State, and to allow Minnesota Horticulturists to become personally acquainted with those of other states.

The annual address from the president, J. S. Gray, contained several suggestions that are of great importance. One being that necessary steps be taken to enforce the laws prohibiting the destruction of insect-eating birds, and that the importance of taking steps to nullify as much as possible the ravages of insects, who yearly destroy crops to the value of one-fifth of the entire agricultural production of this State, be urged upon the legislature.

The annual meeting of the society, held Saturday, Jan. 9, 1887, resulted in the election of the following officers for the ensuing year:

President — J. S. Gray.

Vice President — Wm. Lyons.

Secretary and Treasurer — Prof. L. Asire.

Respectfully submitted.

J. E. NORTHRUP.

The secretary then read the following report:

OLMSTED COUNTY HORTICULTURAL SOCIETY.

To the Secretary of the Minnesota State Horticultural Society:

The annual meeting of this society for the election of officers and the transaction of other business was held at the City Hall in the city of Rochester, on the eighth of January, at 2 o'clock P. M., President A. W. Sias in the chair.

The meeting being called to order thereupon the president read his annual address; also read a letter from S. D. Hillman, of Minneapolis, upon the subject of fruit culture, and an interesting and instructive paper by J. S. Harris upon the subject "Insects Injurious to Vegetation."

After a general discussion upon the subject of small fruits the meeting proceeded to the election of officers for the ensuing year, with results as follows:

President—A. W. Sias.

Vice President—J. D. Swain.

Secretary—M. J. Hoag.

Treasurer—Wayland Stedman.

Executive Committee—J. D. Swain, M. J. Hoag, Wayland Stedman.

Librarian—Mrs. E. Stansbury.

The treasurer's report was read and accepted.

Receipts, \$9.30; disbursements, \$8.25; balance in treasury, \$1.05.

Meeting adjourned *sine die*.

M. J. HOAG, *Secretary*.

The following report was read by the secretary:

M'LEOD COUNTY HORTICULTURAL SOCIETY.

GLENCOE, MINN., Jan. 17, 1887.

S. D. Hillman, *Secretary, etc., Minneapolis, Minn.,*

DEAR SIR: As the storm prevents my being with you tomorrow, I will send you by to-day's mail a brief account of our last annual meeting. As provided by our constitution, the annual meeting of the McLeod County Horticultural Society was held the second Tuesday of the present month in G. A. R. Hall, this city. The meeting was called to order at 2 o'clock P. M.

President Cutler presented an annual address, which was full of encouraging advice. Mr. Benjamin, of Hutchinson, told how he had succeeded and failed in his twenty years of experimenting in fruit growing. "Notes by the Wayside," a paper read by President Cutler, was full of interest to the society. The reports of secretary and treasurer showed an increase in members to twenty-six, and a balance in treasurer's hands of seven dollars and ninety-two cents. The officers of last year are retained for the ensuing one, as follows:

President—Milon Cutler, Sumter.

Vice President—H. Getchell, Glencoe.

Secretary—H. I. Corson, Glencoe.

Treasurer—J. Nobles, Glencoe.

Executive Committee—Carl Hagan, Sumter; Dr. Benjamin, Hutchinson, and Jacob Koons, of Penn. Respectfully,

H. I. CORSON, *Secretary*.

RAMSEY COUNTY AGRICULTURAL AND HORTICULTURAL SOCIETY.

S. D. Hillman, Secretary, etc.:

The Ramsey County Agricultural and Horticultural Society has about fifty-five members, and the meetings are held on the third Saturday of each month, at Turner Hall, St. Paul. At those meetings papers are read and discussed on various subjects pertaining to agriculture and horticulture. The society always did exhibit at the state fairs, at Rochester, Owatonna and St. Paul, and generally was awarded first premium for the best exhibit of agriculture made by any county, and in 1885 was awarded the silk banner valued at \$150, which actually makes it the banner society of the State. In 1886 the manager of the state fair very unwisely barred our society from competing for any premium offered for county exhibits. The matter was discussed at one of the meetings and it was resolved that neither the society nor any of its members would exhibit at the state fair of 1886; consequently most of the space set apart for vegetables was vacant, and the visitors to the state fair were deprived of seeing one of the finest displays of vegetables, fruits, etc., ever made in the State, which the society would have made had it not been barred.

At the meeting held Feb. 19, 1887, E. F. Lemke, Peter Bohland, Nich. Pothen, Aug. Giesmann, Peter Hahn and Fred Spangenberg were appointed a committee with power to purchase a lot in St. Paul for the purpose of erecting a hall thereon, in which, when completed, the meetings, fairs, etc., will be held.

At the last annual meeting the following officers were elected:

President—Adam Bohland.

Vice President—Nich. Pothen.

Secretary—Louis Edlefsen.

Financial Secretary—Fred Spangenberg.

Treasurer—August Giesmann.

Executive Committee—Aug. Richter, F. W. Muller and Chas. Bunde.

Respectfully yours, etc.,

ADAM BOHLAND, *President*.

The secretary read the following report:

MINNESOTA VALLEY HORTICULTURAL SOCIETY.

Mr. President, Ladies and Gentlemen:

I have but a brief report to present. The Minnesota Valley Horticultural Society is yet alive, and though scarcely two years old it has attained a growth far beyond our most sanguine expectations as to the interest manifested, and is fully up to our anticipations as to numbers. We have now one hundred and twelve members in good standing, being a gain of forty-four since our report of last winter; and I would say here that our strength is augmented by the increased membership of the past year far beyond what the mere numbers would indicate. Our membership of two years ago was obtained by persistent effort, and for the purpose, mainly, of trying an experiment, while those of the past year came in almost without an effort, and are mainly men and women of mature age and of ripe experience in that which is of the most importance to us as a society.

We held our summer meeting on the thirtieth of June, in a grove. Mr. J. S. Harris, of La Crescent, was in attendance at that meeting, and added very materially to the life and interest of the occasion. And here allow me to make a brief quotation from the minutes of that meeting:

“At 2 o'clock p. m. Mr. Harris took up the subject of horticulture, mapping out the whole field which the subject

embraces—which is indeed a wide one—and closed by giving an object lesson in budding fruit trees. Then followed a shower of questions from the audience on the various topics presented, which were answered by the speaker to the entire satisfaction of the people.”

We held our second annual meeting in Winter's Hall, in Granite Falls, on the twenty-eighth and twenty-ninth of December last. We held five sessions, three the first day and two the second. At 2 o'clock P. M. of the second day the following officers were elected for the ensuing year:

President—O. E. Saunders.

Secretary—A. B. Regester.

Treasurer—W. J. Rice.

Vice Presidents—J. Cook, J. J. Mooney, Mrs. H. E. Morrill, Mrs. S. A. Hall, C. A. Sargent.

Directors—J. B. Smith, A. W. Knox, Mrs. O. E. Saunders.

The young ladies and gentlemen are becoming interested in horticulture through the influence of our society, and are taking hold of the work in good earnest. Let me relate an incident: Prof. Hall, of Wood Lake, was booked for a paper on the cultivation of potatoes, to be read at our winter meeting, just past. Mr. Hall was unable to attend the meeting, so he got his son, about eighteen years old, to prepare the paper and read it in his stead; and while this paper was being prepared a younger son, a little boy but seven years old, asked his father the privilege of writing a paper on potato culture. Consent was given on condition that he should write it himself and read it at the meeting. The paper was written as per agreement, and when his turn came to read the little fellow stood up by his mother's knee and read his paper like a little man, and the hearty applause which followed showed not only an interest in the subject presented but in the manly courage of that little boy; and let me say, as a matter of fact, that the subject of potato culture presented by those boys called out more interesting discussion than any other subject presented during the sessions of the meeting.

Now a word on the good work accomplished by our society. It has created an increased interest in fruit culture and general horticultural work; it has stimulated a desire to plant more ornamental and forest trees in our public grounds and along the highways. The county superintendents of schools in Yellow Medicine and Chippewa counties have agreed to work up an in-

terest in the adornment of school grounds in their respective counties, and as the president of our society is the superintendent of schools in Chippewa County, we look for grand results in that direction. And as further evidence of prosperity, I will state that near the close of our last meeting, and at the close of the discussion following a paper on canning fruits by Mrs. O. E. Saunders, a committee was appointed to investigate and ascertain as far as possible the best known methods of canning fruits and vegetables, and report at a subsequent meeting. This opened the door for committees, resulting in the appointment of six additional committees to take charge of and report upon as many parts of the work in hand, including one upon horticultural fairs either in connection with our agricultural society or otherwise.

Perhaps a word as to our finances will be in place here. The treasurer's report showed a balance in the treasury of six dollars and seven cents, which, added to six dollars and seventy-five cents obtained as membership fees at the meeting after the treasurer's report was in, gave us twelve dollars and eighty-two cents; but, as was the case last year, the treasury will be nearly emptied by our attendance at the meeting at St. Paul this week. A membership fee of twenty-five cents is but barely sufficient to meet our expenses, keeping us on the ragged edge of bankruptcy, but we dare not raise the fee till we get more firmly established, so that we can afford to lose the few that may be sacrificed by the change. Thus we have fairly started with a hope that we may not run at a rate of speed beyond our powers of endurance nor take upon ourselves burdens which we can not carry through.

A. B. REGISTER, Secretary.



CORRESPONDENCE.

FROM CALIFORNIA.

SAN DIEGO, CAL., Dec. 4, 1886.

S. D. Hillman, Secretary, etc.

Yours of eighteenth ult. came to hand a day or two ago and contents noted. In reply will say I would like the books you speak of, but can not very conveniently drop in and get them at present. In regard to the books Prof. Winchell wishes, I will say I have no objections; do as the rest of the committee, yourself and President Elliot, wish, and I will be satisfied. I have been here since November 23rd, and I have been busy all the time. My wife says she can not hardly get sight of me during the day. I have been looking after ranches, orange groves, vineyards, lots, etc.; there is a whole army of real estate agents here, and they are so anxious to show and sell property that I have lots of free rides and plenty of chances to see and learn about the farms, ranches, vineyards and city lots, and if you and President Elliot wish, I have no doubt but that I could get donated for exhibition at the winter meeting a fine box of fruits from this country, and if by chance I should buy a fruit ranch, I would be glad to contribute my share.

I have been here with Wm. E. Brimhall, W. B. Quinn and their wives five weeks to-day, and they say they have not seen but one cloudy day since they came. Mr. and Mrs. Quinn have no fire in their rooms. We have a nice sunny room and fireplace and have a fire nearly every morning and evening. There is some fog early, but most of the time it is bright, pleasant sunshine and has been from 50° to 80° in the shade; they have no frost except on low grounds and in valleys. I have talked of buying two lots containing ten and thirty-seven one-hundredths acres, all set in fruit and mostly in bearing. I shall know within two or three days. There is the finest fig orchard I have seen; orange trees loaded with fruit; lemons, limes, apricots, almonds, plums, olives, grapes, English walnuts, apples, pears, etc. I should like to take you through the place and show you. There are wind-mills and steam engines for pumping, three or four wells and

plenty of water, with iron pipes laid all over the grounds for irrigation, but of course I have to pay well for it all.

There is more building now going on here than in any city of its size I ever saw, and you know I have seen both St. Paul and Minneapolis grow up from smaller towns than this now is. The climate, the weather, the beauty of scenery, the bay, the ocean, the best harbor on the Pacific coast all tend, with the fruits and flowers, to make the place attractive. I have seen bananas growing here, heliotrope and roses, morning glories and many other flowers are common in most yards; such geraniums as we saw yesterday and such cactus as we saw growing wild; two were at least fifteen feet high and one I should judge was twenty-five feet high!

Pardon me for thus intruding upon your valuable time, but I do enjoy the bright flowers and warm sunshine after leaving St. Paul November 17th in that terrible snow storm and lying snow bound all night at Manly Junction, Iowa, that I can not help speaking of it and the contrast. I do not think after this you will wish me to write anything for the meeting, but will try and send some fruit for exhibition if you and Mr. Elliot wish it and think it would be of interest to the Society, as you know you all have my best wishes for the success of the Minnesota State Horticultural Society.

Yours sincerely,

TRUMAN M. SMITH.

FROM L. M. FORD.

SAN DIEGO, CAL., Jan. 7, 1837.

Friend Hillman:

I have just received, by way of Los Angeles, where we lived until four weeks ago, your program for meeting of State Horticultural Society.

Mr. Brimhall, who also lives here, suggested the idea of writing you something, which please find inclosed. Do what you like with it, and tell all my old friends, including the father of Minneapolis (Col. Stevens), to come down and see us.

Truman M. Smith is here, as well as Brimhall, Quinn and many others.

We all sympathize with those who live in a land of blizzards, cyclones, and thunder storms.

Yours truly,

L. M. FORD.

P. S.—I forgot to include mosquitoes and bedbugs, which do not trouble us here.

FLORICULTURE IN SOUTH CALIFORNIA.

By L. M. Ford, San Diego, Cal.

To one who has resided so many years in the cold and stormy North, the change from St. Paul, Minn., to the extreme southern end of California seems more like a dream than a stern reality. Nor did I ever dream, even three years ago, that my home, as well as that of some others who settled in 1850, where now is growing up the great dual city of the mighty Northwestern Empire, would now be where there is really no winter, and we only use the term from force of habit.

Two years ago, some letters from this State, by a fair correspondent of the *Pioneer Press*, attracted my attention, and being quite unwell, I was only too glad to learn more in regard to a land where the floral treasures I had so fondly cared for in the greenhouse were wont to revel in their beauty, every month in the year, and after a manner that can not be equaled in the finest bay window or conservatory. Where, too, the delicate hummingbird and the "busy bee" are seen, both in June and January, gaily flitting from flower to flower, in search of the nectar they love so well.

And now that I am here and have seen with my own eyes the wonderful product, of this incomparable land, I can most truthfully exclaim, with the poet, "December's as pleasant as May."

Here in San Diego it is not an exaggeration to say that the last month of the twelve is far more pleasant than May in the land where I was somewhat busily engaged in horticultural work for more than a third of a century, though in looking back it all seems but a few brief months.

In Minnesota, as all know, it is not deemed safe to set out our tenderest plants until the last of May or first of June, while here it's a rare thing for even alternanthera to be killed by frost, except in low places. An old settler tells me his Poinsettia pulcherrima has been injured only three times during a residence here of fifteen years, while such things as geraniums, verbenas, abutilons, roses, pansies, petunias, habrothamus and most greenhouse plants that endure a little frost, are never killed but grow to an immense size. Indeed some things we used to know only as little pot plants, here become quite large trees. This applies to lantanas, hibiscus, flowering maples, habrothamus, oleanders, roses, and some others, while the heliotrope can often be

seen at the top of a two-story house, in good soil and proper training.

This climate can be readily understood by those who never saw California, if they will bear in mind the great fact that most of our wind is from the Pacific Ocean, which in this latitude varies in temperature only two or three degrees the year round. Hence, near the coast, July is only from twelve to fifteen degrees warmer than January.

As the earth is warmed by the sun, the heated air rises and cooler air comes from the bay, so it never gets very hot. After sundown, when the land is cool, a current comes from the east to fill the vacuum on the water where it is warmer, and air rises in accordance with a well-known law of nature.

The high mountains on the north and northeast prevent cold winds from sweeping down upon us, which is another cause of our exemption from frost. These are the reasons, in a nutshell, why there is really summer the year round in Southern California, near the coast, while snow may be seen on our highest mountains nearly all the year. It is not to be wondered at, therefore, that it is the home of Flora, as well as Pomona.

But our Eastern friends must not think all these choicethings from even the tropics, as well as semi-tropics, are had without labor. Even the Garden of Eden had to be tended and carefully cultivated; so here we must give them plenty of care, not only cultivating and weeding, but what is most essential, the watering during the many rainless months. After the winter rains begin is when South California is most attractive and when most visitors come to see her wonderful products, not only of choice fruits, but all the charms of our beautiful Flora that are seen on every hand, both wild and cultivated.

SAN DIEGO, CAL., Jan. 6, 1887.

FROM WASHINGTON.

WASHINGTON, D. C., Dec. 29, 1886.)
 U. S. DEPARTMENT OF AGRICULTURE.)

Division of Pomology.

S. D. Hillman, Secretary, etc.,

MY DEAR SIR AND FRIEND: I see by a recent circular from your office, received by this department, that there will be a meeting of the fruit growers of your State, at St. Paul, Jan. 18 to 21, 1887.

It would afford me great pleasure to be present on that occasion, were it not for the urgency of business here. This division, so recently established, has only just sprouted, and if it is to grow into a fruitful tree, it must be tenderly cared for now in its early stages. I shall not be able to leave the office for more than two or three days at a time, until I get things into good working order. But it is my desire to visit your State and personally acquaint myself with your conditions in some degree, and if possible, put this division in living, working relations with your Society and people.

Anything that we can do will be done with pleasure. Let me suggest that you mention in your next meeting my *earnest desire* to receive information concerning new fruits, and specimens of the same whenever possible. Can you not send me a box of specimens correctly labeled, and with name of the growers, to study and compare with those from other states, and to place on the table in this office, to show to visitors as coming from Minnesota.

Yours fraternally,

H. E. VAN DEMAN,

Chief Pomological Division.

A letter was also read from Mr. Van Deman relative to changing the date of annual meetings of this Society, and others, so as not to conflict in that respect.

FROM CANADA.

ABBOTTSFORD, QUE., Oct. 25, 1886.

S. D. Hillman, Secretary, etc.:

Please except my thanks for copy of Minnesota State Horticultural Society. As your climate is even more trying than

ours, your reports are read with great interest by us. I have been absent in Russia again, or would have replied before.

Yours truly,

CHAS. GIBB.

Also the following, under date Nov. 8, 1886:

Your kind letter of the thirtieth of October I find yet unanswered. I am doing my best to get through with some horticultural and other correspondence so as to give my entire time to some other matters, and I regret I can not promise you anything for your Minnesota meeting. I am over busy now. So please excuse me, as it is not want of will. Yours truly,

C. GIBB.

On motion of Mr. Sias, Mr. Gibb was made an honorary life-member of the Society.

FROM MICHIGAN.

The following letter from T. T. Lyon, president of the Michigan State Horticultural Society, was read:

SOUTH HAVEN, MICH., Dec. 29, 1886.

S. D. Hillman, Secretary, etc.:

I am under obligations for a copy of your program for the twentieth annual meeting of your State Horticultural Society. I was greatly interested, not to say surprised in looking over the exhibit of fruits from your State, at the New Orleans Exposition, and especially so to see among them well-ripened Catawbas, a variety whose home proper is in the Ohio Valley, and which we in Southern Michigan only ripen with certainty in our more favorable localities.

It would be a great pleasure to me to be with you and to learn how this is done, and to make the acquaintance of the horticulturists of your State; but I regret to say that press of other duties at present render this impossible.

Wishing you the compliments of the season and trusting that your gathering many prove both pleasant and profitable.

I am, yours respectfully,

T. T. LYON.

FROM WISCONSIN.

Mr. Tuttle, of Baraboo, sent specimens of apple wood and the following letter in reference to the same.

BARABOO, WIS., Jan. 15, 1887.

S. D. Hillman, Esq.:

In showing the blocks of wood, show the old varieties of American apples by themselves, and the old Russians and crabs by themselves. In this way the relative hardness is better shown.

I should like very much to be at your meeting, but expect to be at the Iowa meeting, which occurs at the same time. Every year strengthens my faith in the Russians, and I have no doubt we shall see healthy orchards scattered throughout the whole prairie region of the Northwest. Yours, etc.,

A. G. TUTTLE.

LIST OF APPLE WOOD.

Following is the list of varieties included in specimens:

Crabs: Hyslop, Transcendent, Brier's Sweet, Whitney No. 20.

Old Ironclads: Pewaukee, Walbridge, Utters, Red Astrachan, Golden Russet, Willow, Fameuse, Plumb Cider, St. Lawrence.

These blocks were cut from the best tree and the best limb on the tree, of the old sorts.

Twenty-five Russian and one American variety; classified as to relative hardness as lists 1, 2 and 3.

List 1: Garden, Hibernial, Arabian, Vassilis Largest, Yellow Anis, Blue Anis, Red Anis, Charlamoff, Repka, Enormous, Zuzoff, Early Glass, Switzer.

List 2: White Krim, Beautiful Arcade, Sugar Barbel, Golden White, Lord's Apple, Glass, Green Transparent, Early Champagne.

List 3: Longfield, Alexander, Borsdorf, Duchess; Wealthy, American.

These blocks are a true sample of the trees, and came from orchard trees which have been bearing five years. Trees have been set ten years and over.

FROM GEO. P. PEFFER.

PEWAUKEE, WIS., Dec. 2, 1886.

S. D. Hillman, Secretary, etc.:

Your letter of November 20th was received on 29th. Yes, I see that the paper I sent to last winter's meeting caused discussion and fetched out some facts, so that the public will find that there is as much risk in planting Russian varieties as any others. I still hold to it that our fruit trees, to give satisfaction, have to be grown from seed raised in about the same latitude and neighborhood where wanted.

I shall probably attend your meetings this winter, and hope to see many of our fruit growers.

Cordially yours, GEO. P. PEFFER.

FROM F. K. PHENIX.

DELAVAN, WIS., Dec. 28, 1886.

Friend Hillman:

Thanks for notice of winter meeting. I beg to ask if your Society has sufficiently worked the Ironclad seed-saving and sowing, the Ironclad seedling-growing and testing scheme, as the best, surest, swiftest way out of this wilderness of tender varieties.

A prince fitting up a magnificent new estate had already spent fifty years and fabulous wealth in vain. At last he called on a very modest master workman, of whose wondrous skill he had before heard. "Can you do this job?" said the prince. "I can," was the quiet answer. "For how much money?" said the prince. The master answered, "I work not for money." "Wherein is the cost, then?" asked the prince. "In patient care and heed taken to follow my every requirement. First and foremost, I must have the help of every tiller of the soil we can enlist on your wide domain. I do no hasty, botch work." "How long might it take?" queried the prince. "That depends on the number of your workmen and their careful attention to my instructions. That job will take 10 or possibly 20 years." "Ten or 20 years longer!" echoed the astonished prince; "have I not already spent 50 years at it? And what good will your help do me 10 or 20 years hence?" The master's last answer came: "Remember the 50 years' time, the wealth and hopes already wasted — and then, your children!" The prince went

sadly away, muttering, "Ten or twenty years longer to wait—he wants no money!" My last view of the prince was, drunken and stripped of his last farthing, among a crowd of overjoyed tree peddlers.

F. K. PHOENIX.

FROM IOWA.

The following letters from Prof. Budd of the Iowa Agricultural College at Ames, were then read:

AMES, IOWA, Dec. 1, 1886.

S. D. Hillman, Secretary, etc.,

MY DEAR SIR: Your program at hand. I much regret that I have not been able to meet with you and talk over our mutual successes and drawbacks. But year after year your annual meeting and ours come on the same days. Our time is fixed by law. Is yours? If not will you try and arrange for an earlier or later date next year?

Yours,

J. L. BUDD.

AMES, IOWA, Jan. 4, 1887.

MY DEAR SIR: Your favor at hand. I am also anxious to attend our meeting at Charles City.

This Russian fruit question has several aspects. In the north half of Iowa the old list dropped down to the Duchess, Tetofsky, and Wealthy. I believed six years ago, and am stronger in the belief now, that East Europe had many varieties of really good apples for all seasons, and many sorts of pears, cherries, and plums, which would give perfect satisfaction in the north half of our state, and some of them in your state and the north half of Dakota. Acting on this belief, we have imported cions, grown trees, and sent them out for trial as wisely as we knew how. We did not expect them all to succeed, but out of them we did expect to secure a few treasures. We keep a careful ledger account with each variety we have sent out, and some of our friends who scold at the meanest of the varieties in quality. such as the Hiberna, Lieby, and Silken Leaf (No. 327 of Dep't. list), will be surprised if they spend a day looking over the reports from our many sub-stations in regard to the perfection of tree and quality of fruit of very many of the new-comers from East Russia which have not yet fruited in your state that I know of. As

instance the varieties of winter apples we obtained from the Bogdanoff estates in Central Russia seem quite as hardy as Hibernial, yet their quality is not far behind that of the Baldwin. But I did not intend to talk of varieties.

Another phase of the subject is that of judicious crossing for the south half of Iowa, and indeed for all parts of our state and a larger part of yours. We made successful crosses last spring of such choice sorts as Jonathan, Grimes Golden, Roman Stem, and Northern Spy, on Hibernial, Lieby, Silken Leaf, the Moscow cross apple, Astrokoff Glass (our 361), and other true ironclads, as reported from all our stations. We shall continue this work, and I hope you will commence it in your state as soon as possible.

If you cannot get pollen at home of best winter sorts, you can introduce it in ample time from Southern Illinois, Iowa or Indiana. Apple pollen we find to germinate perfectly after it has been sent in a letter across the continent and then kept in a dry room for two weeks. From my experience and observation in Europe and America, we can rest assured that when the mother stock is a fixed type of undoubted hardiness for a given section, the hardiness of the crossed seedling will, in nine cases out of ten, follow the fixed ironclad mother and the fruit in quality will follow the less perfectly fixed male. The season may also follow the mother type, hence our attempt to use those maturing their fruits late. I will only add that artificial crossing is a simple operation which a child may understand and accomplish; hence the day of chance crosses should become a thing of the future.

I did not intend to say so much.

Yours fraternally,

J. L. BUDD.

FROM WABASHA COUNTY.

PLAINVIEW, MINN., Jan. 15, 1887.

S. D. Hillman,

DEAR SIR: In reply to your request, would say. We had in this vicinity an abundance of apples. Small fruit was not plenty, owing to the drought. I have the Telford Sweet; it is a crab, it came into bearing this year; it is of fine quality, and we have some of them now. The tree seems to be perfectly hardy. I have a neighbor that has a small nursery; he has from crab seed, eight

varieties of winter apples of fine flavor. They came into bearing this year.

Yours truly,
GEO. W. HARRINGTON.

FROM OLMSTED COUNTY.

DOVER CENTRE, Jan. 15, 1887.

DEAR SIR: Very much obliged for your invitation. I would very much like to attend the meeting and see old familiar faces and have a pleasant time, but as the twelfth of this month was my seventy-second birthday, it is not quite as easy to leave home as formerly; otherwise I should come. I hope you will remember me when you distribute reports, for, although getting old, I feel interested as usual. Should you ever come near our neighborhood, come and see us.

Yours in friendship,
R. L. COTTERELL.

FROM CLAY COUNTY.

ARGYLE, Oct. 7, 1886.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I write you in reply to yours, and to express my thanks and pleasure in the receipt of report of meetings of State Horticultural Society, experimental station reports, etc., which I am reading with pleasure and profit.

Our country here being so new but little has been done in fruits or forestry, but the future will change all this to the benefit of both the pocket and health of our people.

I do not know that I could write anything of interest for your State meeting, as my work has necessarily been experimental and on a small scale. And the past summer proving so dry and disastrous to all fruits, I could not speak encouragingly except for the future.

Hoping, however, to make the acquaintance of yourself and the members of the State Society, if opportunity permits, I again thank you for your kindness. Respectfully yours,

CHAS. T. OHMER.

FROM COTTONWOOD COUNTY.

BINGHAM LAKE, MINN., Dec. 13, 1886.

S. D. Hillman, Secretary, etc.,

DEAR SIR: At the request of C. L. Smith, institute lecturer, I send you my experience in orcharding in Cottonwood County:

In the spring of 1878 I purchased from the Phoenix Nursery, Bloomington, Illinois, 3,000 Wealthy, 1,000 Duchess, and 1,000 Tetofsky apple root grafts; also 1,000 Scotch pine, 1,000 arbor vitæ, 500 balsam fir, and 500 spruce seedlings from three to four inches in height. The site selected was a southeast slope. The soil a dark loam, ranging in depth from six inches at the northwest, to three or four feet at the southeast. This was prairie soil; no native timber in the vicinity; had been in cultivation six years; was plowed about six inches deep the preceding fall, and about eight inches again in the spring, after having about three inches of well-rotted stable manure spread over it. It was then thoroughly harrowed and marked out with plow in rows four feet apart and the apple root grafts set in the furrow and the loose dirt drawn around them with the hand. The furrows were then filled by drawing the earth into them with a hoe, the earth being firmly pressed around the roots by tramping.

The evergreens were taken into the field where they were to be set in the original box in which they were received from the nursery. The cover of the box was removed and fine dirt was sprinkled over them and worked down among them and water poured over them, so as to puddle them before taking them out of the box. They were then taken out and treated the same as the apple trees. Of the apple trees, I think nine-tenths of the Duchess and Wealthy scions grew; of the Tetofsky only about a dozen out of the thousand grew.

I have never known one of these apple trees to be killed by climatic causes. I have found in pruning a few limbs that were black in the centre, this being the only indication of disease I have noticed. A few of the Duchess and Wealthy have borne the last two seasons, but the Tetofskys are not over five feet in height, and have not shown any signs of bearing.

As to the evergreens, I lost all the spruce and firs and about ninety per cent of the arbor vitæ the first summer, and the balance of the arbor vitæ the second summer. But of the

Scotch pine I only lost twenty-three in a thousand. The pines stand now from ten to twelve feet high, and from four to six inches in diameter, and of course make a magnificent wind-break.

If there are any points in my experience as given that are of any value to the student of horticulture in Minnesota, I am happy to give them. Yours truly,

S. O. TAGGART.

FROM DAKOTA.

DEADWOOD, DAKOTA, July 24, 1886.

I have quite an orchard set out at my ranch, and expect to have over a barrel of apples this year. I have derived great benefit from reading accounts in *Pioneer Press* of your annual meetings and reports. I think this country, in the immediate vicinity of the Hills, is admirably adapted to horticulture.

Yours truly,

WM. SELBIE.

The following paper was then read:

COLD IS KING.

HOW MODIFIED IN THE COLD NORTHWEST.

By E. H. S. Dartt, Owatonna.

Cold is king! His realms are too extensive for human conception. He envelops the whole earth in a vast mantle which though forced up a little at the equator, gradually settles towards the North and South, till it seems frozen fast at the poles. As a king he is fully able to enforce his mandates. He has said to man, "thus far and no further." And the almost superhuman efforts of rebellious man have not yet enabled him to reach the North Pole.

He has fixed the northern limit of the cotton belt, the corn belt and the apple belt, and if we attempt to force these limits further north we can not expect greater success than those who have labored in vain to reach the North Pole.

Although the northern limit for the successful cultivation of

the standard apple has been definitely fixed, yet the line has not been marked with sufficient clearness for our comprehension. And as the indications now are that we are pretty near that line it seems best that in our efforts to find and follow its intricate and crooked ways, we admit that cold is king and govern ourselves accordingly.

MODIFICATIONS.

If our country was a dead level, and we had no winds or bodies of water, or timber, and the earth's axis was perpendicular to the ecliptic, then lines of latitude and isothermal lines would run parallel, cold would increase towards the north one degree Fahrenheit to one or two degrees of latitude. And if under these circumstances we had just one high mountain cold would increase with altitude one degree to two or three hundred feet. Hence other things being equal latitude and altitude will determine the degree of cold to a certainty. But to understand these other things, there's the rub. For with ocean breezes from the west, bent, twisted and modified by ranges of mountains and counter currents, with our blizzards from the north meeting and commingling with balmy breezes from the south, with the warmth absorbed by the earth ascending and cold from its unbounded and indescribable realms above descending, with the influences of different soils, bodies of water, timber, and electricity, we have a most discouraging complication and it is not strange that the facts we have observed should sometimes contradict our seemingly well founded theories.

If I understand all the causes that tend to modify climate and all the counteracting influences it would require a volume to fully explain. I will therefore only touch upon a few points and leave the thoughtful reader to enlarge at will.

I am free to admit that I am too small for my subject. I am in about the position of a certain presidential candidate when he said the tariff was a local question. That remark was taken as an evidence of weakness; but I believe he was about half right, for its beneficial effects so clearly visible in some localities are scarcely perceptible in others. So of climate, there are potent softening influences in some sections whilst others seems to be left almost entirely out in the cold, and I have sometimes thought Minnesota did not get a fair share of warm breezes, or tariff benefits.

We are so far from the Pacific that if we get a breeze from it in winter it is liable to come by the northern route and have every particle of warmth and moisture frozen out of it. So if a breeze comes from the Gulf those Northern Iowa fellows need all the warmth and moisture and it reaches us deficient in those elements. The great lakes are on the wrong side of us, for we seldom if ever get winds from that direction. So our climate must be to a great extent just what latitude, altitude and our immediate surroundings make it.

Wind is the great equalizer and preserver of temperature. It sweeps the warm air in contact with the earth continually along the surface, not allowing it to rise up and have its place filled by cold air from above, as it would do in case of a calm in the absence of sunshine. In this way those places deprived of the direct rays of the sun by clouds or otherwise are made warmer and overheated places are made cooler, and who will say that wind does not generate heat by the friction of the particles of matter of which it is composed either among themselves or by being forced against obstacles? Does not the mercury *always* touch its lowest point in the absence of wind. We know that a suffocating heat is present in the cyclone. Is this caused by the great velocity of the wind or is it an incipient state of electricity which produces heat and an immense power without producing the electric spark? Who will analyze the cyclone and define its constituent elements?

To judge of the value of wind to the fruit grower we must consider the source from whence it comes. If it has passed over a long stretch of high level prairie it will be far less beneficial than if it has passed over an equal extent of low-lying country abounding in streams, lakes and forests. If our Mississippi Valley extended from southwest to northeast so that prevailing winds would sweep it lengthwise it would be better adapted to fruit growing than it now is. Lake Minnetonka alone is not sufficient to give to that region its notoriety as a fruit-growing section. It has the additional benefit of winds from the valley of the Minnesota from Mankato down, and to the west there are moderately elevated timbered lands with numerous lakes and not very far off the valley of the Minnesota again. Now, suppose we could elevate Minnetonka four or five hundred feet, bringing it up to the level of our central, southern and western high prairies, let the Minnesota River be dried up, fill up the valley and remove the forests so that there would be a broad sweep of high

dry prairie for fifty to one hundred miles south and west, then climate would be so far changed that Wealthies would likely kill to the snow line every three or four years as they now do in unfavorable sections. Then Gould and Latham, instead of exhibiting grapes so large that they are obliged to stack them in order to get five bunches on a large plate, would sneak around with grapes inferior in size and quality and most varieties green at that. Then the Mississippi Valley man would take all the premiums, and if "turn about" is fair play perhaps we had better ask that the change be made provided Gould and Latham do not object.

We now propose to consider another form of circulation of air, the upward and downward flow. In discussing this question we must exclude our usual horizontal winds; for though their mixing in would more clearly represent the actual condition of things, yet we think it best to study each cause separately as far as possible that we may the better understand the combination.

We are told that our surface atmosphere in summer is dense, moist and heavy, and that as we ascend it gradually loses these properties and becomes very light, dry and cold in the upper regions. If the reverse of this was true winter would drop down on us every night in summer, but as it is winter floats three or four miles above us and only comes down on a somewhat protracted annual visit. Cold can only reach us from the upper regions by the slow process of penetrating our atmosphere as it penetrates other substances and in short nights it has hardly time to reach the earth's surface before the sun appears and we are warmed up again. Thus our atmosphere is cooled from above every night and warmed from below every day. As we approach winter with shorter days there is less heat and with longer nights there is more cold till winter has reached us from above.

Whilst we find no cause for upward and downward currents in the upper region, yet in our surface atmosphere extending upward a mile or so it is otherwise. Here the difference in the density of the upper and lower air will not be sufficient to counteract the natural tendency of warm air to rise and cold air to settle. From overheated places warm air is constantly rising, cooler air moving forward from shaded places or settling down from above to take the place; this again is slightly warmed and rises so a current is formed which may continue till the earth has imparted most of its surface warmth and is about as cool in one

place as another provided the night is long enough. We know the moderately elevated hilltop is warmer in the night time and always of more even temperature than the adjacent valley. Why is this? Because being nearer to the cold regions it may be expected to first impart its surface heat; as this rises the warm air of the hillside moves up, perhaps from all sides, forming a current which may continue till the last warm breath is drawn from the valley and this lingers longest on the hilltop while a colder air has complete possession of the valley below. Now we know these upward currents can not exist without corresponding downward currents or a gradual settling of the upper air. Whilst we incline to the opinion that in comparatively level sections equilibrium is produced by the gradual cooling and settling process we believe in more uneven sections quite strong downward currents are often formed, which, like water, constantly seek a lower level. Starting from high elevations of land all depressions are filled, then down ravines to deep valleys and along valleys till dense woods or encircling hills stop or retard further progress, then a raising up in a lake-like form till just the hilltops may remain like islands, or if the night is long enough the whole region receives a thoroughly cold bath.

Now while I believe results tend to prove the correctness of the foregoing theories, I do not believe these upward and downward currents are usually as distinct and forcible as I have intimated, but that like the whole question of climate they are considerably mixed, not only among themselves but by cross-currents of wind, often so far above the earth's surface as to be unknown to us.

It has been my object to point as clearly as possible to the best location for the apple orchard in Minnesota. And when we find a change of temperature of seven degrees to eleven feet or twenty-seven degrees to a few rods, this question of location looms up and becomes paramount to all others and a thorough knowledge of it seems to be a necessary preliminary to successful experiment. For if we are told that some variety new or old is hardy and productive, we must ask the question, where is it hardy and productive? If it has succeeded for a series of years in such unfavorable situations as a sheltered nook in a closed valley or on the high level prairie, then we may entertain hopes of its general adaptation, if otherwise, it is likely to prove a delusion and a snare to rope in the unsuspecting granger.

DISCUSSION.

Mr. Pearce. I would like to ask you when you say "Cold is King," do you mean to say that we can not raise apples?

Mr. Dartt. No, sir; cold in his own limits — king in his own kingdom.

Prof. Maginnis. Mr. President, in regard to Mr. Dartt's paper I wish to say that it seems to me this is an important question. I have been an official in the United States Signal Service and have paid some attention to this matter of climatic influence, especially in the Northwest. I indorse what he says in regard to local influences of timber belts and forests. To illustrate, I refer to the influence which the forests of Minnesota have on its climate. Having reports of the temperature every morning, day after day, from all points throughout the Northwest, as I have had, you could see and it would surprise you to see what differences in temperature these forests make for the State of Minnesota. During the winter they are most marked. The isotherm, or line of equal heat, of five degrees above zero, in the winter in Minnesota, does not run east and west, as it should, under equal conditions. It commences about twenty-five miles northeast of Duluth, on the shores of Lake Superior, follows down the lake shore to Duluth; from there, instead of going west, it strikes directly south, and passes a little to the southeast — possibly twenty miles east — of St. Paul and on to the southern line of the State, and thence through northwestern Iowa.

Why is it that the climate in the northwestern part of the State is so cold, while in the northeastern part it is so much warmer? Simply because there are millions of trees covering the ground in the timbered sections of the State which cause the currents of cold air that come from the north to be diverted in their course in the winter months. I have known the temperature at one time last winter, when it was five degrees above zero in St. Paul, at the same time to register twenty-five degrees below zero, one hundred and twenty miles to the west of here. I have noticed these conditions were permanent, to a great extent. These cold waves come down from the northwest and strike the big woods and pass on to the south, toward the Gulf of Mexico, instead of coming in this direction. This is not speculative, but is a fact.

This is one prominent reason why the great forests of this State

should be preserved. It is one of the most important economic features in this State, because on it depends, to a certain extent, the amount of our fruit products. There is no question about it. When the last stick of timber is razed from Minnesota, you will have the same temperature in this State that ordinarily prevails in Dakota, and that is going to be decisive against many of our productions.

We all know that in Europe there are forest laws. I don't hope to have action taken by the people of Minnesota or any other Northwestern state, from sentimental reasons, for the preservation of our forests. The only reason that will cause anything to be done is the one which will show that it will pay from a financial standpoint. We are a practical people, and look too much to the present and not enough to the future. Now, I can show that if proper attention were to be paid to forestry, as is done in Europe, a revenue would be afforded, so that hardly a cent of taxes would need to be laid on other industries of the State; the forests would pay for carrying on the expenses of government and we would secure those climatic results which would make it possible to produce other desired products. This has been and is being done in other countries, and should be done here. It is not a chimerical project; it has already been tested elsewhere; it is not much credit to our civilization when we pay absolutely no attention to the preservation of our forests.

Mr. Smith. Mr. President, I want to heartily second everything that Prof. Maginnis has said. This is a very important matter. A very small body of timber will show very marked results. At the recent meeting of the Dakota Horticultural Society it was stated that a small grove of timber, twenty-five or thirty feet high, would show its effects for at least half a mile. I know that a garden on the south and east of a ten-acre patch of timber is earlier than one which has no such protection. And I think if we can invade the domain of this King Cold, by planting timber, that we ought to do it.

Mr. Harris. Mr. President, I have always felt that forestry was the forerunner of horticulture in Minnesota and in the Northwest. But it always seemed to me that it was my mission to be one of the followers of the famous apple raisers of my native state of Ohio. Forestry should, however, be the forerunner of horticulture, and since we have lost that great leader. Mr. Hodges, I don't know but some of us will have to lay aside our horticultu-

ral work a portion of the time, and devote a part of the year to forestry. If we had ten acres of timber on every quarter section in the State, with groves and timber belts about farm buildings, there would be no question in regard to raising apples in Minnesota. We ought to encourage forestry and have forests planted throughout the Northwest. It seems to me that the climatic conditions are getting more unfavorable; I used to raise fruit, but since they have been clearing the pine timber from the head waters of the Mississippi we have been suffering great losses, as the cutting away of these barriers has a tendency to bring the north winds down upon us. We ought to bring a sentiment to bear upon our state and national legislators which would cause them to protect our timber, even if they had to send an army to put these timber thieves where they belong.

Mr. Kramer. A good many years ago, when I lived in Indiana, I knew a farmer there who had no timber on his land, and he planted out ten acres to hickory nuts, planting one nut in each hill of corn. The next year he planted his corn in the middle of the rows, and took off two crops of corn. When the hickory trees were four years old they were cut and they would sprout up again, leaving three or four sprouts to each hill. He had a better crop from that land than anything else he could raise, by selling the hoop-poles.

Mr. Pearce. Mr. President, there is no question but we have made a great mistake in not propagating timber, and we have got to do it yet. I know by the cultivation of timber we increase moisture. If every farmer would expend a little money, not over a hundred dollars perhaps, in planting out trees, something that will grow and make a timber belt, he would have little difficulty in growing fruit.

The following paper was then read:

REVIEW OF THE VEGETABLE EXHIBIT AT THE STATE FAIR.

By J. T. Grimes, Minneapolis.

The twenty-eighth annual fair of the State Agricultural Society was held at the Fair grounds, Aug. 30 to Sept. 4, 1886, inclusive, at which the management, for the first time, placed the vegetable department entirely under the charge of the State Horticultural Society, the president of which appointed me to take charge of that department.

In making up my report to this Society, it will be proper to notice the decided advantage of having a permanent location for the State fair, especially in erecting permanent buildings suitable for the different displays, and otherwise improving the grounds for the purpose intended. I think the State can make no better disposition of a portion of the public funds than by the encouragement of Agriculture, Horticulture and Mechanic Arts.

Our fairs are held at that particular time of the year when the husbandman can relax his hand from toil, and wipe the sweat from his brow; when the hurry of summer has ended, and the season has crowned his labors with the luxuries of life, and with a heart of gratitude to the Giver of all good, he is prepared to show the progress attained, and what advancement in the details of industrial progress have been made the past year, and from year to year.

But I was only intending to speak particularly of the vegetable exhibit. There are some things very peculiar about it, especially in regard to the exhibitors themselves as a class. I find that the man who "did'nt bring anything along" always had much better at home than anything he saw there. Such persons might as well have remained at home themselves with their light under a bushel, as they never will become the educators of the people. There is another class who only exhibit for the premiums that may be offered. They always make their entries in compliance with the rules, but keep back their products till near the time when the judges are expected to come around, so as to have it all look "nice and fresh." In the mean time they examine everything in competition, and if they think their neighbors have a better showing, do not take trouble to bring forward their exhibits at all. This, of course, can only apply to some living near by.

Then we have our seedsmen who are indispensable to the gardener, and a fair would be incomplete without them. They know how to arrange everything to the best advantage, so as to make an attractive display. All this of course is only an advertisement for "our seeds," but then they manage to show a full assortment of the very best vegetables that can be procured as the products from their seeds, and make up a full list of single entries and also for a general display, thus placing themselves in competition with the actual grower. I think a sweepstake premium would be about the correct thing for a display of this kind. How far this management was carried out at the last fair I do not know, but some complaint was made.

The worst specimen of humanity at our fairs is the habitual grumbler. He made an exhibit last year and, although he had the "very best there was" did not get any premium. "The whole thing was a farce and you would not catch him there again with anything to show"—"drinking, gambling and horse-racing had become the main features of the fair, and it was about time for the farmers to stay away and let the whole thing fall through as it was bound to do."

In the vegetable department there were two hundred and forty-six single entries and only three displays from county agricultural, or horticultural societies, viz: Brown, Clay and Waseca, the rules laid down in the premium list having excluded the counties of Ramsey, Dakota, Washington and Hennepin, from competing. Why could not those Counties have been included in a district class and have given us a grand display?

Why there were no entries under the head of professional gardeners I do not understand. The premiums were liberal enough to have induced those living in the vicinity of Minneapolis and St. Paul to have made a good exhibit. I am inclined to think they did not covet the name of professor since some of our plain horticultural brethren went up into Dakota to attend a farmers' alliance and came back dubbed in that way.

What has become of the German Horticultural Society of Ramsey county? It usually has made a fine exhibit at our fairs, and some members are practically our best horticulturists. If gardening is to become a science, we must act as co-workers together in our horticultural organizations and at our fairs.

The management has struck the right cord in offering premiums to the boys, but I suppose the boys did not know of it in time to avail themselves of the privilege and prepare for the exhibition, hence, there were no entries in that department. I hope this arrangement will be continued in the future, not only for the benefit of the boys, but for the girls also, in all the different departments in which they are capable of competing. They would enjoy it as a real pleasure, and in the ardent effort to excel and show what they are capable of doing, would acquire much knowledge that would otherwise be neglected and lost, and which would be of great advantage to them in subsequent life.

We find the products of but thirty-two exhibitions on the board, and but seven counties in the State represented. The whole amount of premiums awarded on vegetables was \$324.00, of which twenty-four exhibitors, received part. In quality the display

was creditable, but not as complete, and in some respects not equal to former years, the dry season affecting the growth, and insect enemies were more numerous than usual, particularly the cabbage worm and potato beetle. The crops however were generally good where thorough cultivation was attended.

The varieties approaching the usual standard of excellence, were squashes, melons, pumpkins, tomatoes, onions, beets, lettuce, rhubarb and pepper. Potatoes, rutabagas and turnips were rather inferior in growth and in quality, and cabbages were almost a failure, chiefly on account of the ravages of the cabbage worm.

The vegetable question is one of great importance to the community at large, and demands more than a passing notice from this Society. In order to bring the subject more fully before its members, I hereby append some leading questions which I think are not inappropriate for you to consider at this time. You represent almost the entire State, and can give some information in regard to your particular localities.

1. What has been the conditions of the season in your locality in regard to the vegetable crops?

2. Are vegetables grown for market to any extent in your section, and how do the profits compare with other crops? What markets have you?

3. What fertilizer do you use, and how applied?

4. Is a rotation of garden crops necessary if the ground is kept in a high state of cultivation?

5. What varieties of potatoes are best for summer and for winter use, also for market, profits considered?

6. What vegetables do you find subject to disease, and what is the nature of the disease, and do you know a remedy?

7. What vegetables are effected by insects, and to what extent, and the remedy?

8. What other information of value to the vegetable gardener are you able to give?

The following paper was then read by the Secretary :

RUSSIANS AT THE STATE FAIR.

By Chas. A. Keffer, Minneapolis.

Mr. A. G. Tuttle, of Baraboo, Wis., exhibited seventy-five varieties of Russian apples at the State Fair, probably the largest display of this fruit ever made in the United States by one grower. Mr. Tuttle was present, and by his uniform kind-

ness and courtesy in answering questions, added much to the value of his magnificent exhibit.

The committee noted, among the many showy apples in the list, the following sorts which they regarded as worthy especial mention.

The keeping qualities and condition of tree were given the committee by Mr. Tuttle. The haste with which this report was necessarily made, renders a complete description impossible.

The best keepers shown were Repka, July; Arabskoe, May; Omensk, March; Vargul, Antonovka, February; Blue Anis, January.

In quality they rank as follows: Vargul, Antonovka, Repka, Blue Anis, Omensk, Arabskoe. The samples were too immature to judge of flavor, but Vargul and Antonovka, which resemble each other, are much finer in texture and evidently much better than Duchess.

In size Omensk, Arabskoe, Vargul and Antonovka, are large apples, Blue Anis is medium, and Repka is small.

Arabskoe has blighted in twigs, but otherwise they are thus far free from blight, and all are as hardy as Duchess.

Among the early winter sorts, the committee were most pleased with Golden White,—season of Wealthy, Hibernial, December; Zuzoff's Winter, December; Red Queen, December; Long Arkad, November and December; Zuzoff, November and December.

In quality this list ranks Golden White, Long Arkad, Zuzoff, Zuzoff's Winter, Red Queen, Hibernial.

Golden White is an apple of fine flavor though rather coarse grained. Hibernial is sour and only good for cooking—for which purpose however it is excellent. In size Hibernial, Golden White and Red Queen are large, Zuzoff's Winter and Zuzoff are medium, and Long Arkad is small.

As to hardiness, Hibernial and Long Arkad are hardier than Duchess—the others as hardy as Duchess. None of this list is subject to blight.

The September and October List includes Raspberry, Switzer, Anisette and Arabian (both Duchess type) Titovka, three hundred and sixty-three, Green Selonka (September) and Zolatoreff; of sweet apples, Barloff and Beautiful Arkad. In quality this list stands, Raspberry, Switzer, Green Selonka, Titovka, Three Hundred and Sixty-three, Anisette, Zolatoreff and Arabian. Of the sweet apples the Barloff is the better.

Raspberry fulfills all the requirements of a fine dessert apple,

being beautiful—fine red color covered with bloom, fine white flesh of pleasant flavor—we should say almost “best.” The Switzer, Green Selonka, Titovka and Three Hundred and Sixty-three are all good sorts, which anyone can eat with satisfaction, the Green Selonka and Titovka being large, highly colored varieties.

In size Titovka, Green Selonka, Zolatoreff, Beautiful Arkad, Anisette, Barloff and Arabian are large, Three Hundred and Sixty-three and Switzer are medium, Raspberry is small. All are as hardy as Duchess. Zolatoreff being hardier. Blight has infested Switzer, Barloff, Green Selonka, Zolatoreff, and to a greater degree, Titovka.

The summer list in the order of earliness includes among others, Early Champagne, Sour Turnip, Yellow Transparent, Lowland Raspberry. In quality these rank, Lowland Raspberry, Yellow Transparent, Early Champaign, Sour Turnip. In size Yellow Transparent is large, Lowland Raspberry medium, Early Champaign and Sour Turnip are small. All of these are as hardy as Duchess, and only Yellow Transparent blights.

It must be remembered that the items of blight and hardiness are given as observed by Mr. Tuttle at his home in central Wisconsin. Due allowance should be made for the fact that the further west and north trees are taken, the more intense is the cold and blight conditions.

[We append, in this connection, the following from the *Farm, Stock and Home*.—SECRETARY.]

“An examination of the Russians, exhibited by the well known, industrious and patient horticulturist, A. G. Tuttle, almost, if not quite, forced the conviction, that the eagerly sought for and long delayed solution of the problem of apple growing in the Northwest had at last been triumphantly solved. Mr. Tuttle had seventy-five varieties on exhibition, embracing many desirable sorts, from those maturing in early fall to those which appear to be able to keep till apples come again. Many of these were “first fruits,” and their quality, keeping and other desirable points are yet to be demonstrated; others again have been fruited before and their value is well known. Taken all in all, this show of apples justifies Mr. Tuttle in the evident pride and satisfaction he feels in it, and warrants the people of the Northwest in congratulating themselves on the assurance that but a few years more will pass before the Northwestern apple will take its place among the other products which have made

this region famous, and by its excellence will add one more triumph to the many which have already been achieved here in the realm of agriculture.”

DISCUSSION.

Mr. O. F. Brand, who was a member of the committee with Mr. Keffer, was called upon to report as to these Russian varieties, and said:

In conversation Mr. Tuttle admitted that blight was the greatest enemy of the Russian varieties. We could not tell from the looks of the fruit how much they blighted, but from my own experience I find that those varieties that don't kill by blight don't bear very much.

Mr. Smith. You had a great many Russian varieties eight or ten years ago; what has been your experience with those?

Mr. Brand. I had sixty-five varieties of the first that were sent out by the department, which I propagated, and I got most of them large enough to bear. Where the Wealthy bore from trees planted in the same year, a bushel and a half to the tree in 1881 and 1882, there is not a tree of the Russian varieties that have borne a half a bushel. There are several varieties of trees that remained, which were root grafts in 1874, and some of them were grafted two or three years previous to that. Of those that remain there are only two varieties that are good for anything, and they never bear but very little. So I class the Russians like this: Most of them blight; those that remain which bear, three-quarters of them are good for nothing, and the rest don't bear enough to be good for any purpose except to make up a collection at a fair.

Mr. Corlett. Do your trees stand in sod or are they cultivated?

Mr. Brand. They were cultivated for a good many years.

President Elliot. I would like to know your method of planting, whether shallow or deep?

Mr. Brand. I plant deep; on heavy timber soil, a black sugar maple soil, underdrained with clay. There is a descent to the southwest.

Mr. Pearce. It seems to me Mr. Brand has put Russians in a bad light, and it don't coincide with my observation; neither does it with that of a number of other members present who have orchards in this section of the country. I refer to Andrew Peterson's orchard; he has trees twelve years old and

has twenty-five or thirty Russian varieties; his trees have borne well and some of the fruit is of fair quality. I have watched his trees with much interest and have never found trees that were more healthy or prolific; the fruit is large. There is the Yellow Transparent that I have known a number of years which bears freely and fruit of good quality.

Mr. Corlett. Mr. President, in the spring of 1880, I procured forty-three varieties of Russians from Prof. Budd; I divided the collection with five neighbors, living in Clayton County, by his request, so as to test them on different kinds of soil. Some had timber, oak openings, some hazel-brush land, some rather broken and near sink holes, and three of the parties had rich prairie soil. My own is what is called high prairie, and is near the Milwaukee road, a short distance west of McGregor. I can only speak from memory as I did not bring my list of varieties; but of the kinds set in 1880 of those that bore last year were Nos. 544, and 210, No. 61, known as Red Streaked, Nos. 19, 437, 262; of this number 19, 262 and 61, this past season the limbs had to be propped, as they bore such an immense crop. No. 544 seems to be a shy bearer; it has borne for three years. It is an early winter apple and we have kept the fruit till January 22d. Of the forty-three varieties I planted myself Nos. 185, 262 and 252 blighted; Nos. 19 and 230 are the only ones in the collection that blight now. Nos. 288, 316, 337, 15 (Moscow), 230 and 387 are the finest trees I ever saw.

Previous to the time of applying for the Russians I had about one hundred varieties in my orchard. I have grown successfully in times past such varieties as Dominic, Early Harvest, Sops of Wine, Winter Winesap, Ben Davis, Benonia, Seckler's Red and have none of those kinds left now, and my only hope is in the Russians. When I heard these letters of Mr. Tuttle and Prof. Budd read I began to think I was on the right track, but on hearing this report from Mr. Brand I don't know what to say about it.

From where I live I can see into seven townships; the ridge inclines a little to the west, somewhat steep to the north, and not so much to the south. North of me one of these varieties has borne two years, and it is thought a great deal of; I don't know the number of the variety. There are some eight or ten of these that have borne, and some of them are evidently winter apples. I set my first orchard in 1856, and as that failed I have concluded our only salvation was in the

Russians. If they are hardy we can top-work them, if the quality of the fruit is not satisfactory. I have three hardy varieties of winter varieties which I have grown in that way. I budded trees on the last day of May and they failed; my next budding was on the ninth of June. I kept on at different times till the twenty-fourth of August, and have a thousand buds living in the different kinds of stock, budded on the Russians. Have top-worked Duchess and other Russian varieties in what is reported as long-keeping winter apples. The first three years I sowed the orchard to buckwheat; the last three in clover. My location is about thirty-five miles south of the Minnesota state line. Our hope there is in the Russians, and if that fails I am going to sell out and go to Tennessee or somewhere else.

Mr. Gideon. I got a great many of the Russian varieties, of cions, and set out the trees some years ago. The blight destroyed all but three of the trees in the orchard, and the fruit of those proved to be worthless. Afterward I had some 230 varieties. But the blight destroyed most of them. Four years ago I had some 7,000 orchard trees; over 2,000 went down entirely, and others were damaged. I still had 20 Russian varieties left, but two years ago took most of those; only 2 of the list bore last season. Our soil is a rich, warm loam, and brings forward trees quickly, and they are generally in bloom some two weeks earlier than trees a mile away, on clay soil.

The injury to fruit trees two years ago was caused by the early freeze. Before cold weather set in I was in my orchard and noticed when I broke the twigs that the bark would peel as well as in June; it froze hard that night and that used up my Russians. The stock I had was about the same as Duchess and Wealthy in hardiness; but none of them were able to stand two years ago when they were caught in a full flow of sap. My doctrine is that it takes a tree with the Siberian crab in it to stand the influence of the sap flow and bear the next year.

Mr. Dartt. I wish to inquire of Mr. Corlett if his Ben. Davis were not as hardy as the Russian varieties at the same age?

Mr. Corlett. When the cold wave struck the Ben. Davis and cleaned them out the trees were about twelve years old and had borne three crops; the Russians I have now were set in the spring of 1880.

Mr. Smith. Mr. Brand, didn't you have some Haas that stood well till they were about twelve years old?

Mr. Brand. Yes, I had Haas and Saxton, Talmon Sweet, Fameuse, the Willow Twig, and a good many more. My experience is that trees stand very well and after beginning to bear at the age of eight to twelve years are killed out, and the Russians likewise. They may do well for awhile but after they begin to bear and the vitality is reduced they are unable to stand the winters as well as when four or five years old.

Mr. Corlett. We had all the leading varieties mentioned and in the last three years we have grubbed up a thousand trees; some of our Haas trees were nearly a foot in diameter.

Mr. Dartt. It occurs to me we lose time when we place much dependence upon the hardiness of a tree here because it is hardy in a favorable locality in Wisconsin or in Iowa. This location described by Mr. Corlett is probably a favorable one. It is near the Mississippi Valley, it is a hill country. The fact that the Russians have done well four or five years is not evidence to my mind that they are hardy, because we know that the Ben. Davis, for instance, did well in that section for several years, which is known to be a tender variety. Thirty years ago when in Wisconsin I raised apples, and I know something about their seedlings. Mr. Tuttle's location is similar to the one I had there. I could raise most any of the standard apples, but when I hear it said that we can grow those seedlings here in exposed situations I think it is but a waste of time. I brought some of the hardest seedlings I could find to Owatonna, but they are all gone; all there is left is the Duchess.

Mr. Corlett. We had Utter's Red, Northwestern Greening, McMahan White, Wolf River; they are all dead.

Mr. Brand. I wish to add that I have eight or ten Duchess that have been planted twenty years this spring, which look good for as many years more.

Mr. Dartt. When I said all were gone but the Duchess it was a little too sweeping, for I have the Lieby, that looks well and has borne some apples. What I wanted to say was that I had nothing on which I placed dependence outside the Duchess.

Mr. Harris then presented the following report as delegate to the meeting of the Dakota Horticultural Society:

REPORT OF DELEGATES TO THE MEETING OF THE
DAKOTA HORTICULTURAL SOCIETY, HELD AT
SIOUX FALLS, DEC. 14, 15 AND 16, 1886.

Mr. President, and members of the Minnesota State Horticultural Society:

By request of your president and secretary we availed ourselves of the opportunity offered for attending the third annual meeting of the Dakota Horticultural and Forestry Society, which took place at Sioux Falls, Dec. 14, 15, and 16, 1886.

Sioux Falls is a city of about 8,000 inhabitants, is pleasantly situated, and located in the centre of a large area of the finest agricultural lands in the Northwest. The location possesses many advantages that would naturally tend to make it a large and flourishing town—the metropolis of the region. The Sioux River has here a fall of about ninety feet, affording one of the finest water powers in the world. It is being improved to some extent; is running one of the finest flouring mills upon the continent, with a capacity for making 1,200 barrels of flour per day; two or more mills for sawing, turning and dressing stone, etc.; and has power, not yet utilized, to turn the machinery to do all the manufacturing of the entire country tributary to the city. The valley of the river is a vast field of granite, of a superior quality for street paving, building purposes, the manufacture of monuments, fine building, etc.; the granite is nearly indestructible, takes on a polish smooth as glass, and presents beautiful markings. The quarries afford employment for a great number of laborers, and the supply is inexhaustible.

The state prison and a university are located here, the hotels and business houses are first-class, and the town has an air of solidity and permanency about it, as well as the push which is characteristic of the new towns of the West.

The meeting convened in the pleasant rooms of the Y. M. C. A., at 2 P. M. on the fourteenth, and was promptly called to order by the president E. De Bell, of Sioux Falls. The number of members present at the opening was not large, but continued to increase during later sessions. From beginning to end the meeting was deeply interesting, and much valuable and practical information was elicited. The order of business and manner of conducting the meeting did not differ materially from that followed in other societies we have met with. In addition to

the Dakota members, there were present two delegates from the Iowa society and three from the Minnesota.

A timely and appropriate address of welcome was made by R. J. Wells, of Sioux Falls. He said that he fully realized that Dakota was a land possessing a deep rich soil, ready for the husbandman's plow, well adapted to the production of cereals and vegetables, but it also abounded with broad, level, wind-swept prairies, affording a boundless field for the horticulturist's art. What the future would be was yet unknown. All eyes are turned towards this meeting, and a silent prayer went up from every heart that success might follow their deliberations. The future comfort and happiness of the people of Dakota depended very much upon the success or failure of this meeting; upon the work started now and carried on through coming years. They were known to be earnest, observing and practical. It was the mission of horticulture to plant forests and groves, windbreaks and hedges, orchards and gardens, without which Dakota homes would be desolate indeed. He therefore extended to them and their friends from neighboring states, who had come up to join in their deliberations, a cordial welcome.

Continuing, he said: "The pathway of humanity since the dawn of creation has been one of destruction. Your meeting to-day is not for destruction but for creation. In olden times man was placed in a garden planted by the hand of God; a garden of most beautiful trees and refreshing fruits. For a misdemeanor he was banished from this delightful garden, and with a perverted nature his descendants have gone forth and with a lavish hand have almost denuded the fairest lands of trees and nearly annihilated from the earth many races of the noblest animals. You, gentlemen, have come to a land where there is nothing to destroy God's great pasture kept for ages for the bison, elk and deer. The savage, who subsisted by the chase, has retired before civilized man and the murderous hunter has depleted the numbers of the animals next to extermination, and you are called upon to transform these great pastures into a condition that shall fit them for the abode for progressive civilized man. Your work is to create and subdue; to create forests, plant orchards and gardens, and subdue the soil that it be in a fit condition to produce bread for millions of the inhabitants of other lands and make life tolerable for us while doing it. You are to develop and improve the native products of the soil; to introduce and acclimatize the choicest fruit and

plant gems of other soils, to manipulate, test and improve them and then to give them to the people. Failures at first may be the rule, success the exception, but nature will open up her mine of treasures to those who carry the key to unlock them, and as a reward a grateful people will crown you public benefactors, whoever of you develops any fruit until it will succeed and then introduces it for the use of his neighbor. The man who gave us the Early Rose potato did more for this country than he who discovered the gold of California. The man who develops a hardy, good apple that shall succeed everywhere in the Northwest and fill the season from the last Duchess to the first Strawberry, will do more for humanity than the greatest philanthropist who has ever lived, and earn a fame that will endure long after granite monuments have crumbled into dust."

C. L. Smith, of Minnesota, responded to the address of welcome. A considerable portion of this session was used by the Minnesota delegates in speaking words of encouragement, reporting the workings of their society, explaining the objects, methods, workings and probable results of the state and individual horticultural experiment stations. This was followed by the reading and discussion of a novel and very interesting paper by A. W. Sias, of Rochester, Minn., entitled "Horticultural Nuts to Crack." This paper called out a rambling discussion on fruit, nursery trees, acclimatizing by taking seeds from the most northern limits for the ideal fruit without seeds for our descendants, who may in the course of time be toothless, the use of thorns, etc. The discussion finally drifted toward forestry.

At the evening session the delegates from Minnesota were unanimously elected honorary life members of the society. This, of course, called for a vote of thanks from the Minnesotians, and an acknowledgment of the honor shown to our Society. Following this the president read his annual address, an able document, in which he alluded to fruit culture as having become a great and leading industry in all other parts of the country, and so important as to demand our first attention. But there is no other subject that comes before the people of this Territory where they are more at sea than in the growing of fruits. He spoke at length upon the adaptation of varieties, and said it might require a vast amount of experiment, and years of time before a sufficient number of varieties were found that were adapted to every part of the vast country, and that every man could plant with a certainty of succeeding with them. The subjects of experimental

fruit and forestry stations, to be supported and sustained by the government, were well handled, and he demonstrated that at least two such were immediately needed. In timber culture satisfactory results had not generally been realized. He thought trees were endowed with a certain amount of inorganic sense, and that the failures were oftener the result of not consulting that sense and complying with the conditions required, than from any inherent fault of the tree, or the climate where it was transplanted. There are about two million dollars worth of fruit wanted annually, to put with the meat, grain and vegetables grown here, to afford the present population a wholesome diet, that will promote and sustain strength of body and vigor of mind, and establish a love of home among the rising generation, that will keep them good and loyal citizens. At least one-half of that amount can be supplied by fresh, canned and dried small fruits that may be grown here with certainty when the people are educated up to follow the proper methods of planting and cultivation. And were it an established fact that apples could never be made to succeed here, it would still prove the part of wisdom for our government to provide liberally for the encouragement and promotion of horticulture.

After the president's address the subject of growing evergreens upon the prairies was taken up and discussed until a late hour.

The second day's session was opened with the reading of a paper prepared by D. S. Grimes, of Colorado, on the Rocky Mountain evergreens, and their adaptation for planting in Dakota. Mr. Grimes evidently understood his subject thoroughly and he discussed the methods of planting and cultivating that class of trees, and gave many important suggestions that were listened to with great interest.

Other papers on forestry were read which attracted much attention from those present. H. R. Hunter, of Sioux Falls, followed with a paper on Planting and Rearing Evergreens. This paper carried much weight with it owing to his having made the growing of evergreens a study for several years, and now having an evergreen farm near the city. These papers led to a renewal of the discussion and many important points and experiences were brought out. It is unfortunate that there was no stenographer present to take them down. Mr. Hunter has growing upon his farm about twenty acres of evergreens in solid blocks and nursery rows. At the noon recess a committee of which your Minnesota delegation formed a part, went out to his

farm to examine the trees. A visit to the farm is all that is needed to enable anyone to recognize his ability to grow the trees, and their adaptability for cultivation in Southern Dakota. We found here blocks of trees of various ages, with scarcely an inferior or missing tree and ranging from one to four or five feet high. The varieties were Austrian, Scotch and White Pine; Blue, White and Norway Spruce; Balsam Fir, Red Cedar and American Arbor Vitæ or White Cedar in large quantities, and some others in less numbers. If the people within a radius of a day's travel would procure their trees from him instead of ordering them from some foreign tree agent, and select a favorable time to secure and plant them and afterwards take care of them, there is no good reason why ninety-nine out of every hundred should not live and do well. This farm is also well protected and sheltered with windbreaks of deciduous trees.

In the afternoon and evening sessions other papers and addresses were given upon different classes of fruit culture, and the facts and experiences brought out in the course of the following discussions tended to strengthen the belief that strawberries, currants, several varieties of raspberries, blackberries and grapes, were given winter protection and summer mulching, could be successfully grown.

The list of evergreens recommended for planting for forests upon the prairies were Scotch Pine, White Pine, White Spruce, Red Cedar, Arbor Vitæ. The most ornamental for trial, Colorado Blue Spruce, Dwarf Rocky Mountain Pine, Douglass Spruce; deciduous trees for groves and timber, White or Green Ash, Box Elder, White Willow, Cottonwood, European Larch, Elm, Wild Black Cherry, White Birch and Sugar Maple. For windbreaks, White Willow. For fruits, strawberries, Crescent Seedling, fertilized with Downer's Prolific, Chas. Downing, or Glendale; grapes, Concord, Moore's Early, Worden, Delaware; apples, Duchess and Wealthy, for orchards; Tetofsky for garden, Siberian and Hybrids, Virginia and Whitney No. 20. For trial, Gideon's Florence. From the best information that could be gleaned it was thought best to recommend the following Russian varieties for trial in limited quantities, when they could be procured from reliable parties, viz.: Hiberna, Ostroloff's Glass, Antonovka, Red or Yellow Anis, Green Streaked, Longfield's White Pigeon and Charlamoff. Only the best varieties of the native wild plums were recommended.

All lists for adoption were brought forward by committees

appointed for that purpose and the reports were considered and varieties adopted or rejected item by item. The election of officers resulted in the re-election of those of last year, therefore E. De Bell, of Sioux Falls, is president and Mrs. Laura A. Alderman, of Hurley, secretary. The next annual meeting is to be held at Huron.

Altogether this was a pleasant and profitable meeting. Our thanks are due to the officers and members for many kindnesses and courtesies shown us in their efforts to make our stay with them pleasant.

JOHN S. HARRIS,	} <i>Delegates.</i>
M. PEARCE,	
C. L. SMITH,	

Mr. H. R. Hunter, of Sioux Falls, was here introduced, and on motion of Mr. Harris, made an honorary member of the Society for five years.

Mr. Hunter returned his acknowledgments to the Society, in a few brief remarks.

Mr. J. E. Corlett, of Iowa, was also made an honorary member for five years.

DISCUSSION.

Mr. Allen. If remarks are in order upon the report on the vegetable exhibit at the state fair, I would like to say a few words. It seems to me we have been educated up to think that the largest specimens should take the premiums, and there ought to be a change in that regard. It is the "Jumbo" that gets the premium; the big squash, pumpkin or turnip. I think we should look more to the quality than to the size, and have judges that understand their business. The way fairs are run, exhibitors are often dissatisfied and cry it down as a miserable horse race, and say they will attend no more. The judges are often to blame for this. At Red Wing we had a fair last season, with a good display and pains was taken to select good judges. The premiums were awarded on the merits of the various articles, and parties were informed that quality and not size was considered as the test of superiority.

Mr. Harris. It is through criticism of methods that we are enabled to remedy evils, and I am glad the gentleman has spoken. It is very important that the quality of the article

exhibited should be considered. The big Duchess is apt to take the premium, no matter how coarse and poor the quality of the fruit. The same rule applies with grapes. You can nearly double the size by pruning and forcing the growth, but it is done at the expense of quality. As the State becomes older, there will be improvement in the matters referred to.

Mr. Dartt. Mr. President, evidently good judges will be the best everywhere. If we could have skilled men for judges of stock, as well as in every other department, it would be well; but that is an impossibility; we can't get them. I don't see any better way than to keep on as we are doing and get the best committees we can, and let them use their best judgment. At the last state fair, the directors did the best they could, under the circumstances.

Mr. Smith. The suggestion to have premiums based on the quality of the article exhibited is a good one, but it may not be practicable without the committee giving the reasons why they make certain awards. This was illustrated in the award of premiums on butter, where there were a hundred entries at the fair. The explanations made were satisfactory, and those who did not receive the premiums acknowledged they were not entitled to them.

QUESTION BOX.

The question box being called for, the following was read: "Why is the most sheltered spot the worst place to be found for the growth of apple trees?"

Mr. Pearce. For the reason no wind comes there.

Mr. Smith. It causes late growth in the fall, which causes sap blight.

Mr. Dartt. Mr. Chairman, I think it is because it is the hottest place and the coldest place to be found; the cold air settles in there, and the warm air can not get out. If there is a slight current the warm air always rises, leaving the cold air so that the mercury will run several degrees lower in a sheltered spot than where the wind has full sweep, on higher land.

Mr. Allen. Mr. President, that is entirely different from the idea I had. Where I have succeeded with fruit was in a coulie protected from the north and east winds. My other trees in the valley that were exposed have principally died out. I have Wealthy, Duchess, Strawberry and some seedlings that have been bearing well in this little coulie. The ravine runs south.

Mr. Smith. But the trees are on the west side of the coulie and part way up the side hill?

Mr. Allen. Yes, and they are protected.

Mr. Dartt. The prevailing wind is from the south or the west and not being sheltered from those is not in the most sheltered spot.

Mr. Allen. No wind can touch them without coming over the bluff and coming down.

Mr. Dartt. The cold air would settle in the lowest ground.

Mr. Latham. The location described by Mr. Allen is undoubtedly one of the best for raising fruit of any kind in this climate. The very lowest ground is unsuitable, no matter whether it is for the growth of the strawberry which lies under the snow or for the grape vine, under a slight covering of earth, or for the life of the apple tree. The summit of a hill is equally bad; but the side hill, part way up, protected from severe winds and where there is the least liability to change in temperature, that is the best place, and the safest and surest for raising fruit. Such a place as the one described by Mr. Allen would undoubtedly be a good one to plant any kind of fruit upon.

Mr. Harris. I visited the grounds of Mr. Wilcox, near La Crosse, on the east side of the river, which are protected by a narrow ravine; the hillsides are quite steep. In the lowest part of the valley he cannot raise apples, but he is raising some of the finest trees of the old varieties I have seen in my travels the past year, and they are pretty well sheltered by the bluff. I found Fameuse trees without any outward blemish upon them, while elsewhere they have been mostly killed. The bluff rises some 150 feet and the sun and wind cannot touch them and they stand better than any place I ever saw.

Mr. Smith. Wouldn't there be naturally a draft of air from the lower Mississippi valley along the sides of that bluff?

Mr. Harris. No doubt of that, but the trees are sheltered, and have the best kind of shelter.

Mr. Pearce. I have studied the apple tree business as well as I could. I have seen trees raised under different circumstances and on different elevations. Out in Pipestone county, one of the highest elevations in the State, on that ridge, the highest in Southern Minnesota, they were raising the finest apples.

Mr. Harris. Murray county is the highest land in the State.

Prof. Maginnis. The bluffs rise some six hundred feet above the Mississippi; Barn bluff at Winona I think is just that.

Mr. Pearce. I found the Duchess, Whitney and many other varieties that appeared to be in perfect condition.

Mr. Brand. I suppose they were six or seven years old.

Mr. Smith. Some were eight years old.

Mr. Pearce. I have observed the same thing at Montevideo, in the Western part of the State, and have been astonished to find the Haas standing well. My experience is that the higher the elevation the better the trees stand. I claim it is not the cold weather that kills our trees and could prove it if I had time. It is the peculiar condition of the sap in the fall. I have known trees to blossom in the fall and that was the condition year before last. I said then the trees were dead and there would be a sharp and woeful howl in the spring; the trees were killed in December. It is not the cold weather that caused the loss but the peculiar condition of the sap. The same thing occurred in Ohio, Illinois, Missouri and throughout the Northwest. If I was going to set an orchard I would select the highest elevation.

Prof. Maginnis. In confirmation of what Mr. Pearce has said in favor of high elevations I would say that there is an orchard near Sparta, in the Trempeleau valley, on limestone soil where there are trees that have been in bearing for years, of varieties that have not been grown in any other part of Wisconsin, except along the lake shore. I received this information while attending the farmers' institutes, and the reasons assigned were substantially those given by Mr. Pearce.

Mr. Harris. I have seen the trees on the place spoken of and know they are raising trees that I cannot touch.

Mr. Dartt. Mr. President, the fact that those trees are growing on that high ground indicates that it was a favorable locality; still they may get to bearing size and then die. There may be low lands in the vicinity, which might be a decided advantage. An elevated plateau, or high level land, is rather against the success of trees, depending on the elevation. If the highest land was the best location for trees you might keep on till you reach the line of snow on the mountains; elevation is good if you don't elevate too much.

Now, the gentleman says that it is not cold that kills; perhaps I would be the proper one to dispute it. [Laughter.] If it was not the cold it seems to me they would not be found dead after we have had an extremely hard winter. You notice that two or three years ago trees down as far as St. Louis were killed out seriously and they reported a cold wave down there when the

mercury was down nearly to forty degrees. It is said by our friend that it was the peculiar condition of the sap in the trees in the fall. I have no doubt but the extreme cold, day after day, freezes our trees dry and when spring opens there isn't life enough left in them to get up a good circulation on the outside. The hardiest varieties start and struggle along and if the next winter is favorable they recover, leaving a black ring in the middle of the tree, making them black-hearted.

Mr. Pearce. How was it some ten or twelve years ago when we had so many trees killed, was it the cold weather that killed them?

Mr. Smith. No. I want to say I have been through three of these winter-killing periods; 1866-7, 1872-3 and 1884-5. To a certain extent brother Dartt is right. But when he says the cold does all the mischief, I would call attention to the fact that each one of these disastrous winters has been preceded by a late fall and continued growth late in the season, so that trees were killed before the very cold weather set in. Again, we have had extreme and continued cold without results. Forty degrees below don't kill an apple tree if in proper condition.

Mr. Latham. Mr. Chairman, I think there is a fact about this that we ought to recognize as individuals and as a society. I have been a member a good many years. We have been through these cold spells, and I have noticed after every one a disposition on the part of members of the society to ascribe the loss of our fruit trees to something besides cold weather; there is always good cause for it. The winter of 1873 was one of these hard spells and at our next annual meeting there was a long discussion, and I remember that some of the members from the southern part of the State thought it was because the ground was so very dry down there; but in this section of the State it was because the ground was so wet. [Laughter.] I was a young member at the time, but I was amused to hear the discussion and all so persistently ignoring the fact that it had been so very cold. If we had no cold weather here we could raise peaches and bananas. The trouble with raising apples and pears in this country is our winters are too cold, and we might as well face that fact. Our trees are not hardy enough for the climate. I can stand the climate with proper clothing, but to wear mosquito netting might cause me to freeze to death; it doesn't follow that I couldn't live elsewhere. We must look for something that will stand the winter, and we might as well face the real situation.

Mr. Dartt. They say it is not the fall that hurts. It is the sudden stop. [Laughter.] That is about the position taken here. They reason that it is not the hanging that killed a man, but the breaking of the neck, or the stopping of the breath. I think if our trees could escape this extreme cold they would probably be all right.

Mr. Pearce. One word: I dug trees the fall before that winter of 1873 and buried them, in the spring they were all dead. The ground scarcely froze at all during that winter, for potatoes came up in the spring that had been in the ground over winter. This is a matter of history.

Mr. Smith. I put 3,000 trees in the cellar the sixth of December and they were all dead in the spring.

Mr. Harris. It was root-killing that caused the injury to trees that winter. Northern Spy showed no injury from the winter, but the trees were killed at the root. I know in our locality we attributed the difficulty to the long-continued and severe drouth.

On motion the meeting adjourned till 7 o'clock.

EVENING SESSION.

TUESDAY, Jan. 18, 1887.

The meeting was called to order by President Elliot.

The following committee was named on Revision of Fruit Lists: A. W. Sias, M. Pearce, E. H. S. Dartt.

Mr. Smith. There is one thing I would like to speak of, to throw out a suggestion to members of the Society at this time. I noticed an article in the *Iowa Homestead*, in the editorial columns, on the subject of protecting farm buildings with windbreaks, recommending evergreens, and, as a temporary expedient, the growing of the Russian Mulberry, to be followed with Scotch Pine, the walnut and other valuable timber. I want to protest against this, for I must say I am not pleased with the Russian Mulberry. I have been well over the State the past year, investigated the timber-culture question, especially as regards the question of shelter belts, and I believe the most valuable for that purpose is the common White Willow. It can be grown on the prairie the best of anything I have found. It is unjust that farmers should be advised to plant out Catalpas

and Russian Mulberries, and trees of that class, which they must pay out their money for without getting any particular benefit, when they can secure the desired shelter belts with little expense by growing the White Willow.

Mr. Sias. I would suppose that a man who would recommend the Russian Mulberry would naturally recommend Scotch Pine next; it is about the poorest thing we have in the line of evergreens for a windbreak. I didn't know that till the twenty-first of August, 1883, when a tornado went through our city, leaving most of the trees of that kind at an angle of forty-five degrees, while Norway Spruce and most of the native trees stood upright. It has not proper leaf surface like White Pine, which has a five-leaf cluster. The leaves of a tree have an effect on the root. What is wanted for a windbreak is a tree that will stand firm like the White Pine. We have a native evergreen that I think much of, known as the Gray Pine. Some may be familiar with it, known as *Pinus Banksiana*.

Prof. Maginnis. Since you have given its botanical name I remember it, and have observed on the map where it grows, and I think there was only one variety that grew further north. It is found on Great Slave Lake, many degrees north of here; it is a cold climate tree.

Mr. Smith. The Jack Pine has a short leaf and is very tough, hard wood.

Mr. Sias. The foliage of the Gray Pine resembles that of Scotch Pine somewhat, but it is a hardier, tougher tree, with better root. It resembles the pine mentioned, but is not the same.

Mr. Pearce was requested to present his paper at this time on grape culture.

GRAPE CULTURE.

By M. Pearce, Minneapolis.

There is no fruit that possesses so many good qualities as the grape, fresh from the vine. It is found in every inhabited part of the earth, where trees or plants will grow, either in a wild or cultivated state. To our native varieties we are indebted for the best varieties we have, such as the Concord, Delaware, Worden, Moore's Early, and others. The handling of the grape vine, necessary to the highest success, is practiced by but few in proportion to the many thousands who are attempting to grow this grand fruit. It is safe to say that in the Northwest not over ten

per cent of those who attempt the culture meet with success. This large percentage of failure does not arise from unfavorable condition of soil or climate, but from ignorance of proper methods of planting, handling, etc.

In trimming the vines in the fall, for fruiting the next year, nothing should be left on them but fruit buds, and these in such quantities only as the age and vigor of the root will bear. Heat and sunlight are the great essentials to ripen grapes; hence the warmest and sunniest place should be selected for them. They will do well on any dry soil, though a sandy loam is best in this region. Side hills sloping to the south, or east, are the most sought after. In cold countries the vines should be protected from the cold winds of the west or north; soil should be moderately rich and cultivated deeply. Make the rows seven



FIG. 1.

feet apart and the plants eight feet apart in the rows, setting the roots eight inches deep, spread the roots in all directions, and press the soil firmly about them; allow but one cane to grow, and tie it to a stake about four feet high; keep off all sprouts from the roots. When the new wood has made a growth of three feet pinch the top; pinch back the laterals to two leaves; hold the plant at three feet and the lateral at two leaves, the first year, by occasionally pinching back; this will develop the buds, make the plant stocky and increase the size and vigor of the roots. Such a plant is shown at Fig. 1. About the middle of October cut it back to three buds, and just before winter sets in press it flat on the ground and cover about five inches deep with earth, with a few inches of straw for mulching. In the spring uncover, tie to the stake, and when the buds push, select the strongest and rub the others off. Manage the growing vine precisely as during the first year, with this exception; let it attain four or five feet, according to the vigor of the vine, before the top is pinched; that is for one vine, all the laterals must be confined to two leaves, and all sprouts that may come from the roots must be promptly removed. Such a vine, if vigorous and healthy, will be well supplied with fruit buds for fruiting the next year. In the fall remove all of the vine except that part which contains fruit buds.

The grapevine has three distinct kinds of buds: fruit buds, forcing buds, and wood buds. The fruit bud is large, round, or

nearly so, at the base; top, oval or round. The forcing bud is flat, or medium size, with a slightly peaked or pointed top. The wood bud is small, flat at the base and pointed. Fruit buds,



FIG. 2.

when they start in the spring, will blossom at each joint from the first to the fourth or fifth. A forcing bud will never blossom unless it is forced to do so by pinching the top of the vine when fifteen or twenty inches long. A wood bud can never be forced into fruiting, to any advantage. There is from two to three weeks difference in the time of ripening the grapes from the two buds first mentioned. Fully nine-tenths of the grape growers of this country are using forcing buds for fruiting, and that is the reason so many grapes never ripen. It is of the utmost importance that grape growers should be familiar with grape buds, for on this everything depends. Whatever system of trimming you may practice, remove all buds except the fruiting ones, and in no case should these exceed twelve to any root. The number of fruit buds must be regulated by the age and vigor of the vine; young vines are often ruined by overbearing. Fig. 2 represents Fig. 1 when two years old, laid down ready to be covered for winter protection. Fig. 3 represents the same vine, the next fall, loaded with fruit.

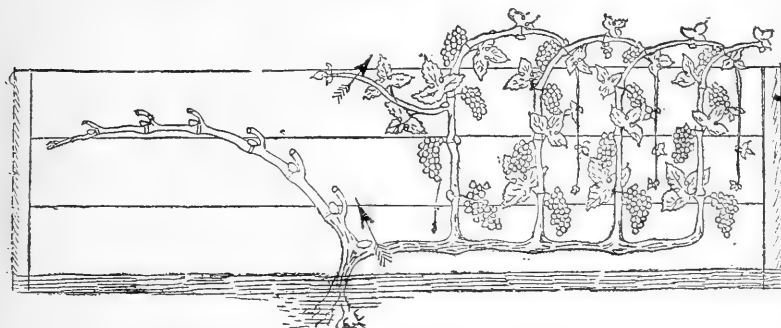


FIG. 3.—TRAINING VINE TO TRELLIS.

The trellis is of three No. 12 white wires, on posts three and a half feet high, the bottom wire twelve inches from the ground, the second midway between the foot and the top. The horizontal vine in Fig. 3 is Fig. 2 in its subsequent position on the

trellis, fastened to the lower wire, in the spring. The buds should all swell at the same time; this result is accomplished by elevating or lowering the vine at the top end; if the buds are making too much growth at the end of the vine, drop it down a little; if it is too slow elevate it; by so doing all the buds can be made to start together; this must be carefully attended to at the commencement of growth. When growth commences it will be very rapid, blossoms and clusters will appear at each joint as shown in the cut; tie the growing canes to the wires; when they reach the top wire turn them down between the fruiting canes as shown in Fig. 3. Allow nothing to grow but the fruiting canes and two leaves to each lateral. The long vine on the left is for the next year's fruiting; allow it to make a growth of six or seven feet, then pinch off and hold all the laterals to two leaves. In the fall remove the bearing arm at the point indicated by the lower dart. The new vine will be the next year's fruiting arm; this is known as the "renewal system," each year growing a fruiting arm or vine.

If you are growing from forcing buds, which is too often the case, pinch the top of each cane above the third joint; also the laterals beyond two leaves; keep off all sprouts that may appear; renew the pinching as new growth appears, and in no case allow the vines to go beyond the top wire. The grapes will be later in ripening, at least two weeks or more, than those from fruit buds.

The following are the most popular varieties for this region: Concord, Delaware, Worden, Moore's Early and Cottage. The last two named are large and good, fifteen or twenty days earlier than the Concord.

Grapes should be well cultivated till the first of August; after that pull out the weeds and they will do much better than if cultivated late. Trim in the fall as soon as growth ceases; this will hasten the ripening of the grapes the next year. Cover the vines as late in the fall as possible, as before directed. Uncover as soon as danger of freezing is over.

I am aware that my mode of handling grapevines differs from most growers in this region, but it is not new, has been fully tested by myself and other parties, and has been found to be far ahead of any other system. The principal advantages of this system are: early ripening, larger quantity and less labor.

DISCUSSION.

Mr. Harris. I would like to ask how many years you have been practicing your system of pruning?

Mr. Pearce. All my life; it is the old system and it has always been followed.

Mr. Brand. Would you advise propagating vines from cuttings treated in the manner you describe?

Mr. Pearce. I would say that you can take cuttings if you wish and grow them so that they will produce a crop of grapes in three years. You can grow fruit the next year even if desired.

President Elliot. That is not generally considered good policy.

Mr. Pearce. I would cut the vine so as to leave three eyes and no more. You can take some fifty of these and tie them together after taking them off in the fall. Make an excavation, putting the top ends down, covering with three inches of earth, then covering with two or three loads of manure; this will create an artificial heat. In the spring the buds will be calloused. Set in strong ground and if they are fruit buds they will grow. It is not policy if you are growing vines.

Mr. Harris. Care must be used not to put on too much manure or the vines will rot, and I think six inches of earth better than three for a covering. The object of the manure is to keep the frost out.

Mr. Pearce. We tried the process described, a year ago and were very successful.

President Elliot then read his annual address.

PRESIDENT'S ANNUAL ADDRESS.

Members of the Minnesota State Horticultural Society, Ladies and Gentlemen:

When I undertake to bend my mind from business cares and try to express in a clear and definite form an address worthy of the cause we represent, I can but wish that this task had fallen to the lot of some other member, better qualified to consider the many questions of interest that are to come before us. And when I read the many excellent annual addresses that have been given by my predecessors, I feel that your selection has been unwise. With this introductory, we come directly to our subject for this evening, with reference to a few points, as Shakspeare would say, "to leave no rules as blotches in the work" of horticulture.

HORTICULTURE.

What does it mean? Webster says, gardening; "The art of cultivating the garden." Those who follow its pursuits can be truly counted benefactors of mankind. It is an art worthy of the most intelligent research, capable of affording great pleasure to its devotees, and success can only be attained in it by constant care and vigilance. In this, as in other pursuits, only the cautious, calculating, painstaking investigator will become eminently successful in a climate like ours. To quote from an essay by G. W. Lawton, of Michigan: "No weariness in fruit growing is tolerated in mind or body if one would succeed; activity in both are prerequisites."

Passable crops may be raised by those not noted for great industry, but to make a good profitable business it must be conducted on business and scientific principles. The success we have attained has been by those who have chosen their location for operation with care, given thought to the preparation of their grounds, made judicious selections of varieties, planted intelligently and given proper protection against drouths, by cultivation, or mulching. The ambition and enthusiasm of one loving his profession will overcome all obstacles and make success of what would otherwise prove a failure. In some of its departments experiments can be finished in a few weeks or months; in others it is a life work, and in a few it requires the energy and patient toil of successive generations. If it is truly said that "time will accomplish all things;" we can hope and work on, believing that we may yet be able to produce hardy fruits for this vast area of country that has hitherto proved so uninviting to horticulturists.

To those not personally acquainted with experimenting in horticulture it seems an easy thing to grow fine fruits, flowers and vegetables; but the experience of those who have devoted the best part of their lives to this health-giving employment proves it otherwise.

When I look around upon these horticulturists with heads whitening with age, and think what results they might have attained had they devoted themselves as assiduously to other pursuits; what opportunities they have lost, what deprivations their families have undergone; when with only discouragements, losses, blighted hopes, failures in the past and utter ruin staring them in the face, oftentimes without a cent in their pockets, home

devoid of every comfort, wife shoeless and children crying for bread, they have worked on with devotion worthy better results. Think you politicians, lawyers, doctors, mechanics, artisans, ministers of the gospel, that you have been more devoted to your professions than these workers that place upon your tables luscious fruits, in your parlors and drawing rooms, beautiful flowers, and surround your homes with taste and adornment? Have you ever stopped to think how much you owe to this profession? Whatever success we have attained has been by patient, painstaking research, gleaning a little knowledge here and there; but the greatest teacher has been close observation and practical experience in the garden, the orchard and on the farm.

God has instituted certain laws with certain principles for governing his universe, and man must conform to those laws to obtain certain results. That there is a cause for all our failures no one doubts. The reason for our want of success in certain experiments has occupied the best thoughts of our leading pomologists and horticulturists hundreds of years. Whenever an attempt has been made to cultivate certain fruits above certain latitudes it has thus far proved a failure. Frost is king, and our most experienced experts in horticulture have not been able to ward off his icy touch. Many of the trees with which we have experimented will not endure a freezing temperature; others, while not killed, are seriously injured by our long winters, and it is conceded that a heavy frost in early fall, before the wood has properly matured, and while the sap is flowing, often injures trees that seem hardy enough to endure the coldest winter.

In the Minnesota Horticultural Report for 1881, page 41, Prof. Porter says: "Why vitality is destroyed by a low temperature is an unsolved question;" giving us to understand that it may be at some future time. I think we have much yet to learn in the acclimation of the Russian apple before it will prove entirely satisfactory. That it has some good points we must all admit; coming as it does inured to rigorous cold, we hope it may prove all its most sanguine friends anticipate. With these, as with all other new varieties, we should be cautious concerning extensive planting until fully persuaded that success is perched upon its banners.

In Hemsley's *Hardy Trees and Fruits*, page 563, on "Climate, its Influence on Vegetation," he says: "It is now universally conceded that no process of acclimatization can succeed in making a plant frost proof even to the extent of one degree." Now,

if this be true, can we expect great results from importation of these new Russian varieties? Should we not rather seek for hardy varieties among our own native seedlings? I do not discredit or discourage the introduction of the Russian varieties, but am glad they are received with so much favor by orchardists and experimentalists, and think it is possible that of the many we may find a few hardy enough to be worthy of cultivation, long keeping varieties of good quality.

In the words of another writer, "It is the misfortune of horticulture that there can be no fixed rules of procedure for all places, all varieties, all seasons." Experience, judgment and skill in observation, are needed by all who attempt to become proficient in our calling. Oftentimes the changing of a particular variety only a few miles is disastrous to its best growth and fruitfulness. Hence the necessity of experimental stations under the guidance of specialists to test and prove their adaptability. Some may say we have made progress slowly. Perhaps our failures and discouragements have made us overcautious; still this experience of the past may prove of benefit in the future. Where is he who has undertaken to raise fruit north of forty-four degrees that has not met with adversities? This does not dishearten a true son of horticulture; only sharpens his perceptions, increases his enthusiasm, and gives him greater appreciation of his successes. Do you think there is one among them that regrets enlisting in this good cause? They each have tried to prove that good fruit can be raised in all parts of our state, which has entailed upon us a large amount of experimental work as a necessity, and although not conducted in the most scientific manner, it has given us food for thought (if not for our stomachs) and helped to develop in us a more intelligent perception of the magnitude of the work.

Some croaker or critic has said that apple trees do not live long enough to be profitable. George J. Kellogg, of Wisconsin, says: "The most profitable pear out of fifty planted was one that never leaved out." This question of the longevity of the apple tree is of little moment, for if fruitful in a very few years it will pay good returns. What did Pliny say of this branch of horticulture over 1800 years ago? "The apple becomes old sooner than any other tree, and the fruit becomes less and is subject to attacks from insects while on the tree." Even though a large proportion die early we shall continue planting to the end of time. We should leave no stone unturned that may assist in developing

this branch of horticulture, and even if the great secret of success is not solved by this generation, we can but think the thoughtful research and experiments of some of the most intelligent pomologists of this and the old world may result in producing fruit hardy enough for every locality.

EXPERIMENTAL STATIONS

are just at this time receiving attention in both the National and State legislatures, and we most heartily sanction the well-directed efforts that are being put forth to pass the Hatch bill, so-called, when we may look for results that will be of great benefit to the northern portion of the United States; and every friend of horticulture needs to help carry forward this movement so ably begun and zealously worked for.

Norman J. Colman, United States Commissioner of Agriculture, in his last annual report, page 32, says:

“I have been able to establish during the year a pomological division in this department. The satisfaction of many leading thinkers with this departure has been generously expressed, not only through correspondence, but through offers of hearty co-operation in the methods employed to establish the division in a proper way. It is too early in the history of the division to enumerate definite results, but there is every prospect that, if properly encouraged, we shall be able to furnish the country, and especially its pomological and horticultural industries, with information of value. The United States contains some of the largest and best adapted fruit-producing regions in the world. Farmers everywhere are beginning to give thought to the necessity of diversification, and, naturally, a fruit orchard suggests itself as the fit successor of those crops which year after year have been exhausting his soil and lessening his annual profits more and more. The all-important step to the farmer then is necessarily the first one. What can science and the latest results of experience and information teach him in the matter of adaptation of fruit trees to particular soils and climate? This is what the division will endeavor to undertake to set forth. Different pomological experimenters, as well as agricultural colleges, have generously offered their grounds and personal labors to assist in any experiments that may be instituted.

“We may also make investigation relative to foreign fruits and the probability of their successful importation and devel-

opment in American soil, to meet the demands of local markets; we may ascertain the habit of every fruit not now known, and in divers ways assist an industry whose annual product probably represents a value of \$150,000,000 and is an important one to the United States. Our people need to plant intelligently as well as to reap intelligence through public schools, and it is just as much the province of the general government to assist them in one as in the other. Horticulture is elevating in all its tendencies, and, by advancing and protecting and promoting this and other branches of agriculture, our people will advance in those paths which lead to moral, intellectual and prosperous citizenship."

This is encouragement in the right direction, and with our central experimental station at the State University Agricultural Farm, and proper lines diverging all over our State, each pursuing experiments according to their facilities, we may in the near future expect marked results. Leaving this matter with them, let us devote our time and energies for the present to the improvement of small fruits, vegetables, shade and ornamental trees and shrubs, such varieties as can be successfully propagated and grown in our gardens, lawns and parks. Here is food for thought worthy of our attention; one that, if treated in the proper manner, should interest our sons and daughters to become useful members in our Society.

HORTICULTURAL EDUCATION.

This brings us to a point of great importance to our organization. How shall we increase our membership and create an interest and desire among our boys and girls for a horticultural education? The following is an extract from a letter received from Commissioner Colman:

"Your reference to having our schools teach the primary principles of horticulture is one that has been frequently broached and urged with more or less persistency, but this is a matter for action on the part of the superintendents of public instruction or the school boards of the several states. Text-books might easily be introduced."

Here is a suggestion regarding a much needed reform in the education of our rural population. A horticultural kindergarten may be one of the possibilities of the future in which may be taught the first rudiments of pomology and horticulture. All

education should have special reference to the occupation to be pursued. Feed a boy's mind with dime novels and reading from *The Police Gazette* and he will be a fit subject for your reformatory prisons. Give his mind horticultural food and the chances are he will become a horticulturist, pomologist, or farmer. It is said that first impressions on the mind of children are lasting and carried all through life. Then decorate the walls of your school rooms in part with instructive pictures of beautiful fruits, flowers and vegetables as object lessons; remodel your text-books by introducing in them practical horticultural teaching, and your sons and daughters, with tastes refined and elevated, will become producers of contented, happy homes and ornaments to society, and our industrial organizations of the next generation will receive the accessions they so much need.

One horticultural writer says: "The best means for the promotion of horticulture are those that will the most effectually overcome the obstacles in the way. One obstacle is a lack of taste for the business; another a lack of knowledge of the different varieties of fruits and flowers and the most approved methods of culture."

ENTOMOLOGY.

Our entomologist, Prof. N. H. Winchell, in the report of last year, made some recommendations that need your attention the present session. They will be found on pages 296-7 of the report of the Society for 1886.

Entomology is closely related to the interests of all classes of producers from the soil. It teaches us how to guard our crops from attacks and depredations of all insects, as well as the benefits to be derived from our insect friends. I herewith present a few extracts from a lecture given before the American Pomological Society, in 1886, by A. J. Cook, of the Agricultural College of Michigan:

"Prof. J. A. Litner observes that insects always impose a heavy tax upon the products of man's labor, and often manifest a desire to wrest from him the entire results of a season's toil. It has been estimated that each plant serves six species of insects for food. The names are given of one hundred and seventy-nine species of insects that are known to attack the apple. The Hessian fly often lays tribute to \$20,000,000 worth of wheat in one year in a single state. The chinch bug has destroyed \$75,000,000 worth of corn in a single season in Illinois. Thus we

see that this problem is one of great political and economic importance, and one worthy the consideration of our best statesmen, and the fact that we have legislators even who sneer at the word bug and at the study of bugs, and research in the matter of insect despoilation, shows that we have weeds in our legislative halls as well as in our own gardens. The latter are plants out of place; the former men out of place."

I sometimes fear that nothing less than a plague of the Hessian fly, wheat midge, cut worm, or army worm, will induce our legislature to make suitable appropriations for carrying on the investigations of insect depredations so much needed at the present time in our state. I quote from Prof. Winchell's report: "I would recommend renewed effort be made to secure an appropriation by the State Legislature for the necessary expense of a state entomologist."

TREE PEDDLERS.

From correspondence received the past season I judge the "festive" tree agent has been working his old racket, passing his wares upon the unsuspecting grangers, mechanics and artisans, in all walks of life. As a class they have their stories well learned; very winning are their descriptions of all they have, so fine, so cheap, and so hardy, and many of them have more "cheek" than a government mule. We do not oppose or ignore honest dealing, but when we find their stock in most cases entirely unadapted to the localities in which it is to be planted, much of it dead before delivery, never leaving out, and what survives the summer is sure to die the coming winter, and the prices from four to six times higher than any reliable nurseryman's, we think they should be discountenanced by all classes interested in the future welfare of our State. If their stock was passably hardy or adapted to the localities in which it was to be planted it would be much better. It is estimated that there has been over \$200,000 worth of all kinds of nursery stock disposed of in our State the past year; fully one-half unfitted for this climate. This money parted with for trash, worse than thrown away, gives cause for discouragement to many new beginners in fruit growing and home adornment.

If there is any class of commerce that needs attention and regulation by legislation at the present time in the interests of the taxpayers, it should be for the suppression of this dissembler,

the tree peddler. We need a law governing the sale of all classes of nursery stock through itinerant tree agents by requiring them to make application to the town clerk for a proper license, to be good for that town only, also that he shall deposit lists, with prices attached of what he proposes to sell, and whenever he is found selling or delivering stock not in accordance with said duplicate list, he shall be fined and the stock consigned to the brush heap to be burned.

This may seem a little harsh but it is sufficient only to protect the interests of a large class of people who have not a horticultural education. If honest nurserymen and agents look at this in the right light they will see a larger field for introducing their hardy stock, which will prove a blessing rather than a curse to our horticultural interests all over the State. This may not be the best way of reaching this evil, but I have thrown out ideas enough to set you to thinking and you can do with them what seems best.

ORGANIZATION AND COMMITTEES.

Our Society needs greater interest and enthusiasm among its members, a better organization of its committees with special reference to the work they have to perform. Many members think their responsibility for our success should cease when they have joined the Society, paid their dollar and received the reports furnished them. Now, this is not right; each should feel that on him rests a responsibility, and to derive the greatest benefits, he should be willing to undertake any duty placed in his charge. All committees should be constituted and arranged with special reference to their tastes, wishes and desires as far as possible. I would therefore suggest that a nominating committee of five persons be appointed, whose duty it shall be to recommend new standing committees and the names of three persons for appointment, that are qualified to arrange the work in their several departments and take full charge of them at all exhibitions of the Society, and prepare reports at the end of the year, to be presented at the annual winter meeting.

I would recommend the following new committees to be created: committee on apples, pears and plums; on grapes and their seedlings; on exploration for new fruits and flowers adapted to our state; on green houses and floriculture; on our native fruits; on deciduous trees and shrubs; on evergreens and

conifers; on marketing packages, and new horticultural appliances; on library; on bread, pickles, preserves and canned goods; on honey, sugars and syrups.

SECRETARY.

The responsibility for the success of our Society for the past two years has rested largely with our worthy Secretary—the right man in the right place, and, if possible, he should be retained there. Never before in the history of our organization have we had so efficient, reliable work performed by the Secretary, as by the present incumbent of the office. He has accomplished more work at a less cost to the Society than any man before employed. Our reports under his management can be pointed to with pride, and are worthy of exchange with all similar organizations in the United States. Of all officers in the Society, the Secretary should receive full recompense for his services, and I most heartily recommend an increase in his salary for the coming year.

STATE FAIR GROUNDS.

I hope our brother co-workers in the agricultural board will not think I am trespassing on forbidden ground in bringing to the notice of our members the great necessity of utilizing the fair grounds for park purposes. By this I mean such as are not needed for the use of exhibition buildings. It has occurred to me as well as to other members of the society, that before much more is done in building, there should be properly adjusted prospective plans procured, by some competent landscape architect, for their embellishment with roads and walks bordered with trees, shrubs and plants, suitable for the best results for the education of the vast multitudes who attend our annual fairs, that would be object lessons worthy of imitation by our citizens, in surrounding their homes for the enjoyment of their friends and children. These grounds are susceptible of being made the finest in the country, at a small cost, with very little ornamentation. Nature has left her impress here in a very pleasing way, and art will be helped very much in bringing out those points of greatest beauty, with very little difficulty.

Following is an extract from a noted work on the subject:

“The landscape gardener has most of his objects laid down. He must accept of locality with its natural features and the contour of the ground, which often prescribes a particular treatment; he must conceal deformities, elicit existing but apparent beauties, and to adorn whatever is susceptible of improvement. A man may thrust his preconceived fancies on a place as fast as he can stake them out, but if the treatment is to be adjusted to the ground, harmony and effect preserved, as they always ought to be, time would be given for the laws of suggestion to come into fair play. It is sometimes useless to attempt to undertake improvements of this character without consulting those that have made the art of landscaping a study.”

I wish to throw out an idea for your thoughtful consideration. This improvement may be delayed for a while for want of means to carry it forward, or it may be pushed with energy and wise foresight at once; but whatever action is taken, can not our members do something to help incite this undertaking, by furnishing or supplying in part a large proportion of the trees, shrubs and plants for the embellishment of this agricultural and horticultural home of all the industries. Let each individual member signify to our secretary what varieties they can furnish, and the present spring set apart some plat of ground in which to plant, care for and train a few specimens, which when the time comes can be transplanted, and for you and your children's reward you shall have the satisfaction of feeling that you have contributed something toward beautifying and adorning these exhibition grounds, and in future years shall point with pride to these living monuments that shall dispense comfort, enjoyment and instruction to our children and the generations to follow, and be reminders of what we, as an organization, have helped to accomplish.

HARMONY OF ACTION.

One author says: “Every vegetable and animal constitutes a machine of greater or less complexity, composed of a variety of parts dependent on each other, and acting all of them to produce a certain result, and on this account called organized beings. Thus defined, each member becomes a constituent part of the whole organization, and all are dependent on each other to accomplish certain ends.” So we, as an organization with diversified interests and desires, striving to accomplish the greatest good to the largest number, casting the unpleasant

things out of our minds and sight, striving ever to teach and be taught, believing that we individually are responsible for the prosperity of our society and the development of all its interests, physically, mentally and morally.

RETROSPECTIVE.

When we look back over the twenty years of our connection with this Society, and see the great unity of purpose that has always prevailed, all fraternizing more like brothers than individual members of society, I assure you that we all have feelings that call for gratitude to know that so great harmony has existed. At times there have been little clouds of dissension perceptible, but with a little tact and foresight, along with the prevailing good judgment of our officers and members, they have been dispelled.

PREMIUMS AND PREMIUM LISTS.

I wish to record a kind word in recognition of the friendly manner in which the executive committee of our society was received by the State Board of Agriculture on the presentation of our wishes concerning the revision of their premium list for the last exhibition. After a careful inspection of the old lists and a free discussion on the inequality of dividing the amounts to be apportioned to the several classes, we found they were generous in giving us very near what we wished for in the three classes which were set aside for our society to superintend and manage, nearly \$2,000. This amount we divided, giving to fruits \$716; greenhouse and cut flowers, \$354; vegetables, \$520; bread, honey, etc., \$325. We increased the premiums on single plates and cut the amount down on sweepstakes; we also made some changes favoring outside counties, which gave offence to some organizations in the two cities.

The coming year I recommend a special list of premiums on vegetables for outside counties to compete for, and the giving of exhibitors in the three counties of Hennepin, Ramsey and Dakota a special sweepstakes for county exhibit. This, I think, will be fair, and in a measure appease their righteous indignation.

The revision of the premium list should be put into the hands of a competent committee early that they may prepare it before the busy season of spring.

The exhibit of fruits last September at the fair grounds was the finest in quality as well as largest in quantity that we have had,

and was very favorably commented upon by visitors from abroad; especially the apple and grape show. Friend Tuttle's Russians were a drawing card, if we were to judge from the packed crowd of earnest questioners in front of his exhibit. The exhibit from the State Fruit Farm of seedlings was very fine, consisting of many varieties of worth to the fruit growers of the Northwest. The exhibit of wild and native plums, although late in the season for them, was very good and gives great hope of their future development; we need to encourage greater activity in their selection and propagation. One variety of particular merit is the Rollingsone which I consider one of our best for all purposes.

Bread, pickles and preserves were received in large quantities, showing what the ladies can do when they come to the front with their handiwork in this department; and one wonderful feature of this exhibit was so many kinds of superior quality, so much so as to give the committees great difficulty in judging and placing the ribbons. Bread and cake shown by the young lady exhibitors, was very fine, giving much cause for congratulation, that whoever the lucky man is that wins, will not eat heavy, sour bread—one of the abominations of the past!

The report from the vegetable department will be attended to by Brother Grimes, its superintendent.

The greenhouse department was very well represented by three leading firms of our state, who exhibited many fine specimens of the floral kingdom. In this department we find one of the worst problems to solve satisfactorily, in the finding of proper committees to pass judgment and make awards that shall be just right. Committee work at our state fairs and exhibitions is a good deal of a thankless job, they always getting more censure than praise.

I wish to call your attention to the propriety of procuring in the future proper appliances for making exhibitions in the central portion of Horticultural Hall and around the fountain. These fixtures are very necessary to provide means of making your displays instructive and attractive.

Our state, if not noted for its extensive orchards of beautiful, long-lived trees, can boast of a few never-failing natural productions that vie with the world. In its crops of pine trees, icy crystals and howling "blizzards," we find those that thrive and grow without the fostering care of man; and we hope with the aid and energetic persistency of our patient investigators, to accomplish in the future the development of a pomology pecu-

liarly adapted to our broad prairies, diversified hillsides, sheltered valleys and along the shores of our many beautiful lakes, with varieties that shall put to blush, for quality and exterior polish, those now already in cultivation.

AMERICAN POMOLOGICAL SOCIETY.

The meeting of the American Pomological Society, to be held at Boston in September next, is an event our Society should not overlook; but should be ably represented by delegates with as fine an exhibition of fruits as can be collected from our orchards and gardens. This would incur an expenditure to the Society of perhaps three hundred dollars, in order to make an exhibit of credit to the State. The propriety of incurring this expense is a matter for your consideration. One or more delegates should be selected whether an exhibit is made or not.

NECROLOGY.

On the sixteenth of last December there went out from earth the spirit of one of the most noted men in the science of pomology of the present century, the honored president of the American Pomological Society, Hon. Marshall P. Wilder, of Roxbury, Massachusetts, and an honorary life member of this Society, at the ripe age of eighty-eight years.

He died as he lived universally respected and beloved, like fruits in their season he passed, but his name will ever be revered and he will be remembered as the great leader in American pomology to the end of time. To quote what he wrote of another noted horticulturist is very applicable now:

“Few are aware of the great revolution that has taken place in fruit culture since the establishment of this national organization, the American Pomological Society, under the care and guidance of this man, whose desire for the cultivation of the useful and ambition to sow broadcast love, kindness and fraternal affection, led him to spend his life in the promotion of our art.”

I shall ever hold dear in my memory the remembrance of the meeting of this grand old society in Boston, in 1873, and the new impulse I at that time received. As I look back through the lapse of years intervening I can see to-day that superb exhibition of fruits and flowers, the finest this country had ever

brought together. It was a continuous ovation under the guiding mind and hand of this great and good man; an event which will be referred to by those present as a bright spot in the work for the promotion of this great industry. I look back at the banquet given as a parting compliment, at Music Hall, at this wedding feast of the silver anniversary of the society, celebrated as its crowning glory, under the auspices of the most sumptuous hospitality, with this grand man the center of attraction, occupying the place of honor on the platform, flanked on either side by distinguished gentlemen and ladies, guests of the association from the North, the South, the East and the West. After this sumptuous banquet was served President Strong, of the Massachusetts society, made a speech of welcome and offered the following sentiment: "Hon. Marshall Pinckney Wilder; pomology and horticulture alike claim him as one of their most devoted and self-sacrificing patrons, and vie with each other in doing him honor."

To give an idea of his knowledge and research I read an extract from his reply.

President Wilder said: "The present occasion will be memorable in the annals of American pomology, not only as marking an important epoch in the history of our society, but for the large assemblage of the best cultivated of our land and the remarkable collection of fruits which has graced the exhibition of the week. But the thought which engrosses my mind at the present moment is the wonderful progress of fruit culture during the present century.

"True, our Puritan fathers in planting the seeds of empire did not forget to plant some fruit trees. Gov. Endicott at Salem, Gov. Stuyvesant at New York, and Peregrine White at Plymouth planted their pear and apple trees. But during the first century and a half very little attention was given to the cultivation of fruit. It was not until after the establishment of the London and Paris Horticultural societies, the former in 1808 and the latter in 1827, that any considerable progress had been made in the improvement of fruits. In fact, there were very few horticultural or agricultural societies extant until the beginning of the present century. The first agricultural society established on this continent was the Philadelphia Society for the Promotion of Agriculture in 1785, of which our own Timothy Pickering was the first secretary. It is but just to state that a similar society had been started in South Carolina a month previous, but I believe

does not now survive. The second agricultural society in America was the Massachusetts Society for Promoting Agriculture, formed in 1792, whose delegates honor us with their presence. But to confine myself to horticultural societies. The first, still existing, in America was the Pennsylvania Horticultural Society, established in 1827; the second was the Massachusetts Horticultural Society, formed in 1829. The first national pomological organization of which we have any knowledge was the American Pomological Society, whose quarter centennial we this day celebrate. Now there are more than 1,000 agricultural, horticultural and kindred associations registered on the books of the department at Washington.

“You have been pleased to allude to me in connection with horticulture as well as pomology. Well, sir, let me say that, from my earliest years, I can not remember the time when I did not love the cultivation of the soil, and the more I am brought into communion with nature, the more I am full of gratitude to the Giver of all good that He gave me a love for fruits and flowers, and cast my lot where I might enjoy them and have sweet intercourse with these lovely objects of creation. And who does not look with wonder and admiration on the infinitude, beauty and perfection of these works of the Hand Divine. The enameled blossom bespangling the orchard with starry spray scarcely less numerous than the glittering host above, dancing in rainbow hues and flinging on the breeze a fragrance richer than Ceylon’s Isles, sweet harbinger of bountiful harvest; the luscious fruits, God’s best gift to man, save woman — the velvet peach, mantled with beauty’s softest blush, and vieing with the orieny of the morning; the delicious plum, veiled with silvery bloom over robes of purple or cloth of vegetable gold; the royal grape, the brilliant cherry, the melting pear and the burnished apple, tempting human taste from the mother of our race to her last fair daughter. But what pencil can sketch the changing hues, the magnificence and glory when Pomona pours from her ever-flowing lap the very treasures of the ripening year. Here are creations originally pronounced ‘very good.’ Here are beauties which fade only to reappear again.

“From the beginning there seems to have been an intimate connection between trees and man. Trees are spoken of as though man could not live without them, as though divine beneficence had given them to us as companions for life, and as emblems of all the beautiful in imagery, excellent in character, or

hopeful in destiny. Our trees—from the opening bud to the golden harvest—from the laying off their autumnal livery, and during their rest in winter's shroud, waiting a resurrection to a new and superior life—all are eloquent preachers, proclaiming to our inmost soul, 'The hand that made us is divine.' God gave us trees adorned with inimitable beauty, pleasant to the sight and good for food. He gave us also a natural and instinctive love for them. Witness the love of Abraham desiring to have all the trees that were in the field, and in the border round about—of Rosseau longing to be laid under his own sequestered trees—of Temple directing that his heart should be buried beneath the tree of his own planting—of Washington returning to the cherished groves of Mount Vernon—of Webster reclining in life, and sleeping in death under the umbrageous elms of Marshfield—of our own Downing, whose genius lives in trees which adorn many a lovely landscape, many a beautiful garden, and many a fruitful orchard in our land."

I can render no more fitting close to this tribute to the memory of one so dearly beloved by all those who love the true, the beautiful and sublime, than by quoting the closing remark of Gov. Washburn, of Massachusetts, to the next sentiment, "Massachusetts:"

"But my friends, I recollected that although he might pass away, his works would live after him, and the monument he had been able to rear and perpetuate would stand when the mere monuments of granite and marble should be forgotten; this monument which will speak in language too eloquent ever to be forgotten over this broad land of ours."

On motion the following committee was chosen on the president's annual address, viz.: Prof. D. R. Maginnis, J. S. Harris and C. L. Smith.



IN MEMORIAM.

Mr. Harris. Mr. President, it seems to me appropriate at this time that some action should be taken with reference to the matter of the death of the Hon. Marshall P Wilder, although from the lateness of the hour I fear we can not do the subject justice. As a member of the Committee on Obituary I have drafted some resolutions.

The last fifty years is marked as the period of the greatest improvement and progress in horticulture and kindred arts and sciences recorded in the history of the world, and most of these improvements have been instituted and developed through the disinterested labors of men born since, or about the beginning of, the present century, who have made their lives a blessing to humanity, and crowned themselves with unfading laurels. One by one these remarkable men of the age are laying down their armor and departing, to join the greater number in that happy realm, of which that first "Eden" was only an inspiration. Within a few years we have mourned the departure of a Warder, Kirtland, Bryant, Vick, Downing and many others, whose well-ordered lives, devoted to the public good in the development of horticulture in our country, had earned names as useful men of their time, that caused their death to be regarded as more than a national loss. And now we have received the sad message informing us that the greatest and best, the acknowledged leader of them all, the great and good man, the venerable Marshall P. Wilder, the president of the American Pomological Society, has gone over to the other shore and joined that band of worthies.

Mr Wilder was a man who was a model worthy of being patterned after. I have read his addresses and articles published in various papers throughout the country, and have never seen a word from his pen, or listened to a word that he has spoken, but that seemed to me to be words of wisdom and words fitly spoken. He was a man of the greatest charity, who ranked far above the great majority of his fellows; he seemed to have a boundless love for everybody. It is said of him that there was no man so objectionable but he could see some good in him and point it out to others. He was one of the most remarkable of men in presiding in horticultural conventions. He was an honorary life member of our Society and seemed to have a fatherly care over it. We have frequently received communications from

him and he has always spoken encouraging words and seemed to take a deep interest in our work.

Marshall Pickney Wilder died at his home in Roxbury, Mass., Dec. 16, 1886. He was born at Rindge, N. H., Sept. 22, 1798. Of his early history we learn that he commenced attending the public school when four years old; at twelve he entered the New Ipswich academy where he remained one year and then pursued his studies for three years under a private tutor. At the age of sixteen his father gave him the choice of preparing himself for the life of a farmer, merchant or professional man. He chose the first and spent the next few years upon his father's farm, and among the lakes and forests of his native state where he laid the foundation for the enduring health to which he was greatly indebted for the mental and physical energy that has distinguished his subsequent career, and there he imbibed inspirations and a love for everything beautiful in nature, that had much to do in moulding his long and useful life. In 1825 he removed to Boston, Mass., and engaged in the mercantile business, in which he amassed a comfortable fortune and attained a high position as a business man, and no man in our country has been honored with a greater number of important trusts. But it is in the pomological and horticultural world where he was most widely and favorably known and his name has been synonymous with progress in horticulture and pomology throughout North America for more than half a century. His name is a household word in every home in our land where good fruits are appreciated, and it has been truthfully said of him that he was one who by his industry and determination has not only conferred lasting benefits upon his own country but has by his careful researches in hybridizing and selections in fruit culture laid the horticulturists of all nations under heavy obligations. We read of him in 1829 as one of the prominent members of the Massachusetts Horticultural Society, and ever after as one of its most zealous and efficient members, and for many years its president. He was its president in 1844 when it laid the corner stone of Horticultural Hall, which is believed to be the first building ever erected by a horticultural society for its exhibitions.

In 1848, as president of the Massachusetts Horticultural Society, he headed a circular addressed to all the horticultural societies and leading pomologists throughout the country, calling a convention in New York, which was held in October, and re-

sulted in the organization of the American Pomological Society, of which he was chosen the first president, and has been re-elected at every subsequent meeting, and held the office until the hour of his death. To him the State Agricultural College at Amherst owes its existence, and every society or movement for the promotion of agriculture or horticulture throughout our country has received his kindest sympathy and been strengthened by his wise councils.

In his addresses to the American Pomological Society he has set up a lighthouse and flung a banner to the breeze from its highest tower, upon which is inscribed in letters of light the method for the sure solution of the fruit question adapted for all lands: "Plant the most mature and perfect seeds of the most hardy, vigorous and valuable varieties; as a shorter process insuring more certain and happy results, cross and hybridize our finest kinds for still greater excellence. Go on; go on while you live, and when we are gone others will rise up to chant our old song:

Plant the best seeds of all your best fruit,
 Good fruits to raise that some lands may suit;
 Fruits which shall live their blessings to shed
 On millions of souls when you are dead.
 Plant; plant your best seeds, no longer doubt
 The beautiful fruits you may create;
 Fruits which perchance your name may enshrine
 In emblems of beauty and life to shine."

The following beautiful paragraph occurs at the conclusion of his last address to the American Pomological Society at Grand Rapids, Michigan, in 1885: "Fruits are the overflow of nature's bounty — gems of the skies which are dropped down to beautify the earth, charm the sight, gratify the taste and minister to the enjoyment of life, and the more we realize this the more shall we appreciate the Divine goodness to us and the duty of providing them for others." May these parting words of our wise and noble friend be indelibly imprinted upon our memory and stimulate us to go forth planting orchards and gardens that shall be fitting and enduring monuments to his memory.

The father of American pomology lived long beyond the age commonly allotted to man, and continued his life work to its close. Sadly do we mourn his loss and cherish his name as one of the most useful men of his time, a name that shall be handed down all through the coming ages, honored and revered.

Resolved, That the members of The Minnesota State Horticultural Society have learned with deep and sincere regret of the death of the aged and highly respected honorary member of this Society, Hon. Marshall P. Wilder.

Resolved, That the members of this Society appreciate the life-long labors of Mr. Wilder, his devotion to the development of pomology in our country and his thorough earnestness in endeavoring to awaken a higher appreciation of trees, fruits and flowers among the people, and we commend his example to all horticulturists of future generations.

Resolved, That we offer our deep sympathy to his friends in this their great bereavement, and to the American Pomological Society, the Massachusetts Horticultural Society and other societies of which he was an honored member, and that as a token of our profound respect for his memory, these proceedings be entered on our records and copies of our transactions be forwarded to his family, to the secretaries of the above societies and to the secretary of the New England Historical Genealogical Society.

The resolutions were unanimously adopted, and on motion the meeting then adjourned till Wednesday morning.



MORNING SESSION.

SECOND DAY, WEDNESDAY, JAN. 19, 1887.

The meeting was called to order Wednesday morning at 9:30 by President Elliot.

The president stated the first thing in order would be the report of the Seedling Commission.

REPORT ON SEEDLING FRUITS.

By J. S. Harris, La Crescent.

Our first official visit was made at Granite Falls, June 28, 1886, where we found a live and strong county horticultural society with O. E. Saunders, president, and A. B. Regester, secretary. We enjoyed the pleasure of joining them in their summer meeting and small fruit show. The meeting was held in Regester's grove, was well attended and a success. Addresses were given on evergreen planting, strawberry growing, birds, insects, etc., and the different subjects were pretty thoroughly discussed. Another interesting feature of the meeting was individual reports by the members upon the trees planted the past season. Strawberries recommended for cultivation were the Crescent and Wilson, and one speaker said if they could not succeed with these we had better let strawberries alone. The strawberries, raspberries, currants and gooseberries upon exhibition were very superior, and all of these fruits do well here when mulched and given clean cultivation, except there is considerable complaint about the Doolittle Raspberry blighting badly. An examination of the plants failed to reveal the cause, unless it came from injury to the canes by the severity of the winter. If that be the cause, covering with prairie hay might obviate the difficulty.

A goodly number of ladies were in attendance; they brought along well-filled lunch baskets the contents of which

were spread upon ample tables in the grove, and we were invited to partake of an elegant horticultural dinner. It was one of the best meetings of the kind we ever attended and we are pleased to add that this society promises to accomplish a good work in that locality.

Our next visit was made at Excelsior August 7th, a place that has gained considerable notoriety for the large quantity of very superior small fruits and grapes grown there, and for being the place where the State Experimental Fruit Farm is located. We went through several vineyards and found the grape crop a large one and the fruit very fine, the Delaware and Concord taking the lead in the varieties under cultivation.

THE STATE FRUIT FARM.

Our objective point was the State Experimental Fruit Farm. We found Mr. P. M. Gideon, the superintendent, at home and ready to conduct us through the orchards and nurseries and to explain everything for us. He has so often explained his method of conducting experiments that it is needless for us to repeat it. We found in the orchard, which apparently has been set six or seven years, and from that time down to the present season, a considerable variety of apples of his own origination, intermingled with dead and dying varieties that had been set for the purpose of fertilizing and crossing the fruit for said purposes. The living trees are evidently crosses between Duchess, Wealthy and varieties of the Siberian species. Many of the trees were bending down under the weight of fruit; some of the fruit was of fair size and very beautiful to look at. The season was hardly enough advanced to judge of the quality of several of the varieties. Taking the Duchess of Oldenburg as a standard for hardiness, many of the trees are exceedingly hardy, and some five or six of them may occupy an important place in our lists of varieties for trying situations. Varieties named August and September are profuse bearers, of a good, medium-size fruit, of excellent quality for cooking and drying. The Gideon is an apple of good appearance and one of the latest keepers; tree productive and apparently hardy, but in this locality subject to blight. Some seedling trees, fruiting for the first time, look very promising and may prove longer keepers. It may be well to add here that the first fruiting of a seedling is not always a safe criterion of its worth; fruit frequently improves in flavor, size and keeping

quality as trees become older. We noticed two varieties of Siberian, the Cherry Red, and Florence, that ought to supersede some varieties that are now being extensively planted.

In a younger seedling orchard we saw some very fine trees, and a few of them were carrying specimens of fruit; one of them we would like to know more about. It had a striking resemblance to the Rhode Island Greening.

IN McLEOD COUNTY.

August 9th and 10th we visited Glencoe, Sumter and other points in McLeod County. In reaching this region we pass over the Hastings & Dakota Railroad from Minneapolis. The country along the road is rolling and much of it has been heavily timbered, showing a deep, rich soil, with a more or less tenacious subsoil, and from its striking similarity to some of the best fruit districts in America, we are led to entertain the opinion that it will yet enjoy notoriety, as a good apple and grape-producing district.

Siberians, Duchess, and some trees of the Wealthy are looking fairly well and bearing a good crop of fruit. Most of the farms have an abundance of timber. Most conspicuous among the varieties we notice sugar maple, American elm, black and white ash, three or four species of oak, bitternut, hickory, butternut, basswood and ironwood. In underbrush the predominating species are hazel, prickly ash, wild grapes and wild rose. About Glencoe considerable attention is being paid to growing small fruits and vegetables. In the village gardens, strawberries, red raspberries and currants are doing well; vegetables are remarkable for size and superior quality. The great drought of the season has not proved as damaging here as in many other sections of the State.

Mr. Cutler, of Sumter, joined us and we visited a farm about five miles south of Glencoe for the purpose of examining some seedling apple trees that had been reported as promising. A number of trees upon this farm had fruited in previous years but all save one had succumbed to the Frost King in 1884; this one the owner says was the poorest in the lot, is carrying some fruit. It may be hardy but the trunk has been badly injured by borers. There is upon the place a younger lot of seedlings that will soon commence fruiting. As the seeds were procured from the state of New York we have very little hopes of any good results from them.

From here we go to Mr. Cutler's farm at Sumter. He is making a success with small fruits. Crescent strawberry fertilized with Wilson and Glendale is proving the most profitable. Where the soil is not too rich they hold up well for shipping to points twelve to fifteen hours distant by mail. The Turner raspberry is doing well; Cuthbert is very promising, Stone's Hardy blackberry is not proving satisfactory. Mr. Crandall and others of his neighbors are succeeding well with grapes and small fruit.

IN BLUE EARTH COUNTY.

August 13th, at Mankato.—We visit Mankato and spend the day in visiting gardens, vineyards, etc.

Hon. Daniel Buck has a large garden devoted almost exclusively to the growing of small fruits in which he engages with enthusiasm and is meeting with gratifying success. His favorite fruit is the grape and he is experimenting upon and has under cultivation thirty-three varieties. His vineyard is one of the best we have ever seen in the State, and most of the vines were carrying a heavy crop of fruit which was just beginning to color. The vines are generally vigorous and the foliage healthy. A careful examination does not reveal any appearance of mildew upon the leaves or rot on the fruit. The varieties most extensively grown are the Delaware, Concord and four or five of the best Rogers Hybrids, and for trial all of the most noted of the newer varieties; Agawam (Rogers'15) were loaded to their full-est capacity with the largest and best clusters we have ever seen that variety produce. Another variety, probably Barry (No. 43), is surpassing the Concord in fruiting and has the advantage of being a few days earlier in ripening. Brighton is carrying an immense crop and strikes us as proving to be one of the most valuable grapes for this State. Pocklington and Moore's Early are not fruiting as heavily but the vines are reasonably vigorous and the fruit is superb. Mr. Buck expresses the opinion that we should give more attention to the production of seedling fruits and believes it is probable we may, by continuously planting seeds of home-grown plants, originate a variety of grapes as large and vigorous as the Concord and earlier than the Champion or Moore's Early. One or two such varieties would prove a bonanza to the originator and make successful grape culture possible for every owner of land in the Northwest. He has several hundred plants started from seeds of his earliest varieties now well started; one of them, three years old, is carrying

some fruit of fine appearance. Currants, strawberries, raspberries and blackberries in several varieties are all doing well.

We also visited the vineyards of Dr. Wickersham, and find him a very successful grape grower. He is succeeding well with the older varieties, while Brighton, Pocklington and Martha are doing remarkably well. The doctor has a small orchard in bearing; many of the trees, however, were scorched by the late hard winter. We meet and form the acquaintance of David Quinn, who is a very successful grower of small fruits, and find that he is the owner of about the best orchard in this vicinity. The varieties are principally Duchess, Tetofsky, Wealthy, and Whitney and some of the newer Siberians and Hybrids. The Wealthy is considerably injured and he lost all other varieties except the above named in the very disastrous winter of 1884-5.

We believe this section of country possesses peculiar advantages for fruit culture and that large quantities of it could be profitably grown.

August 14th.—We spent an hour or two with John Mathewson who is located a little south of Ramsey, on the line of the Southern Minnesota Railroad. The orchards here are looking badly, the worst of any point we have visited. From an observation of the soil and lay of the land about here we infer nothing but the Siberians and hardiest varieties of apples will succeed. Sharp agents have traveled through here and their villainous operations have about discouraged the farmers from doing any more tree planting. Wherever tried strawberries are a wonderful success, the Crescent taking the lead. Red raspberries are also doing well; blackcaps are reported as being subject to blight. Vegetables succeed so well here that farmers have no reasonable excuse for not having their tables well supplied with them as well as with small fruits.

AT MINNESOTA CITY.

August 17th.—We spend a day at Minnesota City, about six miles above Winona. This place is historic grounds in the annals of Minnesota horticulture. Here, in 1852, John Shaw, of Penobscot County, Maine, planted a large quantity of apple seeds, many of the trees from which proved very good, and were made the nucleus of many orchards within a radius of ten miles. Many of the trees proving so hardy as to survive and produce large quantities of fruit down to the winters of 1884-5-6, setting Winona County ahead of every other county in the State for apple culture, and proving beyond a doubt that fruit could profitably

be grown. This place is the home of O. M. Lord, one of the managers of our Society's experimental stations. He is engaged in testing our native plums more extensively and thoroughly than any other party in the State, or perhaps the entire Northwest, and is gathering in for the purpose every variety that has gained local notoriety, and planting them side by side with the Rollingstone, a variety he found growing wild upon his farm. Among those that have fruited he has not found any one that surpasses that variety for general purposes, and very few that anywhere near approach it as a dessert fruit. The fruit of this variety is medium large, round, and of a purplish red color; flesh more firm than any other variety of natives we have seen, flavor very good; skin thin and nearly tasteless, and when the fruit is thoroughly ripe is easily peeled from the flesh. The fruit will keep longer after ripening and bear shipping further than most of the native plums. The trees are hardy, strong growers, of a lower, more spreading habit, than most of the Canada species.

His trees fruit annually and come into bearing when very young. We found a portion of them just ripe, and judged by the appearance that the full crop would mature within two weeks from the date of our visit. He has trees of the Cheney plum — a variety introduced by Mr. Markle, of La Crosse, Wis., — that are looking well. The Cheney proves to be the earliest and largest, and has no superior for canning and preserving, as it is almost free from acidity in skin and pit. Mr. Lord also has the De Soto in fruit, and esteems it very highly; it is a little later in ripening than the Rollingstone. A considerable number of the variety bore some fruit, but this being their first year, and the season a very dry one, we do not think it fair to make comparisons, but will say that this season the Weaver is very fine, and being a free-stone variety and a little later than the others, is very desirable. Now we think we have found a good set for the farmer's garden, viz.: Cheney, Rollingstone, De Soto and Weaver, that will afford a continuous supply of fruit for a whole month. We hope yet to find good earlier and later varieties, and that through cultivation and propagating by seedlings we shall increase the size and improve the texture and keeping qualities of this most delicious and wholesome fruit.

His apple orchard was nearly annihilated during the winter of 1884-5; nothing but a few trees of Duchess, Wealthy, Early Strawberry, and two or three other Siberians remain. These are all fruiting well this year. Mr. Lord says this is the second

time the trees have been killed upon this farm, but he considers that they lived and bore fruit long enough to pay him well. He is replanting, using such of the old varieties as had proved the most profitable, and adding, for trial, new varieties that promise well, as fast as they can be procured from reliable parties, giving preference to such as are reputed to come into early bearing.

Mr. Lord is a fine horticulturist, careful in keeping track of varieties, and we trust whoever knows of choice varieties of native plums, Russian or seedling apples, will give him an opportunity to test them.

Mr. Lord is doubtless the most successful blackberry grower in the State, and has no reason to complain of the success he has had with raspberries and strawberries.

IN FARIBAULT COUNTY.

August 21st.—Winnebago City is a prosperous village in Faribault County, one hundred and seventy miles west of the Mississippi River. Faribault County, on the southern boundary of the State, is one of the best agricultural counties in Minnesota. The general surface of the land is gently undulating; the soil is a deep, black, sandy loam, well adapted to growing grains, grasses, vegetables, and probably all varieties of the small fruits. It is essentially a prairie county, although native timbers are quite well represented, and on every hand are groves of planted timber dotting the country and affording shelter to stock and farm buildings. These groves vary in size from one to twenty acres; some of them are over twenty years old and furnish their owners with sufficient timber for fuel and the ordinary demands of the farm.

We spent a day at Winnebago City and vicinity and visited the original tree of the Hotchkish seedling apple. The seed from which the tree originated was planted by Mrs. Kimball, deceased, over twenty-five years ago. The tree has been a very prolific bearer, producing a large, green apple, said to be of excellent quality and a long keeper. Old settlers of the town pronounce it the best apple they have ever seen in the West, while it has always been as hardy as the Duchess and seemed to stand our winters perfectly, until 1883-4. In the spring of 1884 it showed signs of injury. The present owner, Dr. Beebe, fearing that it was about to die, has given it what might well be termed heroic surgery, and removed a large portion of the top. A careful examination

shows that the trunk and axils of the branches do not show signs of injury from the severity of our winters. There are no blight patches in the crotches, and the wounds made in pruning do not indicate an advanced stage of blackheart. The distance from the ground to the lower branches is five or more feet; the bark is clean and healthy; foliage large, thick and resembles the Duchess. The tree is standing in a strong blue-grass sod, and in such a position that heavy rains would run off, instead of penetrating to the roots, and there is much reasonableness in the opinion of a neighbor that the injury to the top was occasioned by excessive drought. It has not fruited this year, but has thrown a new growth of from twenty to thirty inches with no signs of blight. Further search showed that all orchards in this vicinity were more or less severely injured by the late hard winters, but not as much so as in some other portions of the State. We find the Wealthy bearing fairly well, but all the older trees are unsound.

IN CARVER COUNTY.

Upon the ninth of September the full commission met at the farm of Charles Luedloff, in Carver County.

Carver County is one of the "Big Woods" counties, one of the richest in the State, and is one of the best fruit regions in the Northwest. In 1884 there were over 20,000 apple trees in the county, producing liberally. It was the superb fruit of this county that made it possible for our State Horticultural Society to make so fine an exhibit at the meeting of the American Pomological Society, at Philadelphia, in 1883, where our apples were awarded the highest prize (the Wilder medal), in competition with every other state in the Union.

Mr. L. is a thrifty German, entertains broad and progressive ideas, is a most genial host, well versed in American and German agricultural and horticultural literature of the day, and one of the most enthusiastic experimentalists and horticulturists we ever met, and has unbounded faith in the future production of fruit in this State. He is the manager of one of our horticultural experimental stations, and is conducting experiments on a more extensive scale than any other experimentalist in the State. He has, at considerable expense and trouble, gathered together about all seedlings that have gained notoriety in the Northwest, and also has under trial about one hundred varieties of Russian apples, and other fruits, many of which promise to succeed well

in this region. But very few of them have yet arrived to a fruiting age. He has had large and fruitful orchards, but the winter of 1884-5 was very disastrous to them. However, he is not discouraged, but intends hereafter to grow principally Russians and such seedlings as give promise of success. He does not expect all of these varieties will prove successful or stand our climate, but that a number of them will prove to be perfectly hardy, and that others, through a process of selection of seedlings — like that pursued by Van Mons, in France, with the pear, and of Mr. Bull, of Massachusetts, with the native grape — will surely result in acclimatizing and improving them.

He is getting about him a very extensive collection of deciduous and evergreen trees and shrubs, from Europe and America, which, if they prove adapted to our soil and climate, will be of inestimable value for forestry and ornamental planting. His dwelling is sheltered, and the surrounding grounds ornamented with scores of elegant trees and shrubs, to secure which he must have laid tribute upon many lands.

In his garden we found every variety of vegetable that contributes to good fare upon the farmer's table, growing luxuriantly. Strawberries, raspberries, blackberries and grapes were also in great abundance, all of which are succeeding very well with him. We noticed two varieties of native plums — one bearing a striking resemblance to the De Soto, and the other a free-stone of the Weaver type — which struck us as being worthy of propagation. There are numbers of other varieties which he has recently secured, with some from Russia. He has several of the new Russian poplars and willows, and from their remarkably rapid growth, healthy appearance and great beauty, we believe they will prove great acquisitions.

September 10th. — We visit the place of Andrew Peterson, at Waconia. He is a native of Sweden and the owner of a good farm, situated about two miles east of Clear Lake. Like Mr. Luedloff he is an earnest and intelligent horticulturist; his orchard is the most promising one we found in the State, and is planted largely to Russian varieties of apples, together with Duchess, Tetofsky, Wealthy, and some seedlings. The Wealthy and seedlings were generally in bad condition, the Winstead Pippin being the best. This is an apple of good size and quality, a long keeper, but we regret that it is not hardier. He thinks of discarding it, but we suggested that it might be a good variety for fertilizing Russians for seedling purposes. Mr. Peter-

son has also procured and set trees of the newer importations, that have not yet fruited here. Several of the trees, in the oldest part of the orchard, were fruiting very heavily this year, and present a beautiful appearance from a long distance, owing to the large size and fine appearance of the fruit, in contrast with the dark-green foliage of the trees.

We gave the oldest of these a careful inspection and found some of them to be perfectly hardy, not showing a blemish from hard winters, blight, or any other causes. The Hibernial, Astrokoff Glass and Lieby are as fine trees as any country ever produced, and bearing the best. He thinks Hibernial and Lieby may be identical. The fruit is large, smooth and round; flavor not as good as the Greening and Rambo; excellent for cooking, and he says, "eats well when very ripe." (One eaten by us November 17th was rich, sprightly, and about as good as the Perry Russet.) The Astrokoff Glass resembles the above, except that the fruit is a little smaller and keeps some longer. Neither of them will go begging for purchasers in our Western markets when they are better known. The Christmas and Charlamoff are also promising apples. Mr. Peterson is trying several varieties of Russian pears; the trees have made a wonderful growth this year; also Russian plums, one variety has endured two winters without perceptible injury, and will soon show fruit. He has several varieties of pears and apples from Sweden, but is of the opinion that those from Russia, judging from present appearances, will do the best in Minnesota. He has put his trees to the severest test; they are in no way protected from sun, wind, heat or cold. Clean culture is the rule here, and trees in both orchard and nursery show a strong, healthy growth.

Our next official visit is made at Horticultural Hall, upon the grounds of the Southern Minnesota Fair Association, at the fair held September 14th to 17th. For report, see report of Horticulture at the Southern Minnesota Fair.

IN NOBLES COUNTY.

September 21st.—Thus far our search for that hardy and good seedling apple had not met with the success we had anticipated, although we feel compensated for our labors thus far. *Ignis-fatuus* like, whenever we have approached the spot where the prize was to have been seized it had gone, but was reported to have appeared in some other locality. While attending the late

state fair we were told there was a seedling tree at Worthington, Nobles County that was destined to create a sensation. Nobles County lies in Southwestern Minnesota, on the Iowa border, and only one county between it and Dakota. The surface of the county is a beautiful, rolling prairie, less than one acre in every hundred having any timber upon it. The soil is exceedingly fertile, being a black, sandy loam, two to four feet deep, with clay and gravel subsoil. It is said to be the most elevated land in the State, except a narrow ridge in Murray County; the highest point has an elevation of 1,300 feet above the sea. Okabena Lake is reported to be the highest water in the State, the surface being 1,570 feet above the sea level. J. H. Ludlow is the owner of the tree that we were looking for. We found him at his farm on the southeast shore of Lake Okabena, about three-fourths of a mile from Worthington. He is an enthusiastic and practical gardener and fruit grower. We spent the day in looking over his grounds, which are well adapted to most kinds of gardening. First we inspected his orchard, which is much more extensive than we expected to find in this part of the State, and in better condition. We found Duchess and Tetofsky in very fair condition, some of the Wealthy trees looking rather sickly, but carrying a heavy crop of most beautiful fruit, so heavy that he had the horizontal branches supported by ropes to prevent their breaking down. We found a row of Walbridge all dead or dying, which had never produced any fruit; also several other varieties of the reputed ironclads that were in but little better condition; and a superabundance of hybrid Siberians, trees generally hardy enough, but the fruit nearly worthless; there were also some seedlings of more or less merit. Last of all we came to the Okabena; this was the most promising seedling of its age, so far as the tree is concerned, we found in the State. The tree is more exposed than the rest of the orchard; trunk diameter is seven and one-half inches, one foot above the ground, stands perpendicular, and is over four feet to the first branches. The top is round, symmetrical and well balanced, growth strong and healthy; foliage large, thick and bears a striking resemblance to the Duchess. The wood of three-year-old branches was clean and white to the heart, grain firm, and we can not discover that the tree has ever received any injury from hard winters or blight. The fruit is of medium size, fine form, color yellow, shaded and striped with red. The quality is good, we thought better than the Wealthy; flesh crisp and juicy;

flavor sub-acid; season between the Duchess and Wealthy. Mr. L. was not the original owner of this place and did not plant the trees. The late G. J. Hoffman, at one time an active member of the State Horticultural Society, was one of the original settlers at Lake Okabena, and in 1871 or 2 planted this orchard and started a nursery here. Mr. L. says this tree and many other seedlings upon the place came from seed procured from Peter M. Gideon, and planted by Mr. Hoffman. He does not know that the tree has ever been transplanted from the place where the seed was planted. Mr. Gideon writes us that he thinks he furnished Mr. Hoffman with seeds and cions from seedlings of his own growing, about that time, and from the general appearance we think this is a seedling of the Duchess, perhaps crossed with Wealthy or Hyslop crab. For the last five or six years this tree has borne good crops regularly. The trees in this orchard are planted too closely for the best results, but we found all fruit fair and entirely free from worms or the marks of the curculio.

IN COTTONWOOD COUNTY.

We continued this trip on to Windom, Mountain Lake and other points in Cottonwood County, and attended the county fair. At Windom we met De Wain Cook, of Dale township, a wide-awake man, who is pursuing fruit culture under many disadvantages. He has discovered and is cultivating a hardy Dewberry, which, if it comes near up to what he claims for it, will prove of great value to our lists of hardy fruits. It has been cultivated here thirteen years. We have many testimonials showing its hardiness, productiveness, fair size and good quality of fruit, etc., and have secured plants and had them sent to several of our experimental stations to be tested and reported upon. At Mountain Lake we learn of a few valuable seedling Russian pears and plums, and but one orchard of Russian apples of any promise, which is a great disappointment to us, as we had frequently heard that the Mennonites living here had brought with them trees from Russia that were doing well. From all the information we could gather the varieties brought over by them had disappointed their expectations. There was no fruit exhibited at the county fair except Siberians.

October 15th.—We visited the orchard of Jacob Klein, of Houston County, to examine the tree of the variety of apples that received the award of a second premium at the last state fair as

the best seedling for all purposes. This tree and one other are the only survivors of a batch of near thirty varieties that were grown from seed planted thirty years ago. They were raised from seed procured in Canada and saved from an orchard of ungrafted trees that has now been fruiting over one hundred years. This tree has never been seriously injured, at least so far as present appearances show. The trunk measures forty-four inches in circumference two feet above the ground, is growing in clay soil, upon high ground sloping to the southeast. The trunk is clear of scars and blemishes. The top is large and open. It is standing in timothy sod and has not been mulched; is an annual bearer of very good fall fruit, and appears to be in as good condition as Duchess upon the same place. Season of fruit, October. Both surviving trees lean toward the northeast. The other has been seriously injured by sun-scald on southwest side.

IN WISCONSIN.

October 30th.—We look over the orchards and nurseries of E. Wilcox, near La Crosse, Wis. Mr. Wilcox is an enthusiastic experimentalist, and his experience in fruit growing in Eastern Minnesota and Western Wisconsin extends over a period of about twenty-five years, and during that time he has sustained many serious losses. His present orchard is in a narrow valley about three miles east of La Crosse, and his nursery upon the top of the bluff back of it and about four hundred and fifty feet above the Mississippi River. The orchard has an outlook toward the west; a part of the ground is level, but the most of it a more or less steep side hill. The soil varies from a sandy to a clayey loam, with exposures to the south, west and north. As a rule trees upon the northern slope were doing much the best, but the Duchess, Tetofsky and the Wealthy, when top-worked upon hardy stocks, were doing fairly well upon the south slope. In the experimental department he has gathered together every reputed hardy variety of seedlings that could be obtained, and a number of Russian varieties. These are generally worked upon the tops of other trees in order to first test the quality of the fruit. Several of them survived the late severe winters and are now in perfect health. As fast as they fruit and show valuable qualities they will be further tested as root grafts. Three or four of them bore fruit this season—1886. We sampled them and found one that is evidently a good keeper and perfectly hardy as a top

graft upon Transcendent crab. The fruit is medium in size, oblong round, in shape, color green, striped and splashed with pale red, flavor sprightly, sub-acid, origin unknown.

IN FARIBAULT COUNTY.

December 11th.—We called upon John Dean, one of the pioneer fruit growers of Faribault County. He is located near Blue Earth City. His bearing orchard is almost exclusively of seedlings, grown from seed procured at a cider mill in the state of New York, and planted in 1863, upon the ground where many of them now stand. Nearly all of the trees that proved hardy enough to stand until they fruited are doubtless of Siberian crab origin, or crossed with that species. He has discarded the worst blighting varieties and such as bore worthless fruit, so that the varieties retained will run in size from the Virginia crab to double that of the Transcendent, and better in quality. All of them are excellent for cooking purposes and some of them very good for eating from the hand. All are later keepers than the Transcendent, and we should judge that some of them will keep until spring. A portion of the trees appear to be very hardy. Mr. Dean is also experimenting with the newer Russians and other hardy varieties of apples, etc.

IN RAMSEY COUNTY.

Our last official visit was made at the Agricultural College Farm, under the supervision of Prof. E. D. Porter. As we expect that his report will be published in this volume of transactions, we will only say that he is starting experiments with the Russians, and in small fruits and trees and shrubbery, and we believe that if he has the hearty co-operation of the State Horticultural Society, and the experienced fruit growers of the State, we shall soon obtain valuable results.

IN CONCLUSION.

In conclusion we have, in performing the duties assigned to us, traveled over a considerable portion of Southern and Eastern Minnesota. We wish that we could report better results. The most promising seedling tree we have seen is the Okabena in Nobles County. The next most promising one we have heard of is the Peerless, a seedling of the Duchess growing in Rice

County. We have seen the fruit but not the tree, and can not visit it in time to report at the present meeting. Our observations of Russians lead us to believe that out of the many hundreds of varieties being introduced, we may get a score or so that will be hardy enough for the whole region called the Northwest, and we doubt very much if the quality and productiveness of one-half of this number will prove satisfactory to our people, and not more than four or five will fill the bill as long keepers. We have reason to believe that seedlings from these, and especially crosses with our best varieties, will result in giving to our State in the near future an ample list of adapted varieties of the very finest quality. We think it a duty our Society owes to the people, to have their Russians tested as speedily as possible, and disseminate information as fast as obtained, so that our planters may be warned against the planting extensively of such varieties as will prove entirely unsatisfactory. Every possible encouragement should be given to the production of new varieties from seed — for from this source only can we look for the coming apples of Minnesota.

REPORT ON SEEDLING FRUITS.

By A. W. Sias, Rochester.

MR. CHAIRMAN: Mr. Fuller and myself made a visit to the farm of John Robinson, in the township of Viola, on the seventh day of September last. Mr. Robinson is one of Viola's most prosperous farmers, and like the most of our leading agriculturists, has an eye for good fruit. He cultivates many of our most popular varieties of the apple, and has quite a show of ornamental trees. But our object in calling your attention to this particular place was owing to the fact that he was among the first to experiment with the De Soto plum. When they were first introduced into this State he purchased six trees, for which he paid one dollar each, and it proved money well invested. When we saw these trees they were heavily loaded with perfect fruit, and ripe at that time (September 7th). There appeared to be just about the requisite amount of shade, and a rich, loose soil about the trees, making it an excellent place for the pits that yearly dropped about the trees to take root and soon come into bearing. He informed us that a dealer in trees had instructed

him that the De Soto reproduced itself from seed and he had bought many of these young seedlings labeled them De Soto and sold them. We said to Mr. Robinson that we would be obliged to differ with this "enterprising dealing" as to the fact that they would come the same from the pit. We looked about and found several that he claimed to be from the pits of the De Soto in bearing, but none the same as the original, none as large and fine.

We next visited the orchard of Hon. Wm. Somerville, the leading horticulturist of that section of country, and Mr. Somerville showed us some of the most beautiful apples that our eyes ever beheld; these were new Russians that we propose to designate "Russian Wax," unless we can obtain the true name. That we are not alone in our admiration of this new Russian fruit, many who saw them on exhibition at the last State fair will doubtless bear us witness. Mr. Somerville will, we fear, "run to seed" on Russians, and we don't wonder at it after the experience he has had. He marketed about one hundred and fifty bushels of as fine Duchess as one would wish to see, and many other choice varieties—among them Wealthy, Wabasha, Rollins' Pippin, Elgin Beauty, Gideon's Nos. 5 and 6, Martha, Florence, Brier's Sweet, Sweet Russet, Whitney No. 20, etc., etc. The large variety of beautiful evergreens on these fine grounds are worthy of more than a brief notice. We noticed a singular freak of nature on one of the limbs of his oldest Silver Fir Balsam trees—a fungus some two or three feet in height and about the same in diameter. This fungus is covered with leaves closely resembling the leaves on a yearling balsam in summer, which fall off during the fall or fore part of winter. Mr. Somerville is still of the opinion that the best "insectivorous animal" you can place in an old orchard is the common hog.

Our next objective point was the Brett Seedlings in Dover township. We found Nos. 1 and 2 bearing quite well, No. 3 but few. These trees are too closely shut in by surrounding trees of willow, wild plums, etc., and we noticed that some of the limbs had died since we visited them about a year ago, and from some unknown cause. Since Mr. Brett left the farm, several years ago, it has been rented, and I think the trees have received but little if any care. But your committee are inclined to believe that a new variety that will bear two good crops in succession, following such a test winter as we exper-

ienced here three years ago, and that without any care, must have some virtue in them, and be worthy of further trial to say the least.

Your committee next visit the old veteran pomologist, R. L. Cotterell, also of Dover, now considerably past his "threescore years and ten," with a mind still more vigorous than a boy's on horticultural events, where we put up for the night — knowing as we did that there were too many good things to be seen here for men who love fruit and flowers, to pass upon without devoting some little time to study. Mr. Cotterell had a very fair crop of apples for so dry a season. Small fruit fine, especially his grapes. He makes a grand success with the native plum. He also has the most promising sweet chestnut trees that I know of in Minnesota. He has a seedling from the Haas that bore this year, and appears to be more hardy than Haas, but was injured some three years ago; fruit considerably like the parent and keeps about the same. If anyone wishes to know just how to train the Norway Spruce and other tall growing evergreens for yards of limited extent, he can find the best of "object lessons" on Mr. Cotterell's grounds. We also saw here what we never saw elsewhere, viz., a genuine Weeping Balsam. Mr. and Mrs. Cotterell are widely known for their boundless hospitality, and their happy home is not always so easy to get away from, where one's time is limited as in our own case—but we must push on. We next bring up at the farm residence of John Farrier, of Elmira township. The proprietor was not at home, but Mrs. Farrier gave us the "liberty of the orchard." The most conspicuous and attractive feature of the orchard was the Wealthy Apple. We found many of the leading varieties of the State here, doing fairly well, and on the south slope of the hill, but the Wealthy was the acknowledged "boss of all." Whole rows of Wealthy through quite an extensive orchard were literally breaking down with this beautiful fruit, of which Mr. Farrier made an attractive display at the Southern Minnesota Fair. We next bring up at the former residence of our old friend C. H. Greenman, who in 1879 was the honored vice president of the State horticultural society of Wisconsin. Mr. Greenman had left this farm and moved to Chatfield, Minnesota, some years ago, but his "foot prints" still remain there in the shape of a fine Russian orchard (mostly Russians), fine hedges, etc. One of the largest apple trees on this place and doing remarkably well, was the Peach apple. After visiting this place, we felt

our desire increasing to see the man who had left such a good example here, so we went on to Chatfield, and the first call we made was at the home of Mr. Greenman, but as "bad luck" would have it, he was away from home and we did not see him. By permission of Mrs. Greenman, we took a hurried look at his fine place, and found everything in "apple pie order." He is making a specialty of the grape, as usual, of which he has a large and fine assortment. Our next objective point is the Brook Kidron, twenty miles south of Rochester, in Fillmore County. This is the native home of the *Abies Alba*, *Pinus Strobus*, *Abies Balsamea*, *Taxus Canadensis*, and *Juniperus Virginiana*. In a letter read a few days ago from Robt. Douglas, post-marked New York, Dec. 28, 1886, he writes: "The *Abies Alba* is a northern tree, and will grow better and faster with you than further south. I have to-day been examining that tree in company with the superintendent of Central Park. It does very poorly here, as the soil is very dry and very poor. I have seen very fine *Abies Alba* both in the Black Hills and in the Adirondacks, but I think the finest I have seen under cultivation was in the college grounds at Toronto, where I stopped over one day to examine the old planting (over fifty years old) on the college grounds." We think there is no better authority on evergreens in the Northwest than R. Douglas, and that he is right in regard to its doing better here than further south, and if there is a taller specimen on the continent than we found on the little babbling brook Kidron, we have not yet heard from it. This tree is said to be one hundred feet high, but we think it would fall considerably short of that figure. We next call at the Partridge House, in Pleasant Grove, Olmsted County. Here we found the Wealthy again in good bearing condition, as well as Duchess and some other varieties; and lastly at the beautiful stock farm of J. S. Whitney, postmaster at Groesbeck, Olmsted County. Mr. Whitney is a Wisconsin man, and a great lover of fruit, and has started a fine orchard, and as we have good reason to believe, will soon have the best orchard in all that section; but he says he wants no Dayton, Ohio, trees in his. We reach Rochester in time for dinner and take the train soon after, and meet our chairman the same evening, "cheek by jowl" with that old veteran pomologist, Chas. Luedloff, of Carver County. We will let our chairman tell the balance of the story, as our "best man" is none too gifted to show up this fine place as its merits demand.

REPORT ON SEEDLING FRUITS.

By G. W. Fuller, Litchfield.

I spent but a week with the committee, and during this time we found no seedling apples of any value showing any more hardiness than the Wealthy. The trees which bore the apples (Hart's seedlings) which took the premium at the state fair, were in a very bad condition, showing clearly that they are not sufficiently hardy for our use. We found a few Russians both in Olmsted and Carver counties, which looked very promising.

The hardiest seedlings I found are in Meeker County. One is in Cedar Mills, belonging to Mr. Baldwin, and is evidently a seedling of the Gen. Grant, rather larger, of better quality, and of the same season. But the tree is very much better, perfectly hardy, and has never blighted. It is about thirteen years old, and has borne every year since it was three years old. Another seedling is in Greenleaf and is owned by Mr. Mills. It is fifteen years old and has never shown any disease or failure until last season, when a severe wind broke down a part of the tree, revealing rottenness of the heart. The habit of the tree is very much like the Tetofsky, but the apple resembles the Wealthy. From knowledge thus far gained I can not feel very hopeful of success in the line of seedlings. Still we should continue the experiment.

Mr. Cutler. Mr. President, I believe this committee has done as faithful service as we could expect, and I move this same committee be continued the coming year, with the same appropriation for expenses necessarily incurred.

The motion was adopted.

DISCUSSION.

President Elliot. I would like to hear from Mr. Brand as to a seedling apple which he has on exhibition here.

Mr. Brand. I had hoped the committee would make some report as to this variety known as the Peerless.

Mr. Harris. We intend to examine the tree at the first opportunity.

Mr. Brand. This apple was exhibited at the state fair in 1878, at the meeting of this Society two years ago, at the New Orleans Exposition, at the last state fair, but so far no mention

has been made of it that I am aware of. The Peerless is a seedling from the Duchess, grown in Rice County east of the big woods. It was grown by J. G. Miller, who states that he took seeds from the Duchess and planted them. In the same orchard were bearing trees of Talmon Sweet, Winesap, Fall Pippin, Orange, Fameuse, Golden Russet, and a number of other varieties. From the seeds of the Duchess he raised about two hundred trees, of which number some fifteen that were transplanted survived the winter of 1873. I first saw the trees in bearing in 1875. Of those remaining the apple called the Peerless is the best. Two years ago the tree bore nine baskets. I exhibited some of these apples at the State Fair and was given the first premium for the best apple for all purposes. I have it here on exhibition and as to quality it shows for itself.

Mr. McIntosh. I have some seedling apples on exhibition raised from apple seeds obtained at Lincoln, Mass. The tree bears well and it is a winter apple. We have found the Gravenstein to be the best fall apple we have.

Mr. Gideon. I have tried them and found they won't do.

Mr. Kramer spoke of a seedling at Hokah that looked quite promising, supposed to be a seedling of Duchess, but having thicker and larger leaves.

Mr. Stubbs. While on this question I wish to call attention to a seedling tree on the farm of Samuel Liedyard, near the village of Long Lake, a seedling of Wealthy; it has been bearing well for six years. It is of the size of Hyslop and keeps later than any crab I know of. The tree is uninjured, bears every year, and the limbs are loaded to the tip ends, and it seems to be quite valuable for hardiness and keeping qualities.

Mr. Kramer spoke of some seedling trees growing in Allamakee County, Iowa, that appeared to be promising as to hardiness and good bearing qualities.



REPORT ON SEEDLINGS.

By the Jewell Nursery Co., Lake City.

The report from this station is meagre from the fact that but twelve cions were ever officially received; these were top-worked, and unfortunately the stocks were struck with fire-blight and the cions were thus destroyed.

Recognizing the fact, however, that the Minnesota nurseryman could not pin his faith to old varieties, more or less experimenting has been done on our own account, and, we are proud to state, with the most happy results. From prudential reasons, apparent to all, we can not state full particulars as to origin of all our varieties, but will report in a general way.

Dartt's seedling, originated by E. H. S. Dartt, Owatonna, a seedling of the Tetofsky, as a tree is a beautiful, upright and rapid grower. The wood has proved to be remarkably hardy, during this, the most severe season that has ever been experienced in Minnesota. The fruit is nearly the size of the Whitney No. 20, of a deep red color and promises to keep well until February; quite tart; will unquestionably prove a valuable acquisition to the present list of hardy hybrids.

DUCHESS SEEDLING.

This is from a tree now growing in Southwestern Minnesota, and has been in bearing for six years; is an annual bearer, and from the best information obtainable, the seed was from the Duchess, fertilized by Wealthy. The tree stands in a very exposed situation, growing in tough sod, on a dry, gravelly knoll, in a locality that ordinarily has but little snow. In an adjoining orchard are Transcendent, Hyslop, Duchess, Wealthy, Whitney, red and yellow Siberians, and, without exception, the wood of this tree shows less injury from winter than any of the ironclads named. The quality of the fruit is A No. 1, and its natural method of fruiting is to place an apple wherever room can be found to give it support; when thinned out properly the fruit is of the size of the Wealthy and a better keeper; the marking is peculiar, as highly colored as the Duchess or Wealthy, and each apple invariably shows a band of deep crimson, running half around the apple from blossom to stem end, varying from a six-

teenth to a quarter of an inch in width. Our opinion of its value to horticultural interests may be understood when the price we paid for the control of the tree is known—one thousand dollars.

IOWA SEEDLINGS.

In 1885 our attention was called to an orchard of 300 trees, growing in Northern Iowa, not far from the famous Hesper seedling orchard, that gave to the Northwest through our instrumentality, the Hybrids, known as the Minnesota, Beecher's Sweet, Maiden Blush, Conical, etc. Personal investigation made in the time of fruit, in the fall of 1885, showed seventy odd trees in full fruit, and many others not yet bearing. The seeds from which these trees originated were saved in Northern New York in 1861, from selected apples cut for drying, and were planted the following spring. The seedling trees stood in nursery rows in a neglected garden, overrun with weeds and browsed by cattle, until the spring of 1865, when such as had survived the ordeal were transplanted into orchard rows, where many of them are now standing; and all things considered, they are by far the most remarkable collection of natural fruit in the West, many of the trees being from 10 to 15 inches in diameter and from 20 to 30 feet in height, presenting every type of growth that an apple tree could assume.

The site selected for this orchard was extremely unfavorable; the soil a rich, black muck, and so saturated with moisture that the lower edge of the orchard is a springy bog; the slope a sharp, southern exposure; and on the east, north and west is a dense grove of maple and willow, effectually shutting out the free circulation of air, which, of course, renders the orchard very liable to fire-blight; very few of the seedlings show any sign of blight, however.

In the same plat are planted grafted fruits, of many of the ironclads, Duchess, Wealthy, Walbridge, Haas, Transcendent, Whitney and Hyslop, many of which have been struck by blight; all show the effects of the recent severe winters, and yet the best of the seedlings show but little, if any, signs of injury from any cause.

The quality and variety of the fruit is as varied as could well be imagined, being from the size of a Siberian up to a Pound Sweeting; the predominating colors are yellow and pale green, though twelve or fifteen of them are large in size, high in color and very

shapely and beautiful. All seasons are represented in time of ripening, early summer, or harvest, fall, autumn, winter, and some of them last from one season to the next; one variety in particular is a sweet apple, similar in size and shape to the red Astrachan, larger, and a little longer; the boughs have to be propped to support the heavy loads of fruit, annually borne; the fruit is striped, red and white, and is as handsome an apple as could be desired; the quality could not be improved; its season, September; this is one of a dozen equally good for its season and type.

No time was lost in the purchase of the orchard, and we have to-day growing nearly 50,000 grafts from these valuable seedlings and are confident that they will prove to be a veritable bonanza to this region that so vigorously demands ironclads.

The report of the committee on Russian apples being called for the following paper was then read:

REPORT ON RUSSIAN APPLES.

By A. W. Sias, Rochester.

Mr. President and Members:

Two years ago we had a grand test winter and last year a splendid test summer for the new Russians, and found that they behaved better under this frozen and fiery ordeal than any other plants within our knowledge properly belonging under the botanical head of *Pyrus Malus*. Now, there is said to be a reason for everything; so please to bear with your committee while we indulge in a little theory in regard to *why* the Russian trees stood these severe tests better than our American varieties. We view the situation in this way: For many hundreds of years the same severe tests as those above noted have been going on among their millions of seedling and imported varieties, many times no doubt thinning their ranks more severely than with us, but always resulting year after year in "the survival of the fittest," every generation becoming better and better adapted to its cold, arid situation, the sun and drying winds serving to increase the thickness and pubescence of the leaves until after many hundred years they develop a family of trees, which, perhaps, we might be allowed to designate as the Silver-leaved family, with leaves, in

our humble opinion, better constructed to withstand a long, severe drought than even our native wild crab.

The best representative of this hirsute family we believe to be the Autumn Streaked, of which Dr. T. H. Hoskins, Sidney Corp and others speak in highest terms. This we will class as No. 1. The second in this family group, and with leaves almost precisely like No. 1, we place White Russet, of which H. H. Howlett, of Baraboo, writes under date of Nov. 2, 1886:

“In regard to the White Russet I will state I have nine trees of the ten planted in 1875. They were three years old when I set them in the orchard, and I could not ask for a better tree, or fruit; perfectly hardy, early bearer; every year a good crop. Some years a good keeper and others not so good; this year not any of my varieties kept, everything gone November 1st. Some years the White Russet will be in fine condition through March; with me much hardier than Duchess. My best variety in tree and fruit, also in nursery, is White Russet. See Prof. Budd's bulletin for January, 1886, page 21.”

Plikanoff Small we class as No. 3. This, like many other Russian names, means nothing, as it is not a small apple, and bears a family resemblance to the Autumn Streaked. We will add no more to this list at present, although there may be others just as good — but we prefer to test them further. In this Silver-leaved family of trees, of which we propose to make a specialty hereafter, we are only copying from nature, as we find it everywhere in the Northwest. More than nine-tenths of our forest trees have thick, silvery, pubescent leaves. We want no more thin, smooth leaves “in ours.”

The Autumn Streaked is the most interesting botanical “object lesson” we have yet seen in the shape of an apple tree. The leaves are very large, thick and completely covered with little whitish hairs, which also extend over the current year's growth of wood, completely clothing and shading the newly made cells from the direct rays of the sun, preventing them from drying out too rapidly, and also protecting them from the cold in winter. Another important peculiarity about this variety is, its leaves are of an upright habit, hence the guard cells and breathing pores are more evenly distributed on both sides than in ordinary leaves. The tree is more hardy than the Duchess, but the leaves hang on much later. They fell on our two-year-old trees in November and December, and after they had fallen, the new wood looked as though the leaves had been

cut, preparatory to budding, leaving the leaf stock about half an inch long, and leaving the bud nicely protected for winter. The fruit of the Autumn Streaked is nearly if not quite as large as Duchess, a little better in quality, and keeps some two or three weeks longer.

The Russian apple has no truer friend than myself, but please bear in mind that our best friends sometimes indulge in a little friendly criticism, and it is well known to some of you at least, that we have frequently tried to check some of our most enthusiastic admirers of the Russian apple against hoping for too many long keepers from Northern or Central Russia, and we have harped so much on this point, perhaps we had better indulge in a little theory in regard to why these things are so. Charles Gibb—and there is perhaps no better authority—says that at St. Petersburg they have “a cool, short summer.” Others claim—and no doubt truthfully—that in Central Russia the climate is similar to our own; but all will admit that the summer is shorter; and hot weather, or at least excessively hot weather, is shut off there soon after the fruits, such as the Anis and Antonovka, for instance, are ripe; while here the heat is kept up perhaps two or three weeks longer, or until fermentation sets in, and then the fruit soon decays. Nature had fitted them for a shorter summer than ours. We believe this answers the question why a winter apple in Russia is a fall fruit in Minnesota. And this leads us to advise every fruit grower who possibly can do so, to build an ice house this winter and fill it, and just before these Russians are fairly ripe to pick them, pack carefully and put them in cold storage; in this way we can put ourselves in shape to make the finest display of fruits one year from to-day that was ever made at a winter meeting in the Northwest. We found the Russian apples at Charles Luedloff's and at A. Peterson's, in Carver County, looking just splendid.

Prof. Budd and Chas. Gibb have done signal service to the Northwest by calling special attention to the important fact that we must make a specialty of varieties with thick, pubescent leaves; and while visiting our experimental station in Carver County we had this in view. We found the Autumn Streaked here with a leaf not surpassed, if equaled; we will qualify this a little by saying that this was the way it appeared to us (by the naked eye) but possibly the aid of a good microscope might cause us to give the preference to some other variety.

LEADING VARIETIES.

Six best, as exhibited by A. G. Tuttle of Baraboo, Wis., at our state fair last fall: No. 275, Zolotoreff; No. 177, Green Streaked; No. 288, Raspberry; No. 410, Little Seedling; No. 599, Omensk; No. 277, Wargul.

Six best with me, No. 964, Autumn Streaked; No. 382, Russian Green apple; No. 330, Juicy Streaked; No. 335, Green Transparent; No. 445, Red Cheeked; No. 981, White Russet.

Six best with Wm. Somerville, Duchess, Autumn Streaked, Russian Wax, Charlamoff, Winter O'Porto, Unknown.

No. 978, Golden White, stands high with Dr. Hoskins of Vermont, and from the appearance of the fruit he sent us, should pronounce it a very promising variety.

Mr. Harris suggested that it might be well for the Society to name a list of semi-hardy varieties of apples that may be considered specially dangerous to recommend for planting in large quantities, to be known as a "black list," which was as follows:

BLACK LIST.

Mann apple, Bethel, Walbridge, Haas, Pewaukee, Alexander, Borsdorf, Northern Spy, Salome, Utter's Large Red, Fameuse, Wolf River.

Mr. Harris. I do not believe there is any genuine reliable nursery man in Minnesota or Wisconsin who would sell many of these trees to a customer for planting an orchard. A Wisconsin man might perhaps recommend the Wolf River.

Mr. Pearce inquired as to the Salome.

Mr. Stubbs. It originated in Southern Illinois.

Mr. Sias. I had the Salome but the late hard winter killed the last one. It was recommended by Arthur Bryant, of Illinois, a reliable man, and in that climate might be all right. Those varieties in the list the most hardy are really the most dangerous, and they have been heretofore recommended. The Mann apple has been sold as hardier than Duchess but I have lost the last tree of that variety; they are as tender as Rhode Island Greening, and the Salome is no better. The Fameuse is perhaps the best on the list and if there were no test winters it would answer our purpose. The sooner we adopt such a list the better.

Mr. Pearce said the Mann was doing well in some localities

but ought not to be set generally in the Northwest. Fameuse was hardy also in many localities, but he was not growing it in the nursery.

On motion of Mr. Cutler the "black list," as read, was adopted.

Mr. Harris offered the following, which was adopted.

Resolved, That the press of Minnesota be requested to publish the so-called "black list" and to warn the people from purchasing trees from every unknown tree agent.

OUR SEEDLING AND RUSSIAN APPLES.

REPORT OF THE SUPERINTENDENT OF THE STATE EXPERIMENTAL FRUIT FARM.

By Peter M. Gideon, Excelsior.

It is with pleasure that I comply with your request to give my views on Russian and seedling apples. The seedling has been my hobby for the last sixteen years, and the success attained gives me hope that not far in the future the cold Northwest will be one of the leading apple-growing districts of North America.

Twenty-three years ago I planted a few Cherry crab seeds, obtained of Albert Emerson, Bangor, Maine, and from those seeds I grew the Wealthy apple; in seven years it fruited, and that fruit convinced me that the true road to success was in crossing the Siberian crab with the common apple, and on that line I have operated ever since, with results surpassing my most sanguine anticipations. I did not suppose that in the short space of sixteen years, the time since the Wealthy first fruited, that I should have more than twenty first-class apples — as good as the world can produce — in succession from the first of August to March, and in hardiness of tree surpassing all known varieties of the common large apple. But it is done, and in the doing the problem is solved as to what to do and how to do it, with the material at hand with which to attain yet greater results. At the outset it was test and try; but now that the problem is solved it is onward, with great results certain.

When I say we have twenty first-class apples, that does not include all that are worthy of cultivation by any means. And now, with such results, and only a few thousand trees fruited at the end of sixteen years, what may we not expect at the end of

the next sixteen years, with 20,000 or 30,000 choice, selected trees from the very best of seed, which are not yet fruited, and the seed of over one hundred bushels of choice apples planted this fall, all to fruit in a few years? Then on, on, planting the seed of the best each year, soon the choice varieties will count into the hundreds, and the great Northwest will be the fruit paradise of America.

To get the desired cross we plant the selected varieties in close proximity, so that the natural fall of pollen will the more surely do the desired fertilizing, and the seed thus produced being planted, the most promising of the seedlings selected and set in orchards for fruiting, and, after fruiting, the best in tree and fruit being selected from which to grow seeds to try again, and so on, at each repetition I find there is a gain. The young trees that fruited this year for the first gave a larger percentage of first-class apples than any lot ever fruited before.

By crossing and judicious selection we retain the hardiness of the crab in the tree without the crab thorns, and on top grow large apples without the astringency of the parent crab. And yet, by the commingling of the two natures, we get an exquisite flavor not found in any other class of apples, especially so when made into sauce. But our triumph is not yet complete; we must, we can, fill up the balance of the year with a continued succession of luscious apples. There is no question as to the certainty of such a result; the past is a guarantee that it can be done.

But the proper cross can't be got in Minnesota; a fact clearly demonstrated in the extensive and expensive trials that have been made in the last nine years in the State orchard. And here let me state that the seedling is inclined to ripen its fruit at or near the time the parent apple did from which the seed was taken, hence the need of seed from long keepers to grow the same. There are no long keepers, of the best quality, yet found that are hardy enough to fruit in Minnesota; but we can take our best hardy seedlings further south, where the long keepers can be grown, and there get the cross and then bring the seed here to grow and test the hardiness of tree and quality of fruit. We want first-class apples, and to get them we must use first-class parentage. And even then scullions will be numerous, from the fact that all varieties of apples are mongrels of many degrees of crossing, and the various relations will crop out in a multitude of forms. But past success is a guarantee for the future that out of the many some will be good. Our seedlings will average in

quality with Hyslop and Transcendent; but those of first-class, such as we propagate, stand about as one to five hundred, as hardy as Duchess and Wealthy, and of the extreme hardiest about one to fifteen hundred.

SEEDLING TREES FOR DISTRIBUTION.

Two years ago this winter was the first time the Duchess and Wealthy were seriously hurt, and a like fate befell all the Russians on our grounds, so that not a Russian set an apple on our grounds last year, whilst alongside of them our seedlings carried a fair crop, some of them profuse, and this year all bore heavy crops; showing beyond a question that the crab infusion is to be the foundation of successful fruit culture in the Northwest. The State orchard yielded about one hundred bushels of apples this year, all of which being of our own seedlings; all else of value failed two years ago this winter. This fall we planted the seed of over one hundred bushels of choice apples, to grow trees for trial purposes. We now have thousands of choice trees on hand for distribution to those who want one, two, three and four year old trees from seed. Those who come and dig the trees will get them free of cost; others will have the cost of digging and packing to pay. And, unless otherwise instructed, will ship free of cost, except as above stated, to anyone in the Northwest who may so order. The great bulk of the trees are two years old. The cost of digging, boxing or bundling would be about one dollar per hundred. All who get trees will be expected to take good care of them until they fruit, and if any prove of extra value, so report, but the trees and the profits thereof belong to the cultivator. We only ask the report that we can note the progress. The trees which produce poor fruit can be top-grafted with any good variety that the owner may select, and thus make permanent trees of value. Those who want large trees had better come and do their own digging and thus save a large bill; the trees are large for their age and a more promising lot of seedlings I never saw.

PLANT VARIOUS KINDS.

Though we have a good collection of hardies, and in succession from the first of August till March, yet I would not discourage the planting of Duchess, Wealthy, and some of the best of the Russians. Their value is too great to be rejected on account of

one partial failure, after over twenty years of uninterrupted success; for such a winter as that of two years ago may not occur again in a lifetime, if ever. If those varieties should stand only ten years, they would be the most profitable crop a land owner could plant. Therefore I advise to mix them in with our extra hardies, especially if you have a clay soil, for in such they do best. A north, northwest or northeast exposure is the best for the apple, and, indeed, for any fruit except the grape; give them all the sunshine you can.

While on the subject of apple culture, let me state a few facts in regard to root grafts. The so-called crab roots are not all hardy—none are pure crab, all are mongrels—and where the crab predominates the graft that is not a crab mongrel does not take well, neither on root nor stock. The mongrel root and mongrel stock are only preferable when a mongrel graft is to be inserted, but as all such are not hardy, a good mulch is needed of some coarse litter to make sure against root-killing under certain conditions, as not all winters will kill even the most tender roots.

The common apple will not make a smooth junction on a stock where the crab predominates, and consequently will not make a lasting tree; and a hardy variety grafted or budded on the common apple stock is worthless, as the stock below the junction of graft or bud is sure to winter-kill the first hard winter. You can protect a tender root, but you can not save a tender stock, so avoid the tree agent with his budded trees.

NURSERY FRAUDS.

And, lastly, it matters not where a tree is grown—whether east, south or north—that tree is best that comes to the planter in the best condition, if true to name, but with the great mass of tree planters, the smooth-tongued agent with his rubbish and frauds is the one thing needful. Though fleeced a score of times, they patronize him the twenty-first time as freely as ever, and the bigger the price of the fraud the more greedily they swallow the bait. The fact is notorious that tree agents have sold one hundred trees of the Gideon apple, at one dollar per tree, where I, the originator, have been able to sell one at twenty-five cents. They have been swindled so often, and paid so dear for it, that they have come to love to have it so. They are wedded to the agent; it is love's union, and dead trees, plants and grape vines can not separate them.

DISCUSSION.

President Elliot. I would like to call attention to one matter referred to in the paper, the distribution of trees. I do not know that the way proposed is the best for the interests of the people of the State. If these experiments are worth anything they are worth carrying forward to the end. If trees are distributed in the manner suggested, from seventy-five to ninety per cent of them will never be heard from. Would it not be better to send trees out after they have been fruited? It seems to me that would be a surer plan for obtaining hardy trees for Minnesota.

Mr. Harris. I understand Mr. Gideon has more of these trees than he can take care of, and he wishes others to assist in carrying on these experiments. It might not be well to send them out broadcast, but it would be well to supply experimental stations that would make reports from time to time.

Mr. Gideon stated he had asked advice of the regents of the State University as to this matter of distributing trees and not having received any had concluded to try the proposed plan. About a hundred applications had already been sent in, a good many of which were from Dakota.

Mr. Dartt thought probably very few of these trees would prove to be hardy. It might be better to test the trees thoroughly before sending them out, so there would be at least an even chance for success.

Mr. Gideon said all the tender stock had been removed from his grounds, and he had something like 20,000 trees left that he was sure would stand the greatest extremes. The majority would not bear first-class fruit but there were few of them that would not produce fruit equal to the Hyslop or Transcendent. The trees could be top-worked to advantage. There were but few experiment stations, and to keep them where they are would be expensive. It had cost him one hundred and fifty dollars a year ago to guard the State orchard, and it was useless to plant a seedling orchard on his grounds and expect to get fruit, as people would pull them before they were ripe. Trees would have to be tested as to quality of fruit produced elsewhere. He thought the best plan the one he had proposed, although he did not control the matter. If it was thought best not to distribute the trees in that way he would fill the orders received from his own trees.

Mr. Pearce did not know of any better plan than the one suggested and thought the trees would prove entirely hardy, and was in entire sympathy with the plan.

Mr. Cutler thought the number of trees sent out should be limited.

Mr. Gideon. The number is limited to one hundred.

Mr. Sias approved the plan of Mr. Gideon for distributing the new seedlings, and thought the experiment stations should assist also. That was what they were for and he knew of no place to obtain trees more worthy of a fair trial. The test winters had helped to cull out tender varieties. If one in a hundred proved to be hardy it would prove a valuable acquisition.

Mr. Brand thought the best way to find out whether these trees were worth anything was to put them in the hands of persons who would take care of them.

President Elliot. We have sixteen experiment stations.

Mr. Dartt. Mr. President, I have had a good deal of experience with seedlings. I have raised a large number of crab seedlings and not one of the lot has proved of any value. They made pretty trees but the large majority blighted. There is no objection to sending out these trees for experiment if it is understood that probably not more than one in a thousand will be of any value. The more one takes the worse he will be off, and the effect is likely to be discouraging to the fruit interests of the State.

Col. Stevens. Mr. President, I do hope this project of Mr. Gideon's for the distribution of those seedling trees will be approved, and that we shall not be frightened by Mr. Dartt's melancholy ways. I have visited his orchard and I found he was very successful in growing good apples, and if he can grow them why can not others? It looks to me as though the proposition of Mr. Gideon was most desirable and the most feasible method for placing these trees in the hands of the people. I have no doubt many of them will prove valuable. Mr. Gideon has some forty or fifty kinds besides the Wealthy, none of them much inferior to that variety and many of them are superior.

Mr. Dartt. I do not desire to discourage but to advance fruit growing; and I only wish to refer to the "whistling" of these gentlemen last winter to keep their courage up at the meeting.

Mr. Pearce thought if one tree in fifty proved valuable it was worth more than all the expense required, and hoped no one would throw cold water on this scheme. He would advise every

farmer in the State to send to Peter M. Gideon for a hundred of these trees, to put them out and in a short time the apple question would be solved.

Mr. Harris said one of the best seedlings he had found was the so-called "Okabena," at Worthington, which was grown from seed obtained of Mr. Gideon. It was planted in 1871 and had borne several crops of fruit. It was a fall variety, but if the fruit would keep till March it would be worth \$2,000,000 to the State.

Mr. Dartt. That is the kind of tree to send out.

Mr. Pearce had seen another of these seedlings that was a hundred per cent better than Transcendent and which would in a few years come into market.

President Elliot. We are gratified to have this discussion come up because there are some that are doubtful as to whether these experiments are of any value. But I think facts have been developed which will warrant carrying along these experiments. I hope whatever may be done with the fruit farm that the experiments begun under the guidance of Mr. Gideon will be carried on to final success. I hope it will be but a short time until we shall have by this natural process of hybridization varieties worthy of cultivation in many if not in all localities of the State. We should select and plant the best seeds and continue to experiment until we develop something that will be worthy of our State.

Capt. Blakeley. The great interest of the State in growing fruit is manifest to all. All legitimate agencies should be used to encourage the industry. The project to have a station for the purpose of growing fruit is one that the public should appreciate and these stations should be perpetuated; the wisdom of which can not be questioned. The State and the country generally is to be benefited and there should be someone who has time and the requisite knowledge who should be employed in this work and he should be paid by the general public. The general public are abundantly able to do that. The results will certainly be beneficial to the State. We should realize that this must to some extent be a continued effort. It is well known that in nearly all nations except the United States there is some effort made of this kind for the encouragement of the production of plants, forests and fruits; and we have not yet risen to the intelligence that some of the older countries exhibit in this respect. The government should encourage the planting of trees. I had some experience in early days in bringing trees to this country by the

boat load; and I generally insisted on getting the freight before we started. My idea was the trees would not live in this country; that was over twenty years ago. Thousands of trees were sent out here from New York state, and I presume very few of them are yet alive. In order to succeed in this work there must be persistent effort.

Mr. D. Day. Mr. President, I wish to say that I approve the course Mr. Gideon has taken in regard to sending out trees, and I would like to try some of them myself, and some of my neighbors also. I think if farmers would take care of their trees they would succeed; they need care as well as anything else. Trees will grow with proper care.

Mr. Cutler moved as the sense of the Society that the proposed plan of Mr. Gideon, for the distribution of seedling trees, be approved, which motion was adopted.

Mr. Gilpatrick said much depended upon the cultivation of trees as to whether one would succeed. These experiment stations should report as to their manner of culture. He favored deep planting as a protection from winter killing.

Mr. Brand. In the orchard where the Peerless stands the Wealthy in 1884 and before that had borne a bushel and a half to a tree, but a good many of the trees were killed a year ago last winter.

QUESTION BOX.

The question box being called for the following was read: "Does any member know where the nurseries of L. L. May & Co. are located? They are doing business in Iowa selling fruit trees and other stock leaving cards with address 'L. L. May & Co., Nurserymen, St. Paul, Minn.'"

Mrs. Stager, of Sauk Rapids. Mr. President, I came down here to speak about that same thing. Last year and the year before there were agents through there selling fruit trees and different kinds of plants at high prices, and some of my neighbors bought of them and found the stock to be almost worthless; and the agents told them they had a farm near St. Paul where they raised their stuff. They could hardly get rid of these agents. Last year they brought around Sharpless strawberries and the agent wanted to sell me some of them. I told him I didn't want any; he said he would send me fifty and they came. A good many had signed for things; and instead of sending to the agent they sent to a lawyer there and he made every one take what he had signed for except myself, and the most of them

paid from ten to fifteen dollars; and I was requested to speak about that agent here.

Mr. Cutler said that a man named Jordan had been through his county stating that he was representing May & Co., of St. Paul; that they had a fruit farm of some 160 acres there near the city; he was making a specialty of tree gooseberries, a thornless blackberry and the Gideon apple. Mr. Gideon had represented this firm as a "fraud" in plain words. This agent had photographs of the tree gooseberry with fruit larger in size than a silver half-dollar; said the trees grew about six feet high and the berries had no thorns on them; as to the Gideon apple he stated that Mr. May had purchased the original tree for \$200. As Mr. Gideon was present he could answer for himself as to that transaction. I said to him, "Mr. Gideon is advertising that stock; how did he get it?" His reply was that he supposed he propagated it the same way he had the first one—raised it from the seed. Of course I did not bite at his bait but some of my neighbors did—gave him a small order to get rid of him.

Mr. Gideon. Mr. president, to give a little history. I sold to Chase Bros., of Rochester, N. Y., some stock and I was not to propagate until they got a stock on hand and then they were to let me know; when they had sufficient stock they were to notify me that I could go ahead with it, which they did and I have been propagating it since. I never have sold to May & Co., a tree, vine or plant, in any shape or form; I never got a cion or bud from them; I have had no dealings with them whatever. Their claim that they got the tree of me and had entire control of it (I have their circulars at home but I forgot to bring them out) was entirely false, not a word of truth in it. I have been told that their agents are selling trees in Iowa at enormous prices, claiming that they have entire control of my seedings of various kinds. I have published them in various papers in Minnesota and Iowa. When I first published them in the *Farm, Stock and Home* they wrote to me giving me six days to retract and make it as public as what I had said in exposing them. I told them they could drive ahead as quick as they pleased, I had nothing to take back; that is the last I have heard from them. One editor wrote me they had threatened to sue him, and I wrote back telling him to let them drive ahead, I would be on hand to foot the bill; that I could prove him a fraud, and told him to publish that in his paper over my signature.

On motion of Col. Stevens the meeting adjourned till 2 o'clock P. M.

MINNESOTA STATE AMBER CANE ASSOCIATION.

TENTH ANNUAL SESSION,

HELD AT ST. PAUL, WEDNESDAY, JAN. 19, 1887.

The tenth annual session of the Minnesota State Amber Cane Association was held at the capitol, St. Paul, on Wednesday afternoon, Jan. 19, 1887.

The Association met at 2 o'clock P. M., and was called to order by the president, Capt. Blakeley.

The minutes of preceding meeting were read and approved.

FINANCIAL REPORT.

After the reception of members, payment of annual dues, etc., the following report was presented :

ST. PAUL, MINN., Jan., 19, 1887.

To the officers and members of the Minnesota Amber Cane Association,

GENTLEMEN: I have the honor to present my annual report as secretary and treasurer of your Association :

TREASURER, DR.

To amount on hand, as per report of Jan. 22, 1886.....	\$55 30
To membership fees received during year 1886.....	8 00
	\$63 30

TREASURER, CR.

By amount paid printing.....	\$6 25
By postage and stationery.....	2 75
	\$9 00
Balance in treasury.....	\$54 30

Respectfully submitted,

EDWARD D. PORTER,

Secretary and Treasurer Minnesota Amber Cane Association.

On motion the report was accepted and approved.

ELECTION OF OFFICERS.

The Association proceeded to the annual election of officers for the ensuing year with the following result:

President—Russell Blakeley, St. Paul.

Vice President—Ditus Day, Farmington.

Secretary and Treasurer—Edward D. Porter, State University.

Executive Committee—Russell Blakeley, Ditus Day, Edward D. Porter, Seth H. Kenney, J. F. Porter.

The president appointed as a committee on samples Messrs. Smith, Stubbs and Busse.

Mr. Elliot called attention to the matter of exhibits at the state fair. Last year sugars, pickles, preserves, etc., were placed under the charge of the State Horticultural Society. He suggested that some one be appointed to look after the amber cane interest.

On motion, Prof. Porter was named as a committee of one to take charge of the amber cane exhibits at state fair.

Prof. Porter called attention to the importance of having something arranged in advance for making a creditable exhibit. He urged the importance of making preparations at once by selecting samples of syrups, sugars, etc., for exhibit and display at the state fair, and not leave the matter until a few days before the fair opens, when it will be too late to accomplish anything.

COMMUNICATIONS.

The secretary read the following communication :

U. S. DEPARTMENT OF AGRICULTURE,)
 COMMISSIONER'S OFFICE,)
 WASHINGTON, D. C., Jan. 5, 1887.)

Edward D. Porter, Secretary, etc., St. Anthony Park, Minn.,

MY DEAR SIR: Your kind letter of December 6th only came to my desk a few days ago, and since then I have given it careful consideration. My inclination is strongly in favor of an acceptance of your invitation; but my public duties at this stage of a short session of Congress are pressing, and can not be omitted even for a few days. I should be again happy to meet and greet the members of your joint convention; but I shall have to forego the pleasure.

Very respectfully,

NORMAN J. COLMAN,
Commissioner of Agriculture.

The following communication was then read :

LETTER FROM INDIANA.

To Russell Blakeley, President Minnesota State Amber Cane Association, St. Paul, Minn.,

DEAR SIR: Not being able, as I had intended, to be with you in convention, I take this method of wishing your Association, in convention assembled, a prosperous and profitable session; and wishing to assist the good cause all I can, I tender the Association the free use of the columns of the *Sorghum Growers' Guide* in any way that will advance the interests of the sorghum industry, for which we labor. You will notice by papers which I send the Association, that the Indiana cane growers, at their recent convention, adopted resolutions against glucose adulteration, and also asking a government appropriation of \$10,000 for experiments in the interest of small sorghum manufacturers. We would take the liberty of suggesting the same course to your Association, as in the interest of the common cause. Inviting you all to attend the next annual convention of the Indiana Cane Growers Association, I am,

Respectfully,

A. S. CHAPMAN.

President Indiana Cane Growers Association.

RESOLUTIONS ADOPTED BY THE INDIANA CANE GROWERS
ASSOCIATION AT INDIANAPOLIS, IND., DEC. 31. 1886.

Whereas—The manufacture of sorghum molasses in this country is conducted mainly by farmers scattered throughout our whole corn belt, employing an average individual capital of \$1,000 and aggregating in value several hundred thousand dollars, producing annually a pure, wholesome molasses valued at many millions.

Owing to the adulteration, mixing and compounding of all commercial syrups as practiced in our cities, we can not by our present methods of manufacture produce an article sufficiently low in cost and uniform in grade for successful competition, owing to our isolated condition, other interests in which most are engaged and the lack of means, no considerable effort has been made to develop the industry, our advance therefore during the past twenty-five years has not kept pace with the improvement in other lines of manufacture.

From these causes the industry is in a depressed condition, many plants were not operated the past season and more will dismantle the coming season.

Recent developments have disclosed two processes for cleaning the cane and purifying the juice that give promise of inestimable value to the manufacturer of sorghum sugar and molasses, we therefore feel the urgent necessity of extended experiments to determine the value of these and other processes, hoping to restore again the prosperous condition prevailing upon the advent of these spurious syrups on the market.

Be it resolved therefore: That our National Congress be urged to appropriate the sum of \$10,000 to be expended under the direction of the commissioner of agriculture for the exclusive benefit of the sorghum syrup manufacturers of this country.

(Signed) A. S. CHAPMAN,
A. C. PORTER,
E. W. DEMING,
W. F. LEITZMAN,
Commissioners.

GLUCOSE ADULTERATIONS.

Resolved—That this Association of Indiana Cane Growers in convention assembled this thirty-first day of December, 1886, do hereby petition the National Congress to consider the fraudulent adulteration of the sweet products of the country with glucose, and to pass laws prohibiting such adulteration compelling manufacturers and those who handle glucose to represent it as glucose, and making the adulteration of any sweet article by glucose a misdemeanor;

Resolved—That our senators and representatives be requested to see these, our wishes, properly brought before the National Congress.

On motion, the above resolutions were approved and the secretary was directed to correspond with the Indiana Cane Growers Association, and express our sympathy with them in their efforts to drive adulterated sugar products out of the market.

Prof. Porter referred to the action taken last year by the Louisiana Sugar Growers Association to procure legislation prohibiting the adulteration of syrups by glucose, to the subsequent calling for contributions to enforce the law. It was recognized to be the fact that adulterations had been carried to such an ex-

tent that the southern cane industry was being destroyed. The standard of New Orleans syrups had been lowered and it was next to impossible to obtain a gallon of those goods known to be pure.

The President's annual address was then read.

PRESIDENT'S ANNUAL ADDRESS.

Gentlemen of the Minnesota Amber Cane Association :

In accordance with our rules in the past, it becomes my duty to present to you at this time a review of our work for the year and to compare it with results in the past, and, if practicable, to make some suggestions for our consideration and endeavor to add to the sum of our practical knowledge in relation to our industry.

The amount of work done in this State, has not been as extensive as could have been hoped, although the prices for our syrup are sufficient to make the business reasonably profitable. I regret to say that four and one-half cents per pound for sugar is anything but encouraging to the progress of the business for the future and may be regarded as an explanation for the demoralized condition of our business throughout the country, north and south, in fact the world over, for there is no doubt that this is about the darkest outlook ever presented to those who have capital invested in growing and manufacturing sugar, that history presents.

The season has been more than usually favorable for the growth and harvest of our crop, but we have a new experience to record in relation to a calamity that may possibly overtake our crop before it shall be ready for the harvest. I learn that quite a large amount of cane has been destroyed by the chinch bug. This is the first time that I have heard of this additional hindrance to the success of our labors and, while I do not think that we had any good reason to expect that we should escape this scourge when it came, still, we seriously regret to be obliged to record the fact.

I am not able to report anything in the nature of critical investigation within the State. I will proceed to state some of the conclusions that have been arrived at in relation to the future success of our labors in the production of sugar from sorghum.

Prof. H. W. Wiley, when he finished his work at Ottawa,

Kansas, closed his report (see bulletin No. 6, page 19), with the following

GENERAL CONCLUSIONS.

The general results of the experiments may be summarized as follows:

First—By the process of diffusion, ninety-eight per cent of the sugar in the cane was extracted, and the yield was fully double that obtained in the ordinary way.

Second—The difficulties to be overcome in the application of diffusion are wholly mechanical. With apparatus on hand the following changes are necessary in order to be able to work one hundred and twenty tons per day. (a) The diffusion cells should be made twice as large as they now are, that is, of one hundred and thirty cubic feet capacity. (b) The opening, through which the chips are discharged, should be made, as nearly as possible, of the same area as the horizontal cross section of the cell.

(c) The forced feed of the cutter requires a few minor changes in order to prevent choking. (d) The apparatus for delivering chips to the cells should be remodeled so as to dispense with the labor of one man.

Third—The process of carbonation for the purification of the juice is the only method which will give a limpid juice with the minimum of waste and a maximum of purity.

Fourth—By a proper combination of diffusion and carbonation, the experiments have demonstrated that fully ninety-five per cent of the sugar in the cane can be placed on the market either as dry sugar or molasses.

Fifth—It is highly important that the department complete the experiments, so successfully inaugurated, by making the changes in the machinery mentioned above, and by the erection of a complete carbonation outfit.

I believe that this season's work was closed by a public dinner, given to Prof. Wiley, at which some rather complimentary toasts and speeches were given and made in honor of the final success of the work of the department as conducted by the professor.

This was thought to be the final end of the experiment, and the department asked and received an appropriation of \$94,000 to erect proper machinery as advised by Prof. Wiley, which was erected at Fort Scott, Kansas, this season. Commenced

work September 13th, and worked, through the diffusion, during the season, 2,322 tons of cane.

I have not the patience to give you the details of this season's work, or to do more than refer to the conclusion to which he finally came, at the close of the season, and I think that all that is necessary to quote is the first paragraph of his conclusions, which is in the following words, found on page 41, bulletin No. 14.

"In a general review of the work, the most important point suggested is the absolute failure of the experiments to demonstrate the commercial practicability of manufacturing sugar from sorghum." I will, however, still make one more quotation which may be found in the closing of his report, at the bottom of page 44. He says: "I consider that my connection with the department of this industry has ended." I am compelled to say that I am truly gratified that this is the last that we are to hear of him in this connection. This is a most mortifying conclusion of the last eight years' work of the agricultural department, and the more so for the reason that it is so entirely unnecessary and false.

Sugar has been made from sorghum for the last six years, and everybody acquainted with the history of the business during that time knows it. The only difficulty connected with the business is the unprecedented low price of sugar and syrup, not only in this country but the world over. But let him pass.

I now turn to a more pleasant aspect of this subject and will refer, as I have upon former occasions, to the only practical and intelligent efforts in connection with this investigation. I refer to the Rio Grande Works in New Jersey, operated by Geo. C. Potts & Co., of Philadelphia, and under the management of Henry A. Hughes, superintendent, and Prof. A. L. Neale, chemist of the agricultural experimental station of New Jersey.

The Rio Grande Works has been in operation since the season of 1882 and have been in the hands of experienced sugar men, since they were first started, and have been faithfully operated with the purpose of making them a paying business. They have also had the support of the state, by a bounty for cane and sugar, until this year, but the price of sugar has continued to drop from seven and one-half cents per pound for fair refining to four and one-half cents per pound at the present time; but against all the most unfavorable circumstances possible they have continued to fight with an indomitable courage, determined that they would succeed.

I have now before me the New Jersey Agricultural Experimental Station Bulletin, No. 41, for the year 1886, which gives the result of the work of the Rio Grande Works for this season.

I should be pleased to give a summary of this report but it would make this paper too long and I must content myself with making a few references to its contents. On page 4 they say that 89 per cent of the total sugar in the cane was obtained by diffusion and only 48 per cent of the sugar in the cane was secured by milling. Mill products must therefore be increased by 84 per cent to equal diffusion products. The following is a description of the process of preparing the cane for the diffusors: "The bundles of sorghum, each weighing about three hundred pounds, are raised, by steam power, to a platform, upon which they are opened."

From this platform the cane is arranged in a bed five feet wide, and is conveyed by carriers, butt end forward, to a heavy revolving knife. The feed is so regulated that at each revolution this knife cuts off four inches of the cane bed until the seed tops are reached. By a very ingenious arrangement these seed tops escape the knife by dropping through a trap door which is turned by hand at the proper moment. This separation of the seed tops from the unstripped cane has been found to be thoroughly satisfactory. The four-inch sections of cane, mixed with leaves but practically free from seed, are elevated to a fan which blows away much of the leaf, and, under favorable conditions, wastes very little or none of the stalk. Two small knives, each revolving nearly 2,000 times per minute, next shave these cleaned sections into chips, and the cane is ready for diffusion.

I should be pleased to give a description of the process of diffusion as practiced at these works, but it does not differ from any other very much and would not prove especially interesting.

This process of preparing the cane for the diffusors reduces the weight of the unstripped and untopped cane twenty-one per cent, leaving 1,576 pounds of clean cane. It is suggested that the cane should be cut into two-inch lengths before going to the fan and that two fans should be employed instead of one to make the clearing of the cane of leaves perfect, and it is especially desirable as the leaves contain a large amount of solids that prevent crystallization of the sugar. Small portions of the stripped, topped and shredded cane were picked from the carrier during the time occupied in filling the diffusors. About fifty pounds were secured in this manner, from which a sample was drawn.

This was dried at 120° Fahrenheit, ground to a flour and extracted with boiling alcohol.

The alcoholic extract, properly purified and polarized, indicated that one ton of unstripped and untopped cane contained one hundred and twenty pounds of 100 test sugar.

For practical purposes it is therefore safe to assume that the entire lot of 728 tons of cane used in the diffusion trial averaged not less than 114 pounds of 100 test sugar per ton. Of this 114 pounds the diffusers secured 79.9 pounds. The diffusion bagasse and the waste water from the battery must have contained at least 34.1 pounds, or 30 per cent of the sugar produced in the field. It was ascertained that the bagasse and water did contain this lost sugar, and it was caused by the bagasse not being cut in a uniform manner or size, and the work of the diffusers not being as complete as it should have been.

It would be a great gratification to be able to give you still further quotations from this very valuable and carefully prepared report, but I will not trespass and will close my reference to this report by stating the opinion of these gentlemen.

In regard to this industry, after their close attention and painstaking care, during the last five years' work at this place, where many hundred thousand pounds of sugar and a very large amount of molasses have been made by them, this report says:

“Both Superintendent Hughes and the chemist of this station believe that the sorghum sugar business can be made profitable and claim that the correctness of this opinion can be demonstrated by a house equipped to work fifteen tons of cane daily, and the amount of money necessary to build and equip it will not exceed \$5,000.”

I do not feel willing to extend this address by quoting from the report of Prof. Stubbs, of the Louisiana Experimental Station, except to say that he reports that the cane grown on the station was very promising in the quantity of sugar it indicated, was very good, and the quantity of cane grown to the acre very promising.

I will make some reference to the statistics of the sugar production for the year 1886-7.

The amount of beet sugar produced in Europe as reported by Licht's monthly statement is 2,620,000 tons. The amount of cane sugar will probably reach 2,500,000 tons more and probably the aggregate is larger than ever reported before. Willett, Hamlin & Co., of New York, estimate the consumption of the

United States for ten months at 1,134,269 tons, or about 1,360,000 tons for the year which, at 5 cent per pound, or \$100 per ton, will equal \$136,000,000; and the increase continues at the rate of 100,000 tons per annum, to which the import of molasses should be added.

The increased consumption of our people demands that a supply shall be furnished by ourselves, and I still believe that it will.

The following paper was then read :

THE AMBER CANE INDUSTRY.

By Seth H. Kenney, Morristown.

To the President and Members of the Minnesota Amber Cane Association :

I am reminded that this is the tenth year of our existence as a state organization; one-half the age of the State Horticultural Society. By comparing the samples of crude sugar and syrup presented to the St. Paul Chamber of Commerce ten years ago, to the samples presented to-day by members of this society, it will be seen that a very great advance has been made. As members of this Association, we invite the members of the House of Representatives and Senate and everyone present that is interested to test the samples we have presented. When we remember the state of Minnesota received first and second premiums on amber cane sugar and syrups at the world's fair at New Orleans for 1884-5 over the entire United States, we may congratulate each other for the progress we have made in producing products that commanded the attention of the New Orleans Sugar Exchange and their cordial invitation of the executive officers of this Association to be present at their meeting. As superintendent of the Minnesota exhibit of amber cane products at New Orleans, I heard many remarks complimentary to this State. Mr. John Diamond, vice president of the New Orleans Sugar Exchange, said to Mr. Kenney: "I wish to congratulate you for the fine exhibit of sugar and syrup produced by your State, also the quality of the exhibit." Another sugar planter, addressing his friend, said: "Only think of it, that 2,000 miles up the Mississippi they can produce such goods."

In the last two or three years there has been as much improvement in the manufacture of amber cane products as there has been in the new process making flour. This invention was brought out by a practical worker of our Association, Mr. John F. Porter, of Red Wing, Minn. It has, in my opinion, reduced the operation of sugar making in the North to a decided success.

I manufactured on one of Mr. Porter's copper evaporators the past season more than 6,000 gallons of heavy syrup, weighing from $11\frac{3}{4}$ pounds to 12 pounds per gallon. In the manufacture of this crop there were days when a well-defined sugar grain formed in the syrup before it was fairly cold. This evaporator is constructed to boil by steam, and so fast, that no inversion of the sugar takes place, providing suitable cooling facilities are furnished after syrup is finished. Syrup that will weigh $11\frac{3}{4}$ pounds per gallon at the point that we finish it contains about 236 degrees of heat, and tests by the saccharometer while hot about 36 degrees, a heat sufficient to melt solder. The rapid work which I was able to do, with several gentlemen to time the amount of syrup per minute, the evaporator produced one gallon per minute of thick syrup; the amount of juice to produce 1 gallon syrup was 7 gallons per minute; the juice averaged 8 degrees saccharometer. I have seen it as high as 11 degrees and not uncommonly 9 degrees. One degree after you go above 8 degrees is more in making sugar than the first 5 degrees. The past season in Minnesota, though producing juice of fine quality, for some reason the saccharine strength was not as great as most other years. I have found that cane blown down before fully matured never attains full saccharine strength.

I have also found that a heavy rain on the cane after it is ripe somewhat reduces the saccharine strength. I have been informed that the cane grown for the government works at Fort Scott, Kansas, had much of it taken on a second growth. In my experience nothing is more detrimental to success in sugar making than this. I received a sample of sugar from the works at Fort Scott. It was a credit to those having charge of the works. There are several reasons why the amber cane industry is not making more progress in the Northern states. Glucose is as much a detriment to the amber cane interest in the North as oleomargarine is to the butter interest. If we had a law and a state inspector to test the syrup, and confiscate the products that are sold as "Tennessee Sorghum," that are mixed with from one-half to three-fourths glucose, there would then be a

better demand for home-made syrup. The wholesale price of syrups has ruled very low for several years, because a pure product has to compete with those made with a cheaper material. I am not finding fault about prices. I have sold the largest part of my last crop at forty-five cents, by the barrel, and fifty cents per gallon by the keg. At these figures I can live myself, and am able to hold my customers. But every citizen, loyal to the state of Minnesota, would be glad to see, in the days when wheat growing is not remunerative, another industry that instead of sending money to other states for cane syrup, the farmers of Minnesota could find a home market where they could exchange their pure goods for such products as they may need.

I would not advise large outlays in machinery without some previous knowledge. There are several successful works connected with this Association that have made it a financial success. Mr. O. S. Powell, of River Falls, Wis., Mr. John F. Porter, of Red Wing, and my own works at Morristown, Minn., each factory producing several thousand dollars worth each year. I worked up the cane the past season for forty-eight farmers; the average for each one was forty-two gallons each; the price paid was twentycents per gallon for making. Nearly everyone has a good share of his product in sugar. I have several thousand pounds, like the sample I have brought here, to be drained when the warm weather approaches. The syrup then is drained easily and quickly, and at less than one-tenth the cost to do it in cold weather.

In planting cane I would recommend high, rolling land, and a southern exposure when practicable. The highest land is less liable to early frosts. I think it is highly important to give cane good cultivation. I found I could produce as good a growth the past dry season as ever, by plowing often, while cane not plowed well failed of maturing a good crop. Stripping cane is rather expensive. It can be dispensed with in cutting the cane from twenty-four to forty-eight hours in advance of your grinding, so that the leaves will become wilted. Cane that is used in this way in the early part of the season care must be taken that it is not left in piles over night as it will heat much more readily as the leaves shut out the circulation of air. In grinding the cane I find it very important to scald out the sprouts at least twice in twenty-four hours and the storage tanks once in three or four hours.

I usually introduce a little lime to neutralize the vegetable acids

always found in the juices of the cane. For perfect defecation, I use more lime, which makes the syrups darker, but they are the freest from vegetable matter which is termed by some the "fodder taste." For table use this is what we always use. There is no positive rule in applying the lime; if you get too much it injures the product, if not enough it does not remove the impurities. The manufacture by the use of the Porter Steam Evaporator is so simple and easy, the main point with me is to supply juice enough. I have spent the largest share of my life in the manufacture of cane products, but if I was a young man and could see in the industry what I see now, I could do my work over again and even do it much more successfully as the obstacles are now overcome in manufacturing. After the past season's experience I would not accept a vacuum pan if I could have one given me. I examined the products of these pans at New Orleans from Kansas. It was the opinion of Dr. C. A. Crampton, government chemist in charge, and others, of considerable note, that the open pan-work from Minnesota was much in advance. He made this remark, "Your product is so far ahead no one questions the justness of the award." After twenty-eight years of practice in growing and manufacturing amber cane in the state of Minnesota, I think with careful cultivation and a thorough knowledge of the business, in at least the southern portion of the State, south of latitude 43, it is a safe, profitable industry; that it adds an important factor of wealth to the State, makes us more independent and adds to our wealth. If the dairymen have a right to protection the laboring classes that buy syrup for pure syrup that is badly adulterated ought to be protected. When glucose syrups come up the Mississippi by the thousand barrels and come into every town and village, and so cheap as to seriously interfere with the production of good syrups, is it not time that our lawmakers look after them? The sugar planters of Louisiana are seriously effected, as their products as made by them are pure, but they are bought up and mixed so that it has seriously interfered with their industry in having placed on the market impure New Orleans goods.

I have from my own personal knowledge found there are hardly any pure syrups on the market, except the products made here at home. The wholesale houses can buy the mixed goods so as to make a better profit; the merchant can buy these same goods so he can make a better margin. This leaves the manufacturers with no ready market for their product, except where they have built

up a local trade, and at prices about the same as the mixed goods, and that class of goods sold as *pure goods* is what beats this industry. I believe if once well understood and presented in a proper way by this Association, this wrong may be corrected, and I think we should ask our representatives at Washington to continue the investigations now being prosecuted through the agricultural commissioner, in investigating the Northern cane industry.

The following paper was then read :

THE MECHANICS AND CHEMISTRY OF HEAT AND THEIR APPLICATION TO EVAPORATING SHALLOW BODIES OF LIQUID.

By Mr. B. Densmore, Red Wing.

The prime factors in problems of mechanics are time, space, weight and motion. They occur in infinite variety and application, and enter in some form into the investigation of work done, or being done, or to be done.

Chemistry, in many of its features, is not unlike mechanics. It considers the nature and properties of bodies and the laws by which those properties are maintained or changed. The prime factors in chemistry are, at the present time, about sixty-eight in number, and their combinations and properties are always affected in accordance with fixed laws, many of which are already known and followed by the chemist in his researches.

In the rugged and materialistic philosophy of the ancients, there were recognized four elements only, and they regarded them with much awe, admiration and reverence; and well they might, for what was true of them then is equally true to-day, for "the heavens declare the glory of God and the firmament showeth His handiwork;" for "the sea is His and He made it;" for "the earth is His and the fullness thereof;" and "the fire and hail, snow and vapor and stormy wind fulfill His will."

To neither of these elements has there been aught added, nor from either has there been aught taken, and they are the same to-day they were centuries gone by—indispensable to the existence and happiness of man, and daily ministering to his every want.

The philosophy of the nineteenth century bears much the same relation to that of ancient days as the fruit bears to the tree.

We have learned somewhat of the nature of the atmosphere and of fire; and the earth and the sea have released to man largely of their treasures, and many of their secrets. The earth and the sea and the air have been tried in the philosopher's scales, and many of their salient features made a matter of record their magnitudes have been approximately determined, and they have been "weighed in the balance."

Unlike these, the fourth element, fire, has thus far eluded the pursuit and grasp of the philosopher and the chemist.

Even to the present generation, who have harnessed the lightning and caused it to do the bidding and work of man — to send messages throughout the length and breadth of the land, and to turn night into day — even to them fire is yet accepted as an almost unfathomed mystery.

Heat and light are the only contributions yet made by fire to the vocabulary of science, and to neither of these have been ascribed the qualities of magnitude and weight.

Like their cognates — electricity and magnetism — they have no sensible weight varying with concentration or intensity, nor have they a defined location. They are found everywhere and under all circumstances, and their presence or absence is always noted in the matter-of-fact way of every-day life.

Heat is a term employed in a general sense and without special reference to source or degree, and to denote cause and effect — one or both.

With reference to its status or condition, it is classed either as sensible heat or as latent heat. Sensible heat requires but little in the way of definition. It is heat proper, or tangible heat; it is heat simply, and in the free and general acceptance of the term. Latent heat is described as "that portion of heat which enters into a body while changing from a solid to a liquid form, or from a liquid to a gaseous form, and without altering the temperature of that body." Thus latent heat is that portion or quantity of heat necessary to employ in converting a block of ice at 32° temperature into a body of water at 32° temperature, which, we propose soon to show, is an inappreciable quantity. The same theory holds good also relative to the conversion of water into the gaseous form of steam.

The term latent, and the definition given, although generally accepted and used, seems to want relevancy and fitness, and to be unwisely chosen.

To continue to heat a body without changing the temperature of that body, is at least paradoxical.

In instances of this character in our philosophy, mechanics and chemistry come to our relief. If we wish to cause a specified change in the relative position of a certain body, we call into use the three factors, power, space and time, in such relative proportions as may be required, and the change in position is made. If in chemistry we wish to make a compound of specific character, we combine in due succession and quantity the materials necessary to make that compound. If in any of the arts or in any of the industries of life we wish to work out changes or conditions through the aid of heat, we employ the latter in such form and for such a period of time as may be necessary to produce the result desired.

If we wish to make the compound known as steam, we combine the two elements, heat and water, in the requisite proportions and for the required length of time, and when the formation of the compound has been once established it will continue as long as the conditions necessary to its formation are maintained. Under ordinary conditions, in an open vessel, and at sea level, steam is formed at a temperature of 212° . Up to this point and time there has been no perceptible change in the outward appearance of the compound, but by the addition of one degree more of temperature, or heat, the conditions for producing steam are fulfilled, and steam will be formed with a rapidity due to the proportionate and relative quantities of water and heat employed.

By increasing the intensity and distribution of the volumes or atoms of heat disseminated through the water, the latter is gradually consumed and in a manner fully paralleled by the welding and fusion and final oxidation or burning up of iron or steel under the influence and action of a high and aggressive heat, as is often witnessed in the furnace or forge.

Theoretically, steam occupies 1,700 volumes of space of the same magnitude as that occupied by the volume of water from which it was produced, and 1,700 volumes of steam, in time, contain sufficient heat to raise $5\frac{1}{2}$ volumes of water from normal temperature to a temperature of 212° .

It may be possible, by a very slow and careful process, to produce this change in the temperature of a body of water without perceptibly establishing among its atoms the principle of motion.

This, however, is in reality established almost at the outset of the process, and it increases in activity and strength so long as the temperature is being increased.

If we desire the compound steam possessed also of this mechanical property — motion or power — we cause it to be made within the confines of a steam boiler, and even here should the quantity of heat employed in a given time be too small, the compound does not advance beyond the condition of warm or hot water. On the other hand, should the heat be of sufficient intensity and applied rapidly enough, the resulting compound is steam possessed of mechanical energy known and denominated as a pressure of a certain number of pounds to the square inch, and therefore capable, mechanically, of developing an equivalent of motion or power.

In this form it is extremely infractious and unstable, and if at once liberated from the confines of the boiler, it immediately expands to the full volume, developing all the motion and power due to the pressure, and then as quickly resolves to its normal components — heat and water ; and the heat is disseminated through the surrounding atmosphere, while the water falls to the earth. Or, on the other hand, if a body or an element low in the scale of temperature be placed in contact with the boiler, the steam immediately releases all the heat it contains above 212° , the pressure within the boiler is as instantaneously removed, a vacuum produced, and the boiler collapsed from without by the pressure of the surrounding atmosphere.

Again, should the pressure of steam within the boiler be greater than the boiler can withstand, the latter breaks and opens and the steam escapes into the open air.

It is not necessary to enter upon the details of an instance in which this powerful and fitful compound of chemical and mechanical energy as daily generated in our steam boilers throughout the land finds escape from its confines and spreads havoc and ruin in every direction. The concentrated heat is instantly expended in converting the atoms of water each into 1,700 volumes of steam, and for a moment of time space is insufficient to accommodate the immense increase in volume.

The phenomena of combined force or power and chemical change as witnessed daily in the use of steam, is, however, but the counterpart of that seen in the action of water under the influence of frigorific or freezing mixtures. In steam the atoms of water are disseminated through a large space, while in the latter they are locked up in the smallest space possible.

Subjected to the action of a mixture of snow or ice and common salt in the proportion twelve to one the temperature of

water is reduced to zero. If now the third element—motion—be introduced, the temperature is lowered to 25° below zero.

Snow and dilute sulphuric acid, in the proportion of 4 to 5, produces a temperature averaging from 50° to 90° below zero, while solid crystals of carbolic acid, in passing to the form of air or gas, will, by absorbing heat from adjacent bodies, reduce their temperature to 148° below zero, or 180° below the temperature of freezing water. This is the lowest possible artificial temperature yet attained.

A vessel of water subject to no exterior and disturbing influences, may sink in temperature several degrees below the freezing point, and without congealing. but should the vessel now be shaken lightly, or a small portion of water be removed at this time, thus introducing into the mass the element of motion, ice is formed at once throughout the body of water, and the process of freezing thus inaugurated goes on uninterrupted until the whole body of water is converted into a mass of ice.

But the phenomena of motion does not cease with ceasing to be visible to the eye. During the change from the fluid to the solid form, the atoms make a final change of position requiring somewhat more of space, and to meet this demand the inelastic vessel is burst asunder.

Thus we see the compound, heat and water, in two extremes of status or condition. First, that in which the heat is carried to a high proportionate quantity; and second, that in which heat is reduced to the lowest possible proportionate quantity, and that in either case the active and mechanical principle of motion is present, thus fully demonstrating the close alliance always existing between the elements, fire or heat and water and motion, the prime resultant of all problems in mechanics.

Water and iron are two substances entirely unlike in their composition, their structure and their nature, but there is a close similarity in their actions while under the influence of heat. Either of them increases slightly in volume with the first additions of heat. Free motion is established among the atoms of water almost from the moment heat is added, while free motion among the atoms of iron does not take place until the mass has reached a temperature of about $3,000^{\circ}$. If now a small per cent of water be added to iron at this temperature an immediate and terrific explosion follows.

Sufficient heat is at once imparted to the water to convert it instantaneously into 1,700 volumes of steam, and the molten iron

acting as a barrier to the escape of the steam holds the latter under compression and until with increasing temperature and corresponding force it escapes from its confinement.

In this phenomenon the dispersion and distribution of the molten iron is as complete as is that of steam in the exploding steam boiler. In either case the principle or element of motion is the open link between cause and effect. The condition determining whether the result shall be one of safety or disaster. In the example of the molten iron this resultant is too impetuous and infractional for any and all practical purposes, and its employment is never attempted by operators of good judgment. They prefer to let the liquid return to its normal temperature unmolested and to allow the heat it contained to go to waste rather than attempt to utilize by compounding it with water.

The practicability of employing the compound—heat and water—for the purpose of evaporating liquids lies, first, in the fact that the resulting element, steam, has for equal volumes a weight of only the 1-1,700 part of the water from which it was generated or about 35-1,000 pound to the cubic foot under light pressure, and 2-10 pound under working pressure, and therefore yields readily to the impulse of motion and can be conducted from the steam boiler in pipes to any point with very little expenditure of power or loss of motion save that required to overcome friction—and, second, the perfect adaptation of steam to evaporating purposes is by reason of the great rapidity with which it resolves into its original elements the moment it is brought in contact with a body of comparatively low temperature.

Under a boiler pressure of 70 pounds to the square inch the temperature of steam is about 315°, and as 300 volumes of this steam contains sufficient heat to convert one volume of water into steam having a temperature of 212°, it constitutes at once a most powerful and efficient agent for conveying and imparting heat to any body of liquid, the volume of which we wish to reduce by evaporating a large per cent of the water it may contain. It is powerful because of the slight affinity existing between the component elements at a temperature above 212°, the extra abundant or latent heat being imparted instantaneously to surrounding objects. It is efficient because of its extreme mobility, moving quickly in any direction where it may escape confinement and find a body to which it can transfer its burden of heat, and lastly, but by no means of least importance, it is

the most valuable agent for conveying heat to this liquid to be evaporated, as its use implies security against damage by reason of overheating or burning.

The temperature of steam can no more be higher than that due to the pressure per square inch, than the steam can rise higher than the fountain; hence the complete protection from all liability to damage or deterioration due to a high, irregular and aggressive heat. Even should the steam pressure be carried as high as 120 pounds to the square inch, the temperature would not exceed 340° and the persistent or effective temperature in the shallow body of liquid being evaporated, would vary but little from that found with a pressure of 70° . With the latter pressure the temperature of the liquid in which the steam coil or pipe is submerged will not, under the ordinary conditions of evaporation, vary much from 215° to 220° .

This relatively low temperature is, however, directly dependent upon maintaining a shallow body of the liquid being evaporated. The depth of this incumbent upon the steam pipe or coil acts as an obstruction to the free and liberal escape upward of the bubbles of steam formed at the coil, and should it be allowed to increase there will be a corresponding increase of the resistance and a like increase of the temperature until the latter is nearly if not quite equal to that of the steam within the coil. Thus the liquid being evaporated is the chief condition which determines and regulates this temperature, and it is easily seen that to keep within the lowest range of temperature the depth of the liquid must be kept at the lowest practicable, and maintained at that depth with all the accuracy possible.

In evaporating a deep body of cane juice by means of heat radiated from a steam pipe or coil in the bottom of the vessel there is a reckless waste of fuel and time and a wanton destruction or breaking down of the most valued properties of the juice. The chemical and mechanical factors involved are the same, whether the liquid be in deep or shallow body; these are heat, pressure, time and space.

If in shallow body, these factors develop almost instantaneously the phenomena of bubbles of expanding steam escaping from the coil without resistance, and consequently at the lowest range of temperature, and, by reason of their expansion constantly diminishing in temperature. If in deep body, the incipient bubble of steam remains attached to the coil until all the factors of the phenomena are reinforced sufficiently to enable it to detach from

the coil, and, overcoming the resistance offered by the superimposed body of liquid, wend its way to the surface.

In a mechanical way evaporation has been established, force has been employed and resistance overcome, but meanwhile other attending chemical agencies have been at work. Temperature had of necessity to be intensified in the bubble and the principle of mechanical equivalents complied with before it could start on the journey upward.

The necessarily excessive and persistent heat has inverted a sensible quantity of the cane sugar and has left indelible impressions upon every element of the liquid even to branding them with the unmistakable legend "tried as by fire."

Persistent heat is a powerful agent in chemical phenomena, in fact there are many chemical changes which can not be produced without its special employment. The heat may be strong and of brief application or it may be mild and applied continuously through protracted periods of time, but the results in either case are identical. Given the conditions necessary to produce a certain chemical change and that change will surely and in due time take place.

The effects upon cane juice of high and persistent heat continued through a short period of time and of a low heat continued through a long period of time are analogous. In either case or under either condition the heat co-operates with the normal acids and with the acids of lime and sulphur, if used, and converts the cane sugar into grape sugar or glucose, and with due regard for the physical laws involved, either of chemistry or mechanics, the status of the phenomena may be reduced to a statement of equivalents, and the results placed one opposite the other with the sign of equality between them. It is simply a question of cause and effect—given certain causes and the effect due to those causes is sure to follow.

If in evaporation we employ but a very shallow body of liquid—scarcely enough in quantity to cover the coils—the effects of the heat are at once marvellous and concise. Being instantly expended in converting the volume of water into 1,700 volumes of steam, and there being no superimposed body of liquid to obstruct free radiation and quick absorption, the 1,700 volumes instantly obey the impulse and law of expansion and recoil, and each bear but a fraction of the original volume of heat, and are consequently rendered powerless for working injury to or breaking down the sugar properties contained.

It may not be reasonable to assume that the full force and effect of the proposition of one to 1,700 takes place, nor is it necessary to assume that such is the case, for all the factors of the problem—heat, time, space and motion—are still present intact and in full force. The law controlling their presence holds good until the bubble reaches the surface and explodes. When the bubble expands the heat it contains expands also, and is thus rendered less intense, and instead of being persistent or aggressive is neutral and passive.

But the heat is not all diverted to the production of steam. A large per cent of it is taken up on the way by the impurities of the juice.

To eliminate them or separate them from the juice is one of the highest aims of the sorghum worker, and there is no agent better adapted and none so efficient and concise in its workings to produce these results as heat when embodied in steam and applied to evaporating a shallow body of liquid. In a deep body the continued application even of moderate heat “diffuses” the “impurities,” and develops all their objectionable properties, and they mix with the liquid and become inseparable from it. A continual application of persistent heat produces the same result with only a difference in form.

All the long or continued boiling you may give the juice seems only to deepen a dilemma, for by so doing the impurities become thoroughly incorporated and fixed. The color is changed from amber to dark or black; the flavor speaks of impurity instead of purity, and the cane sugar has been replaced by a product of low commercial value.

In shallow evaporation the impurities contained in the juice are immediately affected by the heat. They are desiccated to an extent which renders them buoyant and at the same time concentrates them into the form of pellicules or spawn, and while in this form should be removed with precision, neatness and dispatch.

REPORTS FROM MEMBERS.

Reports from growers and manufacturers of amber cane being called for, the following verbal reports were made:

Mr. J. F. Porter of Red Wing, said:

Mr. President: I have done about the least sorghum work this past year of any year I have been in the business. I have only made 2,424 gallons of syrup. The cause of the shrinkage was mainly chinch bugs; they got in and used about two-thirds of the cane, so there was not a large amount to work up.

Capt. Blakeley. I would be pleased if those relating their experience would indicate what success they have experienced in the growth of the plant as well as stating the amount produced. We want to know as to the influences at work during the season, and get such information as we may as to climatic influences, etc.

Mr. D. Day. Mr. President, my experience has been about like that of Mr. Porter's, only rather to the worse. The chinch bugs took at least three-fourths of the cane, and in some instances four-fifths, in my vicinity. There were large pieces that were worth nothing; while some pieces made a good article of syrup, the larger portion of the area planted was destroyed by insects. I do not know how we can head off the chinch bugs; I would like to have some one give a receipt for it.

Capt. Blakeley. Continued experiments have been made to solve that question, but so far, I believe, without accomplishing anything very definite.

Prof. Porter. As bearing on that subject we have emphasized the necessity of continued experiment and observation to solve the thousand and one problems bearing upon agriculture in all its varied departments. These experiments as they are carried on are at altogether too much cost. They require the continued effort of years and there is too great a field of inquiry to claim the attention of a single individual. This work should be devolved upon the state and nation, for the reason, in the first place, that the cost is too great for any individual to assume; and secondly, the work itself should be "immortal." The agents who carry on the work are certainly very mortal. Men commence these lines of experimentation and they go on with a very great enthusiasm for twenty or thirty years, and then death strikes them and they drop, and in ninety-nine cases out of a hundred the work dies with the man. We should put this experimental work in such a shape that when the individual having it in charge drops out, his successor in the same line shall step in, take up and carry forward the work and not be required to begin *de novo*. He should commence where his predecessor left off, roll the ball along for twenty-five years, more or less, and then let another go on with it for twenty-five more, and so on. This can only be accomplished by having such work carried on by the state or by the nation.

Now, in this line of experimental work there has been progress made every year since 1839, when Boussingault in France, esta-

blished the first practical laboratory under the authority of the government; and from that beginning, France has increased the numbers of her stations, until she now has forty-eight of the very best equipped agricultural stations in the world.

In 1840 Baron Liebig took up this work in Germany. There was not a single laboratory at that time in that empire where experimental work could be undertaken; Baron Liebig was the first. All the advancement made in experimental work in those countries has been the work done within the past fifty years. At the present time there are in Germany alone probably over one hundred stations, and every civilized nation of the world has undertaken the work, and it is the best and most productive line of work the nations can undertake for the benefit of agriculture. The establishment of these stations in France and Germany have brought about results which are most surprising.

This matter of the establishment of agricultural experimental stations in the United States is of very recent origin. The first station, I think, was established in Connecticut in 1875. In New York stations were established, one or two of which are maintained by individual enterprise. We have now some twenty-five or thirty independent stations, established as such, or in connection with the agricultural colleges of the country. They are mainly doing efficient work, and some of them are sustained by liberal appropriations. New York appropriates \$20,000 annually in support of its experiment stations. The amount appropriated for these stations in the country runs from \$2,000 to \$20,000 per state.

Two or three bills have been introduced in Congress within the last four years looking to the extending of national aid to the promotion of these objects. There is at the present time an important measure pending known as the "Hatch Agricultural Experiment Station Bill." It has been unanimously recommended by both the agricultural committees of the house and senate and has passed to a second reading in the senate. I hold in my hand a petition bearing upon this subject which will explain the object of this bill.

Prof. Porter here read a petition for the passage of the Hatch Experimental Station Bill so-called and then presented the following resolution:

Resolved, That the officers of this association be directed to prepare, sign and forward to the senators and representatives of Minnesota in the National Congress a request that they use their

influence and their votes to secure the passage by the present Congress of the bill known as the "Hatch Agricultural Experiment Station Bill" for the purpose of securing the establishment of at least one agricultural experiment station in every state of the Union, such measure being in the line of progress in agricultural science.

The resolution was adopted.

Mr. Kenney. I did not find any chinch bugs in my cane at all. The season was very dry and I began to cultivate early and kept the plows at work. I think I got as good a crop as I ever raised. I notice where they did not have so much cultivation the cane was smaller and inferior, and the juice was not as good as in other years. I never had better granulation; everything was full of grain. In one barrel of syrup sold to a merchant there was one hundred and thirty-two pounds of mush sugar when the syrup was drawn out. I am surprised at the results that can be had with open evaporation on Mr. Porter's pan, and it has filled me with enthusiasm. If such results can be had at eight degrees what may we not expect when we have cane yielding juice of a strength of ten or eleven degrees? Last season, on account of its dryness was the best for granulation purposes in a number of years. Still I look for better seasons in the future and with good cane seasons and our improved machinery we are going to have an opportunity to show the world what we do. The possibilities of this industry are scarcely realized at the present time, and I believe it is coming to the front, and is going to be an important factor of wealth for the farmers of Minnesota. I look for important results to come from our knowledge of clarifying the juice which we now have and am more enthusiastic than ever as to this industry. Where we can do the work so safely and boil a gallon per minute you can see there is no chance for inversion; where there are good facilities afforded for cooling we can have solid sugar in a short time where kept at about ninety degrees for two or three days.

Capt. Blakeley. You do not attribute the failure of the cane product to the weather?

Mr. Kenney. A high wind struck the cane before it was ripe and blew down a good deal of it and those pieces that were most injured by wind had the lowest saccharine strength; some of it did not amount to half what I expected.

Prof. Porter. As emphasizing the importance of the work of the experiment stations it may be cited that seventy years ago the amount of sugar obtained from the juice of the beet was

about one per cent and by the result of persistent experimental work directed exclusively to this object, the percentage has been raised in Europe to thirteen per cent.

Capt. Blakeley. If that has been done with the sugar beet what can not be done with amber cane? It is said a man was indicted for having brought it up to thirteen.

Prof. Porter. When we take steps to increase the saccharine strength of amber cane we shall go far in the direction of placing the industry on a permanent basis. As the result of my experience and observation I have found the greatest difficulty to overcome in the development of this industry is to get the agricultural community to turn their attention towards the cultivation of the sugar cane, they all acknowledge the profit there is in it, its value as a crop and the importance of it for the community, but as soon as they are ready to grow cane they drop back into the old ruts of raising their rye, oats, barley and grass, and the same thing year after year! When a new candidate for favor comes up, it has to fight its way and show itself to be about five times as profitable as anything else before it will get an introduction and become a favorite. I was at one time engaged in the beet root industry for about four years in the East and as the result of our efforts we were enabled to get nine to ten per cent from the beet and make the business pay a fair return. But the trouble was to get enough beets to run more than two months out of the twelve, and we could not induce farmers even with the aid of large bonuses to grow the beets in sufficient quantity to keep the factories in operation. This is the experience with the amber cane. You can't get material enough to keep your mills going. It is not because the sugar isn't there or because you can not extract the syrup, but you can not get farmers to grow more than enough to supply their home mills, and of course capital will not be embarked in the enterprise.

Capt. Blakeley. What can you say as to the experiments with the amber cane upon the state farm; can you give us a short report as superintendent?

Prof. Porter replied that the work upon the state farm had been in progress the past four years in getting well established and in a condition for work as a practical experimental station. First the land was bought, cleared up, the farm buildings erected, fenced and supplied with proper tools and machinery. It was now in a condition to be one of the best equipped stations in the United States. It was now in a condition where all that was

needed was to get the "steam" in the boiler. As yet there had not been a dollar of money furnished to set the machine at real work and they were waiting the action of the present legislature to forward the enterprise if such an institution was desired to be established permanently here in Minnesota.

Capt. Blakeley. What is the present status of the farm? Is it run by a sort of private enterprise or maintained by means of state aid?

Prof. Porter. Our experiment station was established by the department of agriculture of the university of Minnesota as a part of the equipment of that college, and the farm stands simply as the workshop or farm laboratory of the college of agriculture. A place where the teachings of the text-book, class room and laboratory will find their practical illustration in the field, garden and stable, where young men may become familiar with all the operations of the farm.

Two years ago this winter the legislature passed an act authorizing and requesting the board of regents of the state university, as soon as practicable after the passage of the act, to establish a state agricultural experiment station, placing the direction of it under that board and appointing the professor of agriculture in the university as the superintendent of that station, and the law stopped there; there were no funds appropriated for the purpose of setting the thing in motion. Of course the university was going right along and doing this work, and it was the purpose to make it an experiment station. The State steps in and authorizes this work, or what answers the same purpose. But the work thus far has been carried on as I say, without a dollar appropriated directly from the state funds.

Six years ago we had a farm costing us some \$8,000 perfectly unfitted for the purposes for which it was designed. That was sold, another farm purchased which has been converted into a magnificent plant now estimated to be worth \$500,000, all thoroughly equipped for a first-class agricultural station. In that length of time I have been professor of agriculture, farm superintendent, farm foreman, built all the buildings, purchased all the material, paid all the bills and superintended all the work carried on, and this last year acted as superintendent of the farmers' institutes. Now, then, I submit it is utterly impossible for one man to do everything. If this work is to be carried on successfully and properly, the State must come in and make such appropriations for the completion of the equipment

as its importance demands. We have two hundred and fifty acres of land located midway between the two cities, and the question is whether we should be all the while going to do, and getting ready to do, and let generations pass away before we can accomplish anything.

The committee on samples reported verbally to the effect that they found on exhibition several fine samples of sugar and syrup exhibited by Mr. S. H. Kenney, and a beautiful model of Porter's Perpetual Steam Evaporator, exhibited by the makers, Densmore Bros., of Red Wing, Minn.

Capt. Blakeley stated that the sugar industry needed protection by the government until the country was able to compete with foreign countries. England in 1845 became a free trade nation, as it was able to withstand competition. For the present we should have protection, especially for the promotion of the sugar interest.

Mr. J. M. Smith, of Green Bay, Wis., having arrived was introduced and said: He had been reminded by a statement in regard to the adulterations practiced with glucose, of a statement made by one of their United States senators to him some time since, that an effort was to be made to repeal the oleomargarine bill, and said that the dairymen of the country would kick up a row over it before it would be repealed. He added that if farmers would act their part the next bill to be passed of importance would be one against all adulterations of food products of all kinds; such a bill could be and would be passed just as soon as farmers indicated that they desired such a measure. He thought such meetings as this, and associations of this kind in this State, in Wisconsin, in Illinois and other states, should take this matter in hand and endeavor to have this project carried forward. There should be the most stringent legislation to prevent the adulteration of food; and it would be easily secured if the wants of the people were properly presented and made manifest.

Prof. Porter said the resolutions adopted by the Indiana Cane Growers and approved by this Association asked for legislation looking to the repression of adulteration of sugar, syrups and similar products.

Capt. Blakeley stated that this effort to secure this protection against adulterations of that character would meet the hearty approval of all and it was desirable that there should be concert of action in this regard.

On motion the meeting then adjourned.

AFTERNOON SESSION.

WEDNESDAY, JAN. 19, 1887.

President Elliot stated, upon the adjournment of the Amber Cane Association, that there was time for an hour's session of the State Horticultural Society.

The committee on the president's annual address presented the following report, which, on motion of Mr. Brand, was accepted:

REPORT ON PRESIDENTS'S ADDRESS.

The committee recommend that every school district in the State be furnished a copy, bound in cloth, of the annual report of the Society.

In the matter of experimental stations we are in favor of the Hatch bill and of the location of the new stations in the prairie districts.

If means can be had we are in favor of a primer of Horticulture for use in families and schools; treating of the primary principles of fruit growing and gardening and profusely illustrated.

We recommend the setting aside of fifty dollars or so much thereof as may be needed, for the purchase of books and pamphlets for the information and aid of the Entomologist, the books to belong to the Horticultural Society, to be kept at the Agricultural College Building when not in use.

We indorse the recommendations made in regard to the better organization of committees; also as to the improvement of the state fair grounds. We suggest, when these improvements are made, that it will be a good place for the Society to celebrate Arbor Day.

We approve of the recommendation requesting the State Agricultural Society to give special premiums for outside county exhibits and the giving of equal special sweepstake premiums for the counties of Dakota, Hennepin and Ramsey.

We suggest that in the floral department the premiums for amateur exhibits be passed on by committees composed of amateurs.

We approve of the recommendation for the increase of the secretary's salary, and recommend that it be made five hundred dollars.

TREE PEDDLERS.

Mr. Smith stated that the subject of tree peddlers was discussed by the committee, but had been inadvertently omitted from the report.

Mr. Harris said the committee thought the legislature should pass an act requiring all agents working outside of the county where a nursery was located to file a certificate of agency with the clerk of the court, giving the name of the nursery represented, with a list of the varieties of trees offered for sale, and prices, providing in the act that fraudulent representations should be deemed to be a misdemeanor.

Mr. Smith presented the following, as the sense of the committee on the subject:

In the matter of tree peddlers we recommend that they be required to take out a license, and to file with the clerk of court a certificate of agency and an affidavit as to the location of the nursery represented before receiving license; that canvassing for fruit trees without such license be made a misdemeanor, with punishment by fine or imprisonment.

Capt. Blakeley. I would suggest that you make it cover all horticultural products instead of apple trees simply. These agents sell at almost every house, exhibiting colored plates of plants, something or other, which they represent belong to a big nursery close by. It should include trees, vines and plants, and the selling of these without first obtaining such license should be made a misdemeanor.

Mr. Brand. Why not include shrubs?

The resolution was amended to include trees, plants, shrubs and vines, and the report as amended was adopted.

Prof. Porter presented the resolution adopted by the Amber Cane Association, found on page 184, and moved its adoption, which motion prevailed.

Mr. Harris stated he had made inquiries in regard to the firm of L. L. May & Co., and had been unable to find any nursery of such firm within the state of Minnesota. Even if there was, the conduct of the agents of the firm deserved to be condemned. He had seen some of the stock sold by their agents, giving an in-

stance where an order for stock worth some seven dollars and fifty cents had been filled at twenty-five dollars. He thought their swindling operations ought to be exposed. He did not believe they grew a tree themselves.

President Elliot said he understood this firm had an office here, but were handling stock grown in Western New York.

Continuing, he said there had been an agent around this last summer representing Augustine & Co., who had called upon him to get an order; not having much to do he sat down to listen to his story; he was one of the "greenest" men in regard to stock one could imagine and knew scarcely anything; with a pencil and card he took some notes, which were amusing to say the least. This agent made the most absurd statements as to the stock he sold and its hardiness; had his plate books, with specimens greatly overdrawn as to size and coloring; his stuff was all hardy and outrageously high. For instance, he charged \$1.50 for the Tartarian honeysuckle; Transcendent crabs, worth \$10 to \$12 per hundred, 25 to 75 cents apiece, etc. He was most amused with a statement as to a new lily of which the company had been able to secure all the stock, amounting to some eleven bulbs, at an expense of \$250; he asked the agent if there was any way he could get three or four, and he replied he didn't know but he might manage to furnish one at thirty dollars! That was the style of this class of men that were going all over this country, and if there was any law to reach them, why not have it put in force? why should not Wisconsin, Dakota, Iowa and Minnesota join hands in this matter to get a law enacted that would put a stop to these fraudulent transactions?

Mr. Brand stated that he was acquainted with the firm of May & Co. only by reputation; that he had examined some trees near Mr. Brimhall's place last summer, purchased of an agent, and found among them trees that he recognized as Ben Davis. He had lost 150,000 of that variety in 1873 and knew the variety well, although the labels read "Wealthy;" found some Early Harvest labeled "Tetofsky." Agents had been selling stock in Rice County last season which was untrue to name; Pewaukee was sold for Transcendent, etc. These things were regulated by law in the Southern States; in Alabama and Mississippi their laws provided for a bond in the sum of \$10,000 with a license fee of five dollars, for each town in which orders were taken for nursery stock. The law, however, was not entirely satisfactory; the agents were hard to get rid of.

Mr. Smith. Such a law would not hurt the honest dealer.

Mrs. Stager inquired if there was such a thing as a "strawberry tree," which grew three feet high and bore fruit so one could stand up and pick it; this was one of the things sold by L. L. May & Co. Several of the trees had been sold to mechanics at Sauk Rapids.

Mr. Harris said there was a tree called the Wahoo which was probably the species referred to. A firm had been operating about Caledonia and he had been called upon to examine some of the stock delivered there. He found they had been selling trees at ten dollars a dozen, calling them the Gideon apple, which in every respect resembled the Ben Davis. Another firm had been operating in this country, representing to sell stock from the Sparta Chain Nurseries, while the stock was grown in Southern Ohio. They had sold budded trees representing them to be hardier than root grafts. He had been to Sparta, Wis., and found one nursery of less than two acres, planted with one and two year old crabs chiefly, with barely a carload of such trees as the firm in question sells.

Mr. Lobbitt inquired how many nursery firms there were in this State that sent out stock true to name; he had not found one of them yet.

Mr. Smith thought the greatest obstacle to the fruit growing interest was the fraudulent practices of tree agents, as people who patronized them not only lost their time and money, but lost faith in fruit growing in the State. This project of licensing might be a check, but the only successful remedy was to educate the people against purchasing these untried new varieties. He had been in the Red River country, where they were infested with tree peddlers selling "hardy" Russians, one agent representing that his trees were imported direct from Russia. In the northern part of the State a gang of some fifteen men had been working, under a leader; one of their specialties was a wonderful combination which nobody else had called the "Hardy Hybrid Perpetual Rose," grafted on a dogwood tree. [Laughter.] He referred to several other instances within his own knowledge.

Mr. Lobbitt. Mr. President, I have paid out in the last ten years, I guess, over a hundred dollars for fruit trees, etc. I live very near a nursery; in the spring I used to drive up to get my trees, and, as I supposed, bought a good many Duchess trees, which did not prove to be of that variety; I bought several of the Wealthies without getting one. I finally thought I would

change, and so Mr. Gibbs ordered some trees from La Crescent; the result was I got one Duchess and two of the Wealthy out of twenty-five. The nurserymen in this country are scarce who practice no fraud.

Mr. Harris. Did you say you got them from La Crescent?

Mr. Lobbitt. Mr. Gibbs said he ordered them from there.

Mr. Harris. I will say that I never propagated any trees for sale.

Mr. Lobbitt. I didn't say it was you. [Laughter.]

Mr. Harris. There is no nursery in La Crescent and there has not been for twenty-eight years.

Mr. Lobbitt. The trees were all right so far as growth was concerned, but not true to name.

Mr. Sias. I have just come in from the ice carnival and feel too cold to talk, but would like to ask the gentleman if he ever bought any trees in Olmsted County?

Mr. Lobbitt said he had not, but thought of doing so.

Mr. Allen thought farmers were fond of being humbugged.

Mr. Lobbitt. I am not.

Mr. Allen mentioned an instance where he had cautioned a neighbor against ordering shrubbery, etc., from traveling agents, telling him to order his stock direct from Lake City and he would guarantee it would be satisfactory, as he had dealt extensively with nurserymen and never had received as good satisfaction elsewhere as he had at the Lake City Nursery. But when the agent of a St. Paul firm came along and went at him "hammer and tongs," he countermanded the order and bought of the agent. He had himself bought strawberry plants at a high price of an Eastern firm which had never borne a berry, but he lived in hopes. There were plenty of reliable nurserymen in the State, but the trouble was to teach farmers the wisdom of patronizing them instead of traveling agents.

Mrs. Stager said the agents who had been selling these strawberry trees had represented them as needing no fertilizer and as bearing wonderful berries, whereas the common plants had to be fertilized and cultivated. It looked very much as the gentlemen said, that people liked to be humbugged.

Mr. Harris. A certain gentlemen wrote me inquiring if there is a hardy peach, a native of Wisconsin, and if peaches grafted on the wild thorn would not be subject to the borer? I rise to inquire if they raise peaches in Wisconsin?

President Elliot here introduced Mr. J. M. Smith, of Wisconsin.

sin, who said he had known one gentlemen who had raised a few peaches by bending the trees down and covering them through the winter. As a rule peach trees would grow up in the summer and kill down every winter. As to the statement that there were hardy peach trees it was enough to say that they had not yet been discovered.

Mr. Harris. They are trying to sell them down in Illinois to the "suckers."

Mr. J. M. Smith. In regard to May & Co. I would say that two or three years ago a young man came to me wanting me to help him into some business. He came with a letter from May & Co. and asked me if I knew them. I told him I had met the horticulturists of Minnesota and feared there was a screw loose there somewhere, but was not positive. But they sent on their printed recommendations, etc., and he was induced to act as agent. Their prices were perfectly outrageous; for instance, the Cuthbert raspberry, at two dollars and fifty cents a dozen. I have tens of thousands that I would be glad to sell at a dollar a hundred, as pretty as ever grew. We have been annoyed very much with these tree peddlers in Wisconsin. I am glad to see your Society taking measures of this kind and I shall certainly recommend our society to follow your example at their meeting in February next. We have some nurserymen in Wisconsin whom you can rely upon. I have known them for years as gentlemen and believe them to be upright, honorable men, who will do as they agree. It is very amusing to see so many people humbugged from year to year by these tramps that are running around the country.

Mr. Lobbitt. I don't call it a humbug when I order a thing; the humbug comes in in their clear "cheek."

Mr. J. M. Smith. I have no objections to calling it by that name, if you prefer it.

Capt. Blakeley here referred to the methods followed by agents forty years ago in Virginia and other states and said the experience of the states mentioned was a terrific one.

Mr. Harris inquired if the legislature was asked to give the Society \$500 more to disseminate information among the people, would not the statement be made that too much money was being expended?

Mr. J. M. Smith. The farmers will not object provided they get the books.

Mr. Lobbitt. I would rather pay a dollar tax to get men to

sell what they represent than to pay half a mill to stop other people from buying of these men.

Mr. J. M. Smith. We have adopted a plan in Wisconsin at our institutes that works very well. We are now holding three farmers' institutes a week in Wisconsin, and occasionally four a week. At each institute we have a large number of volumes of our State Agricultural Society with other reports bound in them, and we distribute them at these institutes. The plan now is to have large numbers of them printed the coming year, and perhaps an additional volume with the cream of the institutes, to distribute, so that in a year or so our farmers will be educated and there will not be such good picking for this class of men. The farmers in our State are being waked up as they never were before, and we hope to keep the interest growing; these reports are being called for in every direction. If our sister states will take hold of this work, and the horticulturists and agriculturists will work together, they will find it to their mutual benefit. Our farmers are coming forward and showing an interest never before known in the history of the state.

President Elliot. What is the number of those reports printed?

Mr. J. M. Smith. I think there is altogether some 25,000 and we shall probably have the number increased.

Prof. Porter was very glad Mr. Smith had mentioned this subject; we had been trying to profit by their good example. A year ago the College of Agriculture by its board of regents undertook this institute work at its own expense. They had been doing the work just as fast and as thoroughly as the means at their disposal would permit; they had held thirty-one institutes, besides assisting at others. This had been done with \$1,000. They had felt the want of this literature spoken of; also, another edition was needed of our Forestry Manual of at least 10,000 volumes, with a corresponding number of the Society reports. He was now publishing a report which would contain much valuable matter, but as only 3,000 copies were authorized, there would be very few for general distribution. This Society might act as an auxiliary in this institute work. The legislature had been asked to appropriate \$7,500 for the institute work.

Mr. J. M. Smith. You will find \$7,500 is not enough.

Prof. Porter. We have got to go slow; this legislature is one that was elected on principles of economy. If we expend this sum judiciously we will have no more trouble in getting \$15,000

the next time than we have the amount asked for now. He had seen institutes where the first day farmers would come to the door and look in; the next season a few would come in and sit down; before the meeting was closed, the hall was not large enough to hold the people.

Capt. Blakeley. The question is, whether there is more pleasure to cheat than to be cheated. Legislation of a stringent nature would prevent these fraudulent transactions of tree peddlers in the State; consequently you would be doing yourselves no injury and would be doing the State a great service if you could have an act passed that would abolish these fraudulent practices.

On motion the meeting adjourned till 7 o'clock P. M.

EVENING SESSION.

WEDNESDAY, JANUARY 19, 1887.

The evening session was held in the hall of the House of Representatives and the meeting was called to order by the president.

ADDRESS ON FAIRS.

Mr. O. C. Gregg, of Minneapolis, was introduced and proceeded to address the Society. He said:

Mr. President, Ladies and Gentlemen:

I have been requested to address you briefly upon the fairs of our State.

It came in the order of my duty during the season last past to visit a goodly number of the county fairs in the state of Minnesota, and those visits made a deep impression on my mind and I am glad to have an opportunity to bring before you some of those impressions and submit them to your candid judgment, for approval or disapproval. I wish to say in advance that I do not wish to criticise or allege aught against the fair managers of the state and county fairs, for I have found them almost without exception to be men well advanced in the line of progressive agriculture.

Our fairs as conducted are open to criticism and my first objection is the lack of the educational element.

The people are to be held responsible for fair faults, upon the principle of "like people like priest." Faulty methods have been active and have come to the front, while better methods have been lagging behind. The State supports our fairs by appropriations, presumably as agricultural educators, and our fair managers, as a rule, desire that they shall be such; still it is evident that the educational element is largely wanting. This is not saying that our fairs are failures, for they usually succeed, according to the commonly accepted standard of success, that is, they pay expenses and perhaps a little more. The managers work hard, for no pay, and the people get a horse race, rarely of high order—usually more or less scrub—with an agricultural attachment and fair fakirs admitted. Our fairs have the horse element in them in such large proportion that they are sometimes called "agricultural horse trots."

RACING AT FAIRS.

A manly, robust nature usually loves a horse. The well-trained and well-bred roadster is one of the needs of the day. A cold-blooded, straight-shouldered, paunchy horse is out of place in these days of steam and drive. To raise and train a good horse is as laudable as to raise grain. I believe that true training consists in speeding in natural form, without weights or artificial aids. Intelligent breeding will produce the form associated with the requisite nervous force that speeds itself. Some of our best trotters maintain their highest speed in natural form alone. Good form, mental equilibrium and nervous energy are valuable, for they can be transmitted. Such a value is positive, and its measure of value is often unknown. Hambletonian and old Justin Morgan had so great value that even to-day their value is unknown. Weights and other aids are an open confession of fault in the horse speeded. The true idea should be, not to improve horses by weighting, which is transient, but by breeding, which is permanent. Put the premiums upon horses of permanent values; this would naturally recognize the stallions and mares as first on the list; drive out the pool-seller and jockey, of dark and doubtful methods, and we still would have the horse as an attraction with a value worthy of recognition, and the race of the fair would be an "agricultural horse trot" without reproach.

FAIR FAKIRS.

By fakirs I mean those men who run fortune wheels, cane racks, and gambling devices in general. They should be strictly barred from the fair grounds, for they are but schools of vice. I submit the following "points" bearing on this matter:

1. The State legislates against gambling in winter, but expends its money in autumn to sustain the places where gambling schools are held. The State pays a bounty for wolf scalps; let it now go to raising wolves.

2. The fair is now a bait that brings the farmer within the reach of the net of the sharper; he then is made food of by fakir sharks.

3. Country folk, not worldly wise, are easiest caught; for this reason the highest license is paid by fakirs for these fair-ground permits.

4. These grounds so occupied by games are doubly dangerous, as respectability, like a cloth, covers the hidden trap.

I rest the propositions with the question, "Should these things be allowed?"

GAMING.

I have been compelled to see so much of this that the following short statements concerning it have come to mind and are also submitted:

1. Betting proposes to swap a useless opinion for another man's money; a clear case of getting something for nothing.

2. Betting is backing one's opinion with scrip instead of sense; a bankrupt head banking on the pocket.

3. To "put up or shut up" is to close the mouth of the intelligent poor and open the mouth of the bawling rich. Wisdom is gagged and folly excited to foolishness.

4. Gambling is the action of the child man, the vice of the savage, the foe of industry and the prolific mother of discontent. Gambling has no defenders; society shrinks from it, laws brand it, and its road leads to despair. Surely such a thing should not have any place in the educational centres of a state.

LIQUORS ON FAIR GROUNDS.

Little need now be said here. Public opinion condemns it. The outlook is that proper laws will be forthcoming withholding state aid from fairs where its sale is permitted.

FAIR ATTRACTIONS.

I have no desire to drape the fair, but wish that the crimson hues of vice might be supplanted by the more pleasing colors of joys that bring no pain. Let us welcome the "merry-go-round" that swings its happy burden to the sound of the hurdy-gurdy; the stimulants to feats of manly strength, the national game, firemen and band parades, glass-ball shooting, and increase their number by inducements and ingenuity. Let ample scope be given for "youthful jollity." The fair is now and ever should be a place for pleasure. It should be pruned of those things that lead into doubtful and dangerous ways; the fair should not lead anyone into temptation.

THE FAIR AS AN EDUCATOR.

It should be more of an educator than it is. I submit the following suggestions as aids in that direction:

1. Domestic animals should be scaled by points; the judge should have an outline of a perfect form furnished him as an aid for this work. It is painful to see awards made upon size alone; the world is full of quantity, but is still short on quality.

2. This form test should also apply to vegetables.

3. Grains should be graded by recognized standards. Samples of standard grains should be at hand for comparison.

4. Judging should be done openly; that is a reason given by making an outline, or by verbal or written announcement why awards are given.

5. Standard packages for products and standard coops for fowls, etc., should be recognized; such things educate rapidly.

6. All entries should be made before the fair opens, and judges carefully selected and supplied with outlines and guides in standard measurement. If need be, pay them well and so get good services.

7. Paid and educated judges would be of great value; this paid method already prevails at competitive examinations of a high order.

I close by repeating a former statement, that the faults of the fair system are not the faults of the fair managers.

The following address was then delivered by Prof. Cyrus Northrop, president of the University of Minnesota, upon the subject of "Agricultural Education."

PROF. NORTHROP'S ADDRESS.

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

I have accepted your kind invitation to speak to you this evening, not for the purpose of delivering a literary address or a treatise on horticulture, but in order to say a few things respecting agricultural education, which I think it is well for the State that I should say and say now.

It has been my good fortune to become reasonably well acquainted with your purposes and investigations through the annual reports which you have published, and I come before you to-night with a very sincere respect for you and your work. You have taken hold of that department of agriculture which most imperatively requires special attention here in Minnesota, and which more than any other needs the aid of science and the teachings of experience. You have prosecuted this work with a zeal worthy of all commendation, and with a measure of success for which the entire State ought to be grateful. Many of the papers published in the record of your proceedings are worthy of careful study; and those are not wanting which show the writers to be as refined in taste and as sensible to beauty and as appreciative of the utility of beauty, as the most cultured literary artists. Such a paper is that by Mr J. S. Harris, in "The Model Farmer's Garden," in which occurs a description of what a farmer's home should be, which, if realized to any considerable extent, would add not a little to the happiness of farmers and their families. But, gentlemen, you have done much more than to publish excellent papers. But a few years ago it was supposed that Minnesota was too cold for the successful cultivation of fruit. But you thought otherwise. You experimented and persisted in your experiments when the results were most discouraging. By your wise perseverance and intelligent skill you have made Minnesota the prize bearer of the nation for excellence of apples; you have made it almost the peer of any in the abundance and deliciousness of grapes; you have made strawberries, the most luscious of all small fruits, not only plenty but of great variety and of the highest excellence — while every table in Minnesota is a debtor to you for a variety of food produced here at home, and most conducive to comfort and to health. In the prosecution of this work the names of Gideon, Pearce, Harris, Elliot, and others whom I need not mention,

have become as familiar as household words in connection with the work of this Society, and as benefactors of the State.

If I can not directly participate in your counsels or assist you in your work, I can at least appreciate the value of your work. And I especially desire that, as I speak to you to-night, you shall not look upon me with a kind of pity, as a mere theorist who knows nothing about the mysteries of practical agriculture. It is true that even a theorist may reach his conclusions from a larger induction than the practical man, and so the geologist may be a safer guide in mining than is the practical miner. But I am not even a theorist. My early years were spent on a farm, where I became familiar in a practical way with the whole routine of a farmer's life, including what will some day be more important in Minnesota than it appears to be regarded now, rotation of crops, and the care and feeding of cattle for beef as well as for dairy purposes. I learned how to do things by doing them. I know perfectly well what a farmer's life is; what his work is; and I believe I know what his needs are so far as they relate to education and preparation for his work. This is my only justification for appearing before you at all. While I recognize the fact that the field of knowledge is too wide for any man to be familiar with the whole of it, and while I appreciate the fact that you undoubtedly know vastly more than I about agriculture, I yet modestly hope to lead you along certain lines of thought which will pay for the time and attention which you may give me. I propose to speak upon the subject of agricultural education. I shall first notice very briefly the historical progress of agriculture. I shall then inquire what has been done for agricultural education in Minnesota, and finally, I shall try to show what is needed for the future.

If we examine carefully the history of agriculture, we shall be impressed with the very great simplicity and crudeness of the agencies employed in early times to aid the farmer in his work; we shall be astonished at the slow progress made among the Greeks and Romans, and in the mediæval ages in Europe generally; and in all the world, down even to a comparatively recent time; and we shall be delighted at the rapid strides which agriculture has made in the last half century, not only in respect to machines employed to save human labor, but also in the understanding of scientific principles and their application to farming. It is noticeable that the rapid and marked improvement in agriculture dates from the time when agricultural

societies began to be formed. Some of the societies formed at the beginning of the new era are in existence to-day, and it can not be doubted that the discussions and experiments of these societies have done much to bring on the age of mighty production and of systematic economy in human muscle. At all events, through the publications of these societies it has come to pass, directly or indirectly, that the world has had the benefit of all the good ideas which have been originated by observers or thinkers. This community of ideas, so characteristic of our age, is one great cause of human progress, not merely in agriculture, but in all departments of knowledge. It is no longer one man thinking for himself alone that measures the progress of the race. It is rather multitudes of men thinking for humanity—all eager to share their thoughts and discoveries with one another, and to publish them to the world. Under this stimulus grains have been improved in quality, and vastly increased in quantity; fruits have been multiplied in varieties, and made better in flavor; vegetables have been made to assume unheard of proportions; cattle of improved breeds have taken the place of the stunted and unprofitable specimens of former times, and the dairy has become a most tremendous contributor to human comfort; while the horse has been developed in speed and beauty beyond anything known to our ancestors. And still the work of subduing the earth, so essential to human welfare everywhere, goes on with almost boundless promise for the future.

It would almost seem, indeed, as if the wants of the world would be rapidly met, and a great surplus of unneeded products would result from the vastly increased power of labor; but experience proves that there is no new idea of real value and no new force of real power for which the world can not make room, however well mankind may seem to have been provided for before. It is no longer a question of mere existence with the human race. It is a question of how much comfort, and even luxury, mankind can have in addition to the necessaries of life. We no longer think of famine as possible, since it has been clearly shown that there is nourishment enough in the bosom of Mother Earth to feed all her children for ages to come. And the increase in the production of food has not been the result of the employment of a proportionally increased number of laborers, but of the application of machinery to work instead of human muscles. Thus the labor of the world is not unduly expended

in the direct production of food, but it is applied in larger and larger measures to the manufacture of the myriad articles which the genius of man has invented for human comfort and which, from being the luxuries of the rich, are fast becoming the necessaries of the poor. Whatever adds to the productive power of labor adds to the sum of human comfort, and especially increases the number of those who can have this comfort. We are therefore under the greatest obligations to those searchers after truth who explore the dark places of nature's domain, and bring to light new forces for the service of man.

But with the advance in agriculture and the recognition of a scientific method in agriculture, the old idea that anybody can be a farmer and that as likely as not education will unfit a man for a farmer's life, has, to a considerable extent, passed away, and there has come instead a demand for agricultural education. This demand is sensible and proper. The supply ought to equal the demand. And it does. No person who desires an agricultural education need go without it because it can not be had. The trouble thus far has been that while a clamor is raised for agricultural education the boys to be educated are not forthcoming, and to educate there must be persons to receive the education. Up to the present time the demand for agricultural education in Minnesota can not be said to have been very great, and I have no hesitation in saying that the supply has been largely in excess of the demand. And if, at the present moment, the demand seems to anybody to be greater than the supply, I answer, in the language of the market reports, that "the demand is mainly speculative and not for consumption." And I add, in the language of the Declaration of Independence, "to prove this, let facts be submitted to a candid world."

In the first place it is to be observed that the regents of the university have not been negligent in the matter of providing facilities for agricultural education. Consider for a moment what they have done.

The endowment of a university in Minnesota was begun in 1851 by the act of Congress granting two townships of land for the purpose. The territorial legislature passed an act in 1851 for the establishment of the university. The state constitution, adopted in 1857, confirmed the previous action and expressly provided for the vesting in the university of all lands which may hereafter be granted by Congress or other donations for university purposes. For reasons too well known to be repeated here,

the university was not really organized and put into operation till 1869. Thus eighteen years elapsed between the time of the first grant for the university by Congress and the organization of a faculty for university work. At first the regents very properly made provision for the education that was most needed and demanded. Full provision was made for instruction in science, literature and arts. For years the provision thus made was sufficient for the wants of the State. As schools and scholarship in the State improved the work in the university was raised, preparatory classes were dropped, till now only one remains, and its days are numbered. Later came the organization of the college of mechanic arts, and of the college of agriculture. Up to this time the sons of farmers, like the sons of everybody else, had had free permission to enter every class room in the university for which they were prepared. Now they were permitted to have in junior and senior years special instruction in agriculture in addition to all the other privileges of the university. In other words, a special college of agriculture, with a two-years' course, was established, to enter which a student must have pursued the college course during the two preceding years.

In due time, also, the regents, in order to fulfill their trust and to do all that was possible for the agricultural education, bought a farm near the university, for the practical experimental work. When the present professor of agriculture came to the State he found the farm unsuited to its intended use, and upon his recommendation the regents sold the farm, and with the proceeds of the sale purchased the present experimental farm, erected thereon a model house and barn, placed upon the farm a variety of stock, recreated — so to speak — the whole farm, so that at the present time it is a most admirable tract of land, a beautiful specimen of what it is possible for a Minnesota farm to be; without a weed in its cultivated parts, and with a rich covering of grass where formerly not a blade was growing. In bringing the farm to its present condition and present fitness for experimental work, and in meeting the requirements of the department of agriculture, the regents have expended many thousands of dollars; and they have spent, year by year, far more for the department of agriculture than they have spent for any other department whatever, and they have done this with a very sincere desire to improve agriculture and to benefit the farmers.

If this liberal policy has not been appreciated, if students

have not come to the college of agriculture, if there has been practically no demand whatever for agricultural education, it is not because the regents have failed in their duty, not because they have not made generous provision for this education, not because they have not been willing to do everything which large-minded men could do to promote so great an interest as the agriculture of Minnesota. And I wish to say here that if the regents have not accomplished directly for agriculture as much as might be desired — as much as they desired — they have at least proved themselves wise trustees of the property intrusted to their care — for they have converted property which originally cost them only \$8,000 into property which could easily be sold to-day for \$250,000, while the fruit farm at Minnetonka, purchased for \$2,000, could be sold now for \$50,000. If anyone can show anywhere more profitable farming than that let us know where it is.

But the regents have not stopped even here. In their zeal to meet the wants of the farmers of the State, they have consented to impair somewhat the symmetry of the university, and have opened specially easy paths by which students can enter the department of agriculture, and they have done this by my advice.

When I came to the university, a little more than two years ago, I found one student registered in the college of agriculture. He graduated at the end of the year; and the second year of my administration opened without a single pupil in agriculture. You will believe me, gentlemen, when I say that I pondered upon the subject long and earnestly. I became satisfied that two things were clear: First, that the actual demand for special education in agriculture was very slight, as shown by the fact that in a great agricultural State with its tens of thousands of farmers, not one farmer's son appeared to ask for instruction in agriculture, while hundreds of farmers' sons and daughters came to the university to ask for instruction in other things. Second, that the children of the State who desired education at all would take the highest education that they could get. If, therefore, they once fitted themselves in the high schools to enter the regular courses of the university, they would keep on as long as they could in the lines of their preparatory work in the schools — that is in languages, mathematics, and mental, physical, natural and economic science. In the full tide of successful and joyous scholarship, with its almost infinite possibilities for the future, very few students would ever wish to turn aside to study

practical agriculture. Under these circumstances, I thought I saw clearly that either there would be no students in agriculture, or some special inducements must be held out for persons to take that course. As we would not divert any of the stream of students pouring into the university into the college of agriculture, the only thing to be done was to tap the stream nearer its source before the current set too strong in the present direction; and this we did. We have opened the doors of the college of agriculture to students who would not and could not enter the regular courses of study as heretofore guarded. We have provided that students may enter the college of agriculture upon passing an examination in geography, United States history, arithmetic, English grammar and composition — five of the eleven subjects required for admission to the other departments of the university — and as a result we have this year four regular students in agriculture, not one of whom could have entered under the old arrangement.

But for the agitation of the question of separating the college of agriculture from the university, I have good reasons for believing we should have had five times as many. So long as this agitation goes on it is impossible to work with the confidence in the future necessary for the highest success; and no special efforts, beyond a statement of the facts, have been made to secure pupils for this course the present year. If we are permitted to go forward with our experiment, I do not doubt its success. I am certain that our present plan of starting the agricultural department lower down in the course of study than heretofore is the correct one. I am confirmed in this by the deliberate judgment of Prof. William H. Brewer, professor of agriculture in Yale College; and I am confident that our present plan will commend itself thoroughly to every intelligent and fair-minded farmer who will examine it. Under this plan the studies pursued by the agricultural student to enable him to graduate as a bachelor of agriculture are the following: Agriculture, horticulture, botany, chemistry, agricultural chemistry, natural philosophy, anatomy, physiology and hygiene, entomology, geology, mineralogy, practical mathematics, drawing, algebra, geometry, trigonometry, surveying, shop work, history, zoology, English political science, veterinary science and rhetoric. I submit that the student who does good work in all these branches fairly earns his degree; and that the University need not be ashamed to confer a degree for this work, nor the student be ashamed to receive the degree which represents this work.

The regents have thus made it possible for any farmer's son who has a good common school education to enter the college of agriculture. Besides this they permit him to take any studies in the other departments of the university for which he may be fitted and which he may desire to take. Is it possible to make the situation more comfortable or more inviting for the farmer's boy than it is? If so, will you, gentlemen, please to tell me how?

But the regents have not stopped even here. Determined, if possible, to make the farm of service in the way of education, they last year authorized the formation of a class in "practical agriculture" to be composed of boys who pass no examinations and who receive pay for the work they do. Ten boys were in this class last summer. It was an experiment to see what degree of eagerness would be shown for practical education so much demanded. It is plainly not the kind of work for the university to do, but the experiment has answered its purpose. Meanwhile to fully carry out the design of Congress passing the agricultural land grant bill, the regents have done all that lay in their power to perfect the organization and equipment of the college of mechanic arts, all of whose privileges, instruction and apparatus are at the service of the students of agriculture, if desired. A visit to the new building, an examination of the machinery and apparatus, even a slight observation of the work done there, and an examination of the regulations for admission will show most clearly to anyone that the regents have been most faithful to their trust and have made most ample provisions for the education of students in the department of mechanic arts, while they have not made it difficult for the people intended to be benefited to enter the institution. I can not go into particulars at this point as I should like to. All I can say now, is, come and see the building and equipment for the college of mechanic arts and judge for yourselves.

Finally, as the mountain would not come to Mahomet and therefore Mahomet went to the mountain, so the regents determined that if the farmers' sons would not come to the college of agriculture, the college of agriculture, in part at least, should go to them. Farmers' institutes were accordingly established and more than thirty of them have been held. They have done good. But they can be made much better and more helpful even than they have been, and in a practical way can accomplish more for farming than anything else that can be done. I have no doubt

that they will be heartily sustained by the farmers of the State, and as a result I have no doubt that hundreds of farmers' sons will be induced to seek further knowledge in the college of agriculture, while thousands of farmers who know nothing about the technicalities of science will grasp the practical conclusions and apply them successfully to their farm work. If a farmer knows that by increasing his expenditure twenty per cent in a certain way he can increase the product of his farm fifty per cent, he can work out the problem successfully, whether he knows how to analyze his soil or his fertilizers or not. But while great practical good can be done by the institutes under the direction of the college of agriculture, the real work of the college, the education of students, must be done at the university. If the farmer boys will avail themselves of the opportunity offered and enter into the regular work of the college of agriculture, I promise them an education that will fit them to be not only good farmers, but good and influential citizens of our republic. That, gentlemen, is the present situation so far as the college of agriculture is concerned and so far as it relates to its provisions for agricultural education. We are making an experiment, and if we are permitted to go on without disturbance I believe the experiment will be successful. And if it is successful it will save the State from further temptation to multiply colleges and unnecessarily to duplicate the agencies for education.

It is claimed by those who insist that the agricultural college should be separated from the university that no college of agriculture connected with a university has educated any considerable number of agricultural students, while colleges of agriculture which are separate have educated a large number. An appeal is thus made to experience. I am not a little surprised that gentlemen as intelligent as many of those are who advance these arguments should be deceived by mere names. You can call a theological seminary an agricultural college if you please, but that does not make it one. You can call a common school, or even a high school, a college, but that does not make it one. You can call a high school or college for general education with an agricultural attachment an agricultural college, but that does not in any just sense make it one. Suppose, for example, that to-morrow the legislature of Minnesota should vote to change the name of the University of Minnesota and to call it the Agricultural College of Minnesota, what would be the result? We should go on with our work just as we do now. We should en-

deavor to give our students a good education. We should train them in the same subjects we are teaching now. The larger portion of our students would then, as now, take the scientific course, and in that course they would learn those sciences upon a knowledge of which, in some measure, success in agriculture depends. More than half of our students would thus be engaged in laying the foundation of a scientific knowledge of agriculture, just as they are doing now. The university would be an agricultural college—so called—with three or four hundred students, but not one more student would be studying agriculture than are studying it now. It would be a successful institution and would have scholars and would be referred to as what a success a separate college of agriculture could be made, while, in reality, its success would not be owing in the least to its being an agricultural college in any just sense, but to its being a great deal more than an agricultural college. Its students would be there to gain general knowledge and not mainly to study agriculture. And I assert, without fear of successful contradiction, that wherever a so-called successful agricultural college exists in this country to-day the thing which attracts students to it is not the fact that it is agricultural, but the fact that it is a great deal besides that and the further fact that it is possible to enter this agricultural college—so called—with much less preparation than would be required to enter institutions that do not call themselves agricultural.

Take, for example, the Iowa State Agricultural College at Ames. Its faculty embraces professors in ethics, psychology, the history of civilization, English, Latin, history, mathematics, political economy, pathology, histology, therapeutics, comparative anatomy, civil engineering, mechanical engineering, chemistry, zoology, physics, astronomy, elocution, rhetoric, drawing, painting, music, besides those strictly agricultural.

I think I am correct in saying that the annual expense of the college is greater than that of the whole University of Minnesota. And the requirements for admission to the freshman class of this college at Ames are substantially the same as for our sub-freshman class in the agricultural course, and not equal in amount to half the requirements for admission to our sub-freshman class in other departments. In other words, a boy who could not pass the examinations to the upper classes of a Minnesota high school can enter the freshman class of the Iowa agricultural college with its twenty-seven professors and instruct-

ors. Is it not easy to see why students go to an agricultural college under such circumstances? It is a new process of getting a high education—going to college without the trouble of fitting for college. What is the use of cheating ourselves in this way by calling things by their wrong names?

Then there is the agricultural college at Brookings, Dakota. I have heard it repeatedly referred to as a triumphant proof that a separate agricultural college would succeed when one connected with a state university would not, because, forsooth, there were two hundred students at Brookings, presumably agricultural students, while we had next to none in our college of agriculture in Minnesota. But I had an interview with one of the gentlemen engaged in managing the so-called agricultural college at Brookings, and I received new light on the matter. Of the two hundred students only three or four were studying agriculture at all. The rest have rushed into Brookings as they would to any other place where a better school than could be found at home was established, and they are going to school at Brookings with no more special thought of agriculture than have the boys and girls of Minnesota when they go to a high school or a normal school, or a college or university not agricultural. The agricultural college of Mississippi, so often referred to as having large numbers of students, has a plenty of students for the same reason—the absence of other desirable institutions of learning. Even at Ames agricultural college, I have been grossly misinformed if a large majority of the students do not take special pains to emphasize the fact that, though in an agricultural college, they are not agricultural students.

Now the simple fact patent in all this is that just so far as an agricultural college gives a good education in things generally, while at the same time it is easy to enter because the requirements for admission are low, it will have students. It is not in other words, agriculture, nor the desire to study agriculture, which controls the large majority of students who go to agricultural colleges; it is education in its wide and real sense, the desire to get this education if possible and the feeling that if they get it at all they must go where they can enter.

Now this education in its fullness, in better form and with more thoroughness than any agricultural college can possibly give it in Minnesota for years to come, we are actually giving all the time in the university.

We offer it, including instruction in agricultural science, to

all who are ready to receive it. Whose fault is it if the majority of students choose to graduate as bachelors of science with the scientific knowledge required in agriculture, and not as bachelors of agriculture, without the linguistic and mathematical knowledge which all students need? Are not these students wise in fitting themselves first for influential citizenship? And what possible use can there be in multiplying colleges, when we already have all that the work to be done requires? Gentlemen, I will be perfectly plain, even at the risk of incurring your displeasure. There is no need of a distinctively agricultural education so large as to make work for a separate college. Strip these agricultural colleges of the subjects which every high school or college, not agricultural, must teach and does teach, and what a miserable skeleton of a curriculum or course of study you would have left!

One great danger, and one that, as a state, we ought carefully to avoid, is the unnecessary duplication of educational institutions for the same work. The university and the normal schools ought not to do work which the high schools can do. It has been necessary in the past for them to do some of this work, but they ought to relinquish it just as fast as the high schools become able to do it. They are moving now in the right direction, and soon, it is to be hoped, that the university will do only proper college work, and the normal schools will be largely relieved of grammar school work, and will do their proper work more exclusively—the fitting of scholars to teach. So, to maintain two universities or colleges, having essentially the same course of disciplinary studies, and differing only in that one has a special trend towards agriculture, is a waste of the public revenue, and ought not to be thought of. And I go further than this. If we are to have a university worthy of the State, we must make it the seat of *all* the higher learning fostered and maintained by the State. If a school of mining and metallurgy is needed, it should be at the university. So of every other special school in the interest of the higher education. For all these the library of the university, like the heart in the human body, can serve to send life to every part. Laboratories, collections of specimens, museums, all can be made serviceable without additional expense, as could not be the case if a school of mining is to be in one place, a school of botany in another, and so on. It is by concentration at one point, of the educational forces and material, and not by separation and a weak duplication of forces,

that great universities are built up. Surely we are in sufficient peril from the multiplication of colleges here, without the State adding to our peril by adopting a policy of division and weakness.

The one science which, more than all others, is especially serviceable to agriculture is agricultural chemistry, using this term in its widest sense, as embracing the whole science of vegetable and animal production. As the object of agriculture is to "raise from the soil as large a quantity as possible of useful vegetable products, or indirectly, of animal products," it is very evident that the farmer who does anything more than in a blind way to trust to nature for his crops, must understand the composition of plants, of animals and of soils. True, very many men without scientific knowledge succeed as farmers, because by experience and observation, their own or other people's, they have reached substantially the same conclusions as those reached by science. But if boys are to be *taught* how to become good farmers, — better farmers than their fathers, — it must be by the scientific training, and not merely by experience. Now for this scientific training in agricultural chemistry — the most important — the all-important scientific subject, what need of a separate college, with its new buildings, new laboratories, new library, new apparatus and material, and new professors, when now, *as things are*, without a dollar's additional expense, the whole science of agricultural chemistry can be taught in our present laboratories, and taught, too, under the direction of a professor as accomplished as he is modest, a graduate of Harvard University, and a student in both England and Germany; when, too, a practical application of the principles of science can be made on the university farm, especially selected on account of its admirably diversified soil.

It is not because I happen to be president of the university that I oppose the establishment of a separate college of agriculture. The separation of the college of agriculture from the university would not impair the usefulness of the university in other directions, unless, indeed, the State, burdened with the support of two institutions, should withdraw its support from the university and thus stop it in its career of progress upon which it has fairly entered and to which it challenges attention. I do not understand that the most earnest advocate of separation desires to impair the power and usefulness of the university. But I oppose the establishment of a separate college of agriculture, as a

citizen of the State. I oppose it because it will involve a needless expenditure of money to establish it, and a much larger expenditure of money to carry it on every year than will be required for doing the same work in the university already established. I oppose it because it involves heavier taxes without corresponding benefits. I oppose it because it is unnecessary and if established will never accomplish what its supporters hope. I oppose it finally because we are in the midst of an experiment with the college of agriculture and it remains to be seen whether or not we can meet both the wants and the demands of the farmers. I have only to add that whenever it shall be proved that some other arrangement than the present will be more beneficial I for one shall heartily welcome the new arrangement.

It is a noticeable fact that in one particular farmers are unlike the persons engaged in most other occupations. While we find trades unions of every kind carefully guarding against an oversupply of laborers in their particular departments and so against too many apprentices learning the trade, farmers, on the other hand, seem to be anxious to swell the numbers in their own ranks and to be fearful not that too many boys will become farmers but that too few will do so. They seem to be annoyed that any other occupations than farming should prove attractive to farmers' boys. I do not quite understand the reason of this. It seems to be more a matter of sensitive pride in their own occupation than the result of any broad views of utility or of political economy. But be that as it may, I shall regard it as a sad day for the country when the ranks of the professions and of trade and of manufacturing and of banking can no longer be recruited from the sturdy and energetic and honest sons of farmers in the country. The best blood in all lines of activities in our large cities has come from the country and from the homes of farmers. Long may it be so; and far distant be the day when through any compulsion, social or physical, esoteric or exoteric, the sons of farmers shall be shut up to an education purely agricultural, and be forced, against their own taste and inclination, to follow the occupation of their fathers. As the mingling of nationalities and creeds and purposes and tastes helps the process of assimilation in our national life, so the mixing of families in different pursuits keeps all out of a rut, and adds to the life and activity of the whole. When, then, farmers complain that so many farmers' sons go into other pursuits than farming, they complain of what is for the best good of all concerned. What

we need to look out for is not lest farmers' sons should go into other professions, but lest farmers, whether the sons of farmers or not, should be uneducated and unfit for their work. And in this view of the case, so long as the sons of farmers can receive the benefits of the education in the State provided for the sons of all other classes of people, and can receive special agricultural education besides, if they desire it, I see no reason for sensitiveness on the part of farmers because they have not a separate college provided for the education of their sons, isolated and segregated from the rest of the people of the State. Such isolation, such education of a class of people apart from others is undesirable and would be unhappy in its results even to those for whose benefit it is sought.

I know that the problem of agricultural education is one of the most difficult of all educational problems, because back of it is a host of people who do not expect to go to the college for an education, and yet insist that in some way the college shall benefit them, help them to do better work and to get larger returns. How the wishes of this large class can be met, except by the publication of the results of experiments, by the holding of farmers' institutes in all parts of the State, and by the education of students who as practical farmers shall be examples of skilled workers in agriculture, I do not at present see. If there be other practicable methods, I am not unwilling to recognize them, for no one, I am sure, can more heartily desire to do all in his power to promote the interests of agriculture and of the farmers of Minnesota than I.

Gentlemen, we must have certainty and stability in counsels in order to insure the successful progress of educational work. We can not plan wisely and put our plans into execution energetically if it is to be a matter of uncertainty every time the legislature meets whether we are to continue in existence as a university or are to be mutilated and shorn of some of our departments. We are doing well at present, but we can not rest on what we *have done*; we can not be content with what we are doing, without rapidly falling behind our sister states. The noble science hall, just built by Kansas; the \$200,000 appropriated by the last legislature of Wisconsin for a fire-proof building to replace the science hall consumed by fire; the liberal appropriation of Nebraska for the department of botany, as well as for others; the steady onward march of Michigan's great university, all warn us that a liberal policy towards the univer-

sity of Minnesota is necessary if we are to maintain the honorable reputation we have won, or are to keep pace with the education of our neighbors.

The state of Minnesota has many things of which she may justly be proud. Her territory is a royal domain of magnificent proportions. Her soil is of surprising fertility; her climate is most invigorating. Her people are enterprising, enthusiastic, united. Her rapid progress in material development, in population, in wealth, commands the attention, the admiration, the wonder of the whole country. Beyond her is a territory stretching from the Mississippi to the Pacific, the future home of millions, whose wealth will pour itself an endless flood into her borders. The State so great in material resources is hardly less great in her liberal provision for education. She ought to feel pride in her highest institution, her university. What, then, shall the University of Minnesota be to the state of Minnesota? Shall it be a real university, or shall it be dismembered and divided one part here and another there? Shall it be a university or a confederacy of high schools? Shall it be to Minnesota what Harvard University has been to Massachusetts, Yale to Connecticut, and Princeton to New Jersey, the university of the State and thus of national reputation, or shall it be *one* of the universities of Minnesota and so unknown beyond the State? It is not the university of the regents who govern it, nor of the faculty who teach in it. It is the university of the state of Minnesota. To the state of Minnesota, therefore, I look with confidence for such wise and liberal action as shall preserve the university from mutilation, shall enable it to keep abreast the age in its learning and teaching, and shall make it an institution where all sound learning may be gained, where the rich and the poor may meet together on equal terms and may secure an education good enough for the highest while not too good for the lowest. And for the accomplishment of this I appeal to you, gentlemen, as intelligent members of the most powerful body of workers in the commonwealth, to give it your hearty and effective support.

On motion the speaker was given a vote of thanks for his able and interesting address, and it was ordered placed on file for publication.

DISCUSSION.

Mr. J. M. Smith said he had been assisting in the management of fairs for twenty-five years past and would like to ask Mr. Gregg a question about their management. He had spent much time considering the matter of horse racing at fairs, the awarding of premiums, etc. Teaching a horse to trot was no worse than to teach him to draw a load and anyone would prefer a fast horse to a slow one; some things incident to horse trotting at fairs were to be deplored, but which seemed almost inseparable to them. While managing a certain fair in Wisconsin he had determined to have some honest horse trotting, and he had informed a certain man of his purpose in that regard, asking him to take charge and give them some good, honest trots. The gentleman looked at him in a calm way and said: "Do you ever expect to have an honest horse trot?" There was no such thing as honest horse trots, the drivers would make up some scheme to have their own way about it. The managers could not banish pool-selling entirely. Their Wisconsin agricultural society received \$4,000 a year from the State; county societies two hundred dollars each, provided no games of chance were allowed and certain other requirements complied with; this was having a very wholesome effect upon the character of their fairs.

Mr. Gregg favored employing honest drivers at fairs instead of jockies. He hated to see a horse brought upon the grounds weighted and strapped criss-cross, with the whipping, swearing and making things look "blue" generally. Speed was dependent upon form and not on strapping and rubbing. A horse that had been well bred loved to trot and to make his time as a bird loved to fly, and he believed that honest drivers could be had; let them be had, let them be paid, and let a premium be placed on honest driving.

Mr. J. M. Smith thought the responsibility for all this gambling and liquor selling on fair grounds should be taken from the managers by being prohibited by law.

Mr. Harris said he had been for several years past on the board of managers of the State Agricultural Society. Six or eight years ago the board was nearly a tie, but a majority were in favor of abolishing liquors of all kinds from the grounds. This last year the board took no action as a board, the matter of privileges being left to a committee; the result was liquors were sold at the state fair.

President Elliot said there was a bill now before the present legislature to reorganize that society, and hoped the present Agricultural board would have these matters in mind and try to bring about a wholesome change in the desired direction.

On motion the meeting then adjourned till 9:30 o'clock Thursday morning.

MORNING SESSION.

THIRD DAY, THURSDAY, JAN. 20, 1887.

The meeting was called to order at 9:30 o'clock Thursday morning by President Elliot.

The following communications were read:

FROM RUSSIA.

ST. PETERSBURGH, Aug. 21, 1886.

S. D. Hillman, Secretary, etc.,

DEAR SIR: Please accept my best thanks for the transactions of your Society, that you have had the kindness to send me. I have read the papers and discussions about the Russian apples with great interest, and have the intention to prepare a paper upon this subject, with the intention to attract the attention of our fruit growers to the intelligent labors of the members of the Minnesota Horticultural Society to create a variety that could stand the cold and dry climate of your state. I mail you a report of our department of agriculture and horticulture, about the state of horticulture in Russia. It is written in Russian. If you wish to have an extract from it, I can make one in German and send you, knowing too little English to make it in this language. You can translate it from the German into the English. With great respect,

Yours,

G. DOPPELMAIR.

PETROSABODSK, GOVR. OLONETZK, }
 RUSSIA, Nov. 13, 1886. }

S. D. Hillman, Secretary, etc.,

DEAR SIR: Your welcome letter of the eighth of July received. Please inform me when your next meeting shall take place, and

I will, with great pleasure, send you a paper about our fruit varieties.

I have read all that was written about this subject by Professors Budd and Gibb that appeared in the transactions of the American Horticultural Society and in the report of your Society. I will try to give a sketch of our climate belts and the varieties that grow successfully in each of them, with the intention to give to your members the possibility to make an appropriate choice of varieties to be tried in their localities. You shall receive, in due time, a package of cions of hardy varieties, grown in a dry climate where -18° Fah. is not infrequent.

Mr. Baer, of Kremetsburg, has promised me to send a box with cions of varieties that I begged him to select, to Mr. W. H. Ragan, secretary of the American Horticultural Society, at Greencastle, and I have prayed Mr. Ragan to have the kindness to mail you the package that is destined for you, after reception of the full collection, that I have divided in three parts: one, Crimean varieties, for the South; the second, middle and hardy varieties for Wisconsin, and ironclads for your region.

I have seen here, under the 62° north latitude, apple trees in good condition, but I came too late to see the fruit upon the trees to pass judgment upon the quality of the apples. One that I tasted was sour; they nevertheless affirm here to have varieties that a more delicate palate can taste without making grimaces. If the assertions of the kozells of this place be true, here is the place to recruit ironclads. You may receive an idea about the climate if I shall mention the fact that the lake of Onega is not free from ice before the end of May.

Wishing you to receive the cions in healthy and good state, after their long voyage, I remain, dear sir, with great respect,

Yours,

G. DOPPELMAIR.

FROM COLORADO.

BOULDER, COL., Jan. 17, 1887.

S. D. Hillman, Secretary, etc.,

DEAR SIR: Yours of late date at hand, also program; thanks for same. I send you to-day by express a few of our reports, also photograph of the fruit exhibit, with list of apples (fifty-eight varieties) shown at our December meeting, which was a very successful one. The interest in horticultural work in

Northern Colorado is growing, and our state has a bright future before her, as it is no longer a theory with us but a demonstrated fact that we can grow fruit. Our apples are very fine, and when grown in this high and dry climate they have fine keeping qualities. I remain yours, very respectfully,

C. S. FAUROT.

FROM OHIO.

CUYAHOGA FALLS, OHIO, Jan. 18, 1887.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I find myself unable at this time to send anything for your meeting. Perhaps the best service that anyone can render your Society now, is to induce the members to try the Jessie strawberry. I presume Mr. Kellogg will do this. I think it will supersede more varieties than any other ever sent out.

I think your people would do well to try the Jessica grape, too. It is early, hardy, and the best flavored white variety I ever tasted.

The outlook for careful, intelligent strawberry growers is encouraging. Horticulturists have been so free with their methods that many unskilled persons have engaged in raising small fruits, and there has been a surplus of inferior berries put on the market. Prices for such have been low, and many growers have been discouraged. Let careful growers do their best, and the business is all right. There's room at the top.

Yours, very truly,

M. CRAWFORD.

FROM WISCONSIN.

JANESVILLE, WIS., Nov. 23, 1886.

S. D. Hillman, Secretary, etc.,

DEAR SIR: Your letter of the twentieth duly received. I hardly know now whether it will be possible, profitable or expedient to attend your annual meeting, however much I should desire to do so and enjoy it on my part; but that I should add anything more than one to your usually large convention or to its interest, I have my doubts. With a program so large as last winter, I don't see how your president ever got through so much business in the time. If I had any suggestions, it would be to

cut all papers to fifteen minutes, and allow only the same time for discussion, and restrict speakers to two minutes. This will sharpen up the papers and debates. Let your program be as varied as possible, and not too many papers on one interest. I think tree peddlers ought to be raked over the coals again, and roast them worse than ever. "The Chain" gang that hails from Sparta, Wis., played a big game in Wisconsin, getting orders under false pretenses, and delivering from Ohio. They were badly baffled by the lights that emanated from our annual June meeting. Stir them up, and all other swindlers.

If circumstances so turn, I shall be happy to be at your meeting, but expect now to go as delegate to the Northern Illinois Horticultural Society, January 11th and 12th, at Kankakee. Perhaps President Smith will be all you can use from the Badger State.

With kind regards and great success attending your Society,
I remain very truly yours,

GEO. J. KELLOGG.

LETTER FROM OLIVER GIBBS, JR.

RAMSEY, McCOOK CO., DAKOTA, }
Jan. 6, 1887. }

To the State Horticultural Society:

Thanks and congratulations, kind greetings to old friends in the Minnesota State Horticultural Society. By request of your secretary a note or two from South Dakota.

As I write at nine o'clock this morning, the mercury lies quietly in the bulb. If there is any truth in the theory that it is the cold weather that kills our trees, this time

"The tyrannous breathing of the North
Shakes all our buds from growing."

But mark you, the ground did not freeze last fall till November. There was a moderate supply of rain just before the snow had lain well; there have been no sudden changes with wide range of temperature. Probabilities: trees that were healthy in November are healthy still.

Having been here but one year, and much occupied with home affairs, traveling little, observations are limited. Saw no fruit trees in bearing last fall; saw none large enough, though lots of small ones on various farms, tracks of the missionary.

Small fruits were plentiful. Heard a good deal of praise of the sand cherry, transplanted from the Big Stone River bluffs to gardens. Said to be prolific and of good quality. It is a low, almost trailing shrub, looks some like a dwarf willow. Have them in my garden, but did not see any fruit. Some of my neighbors had plenty. Think it worthy of general trial.

For the first time in my life I own a piece of land where the soil is good for anything, and elevations, exposures, etc., adapted to fruit growing. Had a good garden last summer. Nothing in it worthy of special mention except these: Cory sweet corn, earliest, and the best early sweet I ever planted; Black Mexican sweet, late but very prolific and good; Stokes "extra early" watermelon — not extra early, but the best melon to eat we ever had; small, but even sized and prolific and a good keeper; Ironclad watermelon, large, excellent for shipping; but for the most pounds to the vine, and of excellent quality, the Excelsior heads my list of eight varieties. Vick's Early yielded the largest specimen and a good one. All the rest on the vine inferior, and of mixed characteristics; Miller's Cream Nutmeg, a splendid sort; Bird cantaloupe, large, late but inferior quality. Seeds from Gregory.

I laid out a good orchard site last spring, and planted about two hundred and twenty-five trees, one hundred of them from the Jewell nursery, the rest, the best Russians I could get from Prof. Budd and A. C. Tuttle; among them, Antonovka, Yellow Transparent, Arabskoe, Anis, etc., of the apples, and the Bessemionka; number three hundred and forty-seven of the pears; Budd's Ostheim Cherry, several of his Russian plums, and the Wolf and Speer native plums. Next planted a few Rollingstone plums from O. M. Lord, with Weaver's that I brought with me. Of strawberries I set out some varieties from J. T. Lovett; Glendale, Parry, Warren, Sharpless, Jewell, Triumph de Gand and Black Defiance. Old friends will smile to hear me confess I haven't got a Wilson on my grounds.

I live in a timbered gulch that runs east and west a mile on the north side of my farm, and has thousands of wild plum trees in it. I put in the most of my time last winter trimming these plum trees and grubbing out a good many that were in the way. Didn't seem to "set much store by them," but after the fruiting season came on in the fall, I found we had a bonanza in wild plums; there were about fifteen distinct sorts that were excellent for hand eating or cooking, several of them freestones.

There are two or three sorts that promise to excel any that I have yet seen of the native, propagated in nurseries. One very large, my wife calls the Wild Damson; another of the form and quality of the De Soto, is larger and a perfect beauty in color and finish. There are whole thickets of one kind, few trees bearing inferior fruit; these I shall grub out, encourage the good ones and then crosses, and hereafter think as much of my plums as of a peach orchard. Have planted a lot of pits from the best ones to get a seedling plum orchard. Some of the best sorts are in a pasture where I have to let my cattle run. They will not file their horns any more on plum trees or trees of any other sort, for I have taken their horns all off, and I shall not let any more grow on the farm. If this does not protect the trees, the bovines will get fenced out of the gulch.

Hope you will have a pleasant meeting, lots of fruit and garden truck on your tables, a rich program, and all things else needful to prove to the governor and legislature that you are spending the state appropriation to the best good of the public for whom you work. You have a good secretary. Cherish him.

OLIVER GIBBS, JR.

On motion of Mr. Harris, Mr. Gibbs was made an honorary life member of the Society.

Mr. Sias said the sand cherry referred to by Mr. Gibbs, was hardy on his grounds, the plants being two and a half to three feet high; they had blossomed, but as yet borne no fruit. It was a native of Dakota.

Mr. Brand had experience with the sand cherry some fifteen years ago. He saw an article in the report of the department of agriculture some twenty years ago, calling attention to the "Dwarf Rocky Mountain Cherry;" and he had paid twenty-five dollars for a quantity of the plants. They proved to be identical with the sand cherry and were good for nothing; they were hardy enough but the fruit was worthless.

Mr. Harris gave notice of proposed amendment to the constitution of the Society authorizing life membership fees to be paid in two annual payments of five dollars each.

The annual report of the Secretary was then read.

SECRETARY'S ANNUAL REPORT.

Mr. President and Fellow Members:

In presenting this, our second annual report as Secretary of this Society, it gives us mingled pleasure and delight to meet again with friends and fellow members, to carefully consider and discuss the varied interests we represent and add our mite towards the sure and steady progress, as well as permanent advancement of the horticultural interest of our commonwealth. Again are you to be congratulated for measurable success, prosperity and happiness, attendant on the labors of the months which but too quickly have been numbered with the past, but which have doubtless yielded golden fruitage for earnest effort, thought and toil, which may have been, perchance, with willing, hopeful hand bestowed.

In glancing back upon the few brief months, since our last annual session, we gather many pleasing lessons from the past and find good cause for taking courage for the future, which still is lying just before our reach, but which is constantly unfolding every hour.

THE PAST YEAR

in some respects, at least, has been a prosperous one. Our crops were reasonably abundant, although the prices realized have not been so remunerative as was to be expected; but while much better have been known in other years, compared with other sections of our land, the net results, we think, will average fairly well. Our fertile soil has yielded ample tribute to the thoughtful, patient husbandman, and few complaints are urged in this regard, no matter how severe may be the pressing weight of competition, or how discouraging the crushing load which capital with its monopolizing hand may struggle to impose.

THE WEATHER SERVICE.

Some interesting facts are to be gathered from the statistics furnished by our signal service and by comparisons with other years, regarding certain meteorological changes taking place from time to time. This surely is a most inviting field for thought,

with horticulturists especially, since it is well for them to fully understand all the conditions of success. The sudden changes in temperature, and marked extremes of heat and cold, experienced here, are often quite disastrous to our orchard trees, as well as to our vines and other tender plants. Perhaps this is the greatest obstacle in the way of growing hardy, winter fruits. Last winter was not so severe, (at least for fruit) as usual. Although we had much steady cold, as well as frosty weather, still as a rule the temperature was more equable and mild compared with that of the preceding winter of 1884-5. Here at St. Paul, the mean temperature in January was colder by one-half degree than the preceding January; but the thermometer failed to drop as low by two degrees, and did not go above the freezing point while in that month in the preceding year the range was very great, as for example, January 2d, was 36° below; the 5th, 46° above; then down again to freezing on the 7th, and on the 8th to 46° above. The mean temperature in December, 1885, was 4.1° ; of February 1885, 9.9° ; of February 1886, 15° .

THE SEASONS.

Spring opened somewhat earlier than common. The warm, dry weather which ensued was favorable for outdoor labor, and farmers eagerly improved the time in putting in their wheat and other grain. The copious showers of rain which followed later on, were very timely and rapidly brought forward vegetation. The cereals of every kind were given a good start, the grass afforded pasturage in excellent quality and abundance, the hay crop therefore being good, as well as that of grain.

The most remarkably dry season which prevailed to a considerable extent throughout our summer months was not particularly severe in Minnesota; at least in any sense which might be deemed disastrous to growing crops, or causing serious inconvenience to those who cultivate the soil. The serious injury to crops from drought experienced elsewhere, and notably in portions of the states of Iowa, Nebraska, Kansas, Indiana and Illinois, was quite unknown to us. And this affords a striking instance of the "staying" qualities of our soil, as being of a nature which enables it to quite withstand such trying tests as these, of long continued drought, without much loss to growing crops of any kind. In many instances, in fact, it has been found that yields of grain were larger and of higher grade than have

been raised in other seasons when there was greater moisture. And this is certainly a fact which should not be forgotten, nor soon be overlooked, as it is good and satisfactory evidence of the superior nature of our soil, which may be mentioned to our credit, in common with the well known healthfulness and equability of our climate so well and universally known and recognized by all. As emphasizing somewhat on this point we cite the splendid products of the garden and the field, of vegetables and grains of every kind, as witnessed at our state and county fairs, and ask those interested to note the happy contrast in our favor to be seen, compared with the productions shown from regions further south and east. We think this picture is in no sense overdrawn and that our claims will more than be sustained in setting forth to all the inherent excellence, fertility and permanency of our virgin soil. This is, of course, the standard of our faith and why we challenge the attention of the outside world; and this is why, perhaps, so many sturdy, honest immigrants are constantly inquiring after farms and homes within our State; and furnishes in part the secret of that measure of contentment and prosperity that almost everywhere prevails. And you will pardon reference here, which shall not be indulged beyond the mere suggestion, to point with a becoming pride and satisfaction, which all can surely not but recognize and feel, at the unparalleled development and growth of Minneapolis and St. Paul, the dual cities of the great northwest!

Now, after this digression, we premise further that in offering such suggestions as may seem of more especial interest to the cause in hand, we wish to briefly call attention to those matters which may be of especial interest to members of our own Society as well as those who are in general desirous of promoting horticultural progress everywhere. For lack of time we can not enter into any lengthy disquisition concerning subjects, which are mentioned here, or incidentally alluded to as proper matters for your own consideration.

AS TO FRUIT.

The season, as a whole, has been a fruitful one. Our orchards have produced abundant crops of fruit. Trees which survived the trying ordeal of a previous winter were laden heavily with fruit, although the number of the orchards yielding largely, in the State, are few and far between. There are too many in-

stances, in fact, where young and vigorous trees have been well nigh destroyed, and made more fitting for a heap of brush than bearing heavy loads of ripe and toothsome fruit. Our thoughtful orchardists are not dismayed at this, as yet. Not quite disheartened at the amazing havoc wrought by our late "trying" winter, they seem determined still to persevere and fully test the question whether we can grow that best and fairest fruit of fruits, which tempted, it is said, our Mother Eve to lead the race astray!

The hordes of insects which infest our fruits and usually are so destructive, were said to be less numerous than heretofore, and there was not the same amount of injury from codling moth as commonly has been experienced, nor has there been so much complaint of rust and blight, and kindred maladies that might be named.

The drought of summer shortened up the berry season and ripened small fruits quickly, although there was a fair and average yield. Strawberries ripened fully two weeks earlier than usual, while most of the delicious fruit produced was very large in size, and fine in flavor.

HORTICULTURE

in its broader sense has reference to investigations into scientific modes and methods to be followed and observed by those who seek to be its votaries. Its elevating influence as an art is known and freely recognized, and tends to the promotion of the nobler aspirations of the mind and heart. The laws that govern plant and vegetable life are varied in their nature, yet full of profitable and instructive lessons. Associations which attend the dressing of the vine, the culture of the choicest fruits, the care and close attention to the growth and cultivation of the fairest flowers, which in its laboratory so abound, must necessarily be calculated to promote æsthetic tastes, and tend to cherish admiration for the beautiful and good. This is a proposition it seems to us so palpable to all as scarcely needs the weight of mere assertion, or argument of any kind.

The question has been often asked, why are not more engaged in growing fruits? From lack of thought, or lack of zeal, this industry is surely much neglected. With some the lack of profit is a cogent reason, and this indeed with many is perhaps the gravest question of them all. Just how to make the business

pay is the absorbing, all important point; too many seem to think the only thing to be considered. It would appear to be high time for farmers generally to understand and realize that they must grow their own supplies of fruit, or very largely go without this priceless blessing, which should be shared by rich and poor alike. Good fruits are easily produced when proper means are brought to bear.

THE INDUCEMENTS

offered to the horticultural laborer are many and of a varied kind. This avocation should go hand in hand with that of agriculture and supplement the labor, energy and skill which usually afford such fair returns for time and money thus employed. No prudent farmer should dispense with shade and ornamental trees about his yards, or be without some method of protection for his stock and growing crops; his garden should be well supplied with small fruit products, and vegetables of various kinds; his orchard should contain at least some of the hardiest kinds of standard fruits—some such, for instance, as the well-known sorts our honest nurserymen will recommend; and more than this, he may and should produce each year, a tempting crop of grapes, sufficient for his own demands at least, and some to spare in case of sickness, or adding to the comfort of a well-deserving friend.

We hardly need to call attention to the excellence of Minnesota horticultural products since their merits are so well and generally understood. For flavor, quality and beauty, our fruits are unsurpassed. The numerous awards of merit given to our own Society in the past, where large exhibits have been made and closest competition has been had, attest this very fact, and are among the strongest proofs that we may safely challenge almost any section of the land to make displays of fruit of finer quality than we can here produce. It is well known that southern fruits are not so highly flavored or as good as those produced in colder latitudes; and like the human race on southern soil, are apt to soon degenerate, to some extent, at least. In saying this we do not wish to make invidious comparisons by classing tart and acid fruits with "sharp" and tonguy men; please draw your own conclusions without extenuation.

THE PROGRESS MADE,

as well as the increasing interest shown, in the advancement of the cause of horticulture in general throughout the State, is, we may say, quite marked and most encouraging in fact in every way. There is much seeking after information of modes and methods to be used, varieties to plant, establishing associations and farmers clubs, with other evidences that might be named, which clearly show awakened interest and progress being made, of a substantial kind. Low prices which obtain for staple products of the soil, of corn and wheat, of live stock, butter and the like, may tend in part to bring about this change. The area planted out in strawberries is rapidly increasing year by year and this department is alone becoming quite a leading industry in this immediate vicinity, at least. The same is true of grapes as evidenced by numerous vineyards springing up, producing large and paying crops, and free from rot or mildew, though grown entirely in the open air; the area planted, it is said, has fully doubled in the past two years.

No danger yet seems apprehended that work in this direction will soon be overdone. There may be need of some protection for home-grown fruits; our markets should not be established and controlled by those engaged in the commission trade, nor ought we to be left entirely at the mercy of the foreign shipper. Some method ought to be devised whereby producers might receive an adequate return, at least to the extent that they might sell their products on an open market as well as on their real merits. Perhaps to some extent there may be cause for censuring ourselves in this regard; and should there not be some co-operation among the growers of fine fruits? Fruit growing as a business will not yield a fair return without intelligent and due regard to necessary duties, attention, care and skill, in everything required. Our soil and climate must be understood; our changing seasons, heat and cold; the mode of growing hardy stock; effects of drought and moisture; the various kinds of plant disease; all these must be considered and the best and wisest means employed, in order to ensure the proper measure of success. The merits of the newer sorts of trees and plants should be discussed and carefully considered before discarding those varieties which have been found to be of value in the past.

THE COMPETITION

in the market as to fruits is frequently a serious question. Large stocks are shipped here from a distance just at the time when home-grown fruits are ripe, and hence we come in competition with the foreign shipper; the prices are reduced in consequence, the profits are confined to narrow limits, if actual loss indeed is not sustained. We cite, in this connection, the experience of a small fruit grower at Rochester, in this State, who raised this season 35,000 quarts of strawberries, some of his grounds producing more than three hundred bushels to the acre. With this enormous yield he finds the business hardly pays a fair return, in consequence of foreign competition. We can not hope to cut off competition wholly, but may we not be able to control the market, more or less, by striving to produce and offering for sale the very best and choicest stock? A first-class article is in demand and always brings the highest price. If we can grow the finest fruit why should we not receive the highest price?

THE APPLE QUESTION.

Perhaps no subject is presented at our annual sessions possessing greater interest than this, or one more calculated to provoke the liveliest discussion. There is in fact no more important subject for consideration at our hands, because the question of our ultimate success is still so problemetical. And hence the subject will in various aspects be considered at this meeting.

The seedling question has received attention from those composing the commission chosen for the purpose of making personal inspection of hardy, seedling trees, and their reports will prove most valuable to all who seek for information as to native seedling fruits, as well as other matters dwelt upon.

Prof. J. L. Budd, in his last annual report, as secretary of the Iowa State Horticultural Society, says: "On ordinary prairie soils over an extent of the West equal to half a dozen of the small kingdoms of Europe, the home and commercial orchards are killed, or hopelessly crippled, to an extent not known in the history of this country or any other. Timber soils have not sustained their reputation as favorable orchard sites in Iowa, Indiana, Wisconsin or Illinois. Even so far south and east as Lafayette, Ind., the fine young orchard on the grounds of Purdue University has been grubbed without the reservation of a single

tree. Yet it stood on hard-maple land, which has been hitherto thought favorable to the apple and the cherry."

He further states that the injury to the varieties called hardy "was not in the tops;" that trees top-worked on hardy stock were comparatively unhurt, whereas the same varieties root-grafted failed to show a perfect leaf. He cites the further fact that apple trees which have succeeded best on varied soil and over wide areas of the West, have been from Russian or from crosses of Siberian stock. He thus concludes a somewhat lengthy statement on this subject here considered: "We absolutely can not expect to produce a seedling hardy enough to endure our test winters when in bearing, unless it shows in leaf, bark and wood cell, its descent from the crabs, or the Russians, and I do not hesitate to say that the sweepstakes premium winter apple of our society will not come from a crab seed."

THE RUSSIAN QUESTION.

We note that our Iowa friends are not as yet in full accord upon this subject. In this connection we cite the following statement of a leading fruit grower, at the Iowa meeting just referred to, that of C. G. Patten, of Charles City, who says: "The coming apples of the Northwest, in my opinion, will be the seedlings we originate on our own soil and in our own climate. If we go at this work methodically and vigorously we will secure the varieties we need sooner than we can sift the great list offered us from Russia."

In a recent letter received from Prof. Budd he says: "This Russian fruit question has several aspects. In the north half of Iowa the old list dropped down to Duchess, Tetofsky and Wealthy. I believed six years ago, and am stronger in the belief now, that East Europe had many varieties of really good apples for all seasons, and many sorts of pear, cherry and plum, which would give perfect satisfaction in the north half of our state and some of these in your State and the north half of Dakota. * * * We keep a careful ledger account with each variety sent out, and some of our friends who scold at the meanest of the varieties in quality, such as the Hibernial, Lieby and Silken Leaf (No. 327 of department list), will be surprised if they spend a day looking over the reports from our many sub-stations in regard to the perfection of tree and quality of fruit of very many of the new comers from East Russia."

As is well known the list of importations made by the agricultural college at Ames, comprises several hundred Russian sorts.

The action take by our Society one year ago with reference to Russian fruits, consisted in the recommendation of the following varieties for trial, to-wit: Ostrokoff Glass, Hibernial, Red Cheeked, Red Anis, White Pigeon, Autumn Streaked.

So far as Minnesota seedlings were concerned, there was no action taken, at least no new variety was named as being better than our well-known Wealthy. It may in fact be questioned whether we shall soon discover a larger seedling winter apple, possessing greater merits, especially when hardiness, fine quality, and beauty of appearance are considered. It might be well, however, for this Society to follow the example of our Iowa friends in offering liberal premiums for hardiest and best varieties to be grown and propagated in the future.

Prof. Budd has ventured the opinion that "an apple tree that will endure our test winters well must maintain perfect foliage during our hot, changeable summers and must be as determined in habit of ripening its wood as the box elder or hickory; it must have a bark that will not absorb water readily in wet times in autumn or early winter; it must hibernate in winter and have a cell structure practically incapable of freezing."

At its last annual meeting of the Iowa State Society the list of apples recommended for the northern district, which comprises forty-two counties of that state, was as follows: Duchess, Wealthy, Whitney and Tetofsky; for trial, Walbridge, Fameuse, Gros Pomier and Talmon Sweet.

At that same meeting Mr. Speer, of Cedar Falls, supplemented this report by saying: "I believe that many Russian varieties now on trial will prove valuable to us, but it is useless to recommend them now for general planting. There is no available stock on hand, and if we single out a half a dozen, or a dozen, which we now think most promising, every tree peddler will be hawking them over the whole district in less than a month after the list is published. The real and tangible fact is before us, that aside from the varieties recommended, our apple trees of the North are dead or dying."

There can be little doubt that Russian fruits are gaining steadily in favor, especially with many leading orchardists. We close our notes upon the subject with an extract from *Rural New Yorker*, from the pen of Dr. T. H. Hoskins of Vermont:

"I have fully one hundred varieties of Russian apples growing

in my grounds, many of the trees being sixteen and eighteen years planted, while some, of the later importations, are small. One thing is fully demonstrated, viz., that these apples are, as a class, very much hardier against adverse climatic influences and especially against winter's cold, than those previously grown on this continent. This alone gives them enormous value for the 'cold north,' where, without them, tree-fruit culture would be impossible. In productiveness, size and beauty of fruit, the Russian apples are, on the average, more than a match for those of Western Europe, and for our native seedlings thence derived. Those who have an extensive acquaintance with Russian apples know that there is among them quite as large a proportion which deserve to rank as of dessert quality as there is among the common sorts. Among these fine dessert apples the Yellow Transparent, Grand Sultan, Switzer, Charlottenthaler, Berkoff, St. Peter, Longfield, Golden White, Streaked Red, Summer Calville, Noble Redstreak, Russian Gravenstein, Red Anis, Titovka, White Russet, and several others have now been sufficiently tested to establish the fact of their excellent eating quality, joined, in most of them, with great beauty of form and color."

HYBRID VARIETIES.

Much has been said in favor of the propagation of crabs and hybrid stock; they are admired by some for hardiness, productiveness and thrift in growth of tree. But there are certain reasons why their cultivation largely in our soil and climate should not be strongly urged. Transcendent, Early Strawberry, Orange, and a few other kinds, do fairly well as orchard trees in some locations. In this connection we may cite the experience of Prof. Budd who states that he gathered on the Collage Farm some sixty varieties of crabs and crab hybrids, six years ago, and the most promising of these were sent out for trial; that only six or seven of this number now are left, similarity of size and quality, and their peculiar tendency to blight having consigned them one after another to the brush pile. Of the number left he mentions Sarnia, Gibb and Boone, and states that Whitney's No. 20, Wealthy, Wealthy Seedling and Telfer Sweet, called hybrids, are excellent fruit, but show no trace of crab in leaf, bud or fruit.

THE PRESERVATION OF OUR FORESTS

would seem to be a question worthy of consideration, in view of cyclones, storms and floods which have to some extent prevailed

in certain sections of our land, and which have doubtless been occasioned, more or less, by the depletion in our timber and forestry supplies. The area of our wooded lands is steadily decreasing year by year, and as a consequence important changes have been wrought both in our soil and climate. This feature is not characteristic simply of this State, for we in fact are much less subject here to heavy storms than certain sections further south and east, and yet the ill effects of constant thinning out our forest trees are readily observable by all.

While visiting the eastern portion of New York, last fall, this matter was most forcibly impressed upon our mind. Marked indications were everywhere presented of the disastrous evils consequent on this pernicious practice of deforestation. The lumbermen have largely cleared the timber in the wooded districts of that state, and consequently springs and streams are drying up. The water of the Hudson, at Albany, has been effected and made so low as seriously to interfere with navigation. The number and extent of floods, as well as frightful storms, is yearly on the increase.

In view of facts so readily to be observed why should there not be prompt as well as proper action taken upon the part of state and national legislators to remedy to some extent, if possible, this crying evil, and bring about some wholesome change? It might be well for us more carefully to note the time and bring to bear our influence so far as possible, in order to secure the better and more general observance of Arbor day. The young especially should be encouraged to plant out trees of various kinds.

THE AMERICAN HORTICULTURAL SOCIETY.

At the request of the president and members of executive committee of our Society, we attended the meeting of the American Horticultural Society, at Cleveland, Ohio, being present the last two days of the session, which began Sept. 7, 1886, and continued four days.

This society was organized eight years ago, under the name of the Mississippi Valley Horticultural Society. At the session held during the exposition at New Orleans the name was changed to the more comprehensive one of the American Society.

The meeting was held first at rooms of the board of trade, afterwards at the tabernacle on Ontario street. The capacious

hall was elaborately decorated with evergreens, plants, ferns and flowers. The ample tables, arranged in the form of a hollow square, were well laden with a remarkably fine exhibit of fruits, including numerous varieties of grapes, over forty varieties of pears, many varieties of apples and peaches, thirty varieties of plums of every color, etc. Mr. Cushman of Euclid, exhibited fifty varieties of grapes, and Mr. Hubbard of Fredonia, N. Y., a new seedling showing twenty-five large bunches of white grapes on three feet of wood. Seventy-five varieties of apples were exhibited by a local society, and one fine exhibit from Mississippi included twenty-nine varieties of apples, besides several varieties of pears.

There was not a large attendance of delegates owing to the fact that railway managers refused to make any reduction in rates of fare and members of the society being detained at fairs and other gatherings held at about the same time. About half the states were represented, however, quite a number of the leading horticulturists of the country being present; the larger portion of those in attendance represented local horticultural societies, and citizens of Cleveland. Ontario, Canada, had a representative, and one delegate from Japan was present. For want of space we can give only a brief outline of the proceedings, as gleaned from notes taken and from newspaper reports of the meetings.

President Parker Earle presided at all the meetings with his usual ability and grace. Secretary Ragan presented the financial status of the Society, which showed a balance of \$173.12 on the right side. He then read a paper on "The past, present and future of grape culture in California," by Geo. Husmann, of that state. He thinks California is pre-eminently the horticultural state of the Union, as fruits of the temperate zone flourish side by side with those of the tropics. From an experience of five years there he gives a brief outline of grape culture in that state since 1874, when the Mission Grape was the only variety known there. Now he says they have nearly four hundred sorts, and expect to produce 20,000,000 gallons of wine this year, equal in quality to any on the globe. "Our raisins are competing with the finest London 'layers;' our table grapes go to every city in the Union. We have the best climate under the sun to produce a perfect product; have learned all about location, soil, varieties; can handle the product better, have fewer diseases, and we can furnish the world with better and cheaper wines, raisins, table

grapes and brandies than any other country, while our area for successful production is larger than that of France. Good grape land is worth \$50 to \$100 per acre, and can be brought to bear for \$100 per acre more. Then five tons of grapes per acre, at \$20 per ton, at \$20 per acre for cultivation annually.

A discussion of the paper and varieties in general followed. Mr. Green, New York, saw how cheap Chinese labor enabled California growers to compete with producers of the East, notwithstanding high freights. Mr. Miller, Penn., thought Worden superior to Concord, from one year's trial. He asked Mr. Hubbard concerning a tendency to drop from the stem. Mr. Hubbard said all reports were to the contrary. He had visited the original vine on Mr. Worden's place, which had produced one hundred and ten pounds of grapes annually for three years past. The present crop was the finest he ever saw. Worden is larger, handsomer than Concord, a week to ten days earlier; quality of a first-class Concord; no rot. Mr. Hollister, Mo., reported a very short grape crop in that state, fruit rotting badly. He condemned the practice of selling unripe grapes to get high prices early. Dr. McKay, Miss., said it was a poor grape year there. Concord did best, and was generally regarded as the safest to plant between the 30° and 35° of latitude. Scuppernong never failed, but was not good for market. Excessive rains for thirty days had caused much rot. Mr. Miller had found sulphate of iron a preventive of rot. Mr. Lindsay, N. C., spoke of the increase of grape culture in his state. The eastern section is the home of the Scuppernong, one vine often covering three acres. Seventy-five varieties bunch grapes grown in the middle section, where the finest grapes in the country are raised. Ives and Champion pay best. We call Worden the best black grape. Mr. Van Deman, Kan., reports a good grape crop. He had visited many vineyards in Texas and Arkansas, and found fair crops in spite of the drought. He alluded to the noble work of Mr. Munson, of Texas, who is sowing seeds of wildings, and crossing seedlings with the best cultivated sorts. Some wild bunches there are one foot long, and the grapes are fine.

Mr. G. W. Campbell, Ohio, said: "In Central Ohio, this is the best grape season since 1849. Early and late sorts are ripening near together. I was one of the first to raise Worden in Ohio. It is larger than Concord, juicier, ripens earlier, but it has all the faults of that kind—a tender skin, a poor shipper." Mr. Carpenter, Ohio, thought high culture gave better grapes

and prevented rot. Mr. Te Mari, of Japan, who since the World's Exposition has been studying American horticulture at Lausing, Mich., and other points, then made a few remarks. His people are beginning to grow American grapes. "We had no wine until our country was opened; the Chinese had raised wine grapes for many years. Now we shall have wine, too. There are only two varieties of native grapes in my country. We live so much on vegetable food, eating grapes at table was never thought of."

PRESIDENT EARLE'S ADDRESS.

At the evening session Mayor Gardner delivered an address of welcome which was responded to in a graceful manner on behalf of the society by President Earle, who then proceeded to deliver his annual address. This was an excellent, comprehensive and practical paper, covering the whole field of horticulture. He said the society was organized to meet the wants of the fruit growers, gardeners, forest growers and lovers of rural art in the states of the Mississippi Valley. We have been asked to extend our territorial limits and to embrace all of the horticultural interests of the continent, from ocean to ocean. After much deliberation this was done at our meeting in New Orleans, so that we are now in name as we had been for years before in membership and in the spirit of our work, an American society.

There was scarcely a state in the Union whose industrial development, whose entire civilization did not show the deep imprint of organized horticultural activity. It is seen in bending orchards, in burdened vineyards, and in fruitful gardens. It hangs banners in every part of town or city, and sings pæans in groves and forests planted by man or saved from the woodman's axe. It babbles in fountains built and in brooks preserved, and its beauty shines on 10,000 green and shaded lawns, and in every window where flowers bloom and vines clamber. If you could take out the influence of horticulture from the structure of our civilization, you would have left a system of bare walls, hard farms, and coarse living, in whose presence we should be strangers as in an unknown world.

Horticulture in its larger definition covered a large field. There is an æsthetic and an economic side to it, and he could not tell which had developed most in late years. Horticulture co-operates with education, religion, and moral culture. All

honor to those who have made our country the most fruitful and flowerful under the sun. Thirty years ago the strawberries of the Chicago market could have been carried in a wagon; now they require immense railway trains; three hundred to six hundred tons of the fruit come in daily, and over a quarter of a million persons are engaged in the harvest. He contrasted the poor little flower bed half hidden in the farmer's yard, and the spikes of hollyhock at the front door in years gone by, with the embowered mansion and cottages of the present day. Alluding to complaints of over-production of fruit, he regarded the evil as resulting rather from imperfect distribution. We are marketing too poorly, and there is no obstacle in the way which may not be overcome. We should know more of fruit culture in Russia and Asia. He spoke with earnestness on the forestry question. Without forests no successful agriculture was possible, and no high civilization could be maintained. Every year of timber waste made the matter worse. Seasons change; destructive floods are followed by consuming droughts. The forces of nature are unbalanced. In 1853 the State of Ohio had fifty-four per cent of its surface covered with forest; in 1884 only seventeen per cent remained. Do you wonder at the inundations, the harder winters, hotter and drier summers; or at the absence of the sparkling brooks that ran and sang all summer? He quailed before the inexorable penalties nature had in store for all states and peoples who would ruthlessly destroy so glorious a heritage of forest as the American people once possessed. Our woodlands should be reserved by absolute force where the government has the right, and by all encouraging legislation where it has no control.

President Earle's address was quite lengthy, the above being only a brief abstract. It was loudly applauded, and 2,000 copies were ordered printed in pamphlet form.

On the morning of the second day a paper was read by J. M. Smith, of Green Bay, Wis., on protection of crops in time of drought. He recommended thorough drainage. He used tile on his grounds, and in dry weather gave extra cultivation. Wood ashes was a good fertilizer. He had three acres of strawberries on ground well manured for several years, which produced 1,000 bushels of berries and sold for over \$2,200. It paid to irrigate, and for this purpose he had water works erected, at an expense of \$1,000.

Mr. Ohmer, Ohio, gave his experience with blackberries in

dry weather, stating he had realized \$1,000 from a four-acre patch. Mr. Harrison, of Painesville, had put in about seventy acres of tile last spring, at a cost of forty-five dollars per acre. Prof. McKay, of Mississippi, thought drainage very essential, especially in wet weather. Their tile-drained land had done as well during dry weather as in the wet season.

Mr. Te Mari, of Japan, read an interesting paper on "Vegetables in Japan," from which we extract the following: "When I say a single root of burdock is sometimes worth twenty-five cents in Japan, you will be surprised at the high price for such a noxious weed, and imagine we have no vegetables; and when we hear you pay that price for a quart of blackberries in this country, we may think you may not have delicious fruits here. But we have many culinary vegetables of good quality there, and you have here an abundance of fruits. We have no vegetable so extensively used as radishes. The roots are not small, nor round, nor red in color, but mostly cylindrical, or club-shaped, from one-fourth of an inch to over a foot in diameter, from six inches to over a yard in length, and are grown the year round. Our carrots are smaller but longer than those of this country, and of high color. Burdock comes third in general estimation, and grows a foot in circumference, three feet in length; is soft and delicious. We have turnips, white and red, used as radishes are in this country. Taroos (*Colocassia*) are grown and used as potatoes. *Allocassia*, an ornamental foliage plant in America, belongs to the same family, and possibly may be the same species. Our annual product is estimated at over 6,000,000 bushels. Taro (*Leucocassia gigantea*) is grown for the stock, used as salad. Konjak is grown on moist, shady ground, and is made into gelatinous cakes for use. Onions are grown like celery in this country, and have long, tender stalks. Varieties of peas and beans are numerous. The most important among our pulse is the soy bean, the annual product being about the same as that of wheat, viz.: 11,500,000 bushels. Animal foods are almost entirely excluded from our tables."

Mr. Te Mari is a young man who appeared to be greatly interested in the proceedings of the meeting, but he speaks English with considerable difficulty.

Several papers were read in the afternoon, among the number one by Mr. Grenier, of New Jersey, on "Transplanting;" one by Mr. Lovett, of same state, on "Nut Culture;" one by Mr. Hale, of Connecticut, on "Small Fruits." These papers elicited

considerable discussion of an interesting nature, which was continued at the evening session.

On Thursday, the third day, officers were elected, considerable business transacted, awards of premiums made, etc. Following is the list of officers for ensuing term of two years: President, Parker Earle, Cobden, Ill.; first vice president, E. M. Hudson, New Orleans, La.; secretary, W. H. Ragan, Greencastle, Ind.; treasurer, J. C. Evans, Harlem, Mo.; with one vice president from the other states of the Union, for Minnesota J. S. Harris, La Crescent, being named. The committee on nominations recommended the holding of the next meeting in California in February, 1888.

Mr. Van Deman, of Kansas, read an interesting paper on "Pomology as a Division of the Department of Agriculture." He stated that an act had been passed by Congress establishing a division of pomology and appropriating the sum of \$3,000 for the purpose of carrying on the work, in addition to salary. He urged the importance of experimental stations, the gathering of statistics, investigations as to the value of new fruits, and the issue of reports and bulletins from time to time containing information of special interest.

Mr. H. Myrick, of Massachusetts, read a vigorous paper on "The Press and Horticulture." The press had done much to encourage fruit growing, but had done little towards telling how to sell fruit. Fruit growers want the press to aid them in selling and to discover new markets. Fruit reports should be better looked after. Horticulturists should write for the press.

Prof. Lazenby, of the Ohio State University, gave an address upon comparative growth of trees, illustrating his remarks with specimens of wood from the experimental station. For fence posts the locust was superior to the catalpa; for profit the ash is one of the most promising and thrifty of trees. Timber culture would pay as an industry, and should be urged for profit rather than economic reasons.

Your Secretary was then called upon to read a paper, prepared by Mr. J. S. Harris of Minnesota, on "Fruit Growing in the Northwest." The paper gave an outline of the history of fruit growing in this section of the country, referring to the failures experienced in the past, the success achieved thus far and the prospects for the future. It elicited considerable discussion, and we hope to present the paper elsewhere in full in this volume.

Mr. Campbell, of Ohio, spoke on grape culture, on which subject he is thoroughly informed, recommending the best culture and care. An animated discussion followed, the grape question being one of vital interest among Ohio fruit growers. Interest was manifested to know what varieties were most profitable in Minnesota and among our favorite varieties we mentioned the Concord and Moore's Early.

At the evening session, Prof. McKay gave an interesting account of the success of the agricultural college of Mississippi, which was now crowded with students, four hundred being registered, with a capacity in the institution for three hundred and fifty. He maintained that it required as much education to become a successful farmer as a member of the learned professions. The college was co-educational, ladies being admitted. He stated they had excellent lands in their state for fruit raising, a statement fully sustained by the fine exhibit of fruit from that state.

A paper was read from Dr. Hape, of Georgia, on "Horticulture in the Mountain Region," giving an outline of the status of fruit growing in that state and the measure of success achieved.

The meetings were interesting throughout and the deliberations characterized by harmony and the best of feeling. The awards made were numerous and liberal and in the main satisfactory.

VISITING THE VINEYARDS.

On Friday, the fourth day, the members of the society accepted an invitation from the Eastern Cuyahoga Horticultural Society, to visit the vineyards in and about the village of Euclid. At 8 o'clock some seventy-five of the visitors went to Lake View Cemetery, going out via the celebrated Euclid Avenue, visiting the tomb and monument of Garfield and spending an hour at the cemetery grounds. We then boarded the 10 o'clock train on the Nickel Plate and rode some ten miles to the crossing where teams and carriages were in waiting to convey the party through the vineyards and suburban farms. The various localities and farms visited appeared to be planted almost entirely to grapes which at this season were in their height of perfection, the vines being fairly loaded down with tempting clusters of Concords, Catawbas, Delawares, Niagaras, Isabellas, etc., etc. From the summit of a high hill or ridge, a fine view of the neighboring vineyards was obtained. To the north lay a level plain spreading out towards Lake Erie, which was but a few miles

distant. There are nearly five thousand acres in vineyards in this vicinity; the industry has proven very remunerative and lands in this vicinity are held at high figures. The methods of cultivation appeared to be quite uniform, a very simple trellis being used, and the vines grown in rows, near together.

The guests were royally entertained at the residence of E. H. Cushman, the president of the local society. On his beautiful lawn, among the trees near the farm house, tables were spread where an elegant repast was served. The Euclid Cornet Band enlivened the scene with music.

Dinner over, President Earle was introduced and a number of toasts were given and responses made by leading delegates present. Resolutions were adopted complimenting the local society upon the management of the fruit exhibition, thanking the press and board of trade for courtesies shown, the Forest City House for reduced rates of fare, and returning thanks to the good people of Euclid for their hospitable treatment.

Taking the 5 o'clock train we returned to the city. The weather had been remarkably pleasant, and the trip was one greatly enjoyed by all and the day one long to be remembered. Thus closed the seventh annual meeting of the American Horticultural Society. It is scarcely necessary to add that the meetings attended were greatly enjoyed by your Secretary, and that the kindly greetings and courtesies shown us by officers and members of the society will long be remembered.

THE SOCIETY.

With regard to the work of our Society it may be said that there has been substantial progress made in the past year. There is good reason for encouragement at the marked and steady increase in the number of our active, paying members, which indicates awakened interest and willingness to help advance the work of the Society. Our annual reports have been in greater demand than heretofore and there has been considerable inquiry for them from parties living at a distance in other states. The facts brought out in our discussions, the varied information thus elicited, is often quite important, especially from those more actively engaged in making tests and practical experiments in various departments of horticultural work.

A live society should be aggressive in its work; it will endeavor to surmount the serious obstacles or hindrances which may be

now and then encountered. Some method will be found to overcome the gravest difficulties, and often a comparison of views may aid the inexperienced member in seeking out the best and wisest plan to be pursued.

The local horticultural societies within our State are mainly doing prosperous work. Some new societies have been established in the year and there is room for many more. In this regard the work begun should be continued, and members of our own Society may often render valuable assistance to help along this worthy cause. Our objects being so reciprocal there should be mutual interest manifested upon the part of all.

EXPERIMENT STATIONS.

We note with pleasure what is being done for the advancement of horticultural work, to which attention was directed in our last report. The agricultural and horticultural stations in the land are rapidly increasing, and the importance of these useful agencies for gathering accurate information concerning means and methods to be used are certainly becoming better and more generally known and recognized. Our sister states are specially active in this work, and horticulturists there are moving in the right direction.

Our State, embracing as it does a large expanse of territory, some two hundred and fifty miles in width by three hundred and fifty miles in length, covering many degrees of longitude and latitude, and larger in area than all the New England states, must of necessity present some marked characteristics in variety of soil, climate, exposure, etc., etc.

The work accomplished in experimental lines within our State, though not as far advanced as could be wished, is making rapid progress, and certainly the outlook for the future is encouraging. For more specific data as to what has been accomplished we would refer to the reports that have been handed in and elsewhere will appear in proper place.

It scarcely need be stated here that the assistance rendered by the State for the encouragement of horticultural work has proved of much advantage and that the money thus expended has yielded fair returns. Results thus far secured would seem to indicate that such investments are surely wise and proper to be made. No doubt the need of work upon this line is still as great as heretofore and in the future there will be as large a field for

usefulness as in the past, for our Society and all its active members.

VOLUME FOURTEEN.

The last volume of our transactions was issued in July, and for the variety and extent of the information therein contained was most creditable to the Society. Our thanks are due to officers, members and others, for the assistance kindly rendered in the work of preparation and for contributions made. Much credit, too, is due the publishers, the Messrs. J. W. Cunningham & Co., for the satisfactory manner in which the work of printing and binding was performed. The work of publication was delayed by other state reports, as "copy" was delivered in the month of February. This volume has a few less pages than the preceding number, but in point of fact has considerable more reading matter than any other of the series. In order to bring the book within reasonable limits it was found necessary to print the larger portion of the articles contributed in briefer. It might be well to bear in mind that since our space is limited there should be studied brevity in all discussions, as well as in the papers read.

There were in all 1,000 copies bound in cloth, at an expense to the Society of one hundred dollars; the larger portion of which number was required to furnish our own members and make exchanges with societies in neighboring states, as has been customary heretofore.

Among the many notices received, we quote the following:

REPORT OF THE MINNESOTA HORTICULTURAL SOCIETY FOR 1886. — Embracing the proceedings of the Society from March, 1885, until March, 1886. The volume is edited by Secretary S. D. Hillman, of Minneapolis, and is published by the state. The meetings of the Society were characterized by the high standard of the papers furnished, and the discussions which followed are very fully reported. The secretary has a special department of his own, occupying fifty pages at the close of the volume. In this, he has placed short accounts of the transactions of other societies, notably of the American Pomological Society, together with interesting correspondence which adds materially to the value of the volume. — *American Horticulturist*.

The annual report of the Minnesota State Horticultural Society for the year 1886, embracing the transactions of the Society from March, 31, 1885, to same date, 1886, together with the pro-

ceedings of its annual and semi-annual meetings, and the essays and reports read at them has been received from the secretary, Mr. S. D. Hillman, Minneapolis, Minn. The Minnesota Horticultural Society is already well and favorably known to their co-workers throughout the country, and this report, embracing as it does many practical papers on important subjects with the discussions had thereon will most certainly add to that appreciation. As with the report of our own state society we shall hope from time to time to draw from those pages for the instruction of our readers as the returning seasons call for them. — *Colman's Rural World*.

The annual report of the Minnesota State Horticultural Society for 1886 has been received. As usual it contains nearly five hundred pages, but the matter contained and its arrangement make it one of the best reports that has yet reached this office from any of the states. The horticulturists of Minnesota can well feel proud of their recent achievements and the excellent records made for the North Star State in fruit growing. — *Minneapolis Farm Stock and Home*.

FROM HON. MARSHALL P. WILDER.

DORCHESTER, July 11, 1886.

Thanks for the interesting and useful report of the Minnesota Horticultural Society, which has done so much, and is always doing, good work: Hoping that the Society will come down in full representation with her good and grand friends to the meeting of the American Pomological Society next year at Boston, I am as ever, the friend of your Society,

MARSHALL P. WILDER.

S. D. Hillman, Secretary, etc.:

Five weeks ago to-day the hand that penned those kindly words was stilled in death. The life of that great man went suddenly but sweetly out, like morning incense to the skies.

Secretary Manning, of the Massachusetts Society, writes:

“His last illness was quite short. He was at the meeting of this society on the fourth of December and afterwards presided at the monthly dinner of the Massachusetts Agricultural Club, of which he was president, on the same day. He was generally very constant in visiting these rooms every Saturday and generally came in once or twice a week besides. * * * Thursday morning

he ate his breakfast as usual, went into the library, attended to some business with his son, signed a letter and when the doctor came in conversed with him, told him that the severe rheumatic pains were all gone, and as he put his hand up to his breast where they had been, expired instantly. This was about half past nine in the morning. Dr. Johnson described such a death more than a hundred years ago:

“Then with no fiery throbbing pain,
No cold gradations of decay,
Death broke at once the vital chain,
And freed his soul the nearest way.”

It was a fitting tribute which was paid by our Society on Tuesday night to one whose name has been so long revered and loved by all. The record of his noble life will be an enduring monument to his memory as future days and years go by.

The finances of the Society are in most satisfactory condition, as shown by Treasurer Grimes' report.

The following is a statement of receipts and disbursements by the Secretary for the year ending Jan. 18, 1887, as shown by itemized statement submitted:

SECRETARY'S FINANCIAL STATEMENT.

RECEIPTS.

Membership fees for 1886.....	\$48 50
Membership fees for 1887.....	25 25
Total.....	<u>\$73 75</u>

DISBURSEMENTS.

Envelopes.....	\$2 25
Picture frame.....	3 00
Expenses at Cleveland meeting as delegate.....	5 00
Expressage and drayage.....	18 10
Postage stamps and cards.....	33 25
Amount due Society.....	12 15
Total.....	<u>\$73 75</u>

Respectfully submitted,
S. D. HILLMAN,
Secretary.

The annual report of the Treasurer was then read.

TREASURER'S ANNUAL REPORT.

To the President and Secretary of the Minnesota State Horticultural Society:

THE MINNESOTA STATE HORTICULTURAL SOCIETY, IN ACCOUNT WITH J. T. GRIMES, TREASURER, FOR THE CURRENT YEAR ENDING JAN. 20, 1887.

RECEIPTS.

1886.		
Jan. 21.	From the secretary, membership fees.....	\$57 00
Feb. 8.	State treasurer, one-half annual appropriation..	500 00
	8. By error in last year's account refunded.....	7 23
Sept. 24.	Balance state appropriation for 1886.....	500 00
Dec. 9.	Balance state appropriation for 1885.....	100 00
1887.		
Jan. 11.	Sam Partridge, membership fee.....	1 00
	20. From the secretary, membership fees.....	73 75
	20. Membership fees at winter meeting.....	25 00
Total receipts.....		\$1,263 98

The following accounts have been paid as shown by vouchers herewith returned:

DISBURSEMENTS.

1886.		
Jan. 20.	Borrowed from contingent fund, current expenses.....	\$195 99
	21. A. W. Sias, vice president, incidental expenses.....	4 80
	21. M. Cutler, incidental expenses.....	3 85
	21. G. W. Fuller, incidental expenses.....	3 10
	22. S. D. Hillman, account audited.....	35 55
	22. N. R. Tilton, janitor's services and plates, winter meeting	2 75
	22. Premiums on fruits, vegetables, fine arts, etc.....	68 00
Feb. 24.	A. B. Seymour, expenses attending annual meeting.....	23 10
Mar. 12.	T. M. Smith, delegate to Wisconsin Horticultural Society..	18 15
	12. J. S. Harris, delegate to Wisconsin Horticultural Society...	8 50
June 17.	Executive committee, meeting with the State Agricultural Society.....	10 80
	17. S. D. Hillman, salary first quarter.....	100 00
	17. Premiums paid at summer meeting.....	60 50
July 1.	S. D. Hillman, salary second quarter.....	100 00
	21. J. W. Cunningham & Co., binding 400 copies reports.....	100 00
	21. S. D. Hillman, account audited.....	70 10
Aug. 24.	J. W. Cunningham & Co., drayage on books.....	4 00

Oct.	1.	A. W. Sias, expenses on seedling commission.....	\$25 00
	1.	G. W. Fuller, expenses on seedling commission.....	28 23
	1.	J. S. Harris, expenses on seedling commission.....	51 65
	1.	S. D. Hillman, salary third quarter.....	100 00
Nov.	29.	N. H. Winchell, Buckton's Aphidæ, for library.....	30 00
Dec.	24.	Brown, Treacy & Co., printing programs, etc.....	10 75

AUDITED AND ALLOWED AT WINTER MEETING.

1887.

Jan.	20.	Brown, Treacy & Co., membership tickets.....	\$2 75
	20.	J. S. Harris, expenses seedling commission.....	33 70
	20.	M. Pearce, delegate to Dakota	3 50
	20.	Ditus Day, vice president, expenses 1886	6 50
	20.	J. T. Grimes, incidental and traveling expenses, 1886.....	7 50
	20.	M. Cutler, vice president, expenses 1886.....	2 60
	20.	S. D. Hillman, account audited	61 60
	20.	E. H. S. Dartt, vice president, incidental expenses.....	4 00
	20.	Wyman Elliot, president's salary	25 00
	20.	S. D. Hillman, salary fourth quarter.....	100 00
	20.	J. T. Grimes, treasurer's salary	25 00
	20.	E. A. Cuzner, librarian's salary.....	10 00
		Total	\$1,336 91
		Total receipts.....	\$1,263 98
		Borrowed from contingent fund.....	72 93
			————— \$1,336 91
		Balance contingent on hand.....	\$809 47

GENTLEMEN: With your acceptance of this report I close my books as the treasurer of this Society. My age admonishes me that I should lay aside the active duties of life. You have long honored me with many important trusts. How well those trusts have been performed it is not for me to say. If I have done my duty, it was only my duty, that which you had a right to expect. There are younger men and more active horticulturists among you. I say, give the boys a chance.

With many thanks for your kind regards, I still hope to meet with you for many years to come.

Respectfully submitted,

J. T. GRIMES,

Treasurer.

The reports of the secretary and treasurer were, on motion, accepted, and referred to the finance committee.

REPORT OF FINANCE COMMITTEE.

JAN. 20, 1887.

Having examined the within reports and compared the same with accompanying vouchers, we hereby approve the same as correct; we recognize in Mr. Grimes an efficient and faithful officer in whose trust we hope to continue the finances of our Society.

J. M. UNDERWOOD,
J. S. HARRIS.
DITUS DAY,
M. PEARCE,
Executive Committee.

LIBRARIAN'S REPORT.

Among the books received the past year through the hands of the secretary, are the following:

25 copies	Wisconsin Horticultural Report	1886
50	" Dakota " "	1886
10	" Illinois " "	1885
12	" Michigan " "	1885
12	" Kansas " "	1885
30	" Montreal " "	1885
12	" Missouri " "	1885
15	" Iowa " "	1885
6	" Indiana " "	1885
15	" Ohio " "	1886
12	" Colorado " "	1884-6
12	" Massachusetts " "	1885-6
3	" Pennsylvania " "	1885
5	" New Jersey " "	1885
6	" Western New York Horticultural Report	1885

A portion of these reports have been distributed among officers and members of the Society. Several hundred copies of our reports have been sent out during the year, including several complete sets.

E. A. CUZNER,
Librarian.

Mr. L. L. May. Mr. President, if I am in order and you will allow me; yesterday, I understand, there was quite a discussion arose on the mode of doing business, conducted by L. L. May & Co., of St. Paul?

President Elliot. Yes, sir.

Mr. May. I am here to-day to open up the discussion — not knowing anything of the meeting; only in justice to myself I feel that this association should allow us the privilege of counteracting some of the charges which have been indicated by Mr. Gideon and others. If any special time could be appointed that would be convenient for the meeting I should be glad to have the time set.

President Elliot. This is Mr. May, I take it?

Mr. May. Yes.

President Elliot. We are happy to meet you; it is a question that interests us all and I hope we can give the time for it. If there is no objection we will set it for the opening discussion at 2 o'clock.

Mr. May. Thank you, that will suit me.

The following paper was then read:

THE NEW STRAWBERRIES.

By Geo. J. Kellogg, Janesville, Wis.

Mr. President and Members of the State Horticultural Society:

By request of your secretary, I write a few thoughts and facts. Since the advent of the Wilson, nothing has had the deserved boom until the Crescent. There have been McAvoy's, Agriculturist, Boyden, Great American, which measured fourteen inches, Triumph de Gand, Jucunda and Sharpless, and one hundred and forty-nine others of local merit, and the other two hundred are coming. You may just as well count out your two dollars a dozen and go in with the tide. Many new kinds are already disseminated and partially tried; many of them are a success. Of the more recent kinds, I think May King the best mate for the Crescent yet sent out, and Parry for Jewel; but I will not cumber this paper by mentioning the kinds we have on trial. We must try all kinds, and "hold fast that which is good."

THE "JESSIE."

Your secretary asked me to say something about the "Jessie," one of Mr. F. W. Loudon's group of over fifty varieties of

seedlings. This kind has fruited five years. In 1884 twenty-six berries, making two quarts, were shown at the Chicago convention. These were either overripe or badly handled, as they did not show good shipping qualities. The past season (perhaps owing to the drought) they were much firmer. If there is any weak point in the Jessie, this is it, lack of firmness for long shipments. I picked two quarts one evening for trial on the table, but when I got home selected one quart and sent it with other fruit six hundred miles, and forty-eight hours after picking it was in good condition. But this is no test of shipping qualities.

The wonderful show of Jessie at our June convention, and the visit to the two acres in bearing, captivated the whole crowd, and we did "*Resolve*, That the show of 'Jessie' exceeds anything we have ever seen, in size, productiveness and quality; and we believe it possesses more valuable qualities than any variety now disseminated." This is very strongly put, but the facts fully justify the resolution. The trials on a variety of soils here, and Mr. Crawford's report from Ohio, lead us to believe that it is a prize worth the seeking. It is large, too, very large, uniform in shape and color, perfect in the blossom, very healthy and vigorous, wonderfully productive, and stands drought splendidly. In competition with Sharpless, it took first prize for size; and competing with Atlantic, Prince of Berries, Mrs. Garfield and many others, it took first for quality. This is but one of the fifty kinds now fruiting, and Mr. Loudon is raising new seedlings from the best crosses every year, by the hundred. He has doubtless thrown away many kinds far ahead of many that have had a wonderful run. He has some that surpass in size the Jessie, and may prove better on further trial.

DISCUSSION ON THE "JESSIE."

Mr. Cutler. As this report has brought the Jessie strawberry before the Society I should like to hear something further about it; I think before investing very heavily in this new berry we had better get the full facts in the case; and then I would advise not to invest too heavily. As Mr. Smith was mentioned as one of the gentlemen who visited the grounds where it grew I should be glad to hear from him.

Mr. J. M. Smith. Mr. President, I was one of the number of the members of our state society when they made the trip last

summer to see the Jessie. On its native ground it certainly did make a creditable showing. At that time the ground was very dry and there were cracks in the ground large enough to put your hand down among the plants. The berries were large; they would average as large as Sharpless and of better form. One was brought to me measuring nine inches or perhaps eight and seven-eighths inches. That was quite a perfectly formed berry and I think I could have picked bushels, if necessary, without taking any that measured less than four inches in circumference, and from that to six. The quality I thought very fair, but not as good as one or two other varieties he is testing.

The question in regard to that fruit resolves itself simply to this: Will it do as well away from home as it does on its native grounds? New strawberries are usually sent out with flaming posters, but it is a fact that a variety often does well in its native home when under other conditions it may prove to be entirely worthless; it may fail entirely when taken away from its home. Boyden No. 30 is an instance; it made a remarkable growth and was the wonder of the place at home and the fruit sold for enormous prices; and yet, on land only twenty miles away, it was not worth ground room; it was an utter failure. I don't say this will be the case with the Jessie.

Mr. Crawford, of Ohio, and myself were perhaps the only ones who had any of the plants previous to last year, and he told me they were doing very well indeed and promised well. Mr. Chas. A. Green, of New York, has the distribution of the plants and has lately come out with a circular setting forth their merits and using my name rather freely. I wish to say that if the plant does as well all over the country as those I saw last summer were doing, that it will prove a very great accession to our strawberry list.

I don't want to injure the berry, but I wish to say here that I have not been satisfied with the way it has acted on my grounds; there may be a reason for it that I don't know of, and I shall try it further. In firmness the berries are not equal to Wilson, but will bear shipping with Crescent and are much better in quality.

President Elliot. Will you state what kind of soil Mr. Loudon has?

Mr. J. M. Smith. I think most of it is oak openings. They made a magnificent showing on his ground and I have nothing to take back from what our society said of them.

Mr. Stubbs. Can you give the parentage of the variety?

Mr. J. M. Smith. I think the Sharpless for one and I have forgotten the other.

Mr. Stubbs. Is it a staminate or a pistilate?

Mr. J. M. Smith. It is staminate or perfect flowering. A perfect flowering plant is really hermaphrodite, from a Greek word signifying both male and female, or a perfect flowering plant.

Mr. Bunnell. Have you tried it on sandy soil?

Mr. J. M. Smith. I tried it on different ground; I couldn't find any place where it did well.

Mr. Bunnell. I planted some on sandy soil and it didn't amount to anything whatever.

Mr. C. L. Smith. I tried them on sand, clay, gravel and on black loam, and they didn't do well on any of them.

Mr. J. M. Smith. I wrote Mr. Green in regard to their action on my soil; he replied there was something "peculiarly unfortunate" about my soil, that nothing seemed to do well except the Wilson.

Mr. Kramer. The Wilson don't do anything on my grounds; I have tried them several times and they are worthless on my grounds.

The following paper was then read:

BIRDS IN HORTICULTURE.

By E. E. Harris, La Crescent.

Every animated creature has its mission to perform and that the mission of the birds is a very important one, no intelligent person will deny. There are various ways in which birds are a blessing and benefit to the human race, but as all will agree their chief mission as related to mankind is to destroy and keep within proper bounds the millions of injurious insects which infest our land. Nothing has been created in vain, but if the only mission of the birds is to eat worthless insects and the insects are only bird food, then the creation of both birds and insects was unnecessary. Anyone who has ever examined the great plan of creation with an unprejudiced eye must have noticed how wonderfully each creature is adapted to its own station, and has its own work to perform which could not be done by any other creature. And as man is placed at the head of all creation, it is but reasonable to believe that all creatures, no matter how in-

significant they may seem to the casual observer, are in some way directly or indirectly beneficial to the human race.

Undoubtedly the great object in the creation of birds was to beautify and enliven the earth and make it a pleasant and agreeable habitation for man.

In order to successfully accomplish this object a very great variety of birds was necessary, and so complete is the collection that they are bountifully distributed all over the earth, inhabiting the different elements, land, water and air, in profusion, and each species fitted by nature to live in its own country, so that from the frozen regions of the north to the burning desert, wherever the foot of the discoverer has trod, birds of some kind have been found. And in order to supply these birds with proper food a very great number of insects are necessary. We will suppose then, for convenience, that the majority of insects which are injurious to vegetation are for bird food though no doubt they have other duties to perform which the limited vision of man can not discern, and while we censure them for their bad qualities, let us not lose sight of the fact that they are gratuitously performing important tasks which we could not hire done, and so they are all right in their proper place, but from a horticultural point of view the best place for most of them is inside of the birds. There are a few insects which are directly beneficial to the fruit grower, principally those that feed on other insects. Now let us notice this important fact that birds do not eat carnivorous insects. The same is true of all animals. The lion does not eat the flesh of the tiger, nor does the tiger seem to relish leopard meat. Notice also that man never eats the flesh of carnivorous animals or birds, preferring instead the flesh of animals that feed on vegetables, and birds whose diet is at least partially vegetable. Now it is the same with birds whose instinct teaches them to distinguish between the tender and juicy cut worm and the bitter stink bug, which eats potato beetles. So we must admit that all birds which eat insects are beneficial to the horticulturist and those only injurious which feed principally upon vegetation or that prey upon smaller birds of insectivorous habits. There are many other ways in which birds are a benefit to man. The flesh and the eggs of the game birds are a great addition to the food product of all nations.

Their feathers serve as personal adornments, toothpicks and pillows, and before the introduction of metallic pens, they were the implements with which our worthy ancestors wrote some

very queer and good thoughts. We are told that in China and India a variety of water birds called cormorants are taught to catch fish and carry them to their masters. In our own country they have been used as messengers.

But time will not permit us to notice all the good done by our feathered friends. In the eyes of the average horticulturist, they are simply insect destroyers, and as such they do not receive the notice and protection which they really deserve. Now, supposing that insects are principally bird food; in order to satisfy the enormous appetites of the birds, it was necessary in creating insects to have the reproductive faculty predominate. And some varieties are astonishingly prolific, laying thousands of eggs during a life of but a few days; and Nature's great incubator works better than any patent self-regulator which the ingenuity of the Yankee ever hatched up. It has been estimated that one insect may in one year become the progenitor of 6,000,000,000 descendants. Three hundred and twenty-five thousand species of insects are known, and thousands more are as yet unknown to naturalists. If undisturbed, they would soon increase to such prodigious numbers as to destroy all vegetation and animal life would soon perish. Now the only thing which prevents this catastrophe is birds, and I say they are our best friends and well deserve our protection. The damage done to our crops by insects can not be accurately estimated, but that it amounts to several hundred millions of dollars annually in the United States alone is a certain fact. In our land of plenty this great loss is unfelt and unknown by the majority of the people, but the time is not far distant when some steps must be taken to prevent the ravages of insect pests, which are rapidly increasing as the birds are diminishing. But the question arises, What can be done? A man can not spend his time hunting worms, and he is not very well adapted to that kind of warfare. The very best way to fight them is with birds, and if let alone there would be enough of them to keep insects within proper bounds. Nature makes no mistakes, and the proportion of birds and insects is self-regulating and would always remain so if it were not for the interference of man. But that the birds are rapidly diminishing and the insects correspondingly increasing is a fact that sticks out so plain that "he who runs may read."

Now let us briefly notice the various causes of this alarming decrease of our birds. The larger birds of prey, such as the hawks and owls, no doubt destroy a great many beneficial

birds, but not so many as some imagine, for the little fellows are too sharp to be easily captured. Wild cats, foxes, skunks and other carnivorous animals come in for their share when they can get it, but mice, rats and other small mammals are so much easier captured that they do not molest the birds much. Domestic cats also kill great numbers of them. In our cold country the severe winters freeze and starve out many beneficial birds. The destruction of the forests drives a great many away, for they will not stay where there is no natural protection. These are some of the causes of the diminution of our feathered companions. But the great cause, and the only one that needs looking after, is man, who should be their best friend, for without birds successful fruit culture is impossible. Boys are allowed to go about robbing nests, with no other motive than morbid cruelty and degenerate cussedness. No doubt it would be a benefit to rob the nests of some birds, but notice that those are the very ones that are untouched, as such birds generally build in some inaccessible place. It is the innocent and beneficial birds that suffer most from the depredations of these juvenile hunters. Oologists also destroy great number of eggs. This evil is not so great, however, as the above mentioned one, as the indefatigable curiosity hunter takes the bad as well as the good, and no doubt in a majority of cases where nests are robbed the birds rebuild in some other locality. This, however, is no reasonable excuse for promiscuous plundering.

Great numbers of birds, both good and bad, are killed by taxidermists for stuffing. This is admissible only when the motive is the advancement of the cause of science. But when the specimens are used only as home adornments it is wrong, and should be prohibited by law. But a greater evil than any of these is the killing of game birds for food and sport, as some call it, but just where the sport comes in I have never been able to discover. The man who can look with pleasure on the death agonies of an innocent creature, knowing that his own hand has snapped the brittle thread of life, must be hard-hearted indeed. As far as sport is concerned, it is as good a test of marksmanship to shoot at a hunting dog as at an innocent bird, and the flesh of the retriever would be about as fit for food as a mutilated bird. We would not relish beef that had been torn in pieces by a cannon loaded with grapeshot; our poultry must be killed in the most approved way, and all animal food must be

properly dressed in order to be palatable. Why is it then that a bird filled with shot, mangled and unbled, is considered such a dainty. Now I am not blaming anyone for this state of things, the trouble is in the education and customs of the people.

But the greatest cause of the loss of bird life is the senseless fashion of wearing bird skins on hats and bonnets. In the United States many millions of birds are slaughtered annually, to supply the demand, and we are told that in Europe this fashion is even more prevalent than with us. Now this enormous slaughter of innocent and beneficial birds can not be long continued without disastrous result. Something must be done, and that quickly, or our fields, orchards and groves will soon be destitute of birds and overrun with noxious insects and crops will be a thing of the past. No doubt, if brought to the test the ingenuity of man would devise some other way of keeping the insects in check, but nothing better or cheaper than birds could be thought of. But how to stop this great waste is a difficult problem. No doubt the people can be taught to look at the matter in its proper light and abolish this cruel fashion, but teaching some people is a very slow process. Our present game laws are very inefficient as they merely prevent the killing of game birds during the breeding season and allow them to be indiscriminately slaughtered, even to total annihilation, at other seasons of the year, and our laws do not include many of our most useful birds, being specially designed to protect certain birds until a class of men erroneously termed sportsmen are ready to destroy them.

What we want is a law making the killing of any and all birds at any time a criminal offense, punishable by heavy fines and imprisonment. I will pile it on still thicker: a shotgun is a useless and dangerous implement and no man should be allowed to make, buy, sell or use one for any purpose whatever, except to ventilate dog skins.

But some will say if none were killed birds would become so plentiful that insect food would not hold out, and then our crops would suffer. There is no danger of that whatever. They have natural enemies enough to prevent any alarming increase; and who would not rather have his crops destroyed by these beautiful songsters than by repulsive vermin. But when they get so plenty that we can't raise crops for a living, it won't be hard to resurrect that monstrous fashion, and then we could all be bird-skinners.

Perhaps some expect on this occasion a classified list of our common birds, with a division of good and bad. It was my intention at first to attempt this, but I have about come to the conclusion that none of us are competent to make the division between beneficial and injurious birds. No doubt a great majority of them do some damage, and some do much more good than others. Among those that deserve particular mention as the most beneficial to the fruit grower and farmer are the robin, bluebird, catbird, brown thrush, nut-cracker, meadow lark, cowbird, pigeon, quail, flycatcher, woodpeckers, warblers, vireos, swallows, swift, nighthawk, whip-poor-will, orioles, tanagers, cuckoo, and I would like to include the bluejay, if there is no objection. These, we may be sure, do much more good than harm, and while I do not advocate the destruction of any, I would particularly recommend the above mentioned species as deserving our protection, knowing that we will be well rewarded for our trouble, and that time spent in the study of their habits will not be wasted. How to protect our birds has become a serious question, and the fruit growers should be the first to take active steps in their favor, for it is they who receive the direct benefit of their active labors in the destruction of noxious insects.

DISCUSSION.

Mr. Underwood. I can not discuss the paper read as I heard only a few of the closing sentences. But speaking of birds reminds me of the experience we had this last summer, and I would like someone to tell us what to do. It is an experience that perhaps is easily answered and perhaps covered by the paper, but I would like to hear what to do before I go home because I might forget it if I didn't find out now. If you had a nice crop of grapes and the birds had managed take the best part of them, I want to know what you would do about it; would you let them, have the grapes or shoot the birds?

Mr. E. E. Harris. I suppose I am expected to answer that question. We have had very much the same experience, as the birds are probably as thick in our locality as anywhere else. I don't say anything about that, because I object in all cases to killing the birds. I have lost a good deal of money on that account. By burning a good deal of powder and making a good deal of noise one can frighten the birds, but I would recommend one to be very careful about shooting not to hit any of the birds.

Mr. J. S. Harris. I might say that he is very careful of the birds while his older brother takes his gun and goes for them in earnest.

Mr. E. E. Harris. Well, he is only three or four years older than myself and as soon as I catch up with him I am going to lick him. [Laughter.]

Mr. Kramer said the birds last summer destroyed a third of his crop, ate one-third and left a third, so it was raising a crop on shares; one could put up a scare-crow to frighten them, but the robin was the meanest bird of all; it sits on a post and watches you put it out and as soon as he finds out what it means he goes right at the fruit same as ever.

Mr. E. E. Harris. Our friend Kramer has done fairly well; says he received one-third for his share; that is all I give my father. If the bird gets half his share I never shoot it.

Mr. Kramer. You want the birds to take one share, is that it?

Mr. Cutler. My neighbor, Mr. Crandall, prevents the birds getting his grapes by putting small paper sacks over them; he has practiced that three or four years.

Mr. Underwood. Last year we had some very nice grapes, fine and sweet, and were expecting to have two or three tons of grapes. In going through the vineyard one day I was surprised to find the birds had hardly left a bunch untouched. They must have taken nine-tenths of them. They did not eat them entirely but picked into the bunches and spoiled them. We had a pretty good gun and we made a slaughter among them by means of which we saved a portion of the crop.

President Elliot. Was it not pretty dry down there?

Mr. Underwood. Well, I should say it was; it was dry all summer.

President Elliot. I would suggest the propriety of setting out dishes with water in them near your vineyards where the birds can get a drink. It may be their thirst for water they wish to overcome more than anything else.

Mr. Underwood. I might be a little ungenerous, but the lake is close by us and the birds can go there for water. [Laughter.]

Mr. Harris. This is a serious question but there is no doubt in my mind that the birds are more beneficial than injurious. They are fond of small fruits and live largely on wild fruits. They take shelter among the vines at times and their sharp claws injure the grapes, the fruit splits open and the wasps and bees prey upon the fruit. Some birds are man's greatest friends.

There is one bird that is very destructive to evergreens, known as the yellow-breasted woodpecker. It is fond of boring holes in the trees.

Mr. Pearce. Is not that the wood sucker?

Mr. Harris. It is. Another is the cherry bird, which is very fond of raspberries and cherries.

Mr. Sias. I am decidedly opposed to shooting the birds. I like the suggestion of placing basins of water all around the vineyard. I would suggest in addition to that the propriety of putting a loaf of good white bread at each basin. [Laughter.]

Mr. Pearce. I have noticed the depredations of the birds are worse after the wild fruits are gone; after that they come in and take our grapes. I think this is a local question.

Mr. Stubbs. I have had some experience in raising grapes. The robins do me a great deal of damage, and the last few years I have adopted the plan of using paper bags. I find the expense is not so great after all, as I actually get enough more from the crop to pay for the extra work, and it proves a complete protection.

Mr. J. M. Smith. I am afraid our president's cold water won't work very well. My grapes grow right by the side of the water, and the birds certainly like grapes better than they do the water. My protection is to put the sacks on, which can be done very cheaply, and the bunches will be a little larger.

Prof. Porter. By covering one protects the grapes from disease as well as birds. There is increased growth, and the dust and dirt is guarded against.

Mr. Pearce. Wouldn't there be danger of water getting in?

Mr. Stubbs. If lapped around and pinned on at the corner there is no trouble from water. I use a common two-pound grocery sack.

Mr. Gilpatrick. I think it will pay a man five dollars a day to use the sacks, and besides it beats the birds.

Mrs. Stager. I have tried using coarse cloth with success.

Mr. C. L. Smith. The advantage of using paper sack is their being so much cheaper, and less work to put them on.

Mr. Stubbs. I buy the sacks for a dollar and twenty cents per thousand.

Mr. Grimes offered the following resolution, which was, on motion, adopted:

Resolved, That the secretary of this Society be instructed to have 5,000 copies of the address of President Northrop, delivered before the Society last evening, printed for general distribution.

The following paper was presented by Mr. Smith:

NOTES BY THE WAYSIDE.

By C. L. Smith, Minneapolis.

Mr. President and Gentlemen of the Minnesota State Horticultural Society :

Since our last meeting I have traveled over a large part of the State while engaged in institute work, under direction of Prof. Porter, and generally speaking on horticulture. I have made the acquaintance of those interested in fruit and tree growing at the points visited.

The most northern point visited by me was Moorhead, Clay County, on the Red River. Here I found the Red Dutch, Victoria and White Grape currant doing well, the bushes being loaded with fruit; there seems to be no obstacle to successful currant growing in the Red River Valley that is not found elsewhere. Cultivated Weaver, De Soto and wild plums were also doing well; strawberries were exceptionally fine. The soil of the valley seems to be specially fine for this fruit. As the ground is very flat it is found advisable to ridge it so as to give surface drainage. Raspberries have not been very successful, owing to lack of winter protection; where covered they have done well. I found one man at Moorhead who was trying blackberries; by covering his vines with dirt they had wintered well, and on June 1st were covered with blossoms. Another had been successful with grapes. Am inclined to the belief that with proper care some of the earlier varieties will yet be successfully grown there.

At Glyndon one man has done something with small fruit, but his first venture in grapes and currants was bankrupted by grass and weeds; of Wilson strawberries he had raised a fair amount of fruit which had finally surrendered to the universal foe, "grass." He planted currants on clean, rich ground and by keeping them free from grass by mulching with clean straw or cornstalks, their strong, healthy stems, rich green leaves and rapid growth gave promise of success. A plat of Turner raspberries that were perfectly hardy had killed so badly as to produce but little fruit. A few bushes that were protected from the exhaustive effects of blizzards, freezing, thawing and drying, were bearing well. He had faith that he could grow raspberries profitably. His second planting of strawberries, in rows

four feet apart, on ground that had been well manured, back-furrowed in ridges sixteen feet wide, and well harrowed to give surface drainage, were doing finely.

About Detroit, in Becker County, small fruits and the Transcendent crab seemed to be doing well. This is a timbered county and from an examination of the soil and the fruits growing there I am satisfied it is well adapted to the production of all kinds of small fruits; however, there is very little grown there at present; the county has been deluged with hybrids, said to be better and hardier than the Transcendent, which appear to be either dead or dying. I visited one farm where fifty such trees had been planted; only three were alive; four Transcendents in the same field, four years from planting, were clean, sound, healthy trees and loaded with fruit. Where Red Dutch currants had been planted they were doing well, but as near as I could learn most of those who had purchased currants had invested in Fay's Prolific at a dollar apiece and the returns had been so small they were disgusted with the business.

In Otter Tail County the situation was much the same, although I found more here who had been successful owing to the fact that many of them had bought better trees and plants. Transcendent, Duchess, Beecher's Sweet, Hyslop, Whitney and Wealthy are in many instances bearing well.

Geo. F. Cowing, of Fergus Falls, had some very fine grape vines that were loaded with fruit; the varieties were Delaware and Concord. He had three trees of Weaver plum that were loaded the heaviest with plums of any trees I ever saw. The trees were sound and healthy, having made a vigorous growth each year since planted. M. T. Duncan and John Bock have both been quite successful with small fruits.

The soil through a large part of this county is quite loose and freezes very dry in winter. Heavy mulching for currants and raspberries seems to be the best guard against the effects of winter drought. Turner raspberries without winter protection would live but would not bear enough to pay. I visited one farm where they had an abundance of currants and raspberries in bearing for several years, the only cultivation given being a liberal mulch of straw each fall. We had raspberry shortcake for dinner, and on discussing the cost learned that they regarded it as almost nothing; only half a mile from there, the next day we had a prune pie; not quite so nice, but much more expensive, as the prunes were imported, costing ten cents a pound,

and were paid for with wheat at fifty-two cents a bushel. This man could not afford one dollar for membership in our Society, but had just given an order to a traveling tree peddler for two dozen strawberry plants (pistilate variety), with a beautiful name only two dollars; a "tree rose," three kinds grafted on one stalk, two dollars; five budded apple trees, imported direct from Russia; only \$2.50; three Fay currants (the tree variety), \$2.50; one celebrated Russian Mulberry, one dollar; etc. Is it any wonder the poor victim of misplaced confidence thinks our soil and climate unfitted for successful fruit culture?

In contrast to this we cite the experience of Wm. Danforth, of Red Wing. His model farm is located on the Cannon Valley Railroad, two and a half miles northwest of Red Wing. Mr. Danforth is by profession a civil engineer, and his time is divided between his profession and the care of his farm. A few years ago he turned his attention to small fruits and bees. As a preparation for the business he secured the best books and papers he could find and carefully read up what had been learned by others. He procured a swarm of bees and familiarized himself with their habits; he also planted a few raspberries, strawberries, currants, grapes, etc., and with book or paper in hand began to study plants and vines. As a result he has today an apiary that is first-class in every respect, winters his bees without loss, controls the swarming, regulates the production of honey, and this season secured over one hundred pounds of choice honey per swarm. His strawberry crop this year was a surprise to himself and all his neighbors. There was very little rain during the season and the drought was severe on all crops in his locality, yet his strawberry crop came out abundant in quantity and excellent in quality. The varieties grown were Wilson, Crescent, Downing, Glendale, Manchester, Old Ironclad, and some others, but Wilson and Crescent were the best. His ground is clay loam, had been previously manured and was in fairly good condition. He set his plants in April, in rows four feet apart, Wilsons sixteen inches, and Crescents twenty-four inches in the rows; the cultivation was shallow but frequent; throughout the season the runners were thrown along the rows, forming matted rows of plants about two feet wide; all weeds or grass growing among the plants was pulled out by hand. In November he mulched the whole surface with straw, with the exception of a few rows where he used straw between the rows and cornstalks over the plants; they all came out bright and

nice in the spring, but those covered with the cornstalks seemed rather the brightest, and he thinks he would prefer the cornstalks over the plants, using the straw between the rows. As soon as vegetation started in the spring the mulch was drawn between the rows and left to retain the moisture and keep the berries from the dirt. The Wilsons were the first to ripen; they did not yield quite up to the Crescent, but were found more valuable for market and for canning purposes. Some customers would buy only Wilsons, and he will plant an acre of them next spring. The Crescent were alternated with Wilson, Downing, Glendale and Ironclad, the rows of Crescent yielding much more than any other sort; they were bright, highly colored and well adapted to home market and immediate use. The average price received at wholesale was two dollars and twenty-five cents for twenty-four box crate; the price paid for picking, two cents per box.

As soon as the fruit was gathered the plantation was plowed, with the exception of one block; the mulch was stirred up on this and burned over, burning out the old plants, the space between the rows cultivated thoroughly. There were enough young plants left so that now the rows were quite full and give promise of an abundant crop next year. Mr. Danforth is well pleased with results and is satisfied that he had the right method of cultivation. He has a fine lot of raspberries, including Philadelphia, Turner, Cuthbert and the blackcaps; he gives them winter protection, covering with either dirt or straw. He regards the Cuthbert as the best.

Mr. Danforth is a member of the State Horticultural Society and attributes much of his success to the lessons learned in their meetings and from their valuable reports. He is setting an example that should be imitated by thousands of our Northwestern farmers.

At Morris, in Stevens County, J. P. Lowater had some very fine Duchess trees, eight years old, healthy and vigorous, loaded with very large, fine-colored, perfect fruit. He had one tree of Beecher's Sweet that was so loaded with fruit that the lower limbs were bent to the ground with the weight of fruit; the tree was about twelve feet high and was a perfect pyramid of fruit, which was exceptionally large and fine flavored. His Transcendents, Hyslops and Orange were all bearing well, no signs of blight or blackheart; currants, raspberries and strawberries doing well.

One of the finest groves of Scotch pine and European larch I have seen in the State was to be seen in the village of Morris.

At Browns Valley J. O. Barrett has made a fine start in the way of small fruit and timber seedlings and I hope we shall have a report from him.

Our honored friend, G. W. Fuller, of Litchfield, certainly has the most complete collection of trees, in the best condition of any that I found west of Minneapolis.

At Foster, on the east side of Big Stone Lake, Irving Mathews has a fine collection of small fruit, also Transcendents are doing well. I suppose Col. Stevens would not forgive me if I neglected to say that he also has several Catalpas that have proven hardy and are growing nicely.

I believe the seedling fruit committee have visited a large part of the State, but I would like to mention S. O. Taggart, of Cottonwood County, who from an investment of \$14 in root grafts and Scotch pine seedlings, 1,000 of each, 8 years ago, has to-day 970 Scotch pines, 10 to 30 feet high, and a bearing orchard of 400 trees, mostly Duchess and Wealthy. His trees were planted on deep, rich, black soil, with clay subsoil, slightly sloping to the south; ground kept free from weeds by shallow cultivation, early in the season. Trees did not injure two years ago. He had sold young trees to his neighbors for more than enough to pay all the expense incurred.

While at Pipestone I spent two days and nights with Job Whitehead who took a tree claim near the Indian pipestone quarry eight years ago; he has ten acres of fine timber, willow, ash, box elder, maple and cottonwood. He has raspberries, currants, blackberries and strawberries. Mr. Hoag, of Rochester, had given him one of our reports for 1885 and I found he had been an apt scholar; his raspberries and blackberries were covered with dirt and straw, his strawberries were grown in matted rows, properly mulched, and he was so full of enthusiasm about fruit growing that he wants to plant ten acres of berries this year.

Mr. Harris, Mr. Pearce and myself spent two very pleasant and profitable days with the Dakota Horticultural Society at Sioux Falls, but Mr. Harris has already reported this meeting very fully.

Princeton, Mille Lacs County, is a point which I think has not been heard from yet. They have a soil and location very favorable to successful fruit growing, but little has been done as yet.

Wild strawberries, blueberries and raspberries are abundant; currants, raspberries and strawberries have been grown by a few and have yielded well. Crab apples, Duchess and Wealthy, under favorable conditions as to stock and care, have done quite as well here as in other parts of the State. Protected from blizzards by an abundance of heavy timber, quick soil, not affected by droughts, I predict that this region will soon be competing with the local garden for the small fruit trade of St. Paul and Minneapolis.

In conclusion I would say that I found no point but what will produce small fruit in abundance when good plants are grown, properly planted and cared for. The obstacles are:

1. New and untried sorts, at high prices, which the farmer is induced to buy, not because they are the best for him to plant, but because the dealer can make most profit out of them.
2. Careless packing and handling.
3. Poor preparation of soil and careless planting.
4. Weeds, grass and stock.
5. Neglect to give winter protection.
6. Drought.
7. And least of all, cold.

Avoid the first by buying old and well-known sorts that may be bought for a nominal price; second, patronize reliable dealers; follow the rules found in each report of the Horticultural Society and the cold will be powerless to harm; to bring all this about publish 20,000 primers of horticulture and scatter broadcast over the State.

The meeting then adjourned till 2 o'clock P. M.

AFTERNOON SESSION.

THURSDAY, Jan. 20, 1887.

The meeting was called to order at 2 o'clock P. M. by President Elliot, who stated that an opportunity would now be afforded Mr. May to be heard; it might be well to state how the matter came up.

The secretary then stated that the question had been asked through the "Question Box" if anyone knew where the nursery firm of L. L. May & Co. was located, which had elicited some discussion.

President Elliot read an extract from a letter from Mr. Gaylord, of Nora Springs, stating that: "A firm of L. L. May & Co. claims to be northwest of St. Paul two or three miles. Is this firm genuine? The agent is here selling the Gideon apple at one dollar each, representing they are growing these trees there and that they have the entire stock." To bring this matter right to the point, he would like to inquire if there was such a firm as L. L. May & Co. in St. Paul, or a representative?

Mr. May. Yes, sir, there is and I am that representative.

President Elliot. Where is that located?

Mr. May. Our offices are located in the First National Bank building, corner of Fourth and Jackson.

President Elliot. Where is your nursery located?

Mr. May. Our nurseries are located in Rochester, New York.

President Elliot. What stock are you selling?

Mr. May. We are selling the Gideon apple more particularly; a general line of nursery stock.

President Elliot. Will you furnish a list of this stock to our committee on fruit lists?

Mr. May. I will.

President Elliot. Are you selling the same class of stock in Southern Minnesota that you are for Northern Minnesota and Wisconsin?

Mr. May. No, sir; not by any means.

President Elliot. We would also like a list of the prices at which you sell nursery stock.

Mr. May. We can give you those. I wish to make a few remarks about the Gideon apple. It was originated here, at Lake Minnetonka, by Peter M. Gideon. Some years ago Mr. Gideon sold that variety, with the distinct understanding that the parties buying this variety were to have the sole right of propagation of it. It was sold to Messrs. Chase Bros., of Rochester, N. Y.; they paid Mr. Gideon the sum of two hundred dollars for that variety. Some fifteen months ago Chase Bros. wrote to us that they had a fine stock of this variety, and wished us to take it and sell it. Knowing the variety to be hardy, we of course put it on our list willingly, and we have been selling it to this day, and intend to sell it; and we defy anyone to come forward and show that we can not deliver the genuine variety. We have been in this business some eight years, and located in St. Paul. We commenced in a small way as dealers, and our business has grown until it has extended through all the West-

ern States, and as far west as the Pacific coast. We employ one hundred and fifty men to sell for us. We are selling such stock as Duchess, Wealthy, Gideon, Fameuse, and other varieties. We have aimed constantly for these eight years to place before the public in the states of Iowa, Minnesota, and Illinois a variety of nursery stock which will give every satisfaction. In my mind, and in the minds of many from whom we have valuable testimonials, we have aimed to give people a variety of stock that would do well, and that they would succeed with. Of course, as with all nurserymen, more or less trees die; but we have been the instrumentality — if I do say it myself — of furthering horticulture in this city and in the Northwest as much as anyone in the Northwest, and handling as much stock as any two nurseries combined. What I say here are words of truth. I can show recommendations as to quality of stock which we deliver, and as to the satisfaction with the stock which we sell. These insinuations have been cast out from time to time by Mr. Gideon. He dare not come out boldly and say that we can not deliver the Gideon apple. We defy him to do it. We can deliver it and do deliver it, notwithstanding his coming out and trying to convey the idea that we are frauds. Will these gentlemen come out and state what they mean, so that we can have recourse through the courts if we can not get at them through this association? We have done the best we could to place before the people of the state of Minnesota stock that will do well. You can take it here in the city of St. Paul; eight years ago when we came here there was very little shrubbery to be seen; now look at our city with its lawns and beautiful yards and grounds. Of course we have been gradually getting into this; and what we sell, gentlemen, we deliver true to name, and we deliver the best stock that can be grown. I will state right here to Mr. Gideon —

President Elliot. Mr. Gideon is not present.

Mr. May. I beg your pardon; I will state here to you, Mr. President, don't you think a Duchess apple raised in the state of New York, or a Gideon apple, a Wealthy, a Transcendent crab — any of those varieties — that it is just as hardy as if it was raised here?

President Elliot. Our Society has discarded them.

Mr. May. I see the Iowa society recommend the Duchess and Fameuse.

President Elliot. Yes.

Mr. May. Then why do you discard those varieties?

President Elliot. We do not, but we discard the methods by which they are produced; if you go to Rochester you see how they are produced. They manure their land, their object being to get large, thrifty trees and cause a growth the first year of two or three feet, the second year from three to four feet; and that is done at the expense of the hardiness of the tree. We all know that such stock will not grow in Minnesota and you can't point your finger to a tree that has been produced under that system of cultivation that has proved to be hardy.

Mr. May. I beg to differ with you. I can show you those varieties that are growing in Minnesota, Iowa and Illinois. There is a good deal said about acclimatization; but you can take a Duchess and plant it at the South and bring it here and it will be hardy? The same with a crab.

President Elliot. Crabs, we will admit, may be.

Mr. May. One is just the same as the other.

Mr. C. L. Smith. Do you inform your agents that your nursery is at Rochester, New York?

Mr. May. Yes, sir, we do.

Mr. Smith. Do your agents inform your customers that your nursery is at Rochester?

Mr. May. That I cannot say.

Mr. Smith. I can say that they do not.

Mr. May. I have heard it said that we represented that we sold nothing but Minnesota stock; but I say when they do that they are stating a falsehood, nurserymen must import more or less.

Mr. Smith. Well, I denounce that as absolutely false.

Mr. May. Well, sir, I can prove it to you notwithstanding.

Mr. Harris. When these agents introduce this stock do they sell it for four times the value of the stock?

Mr. May. It depends on the quality of the stock; you can't compare a one-year-old tree to a four-year-old.

Mr. Cutler. I would like to ask you if you haven't authorized your agents to say that you grew this stock here in St. Paul that they have been selling, and in your own nursery?

Mr. May. No, sir; I have not and you can not produce the proof of it.

Mr. Cutler. Had you a man working for you by the name of Jordan, last year?

Mr. May. No, sir; no such man in our employ. I may say

there are unscrupulous firms who have agents going through the country selling inferior stock. You can take our blanks and you will see that we specify everything is of a certain age and of a certain grade; the contracts are such if this stock is not in condition, up to size and quality, no purchaser need to accept it. As to selling stock true to name; we claim to be a responsible firm; of course you can easily find out through any of the banks and the mercantile agencies; we agree to deliver stock true to name and if it is not purchasers have their recourse. And as to selling all classes of stock in the same section, I will state a few points on that. For Northern Minnesota we run almost entirely on small fruits and crab apples; for Iowa we sell under a larger line; Illinois and Southern Wisconsin the same; but our principal trade consists mainly in such stock as roses, shrubs and small fruits. And I might say here, as I understand this Society is bonused, as you might say, by this government; it receives a thousand dollars a year for the promotion of horticulture. Now, as a resident of this city, as a taxpayer, I consider that I contribute to the support of that, while still your Society comes up and denounces me as a "fraud." I say it is a piece of infamy — *a piece of infamy*, and legislation will have to be had on it sooner or later; my interests are at stake here and I intend to see that I am placed in a proper light before the community.

Mr. C. L. Smith. That is what our Society intends also.

Mr. J. M. Smith. A young man came to me in our place, a straightforward and truthful young man, and stated to me that there was a firm at St. Paul by the name of May & Co. that wanted him to sell nursery stock, representing to him that the stock was grown in or close to St. Paul. Did he tell the truth, or did he lie?

Mr. May. He did lie, most assuredly. I defy any member of this Society to show me wherever I have instructed one of my men to represent that we are selling stock grown in St. Paul. Our trade comprises much stock that is grown in other states; we could not grow all this stock; people know different. This talk is all bosh, gotten up by rival firms to injure us.

Mr. C. L. Smith. I met one of your canvassers about a year ago and he said your nurseries were about a mile north of St. Paul. I called at the office of L. L. May & Co., in this same National Bank building, and their clerk informed me that their stock was out about three miles, but he did not have time to go out there with me.

Mr. May. I will wager you a hundred dollars that no clerk in my office ever made that statement to you. I will put the money up and donate it to the orphan asylum. I tell you talk is cheap.

President Elliot. We want to get at the bottom of this thing. and we have some few here that have run against the agents of this L. L. May & Co.

Mr. J. M. Smith. The gentleman I referred to I have known a good many years. I said to him, "You had better write over there. I know some of the Minnesota people and I have never heard of any such firm, although it may exist." A few days afterwards he came to me again saying that he had further letters from May & Co., and they wrote him their stock was grown in or about St. Paul, and that it was perfectly good. How is it that this young man should turn liar all at once?

Mr. May. Well, I don't know; but I assure you upon the word of honor that I have never represented to my men that our stock has been grown in Minnesota.

Mr. J. M. Smith. Did you send the man good stock — that was reliable — when you filled his orders?

Mr. May. I think we do. We pride ourselves on the quality of stock we ship; I don't say all of it; I will leave that to you; what do you think of our stock?

Mr. Smith. The most of it I thought was very poor.

Mr. May. What varieties?

Mr. Smith. I didn't buy but little of it myself. My wife bought a little vine.

Mr. May. What kind of vine, please?

Mr. Smith. I forget the name of it.

Mr. May. Of course you are horticulturist enough to know that all varieties don't grow alike.

Mr. Smith. Where large quantities of stock were sold, as far as my experience goes, it did not live well.

Mr. May. Of course there is a good deal in the care of stock. But what I may say here is this, we don't claim to grow our stock in Minnesota. What we claim is we grow our stock in Rochester, New York. We deliver stock true to name of the hardiest varieties and of the best varieties that come out. We are now propagating some seedlings through our agents, and in a year or so shall have those for sale.

Mr. Cutler. Where are you propagating them?

Mr. May. In Rochester, N. Y.

Mr. C. L. Smith. What is the location of your nursery at Rochester, N. Y.?

Mr. May. It is about eight miles east of the city, at Penfield.

Mr. Smith. You have your nurseries there?

Mr. May. We have our nurseries; we are growing on shares with several parties. We get our principal stock of roses from Elwanger & Barry; we buy them. The nursery business is not conducted as it was years ago. Years ago nurserymen used to grow their own stock, now it largely passes out of their hands. Elwanger & Barry hardly keep a man on the road now, but the dealers do this work; it is virtually a separate branch of business.

Mr. Brand. Are you acquainted with the varieties you handle?

Mr. May. We are.

Mr. Brand. So you can pick them out at sight?

Mr. May. No, I can't do that. It requires a man to be constantly working among trees. I see them perhaps three times a year; I don't do the propagating myself.

Mr. Brand. Are you selling in this locality Winesap, Ben Davis, or Haas?

Mr. May. No sir, we are not. We have them in our list but we do not recommend them for this section of the country.

Mr. Sias. Do you recommend the Mann apple?

Mr. May. No, we don't recommend it but we handle it.

Mr. Brand. Do your agents handle these tender varieties?

Mr. May. Of course you know the trouble of handling 150 men. Agents will talk more than they should in a good many cases, in order to sell; of course you know that. Alexander is a good apple and we are selling it.

Mr. Smith. Why do you have your nursery in Rochester instead of in Minnesota?

Mr. May. It is thoroughly demonstrated in the growth of young trees in a nursery they need good soil and good cultivation to make them thrifty.

Mr. Harris. It is certainly too severe treatment to take young stock grown in an Eastern or Southern nursery and bring it here and replant the trees in this climate, without putting on overcoats.

Mr. May. Well, I claim it is all right.

President Elliot. Experience has not proved that yet.

Mr. Brand. Do you sell the Walbridge?

Mr. May. Yes, we sell the Walbridge.

President Elliot. Have you had any agents at St. Cloud or in Sauk Rapids in the last two years?

Mr. May. I think we have.

President Elliot. I would like a statement from a lady here who has had some experience with certain things sold in that vicinity.

Mrs. Stager. I would like to ask Mr. May about his strawberry tree that he sends out, which grows three feet high and you can pick strawberries from the top of it; several of our ladies in the village bought them and have been waiting for them to bear. They bought two years ago, from an agent of L. L. May. I can't say whether they would bear as the cyclone took the plants away, but would like to know if there is such a thing?

Mr. May. I doubt very much—I have never sold a strawberry tree with a representation of fruit being on that tree.

Mrs. Stager. Well, that is what the agent said.

Mr. May. The strawberry tree is a shrub, the burning bush—a flowering shrub.

Mr. Harris. It is known, I suppose, as the Wahoo?

Mr. May. I don't know that I have ever heard the name before; it is a shrub. So far as representing a strawberry tree to grow strawberries, that I never have.

Mrs. Stager. I was asked to inquire about this, and there was one thing that the agents of May & Co. told was that they had their nursery here at St. Paul and the fruit was perfectly hardy. Several neighbors bought of them. Last year they came through selling the Sharpless strawberry at, I think, \$2.50 a dozen. The agent sold all through the village and wanted to sell me fifty and said he wanted me to have them anyway. I said I would not take them if they came. In the spring L. L. May sent me a card and said they were shipped to me; I wrote back I had never signed for them and would not pay for them. But the plants came and all who had signed for them had to pay. He sent his bills to a lawyer there, who told me he would sue me and I would have to take them. He said he had my signature to the order; and I told him if it was I would pay him, but he had to allow it was not, and therefore I didn't pay for them.

Mr. May. You did perfectly right.

Mrs. Stager. I hardly think there is a tree or shrub standing now that we bought of you two years ago. One man was told your nursery was here at St. Paul and he ordered, it seems to

me, nearly a hundred dollars worth of trees. Our neighbor, Mr. Fogg, had engaged to take about eight hundred dollars worth of stock and would have done so but another neighbor sent down to see if there was any such nursery, and as he could not find any such concern Mr. Fogg refused to take the stock he had ordered.

Mr. May. I remember the case of Mr. Fogg. It was a large bill of some six hundred dollars. We wrote to that gentleman the whole facts of the case, and as this man was not very responsible we wanted him to advance half of the money before we shipped the stock; that he refused to do and it was not sent to him; it was totally on account of Mr. Fogg's inability to pay for the stock.

Mrs. Stager. Mr. Fogg had concluded to mortgage his place to get the money and he called on my husband to ask us about it; and he would have done so had not he received word by this neighbor when he wrote to St. Paul to find out about it.

Prof. Maginnis. Can you show by your letter book, Mr. May, in regard to those transactions?

Mr. May. Yes, sir; I can.

Mr. Bunnell. I wish to say that I have been on the road considerable and I often come in contact with men selling Mr. May's stock. Some two years ago I received a letter from my father wanting to know if there was such a firm. I know the agents have represented the stock as being grown at Rochester, N. Y.; there was nothing wrong in that.

Mr. May. This is unsolicited from a representative of the Lake City Nursery in this State. I have no more to say. My business transactions have been free and above board and I defy anybody to show to the contrary; that is all I have to say. Of course if you have a mind to placard me through the minutes of your meeting, or the publication of your book, you are at liberty to do so; but I have come here with a frank, free, open confession, and stated to you the full facts of my business. I leave it with you as gentlemen to act upon this in a proper way, and not to resort to the low means of casting insinuations through the papers; those are things I despise. Let us get right at the facts and then we know what we are doing; but these insinuations we have no time for.

Mr. Register. Had you an agent a year or two ago by the name of Fairfield?

Mr. May. Yes, sir; I had.

Mr. Regester. I don't know anything about you or your firm but I know that Fairfield is a swindle; I know that.

Mr. May. It is pretty hard for me to be responsible for all the men in my employ.

Mr. Regester. I might tell a little circumstance. This Fairfield was in our neighborhood at the time.

Mr. May. What location?

Mr. Regester. Granite Falls, Chippewa County.

Mr. May. Oh, yes.

Mr. Regester. He was through there and wished me to go into the business and I thought perhaps I would; he met me on the sidewalk, and said he would give me a little lesson as I was thinking of going into business; so I listened to him, and it is the first lesson and the last one that I ever took on the business of swindling, but he gave it to me in such good shape that I thanked him and told him if that was the way—

Mr. May. You might tell it and enlighten some of these other gentlemen so they will have a chance!

Mr. Regester. He said to take up one or two articles, put them forward and praise them up to customers and keep their mind right there as he did with me; if they go to talk just talk them out, don't let them have anything to say, and occupy them until you get them magnetized. I was swindled to the tune of twenty dollars but he didn't swindle me any more; you see I was a "stranger" and he took me in. [Laughter.]

President Elliot. I think we have gone about far enough; we have spent half an hour. If Mr. May will furnish his list and the prices attached we may in correspondence the coming year be able to develop something in the operations of this L. L. May & Co.; for I propose as one of the executive officers of this Society to follow this thing; and if there is such a thing as hedging out these itinerant tree peddlers, these men from Eastern firms, coming in here and putting upon our State and upon our people stock that is grown in a southern climate, that is wholly and totally worthless, why we propose to do it. [Applause.]

Mr. Harris. We propose to make the firm that sells responsible for the work of their agents.

Mr. Latham. Mr. Chairman, I don't know how much has been said on this subject before I came in, and I don't know what the view of the Society is in regard to the amount of responsibility that a firm shall take as to the character of the agent that he sends upon the road. Messrs. May & Co., of St. Paul,

may be doing an entirely legitimate business. There is certainly nothing out of the way in a man selling Rochester, N. Y., stock. I wouldn't condemn a man entirely on that account. The trouble seems to lie not perhaps with Mr. May — I don't know the gentleman — but there is something wrong about his agents, and if he is responsible for them then he certainly will be in bad odor through the state of Minnesota. I have a letter in my possession from a gentleman who writes to me that there is an agent in his place working for May & Co., selling nursery stock there that he claims is coming from my nursery, and I know that isn't so.

Mr. May. There are a number of men going through selling under our name.

Mr. Latham. I think a man who sends an agent on the road in Minnesota anywhere should be responsible for what the agent says. Mr. May looks like a man of his word; he ought to see that his agents don't say anything that he can't back.

Mr. May. I would be pleased to show to the committee the contracts we have with our agents, binding them down in the manner we do. I will mail them to Mr. Elliot. Of course men on the road are anxious to make sales. They talk more than they should. Having such a large force it is utterly impossible for us to keep track of every sentence a man utters in taking an order. We take the precaution to print on our orders that any outside talk or bargain of the agent shall not affect the contract in any manner. We do that in order that people will not say "oh, well, he agreed to do this and agreed to do that," and to give people an idea that they must not expect anything only what is embodied in the order precisely.

President Elliot. Do you have those read over to your customers?

Mr. May. Mr. Elliot, I will ask you a question. Before you signed your name wouldn't you read that contract?

President Elliot. Is the contract on your bill, or order?

Mr. May. It is on the order, which is made in duplicate. Mr. Smith, I think if you remember — if you signed an order — you were left a duplicate of your order.

Mr. J. M. Smith. I bought nothing myself.

Mr. Bunnell. I saw Mr. May's contract.

Mr. Smith. I think it has occurred to you that you are exceedingly unfortunate in your agents.

Mr. May. That is of course a misfortune of any firm doing

business. We have on during the year, I suppose, four hundred or five hundred men. Some fail and some make a success of it. I don't care how conscientious a man may be, how close he may try to look after his business, it is utterly impossible for him to watch all the acts or remarks of his agents.

Mr. Cutler. I would like to inquire if Mr. May has not been informed that his agents have misrepresented as to the stock that he sells?

Mr. May. Yes, sir; we have. But what right have you to expect anything more than what the order calls for? That is the fault of the purchaser. The orders are plainly written and printed. They should know what they sign.

Mrs. Stager. I want to say that a good deal of this fruit is sold to men and women that don't understand the language, and any sort of writing they can not read at all. Up our way there are a good many foreigners and they have to depend on the agent in what they buy. Therefore, he ought to have agents he could depend on.

Mr. May. Well, as I say, it is difficult to get them.

Mr. Cutler. Mr. President, the acknowledgment he has just made is sufficient to condemn him in any part of this State. He has acknowledged that his agents have misrepresented.

Mr. May. Suppose I did; what of that?

Mr. Cutler. With this knowledge you have allowed these men to go on?

Mr. May. Excuse me, how do you know?

Mr. Cutler. Under the law you are responsible for the acts of your agents.

Mr. May. I am responsible for my contracts.

Mr. Cutler. He has acknowledged he is selling stock grown and raised in New York, such stock as was condemned by this Society years ago. His whole statement here, it seems to me, condemns the firm; that is the way it looks to me, and I think the Society, to do justice to itself, will put itself on record in opposition to the transactions of this firm, or any firm selling Eastern stock, representing it to be grown in this State. Two years ago there was some \$6,000 worth of stock sold in our county by the "chain nurseries." This work has been going on year after year. Five or six years ago agents from Dayton, Ohio, swindled the people of this State out of thousands of dollars. Are we to allow these things to go on and allow innocent persons to be imposed upon? I consider it equal, if

not worse, than highway robbery. These people not only impose upon the people by taking their money for worthless stock, for which there is no compensation, but there is a loss of time also. I have known people to spend ninety to one hundred dollars for stock, such as peach trees, pears, cherries, etc., which were utterly worthless. Our legislature should pass some law to prohibit this kind of fraud. That is my idea about this, and I hope this Society may accomplish something for the protection of innocent purchasers. This man Jordan that came around selling the gooseberry tree had a picture of a tree with him which represented a tree some six feet high, with a fifty cent piece in front with the berries larger than the half dollar. One of my neighbors gave an order for \$100 worth, and when the trees came to be delivered he compromised with the agent for \$50, so he didn't lose but \$50 that time. Usually they send around another man to deliver the stock so there is no chance for the man to object who has been duped by the fraudulent representations.

Mr. Grimes. I think this discussion has gone about far enough. We understand ourselves pretty thoroughly, and as the secretary is keeping a record in regard to the matter it will come out in our transactions. But there is one point that has not been touched upon in the controversy; that is the influence these agents and outside parties have in pawning worthless stock upon the citizens of Minnesota. Our legislature is expecting something to be accomplished through our Society for the promotion of the horticultural interests of the State, and if we take no action in this matter will they not conclude our Society is a failure? Our work is worse than thrown away if we are only misleading the people. I hope this convention will take some appropriate action in this matter to place us in a proper light before the representatives of the people; we are friends of the State and propose to protect the people of the State and their interests.

Mr. Sias. I see that Mr. May is about ready to leave, and he promised us a list of his fruits that he has been selling here; and I would say that I am chairman of the committee to revise the fruit list and when it is convenient would be glad to get the list, especially of the common apple.

President Elliot. We want a full list of the stock they are selling.

Mr. May. We will mail it to you, or deliver it to you.

Mr. C. L. Smith. I presume I have been asked a hundred

times whether there was such a nursery here at St. Paul, that was carried on by L. L. May & Co.; now, I did not know and consequently have evaded a direct answer. Would it be satisfactory to answer all such questions, No?

Mr. May. I certainly should.

Mr. Pearce. I have been quiet on this subject and would like to say a word. I am opposed to agents and think the sooner the agency system is abolished the better it will be. Have no prejudice for or against this firm; I attend to my own business and don't go outside of that; I don't care what this man or that man does. I have sold stock to May & Co., sold them good stock, which had been delivered and is doing well; I will say that for them.

Mr. Bunnell. I don't think there would be many orchards in Minnesota, if it was not for the middleman.

Mr. Pearce. I am speaking from thirty-three years' experience in Minnesota. The quicker we strip every agent from Minnesota the quicker we will get apples.

Mr. Bunnell. The grangers tried that I believe and they have played out.

Mr. Latham. I was glad to hear from our friend from Sumter; he hits hard when he can see anything to hit, but I hope he did not hit anything he ought not to hit. It seems to me the farmers are a little to blame; there is no excuse for their being swindled if they read the papers. Of course the farmer never looks at the contract he makes when he gives his order for stock. I have taken a good many contracts and I don't remember an instance where I had the contract read. They listen to the story of the agent and when they give you their confidence they swallow you whole. They know nothing about these nursery firms, but they ought to be educated up to protecting themselves; they should know the Mann apple is of no value and that strawberries wont grow on trees. I don't think L. L. May & Co. are altogether to blame. It is absurd to condemn selling through agents as our friend Pearce does. Of course the trees will die and they will have to be planted again and again. Not that I want to belittle this system of selling bogus stock, or this taking an order for something and then putting in anything you happen to have, but let us be sure about this; let us educate as far as possible through the association.

Mr. Hunter. Mr. President, I wish to say a word or two. I am not going to say a word against Mr. May or anyone. I live

in Sioux Falls, Dakota. I am one of the oldest settlers there; have been there seventeen years this spring, and during that length of time there have been hundreds and thousands of people who have immigrated from almost every state in the Union to our territory. These people have been anxious to get trees started and have purchased trees from different states. New York people have sent to New York state; Michigan people have sent to Michigan; and Illinois people have sent to Illinois, and when they have tested the trees have found two-thirds or three-fourths of them are worthless, or at least have produced no fruit. We deem it of the utmost importance to know where trees are grown, and the people of our territory are getting their eyes open on this subject. We don't want to purchase trees raised in the south; and I will venture the assertion that the majority of trees purchased the past two years and that will be, in the next five years in our territory, will be such as come from Minnesota, Northern Iowa and from Wisconsin. It is of the utmost importance whether they are grown in those localities or grown in the south, in Florida, California or some other place.

Mr. Bunnell. The trouble is, perhaps, that agents tell a good many things they are not authorized to do in order to get an order.

Mr. Cutler moved that a committee of five be appointed to take suitable action with reference to the matter under consideration.

Mr. Dartt. I would suggest that the committee report as to foreign companies canvassing for stock.

Mr. Cutler. I didn't intend that the report of the committee should have any reference to May & Co., but to the matter of misrepresentation.

Mr. Pearce thought Mr. May and all other parties should be left out.

Prof. Porter. Mr. Chairman, it seems to me that this Society, standing as it does, as a protector of horticultural interests, should not be made a machine for injuring any private individual. It strikes me that the report should contain nothing in regard to the firm of May & Co. I would therefore move that in order that no injustice may be done to anyone, that in the report of the committee and in the records of the association all reference to any nursery firm be stricken out up to the present time.

Mr. May. I thank you, sir.

Mr. Cutler. It looks to me that the adoption of such a motion would have the effect to strike out all the discussion on the subject.

Prof. Porter. I think the committee will act on general principles, and take such action as is calculated to protect the interests of the State and that will do no injustice to any individual firm.

Mr. C. L. Smith said in correspondence and in conversation in regard to this matter he had never been personal. He had not wished to do injustice towards L. L. May, but had protested against the introduction of eastern varieties, and new and untried varieties through unknown parties. He opposed no one individual, but everybody doing business upon that principle.

Prof. Porter thought it was difficult for the Society to say what should or should not be sold by a firm doing business from the Atlantic to the Pacific. They were not endeavoring to strike at individuals, but to get at the principle involved. He thought everything pertaining to individuals should be stricken from the records. We can hate the sin and still love the sinner. [Laughter.]

Mr. Harris. The Horticultural Society is an educator of the people. If there was any way to get at facts and leave out personalities, he would be glad to do so; but if the Society failed to let the truth go before the people, they were undeserving of the appropriation received from the people for the support of this organization. The Society was working in the interests of the people, and should let its light shine.

Prof. Porter presented the following:

Resolved, That while it is the province of this Society to collect and disseminate correct information upon all subjects relating to horticulture, and to protect in all ways possible the interests of the agricultural community, it is not their object or intention to injure in any way legitimate private enterprise; and that while retaining the substance of the discussions relating to tree agents, and foreign grown stock, the names of such agents or dealers, be omitted from the published report.

The resolution was adopted.

The chair appointed the following committee, viz., J. T. Grimes, J. S. Harris, O. F. Brand, A. W. Sias, D. Day.

The *ad interim*, or District Reports of the Vice Presidents being in order, the following reports were made:

REPORT FROM FIRST DISTRICT.

By A. W. Sias, Rochester.

Mr. President, Ladies and Gentlemen:

We will report on the apple first—the king of all fruits. Will say to begin with, that if you ever expect to make a croaker of your committee, you must stop sending him about the State looking up fruits, etc., for the more he wanders over this commonwealth, the more good fruit he finds and the more fully convinced is he that Minnesota is destined to astonish everybody in the amount of fine fruit she will at no very distant day be able to export.

Mrs. E. B. Jordon reports seven hundred bushels of apples for the past season, among which were some two hundred and fifty bushels of splendid Wealthy, many fine Duchess, Tetofsky, Russian Green, Peach apple, and other fine new Russians.

We estimate that J. Farrier, of Elmira, had some two hundred bushels of beautiful Wealthy apples, besides many other kinds in smaller quantities.

Wm. Somerville, of Viola, about 150 bushels, including some of the finest new sorts ever grown in this section. R. L. Cotterell 150 bushels; Page Bros. 100 bushels, largely Wealthy; many others in our district had full bearing orchards, but our time has been too much taken up with other duties to enable us to collect the statistics.

We have been most agreeably surprised; after the Wealthy was subjected to the low temperature of 50° below zero two years ago, and then last summer to the most severe drought ever experienced here since the first settler erected his log cabin, to find these trees in many places, as we have the past season on sunny southern slopes, completely loaded down with perfect fruit, was to us a most delightful surprise.

The leaf of an apple tree appears to be a safe index to its ability to withstand severe droughts, in windy, exposed situations, and also something of a criterion by which to judge of the hardiness of a tree—hence we are led to observe while the Wealthy has not as good a leaf for the climate of Minnesota as the Autumn Streaked, it has really a large, fine leaf. Leaves like those upon the Century plant and Live-for-ever are becoming a necessity. Having traveled considerably over the State the past season, and having noted the fact that the majority of the trees

set by our farmers were thin-leaved trees, grown in moist climates further south, if asked for the best piece of advice that I could give the Minnesota orchardist, I should say — set no more thin-leaved trees.

STRAWBERRIES.

With us the next thing of commercial importance to the apple is the delicious strawberry. The crop was unusually good and prices ruled fairly well, or at least higher than at any of the leading cities of the West.

The Crescent is still the leading variety, and if I judged by my own experience, I should place the Old Ironclad next; but from what I saw at other places, should be inclined to put Downer's Prolific second, Manchester third; many others were good and productive. Mrs. E. B. Jordon reports 11,000 boxes for their place. M. J. Hoag reports 6,500 quarts on one and a quarter acres. Wm. McHenry, St. Charles, reports the strawberry a poor crop, injured by the dry weather; not over one-fourth or one-half a crop; amount picked, 2,000 quarts. A. C. Ballard, of Rochester, had a splendid crop of strawberries, some three-fourths of an acre, yielding 3,750 quarts.

RASPBERRIES.

The raspberry crop about Rochester was immense, and I am sorry that I am able to give the figures from so few of our best gardeners. Some keep no account of what they produce; others promise to hand in the statistics, but fail to do so. Mrs. E. B. Jordon marketed 15,000 quarts; M. J. Hoag, 2,520 quarts on one and a quarter acres; A. C. Ballard, 2,214 quarts. Wm. McHenry writes: "Raspberries started for a very large crop, but the dry weather injured them fully one-half. Marketed 2,500 quarts. Turner is the most productive."

BLACKBERRIES.

Blackberry culture with our people is still in its infancy. We have just got the idea fairly through our heads that by covering our plants in the fall we can produce splendid blackberries in great abundance. Mr. McHenry says: "Blackberries did much better than strawberries and raspberries; were injured less by drought, though the last of the crop was small. Marketed 2,300

quarts." He says Stone's Hardy holds its own fully up, if not ahead of all the rest. The Thornless bore well without covering.

GRAPES.

Crop shortened up a little by the drought, but fair. Worden stands at the head, Moore's Early second, Delaware third, Concord fourth, Janesville fifth; Rogers' seedlings next.

Currant crop was good; Long Branch Holland among the best. Fay's Prolific fails to "pan out" as well as we anticipated from the high commendations of its introducers; it no doubt succeeds better further east. The Flowering Raspberry—or "Grapevine Raspberry," as the tree peddler has it—must be adapted to a dry climate, as it produced more fruit this season than ever before. The Russian mulberry crop, owing, perhaps, to the inclemency of the weather, was extremely light in our part of the State; in fact, I have not seen one of those large, luscious berries the past season.

I append the following report from M. W. Cook:

"ROCHESTER, MINN., JAN. 14, 1887.

"A. W. Sias, *President Olmsted Horticultural Society,*

"DEAR SIR: In compliance with your request to report amount and varieties of fruits grown by me this season I cheerfully comply with that request, although the varieties grown will fall short of previous years owing to the fact of selling a ten-acre lot containing the most of my raspberries and blackberries and a part of my strawberries, leaving me with only a newly set plantation of the above. I hope in good time to be able to make a favorable report of both yield and value received. Of strawberries my bearing beds are planted with the following varieties: Crescent, Downer, Ironclad, Pipers, Capt. Jack, James Vick, Glendale, Bidwell, Parry, Sucker State, Mt. Vernon, Cumberland Triumph, Wilson, Windsor Chief. All being planted in rows three feet apart; fully one-half of all my bearing beds are Crescents, which I consider the most prolific of any when well fertilized; and in order to secure that object I usually plant three to four rows of Crescent, then two to three rows of some perfect flowering kinds. From a field of 5½ acres of above varieties, planted in that way I picked this season thirty-five thousand boxes which were mostly shipped to various points in Dakata. The first shipments were billed 10 cts.; after

that at 8 cts. or \$1.92 per case of 24 quart boxes. Owing to late spring frosts my two acres of currants yielded only about 100 bushels. They were set four years ago and consist of the following varieties: Improved Red Dutch, Victoria, Prince Albert, White Grape, Long Bunch Holland. One-half an acre of White Grape was a marvel of fine fruit; all the above are good. Of raspberries, red, I consider Turner, Cuthbert and Brandywine the safest and best to plant, of which I picked about 1000 boxes from a new plantation, and 500 of black, mostly Tylers. At some future time if you desire it I will give my views on the different kinds of strawberries and raspberries and most practicable modes of culture.

Respectfully,
M. W. COOK."

REPORT FROM SECOND DISTRICT.

By E. H. S. Dartt, Owatonna.

MR. PRESIDENT: I have no written report. If I say anything I think my report had better be confined to Steele County, because you have heard from me before now as reporting from that county, and perhaps would understand me better in that way.

Our county is situated, I suppose, some five hundred feet higher than St. Paul. I think water runs from our county in every direction — south, towards Iowa; east, into the headwaters of the Zumbro; north, into the Strait and Cannon Rivers, thence into the Mississippi. That gives us a high elevation. The bulk of the land in the county descends a little to the north, or is drained by Strait River. There are no elevations that are very much above the general level; valleys are comparatively shallow. It has been found that high lands, in order to be favorable for fruit growing, must be in the vicinity of considerably lower lands. Where there is not much difference in altitude, where lands are all high, it is considered rather detrimental to successful fruit growing. That is our situation.

I will say in regard to small fruits that I believe there has been generally a fair crop produced in our section. We have been troubled considerably by drought, and I have no doubt the crop was diminished; but that not being my hobby, and the apple tree being my hobby, I will report most in regard to that.

The condition of apple trees previous to 1884-5 was various.

Among varieties of the standard apple nearly all of them seemed to be in rather a precarious condition; were gradually dying out; that is, such as Haas; Saxton was gone many years ago, also Ben Davis; Peach apple was growing fairly up to that time, but had never borne scarcely any; Wealthy was doing well; Tetofsky had died partially, some of them had died previous to that, and some Duchess, where on low grounds.

After that time all half-hardy kinds seemed to be finished; every Haas, every Wealthy, and all of that class, were either dead or as good as dead. Out of eight hundred Wealthies in orchard, which had been set and received good care, not one sound tree was left, and barely half a dozen had life enough remaining to produce apples at all. Most of the trees sprouted again from the root, and with a succession of warm winters there may be hope of getting apples yet from those trees.

About three-quarters of my Tetofsky were killed out, and we may count one-fourth in fair condition, but those are where they have had the best care and stood in the most favorable location.

Previous to that time I heard of many seedling apples in that section of country that were recommended as valuable, which were represented as bearing good crops, and it was thought we might look for something valuable from these seedlings. Since that time I have not heard of but one seedling that is represented as being hardy; I refer to standard apples. That variety was grown on the north line of Steele County, and I think the apple is on exhibition here.

Of other seedlings I have raised some. One that I call Dartt's Hybrid is a seedling of Tetofsky, and the trees are growing fairly. It is a fine nursery tree; and the only doubt of its being eminently successful and valuable is that it may not prove a heavy bearer. The original tree bore two bushels a year ago last season, but last season did not bear. I think it is a little hardier than Whitney, fruit about the same size and about equal in quality.

The fruit crop last season, considering all these discouraging points, was remarkably good. Our Owatonna market was supplied for I think nearly two months in the early part of the season with apples grown in our neighborhood. I raised most of Duchess, of which I sold four hundred and fifty bushels; my crop would amount to at least five hundred bushels. The apples in the market referred to were Duchess and Transcendents.

In regard to Russian varieties would say we had a large list of

them under cultivation prior to 1885, and I had a good deal of faith in them, but that winter was too much for nearly all of them.

My own apple crop was very much diminished by the damage done by insects; in one orchard I think that fully one-half of the apples were destroyed by being knotty; they commenced falling early in the season, and those that staid on became very ill-shaped, many falling later in the season, or were in that condition when gathered. I lost fully one hundred and fifty bushels in that way. I don't know what insect did the mischief; perhaps some of our friends can tell us a remedy. I have thought of trying arsenic and water.

DISCUSSION.

Prof. Maginnis. How are the trees doing in the new orchard?

Mr. Dartt. On high grounds, where well cultivated and manured, they are doing well. South of the railroad trees have always done poorly, and I suppose that to be the coldest spot that can be found anywhere around there.

President Elliot. Is the planting of trees in your section on the increase?

Mr. Dartt. There is general discouragement throughout our section of the country. Nearly all the farmers say they would rather raise wheat at a low price than to bother with apple trees. Others say they shall continue to plant out orchards or fill the place of missing trees.

Mr. Gilpatrick. You stated that the portion of your orchard that you had cultivated and manured had done well. What do you call good cultivation?

Mr. Dartt. Plowing and dragging in the spring. My practice has been to manure heavily in opposition to the general theory that prevails, and I have heaped it on, and think there have been beneficial results from this method; trees that I set sixteen to eighteen years ago are in fair condition. The manure keeps up the vitality of the tree and prolongs the life and promotes its bearing qualities.

Mr. Pearce. Have you made any money from your orchard?

Mr. Dartt. I have made some money. My orchard is Duchess and Tetofsky, and it has paid me better, I believe, per acre than any other land that can be found in Steele County that has been used for any other purpose. I have kept account of my apples

and I estimate that my orchard of 18 acres has netted me about \$300 or \$400 per acre, clear, besides trouble and expense and the cost of the land at \$100 per acre. I have a new orchard set since the hard winter, with 500 Duchess.

Mr. Jenkins. What have you fruited this past season?

Mr. Dartt. It is hard to tell. Most of the fruit grew on four acres.

President Elliot. What is your method of planting?

Mr. Dartt. I plant rather shallow, about the same depth as in the nursery. But plowing towards the rows has caused the trees to stand on ridges. They were in nursery rows and thinned out afterwards.

REPORT FROM THIRD DISTRICT.

By M. Cutler, Sumter.

Mr. President, Ladies and Gentlemen:

It gives me pleasure to meet with you once more. This is a place where we, the lovers of fine flowers, fruits and vegetables, meet on a common level to receive and impart information that will be of value to us, as well as the thousands of tillers of the soil throughout this great northwest, who are not present. As I come from the great prairie west of the Big Woods my report will necessarily pertain mostly to that section. Since our last meeting I have succeeded in organizing a county horticultural society in McLeod County. While we have not met with the success we hoped for, we do not propose to give it up yet; remembering the early history of our State Society, which we now consider a great success, we shall persevere. As to our work the past year and present standing I refer to our secretary's report.

The exhibit of vegetables and fruits at our county fair was probably the best ever made. That of vegetables was said to equal that made at the state fair. The grand display was no doubt the result of offering liberal premiums for the best display of farm products. One man entered over eighty kinds of fruit, grain and vegetables.

Wild plums and grapes were abundant the past season.

STRAWBERRIES

owing to the drought were not as fine or abundant as usual. The best were on low land and where huge snow drifts covered them

during the winter. Crescent and Glendale stood the drought and produced the best. A row of Jas. Vick produced well. Wilson and Old Ironclad were a light crop. Jumbo and Sharpless produced a crop of very large, fine berries. Jumbo is too soft for shipping. A Frenchman living in the Big Woods near Winsted lake had about 4,000 quarts of Wilson and Crescent from seven-eighths of an acre. The average market price in our county was about ten cents.

RASPBERRIES.

Turner, Cuthbert, Doolittle and Gregg raspberries produced a fair crop; price, 12½ to 15 cents.

A new seedling red raspberry lately introduced in our county attracted considerable attention the past season. It is called the York State Sweet. In answer to questions addressed to the originator, I received the following information: He set in rows six feet apart, hills two to three feet apart, among apple trees, on a southern slope. No winter protection has been given them during the past seven years, and they have never winter-killed. From a patch three by seven rods forty dollars' worth of fruit was produced. It seems to be a promising variety.

My Stone's Hardy blackberries that were covered with dirt during the winter bore a good crop, but the quality was not number one. I think the hot, dry weather injured the quality and made them look as though they were scalded. Query: Is this berry generally of good size and color? A few neglected canes of the Snyder and Taylor's Prolific produced nice berries.

I purchased five hundred plants of the Ancient Briton blackberry of Mr. Hamilton. Owing to the spring weather coming on so much earlier than it did at Ripon, they did not arrive until the ground got pretty dry, which, with the aid of cut-worms, caused two hundred plants to die. Some of those that lived seemed inclined to trail on the ground instead of growing upright. Query: Is this the habit of the Ancient Briton? A few dewberry plants owned by myself and Mr. Crandall produced some of the largest and finest berries in the blackberry line I have seen. Question: Can any member present give us any information in regard to the hardy dewberry advertised by Dewain Cook?

My Red Dutch and white currants produced a fine crop. But few grapes are grown west of the Big Woods. Concord, Rogers, Salem and Janesville produced good crops where properly cared for.

Transcendent and Hyslop trees bore well, but the fruit was smaller than usual. One of the nicest sights that greeted my eyes the past season was several nice, healthy, sweet crab-apple trees from ten to fifteen feet high, well loaded with light-colored apples, about the size of large Hyslops; some had a slight blush on one side. They were very sweet, crisp and juicy, nice to eat out of the hand or bake. I do not know the name of the variety.

TREE AGENTS.

But few swindling tree peddlers invaded our county the past season. Probably the worst one was a man by the name of Jordan, representing May & Co., of St. Paul. His principal hobbies were tree gooseberries, represented by a photograph of a gooseberry with a fifty-cent piece in front of it, the berry being larger round than the money;—when the buyer gets his berries he may think the money he paid for them was the largest;—Thornless blackberry and Gideon apple trees, at one dollar each. I have heard of a few who gave him a small order just to get rid of him. Better let loose the watch dog and cry “sic ’em!”

The farmers who invested so heavily in Albaugh & Co.’s budded trees found when spring opened that most of their dollar trees had given up the ghost. One of my neighbors who invested five dollars in them, hearing that some of his neighbors had found most of their trees dead concluded that his trees would do as well to remain in winter quarters and left them there. Still there are men who say that this wholesale robbery of our people serves them right, that they should all come to the meetings of this Society and get better posted. Experience and observation have taught me to beware of the stranger who promises much for little, for they work for big pay, and not for the benefit of the people. I believe our people can raise all the fruit they need for home use, but do not advise farmers west of the Big Woods to invest their money in any apple trees but the best of the crabs and hybrids.

I have received some interesting letters from correspondents which I will read. The first is from Charles Kenning, of Bird Island, Renville County. He says: “In reply to your letter I wish to say that but little fruit is grown here except what is grown by Dr. Puffer and myself. I am growing several varieties of currants; the common Red Dutch did splendidly. Of raspberries the Turner does well. Champion and Miner strawberries

bore a fair crop; Crescent a good crop; Wilson and Glendale, also Monarch, medium. The plants were received from Charles Luedloff and were set out the latter part of May, 1885, on ridges made with plow and hoe. The season was late and dry and I received the plants about three weeks before setting them, tied in bunches. They were put in the ground until I could find time to set them out; of three hundred plants I lost but six. When I planted them I used the following method: After making the ridge and removing all lumps, I set in rows two feet by five, walking over the rows with a pair of wooden shoes until the ground was well packed, watered while planting and no more. I kept them well cultivated until the middle of August, after which I let them take care of themselves until the ground was frozen, when they were covered with slough hay about four inches deep; in the spring they showed a nice matted row and bore a good quantity of well-formed fruit. After fruiting I plowed out the middle, forming a ridge and leaving a row of plants from two to four inches wide, letting them run, and kept the ground clear from weeds. The ground in the fall was covered with nice young plants which were again covered with slough hay. This is my first attempt to raise berries or fruit and I have been very successful. My apple trees that I planted last year, some forty of six varieties, have made a good growth of well-matured wood. Of plums I have growing Weaver, Forest Garden, and De Soto; all doing well, but none fruited; all planted in 1886. My ground is all new and well drained. I will plant more next spring; shall try a few more varieties of strawberries and also try blackberries. Yours.

CHAS. KENNING."

"*M. Cutler, Esq.,*

DEAR SIR: Yours of the twenty-seventh finds me extremely busy, and the few notes herein contained constitute a very meagre report, but it is the best I can do for you now. Please take the will for the deed.

BEACH'S SWEET CRAB

will always occupy front rank in my regard for the following reasons: It is a rapid grower and fruits early and abundantly; it is hardy, free from blight, and the quality of the fruit second to none; fair specimens will measure one and three-fourths

inches in diameter, very smooth, and a beautiful high crimson color, the flesh almost cream-colored; and is crisp, tender, and the sweetest apple known to me. Nothing will equal it for sweet pickles.

GRAPES.

Rogers' Hybrids, Delaware and Janesville, very fair crops. Concords in some vineyards cut by frost. On many vines of Brighton and Agawam a second crop of fruit was produced so early as to get full growth before frost. Query: Can as good a crop be expected the coming season on this account?

GOOSEBERRIES.

Only a third of a crop.

CURRANTS,

cut by late frosts, gave about half a crop. Fay's seedling is all and more than has been claimed for it. Black and white both fruited more freely than the red.

RASPBERRIES.

The Clark and Philadelphia gave a full crop; no protection, except plentiful mulching. Cuthbert was caught by extreme drought. Blackcaps, especially Gregg, were fine. Have learned by experience that it pays to cover canes with straw in November, not heavy enough to break canes, but sufficient to cover carefully, working it in under the canes in the spring for mulching.

STONE'S HARDY BLACKBERRY

was among the most profitable small fruits handled in 1886. All blackberries should be protected in this latitude. Light straw mulching answers every purpose. This, with coarse manure and litter worked well in under and about the bushes, serves the double purpose of choking weeds and grass and keeping the ground moist during the scorching days that, as a rule, are to be expected in August.

With prices for Stone's Hardy at twenty cents per quart, and at this price with abundant yields that this variety always gives under proper cultivation, it is safe to estimate on five hundred dollars to the acre in the gross.

Trusting your session may be a profitable one,

I am, yours truly,

S. M. EMERY."

“LAKESIDE, JAN. 6, 1887.

M. Cutler:

DEAR SIR: Yours of the 27th ult., is just received. I have been quite successful with small fruits. Concord grapes bear fairly well each season, but of course have to be laid down in the fall. We have the White Grape currant which bears heavy crops of fruit each season with but very little attention aside from mulching. We have the blackcap raspberry that gives us abundance of fruit each season without any protection or other special attention aside from pinching back and a light coat of mulching each season after the fruit has ripened. My strawberries do best without mulching, as they are located near a wind break and are covered with snow the winter through. Hyslop and Transcendent crabs do well with us, and when ashes are placed around the roots of the trees, no blight is perceptible; not so treated, blight more or less.

Yours truly,

M. T. REDOUT.”

On motion of Mr. Harris the Society then proceeded to the election of officers for the ensuing year.

ANNUAL ELECTION OF OFFICERS.

The following list of officers was then elected, to-wit:

President—Wyman Elliot, Minneapolis.

Vice Presidents—A. W. Sias, Rochester; E. H. S. Dartt, Owatonna; M. Cutler, Sumter; N. J. Stubbs, Long Lake; and G. W. Fuller, Litchfield.

Secretary—S. D. Hillman, Minneapolis.

Treasurer—J. T. Grimes, Minneapolis.

Executive Committee—J. S. Harris, Chairman, La Crescent; J. M. Underwood, Lake City; D. Day, Farmington; F. G. Gould, Excelsior; I. Gilpatrick, Minneapolis.

Librarian—E. A. Cuzner, Minneapolis.

Entomologist—Prof. O. W. Oestlund, Minneapolis.

The following were named as a Committee on Publication: Wyman Elliot, S. M. Owen and S. D. Hillman.

On motion of Mr. Harris, Worthington was designated as the place for an additional experiment station, with J. H. Ludlow as superintendent.

On motion of Mr. Smith, Fergus Falls was named as an experiment station, with M. T. Duncan as superintendent.

On motion of Prof. Maginnis the executive committee were directed to name the members of the additional committees to be selected hereafter.

Mr. Harris presented the following, and moved its adoption:

Whereas, Our State has a great diversity of soils, elevations, aspects and exposures, and consequently diversity of climate, requiring persistent and long continued experiment in order to establish a solid basis for successful fruit culture; therefore,

Resolved, That we ask the legislature to establish an additional experimental station on the state school farm at Owatonna, and that we recommend the appointment of Mr. E. H. S. Dartt of said city, as manager of the same.

DISCUSSION.

Mr. Pearce. I don't think it is necessary to open another institution of that kind to be supported by an appropriation by the State.

Mr. Harris. It would come under the management of the board of regents of the state university.

Mr. Sias. I am in favor of this proposition. In fact it seems to me that Owatonna is just the place for such a station; as Mr. Dartt has shown us, it is the height of land in all that section of country. His reports for many years past show that it is a very hard place to grow fruit, and anything that would prove hardy there would prove hardy all over the State. Almost everything tried there has failed, and for that reason I would like to see a station located there. Give him a fair chance to test all these different hardy varieties in that exposed location.

Mr. C. L. Smith. This is a step in the right direction. I don't care whether the State appropriates \$10, or \$100, or \$500, the money can be well expended. In connection with the school at Owatonna a horticultural station would be a grand, good thing, and if no other benefit is derived the horticultural education afforded the pupils would be worth more than the expense required. The fact might be stated that it is similar to the station at Minnetonka, and the objection might arise that has been urged against the management of that station. I don't care to discuss that at all, for I think Mr. Dartt could manage it in a different manner. But if he did not, still so far as an educational station in the direction mentioned, it would be a good thing and worth much more than its cost.

Mr. Pearce. It seems to me that is the most unfavorable place in the world for trees. Mr. Dartt will say that he has

failed with everything—that the Duchess won't do anything. Steele County is perhaps the worst place in the State for fruit trees, and what is the use of putting anything there for trial if it won't grow? It would be a failure.

Mr. Dartt. There is one part of the resolution perhaps that I could speak to; that is the first part. So far as failure is concerned I would say that I have met all these gentlemen at our state fairs and have taken perhaps my full share of premiums at those I have attended. At the last state fair at Owatonna I took the first premium on the best ten varieties of apples adapted to Minnesota; the first on the best six varieties; the first on the best plate of Duchess, besides other premiums. That would seem to indicate that it is possible to raise fruit at Owatonna. Admitting that it is the hardest place for fruit in all that section of the State and that it is as hard as any much further west, it seems to me a good reason why a station should be located there. Whatever we could raise there successfully would be thoroughly tested as to hardiness. It could be depended upon in trying situations. Some localities in different sections are more favorable than others. For instance, a northern slope, on high land in the vicinity of low land, especially with a sweep from a lake surface, might be a favorable location for fruit when otherwise it might be considered unfavorable.

Mr. J. M. Smith. I rise to endorse what the last gentleman on the floor has said. We have tried experimenting in Wisconsin a good deal, and it strikes me the opinions urged by Mr. Pearce, if correct, are really the strongest ones why such a station ought to be established at such a place. If you have the means to do this and do not do it, is it not equivalent to saying, "You are in a God-forsaken region where nothing can grow and we will let you go to your own destruction?" I don't believe there is a spot so bad in Minnesota but you will eventually raise fruit. I don't expect to see it myself but those days are bound to come, and the quicker you go to experimenting as to what succeed the quicker that fruit will come. When you succeed in such a place as this it will be something worth while and worth much more than the expense required.

Mr. Harris. Mr. President, I feel that it is the duty of our State to foster horticulture; every dollar expended for that purpose will bring a return a thousand fold to the generations that are to come after us, if not in the immediate future. The reason why I favor Owatonna for such a station is because the

State has a farm there. Mr. Dartt is a practical nurseryman who lives there and has shown by the premiums he has taken from time to time that he has the skill to handle such a station, and he would be the right man to superintend it. It is important that these experiments in fruit culture should be carried on in different parts of the State.

Mr. Pearce. I cannot exactly understand how Mr. Dartt can take all those premiums and raise hundreds of bushels of apples and still live where apples won't grow.

President Elliot. I did not know this resolution was to be brought up, but it seems to me a move in the right direction. If we have a school at Owatonna for indigent children, under the instruction and care of the State and fostered by it, it seems to me just the proper place to put an experimental station and a good place to teach the rudiments of horticulture in a practical way. I don't know of any man in that section of the State better qualified than our friend Dartt to undertake the work; he has had eighteen years experience there and would do better than a person who had no experience.

Mr. Cutler inquired if this farm was not in the city where boys would be likely to gather the fruit.

President Elliot said the boys were supposed to be under restraint; while at Minnetonka people came there for pleasure and there was little protection from the fruit being stripped on the experiment fruit farm there.

Mr. Stubbs thought this a move in the right direction, and had heard no reasons urged why the new station should not be established. If Mr. Gideon gave up the fruit farm there should be another one selected elsewhere.

Mr. Sias said he would not wish to do anything that would interfere with the stability of the station at Lake Minnetonka, or have anything done to jeopardize or supplant it in any way.

The resolution was then unanimously adopted.

The following paper was then read:

PROPAGATING BY GRAFTING, BUDDING AND LAYERING.

By J. S. Harris, La Crescent.

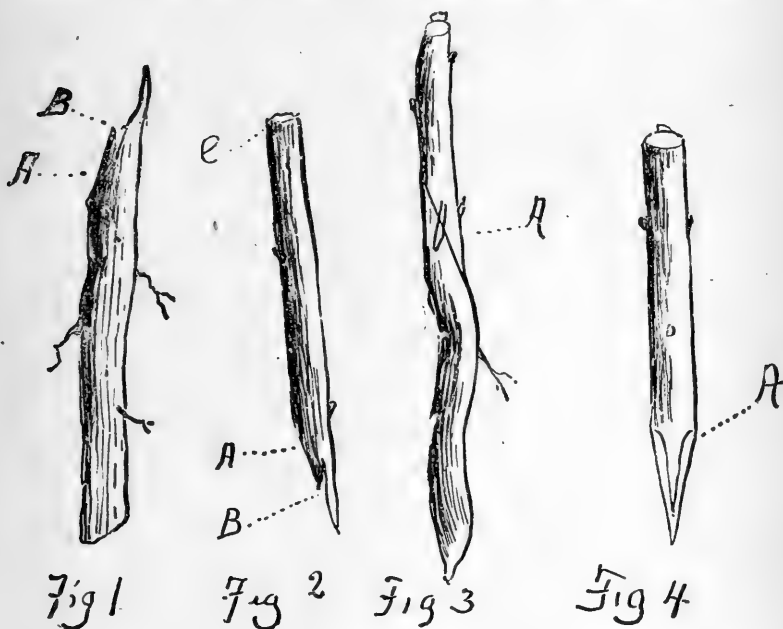
Seedling fruit trees are now seldom used for planting orchards, except in countries where the rudest systems are in vogue, and in new countries where the first settlers have not the means for purchasing grafted varieties or are so remote from commercial nurseries that they cannot be transported safely. The principal reason for this is, that varieties rarely reproduce themselves from seeds, therefore seedlings are grown for two purposes only, viz: to secure stocks for grafting established varieties upon, and to obtain new varieties. For growing stocks to graft upon it is the custom of many of our nurserymen to procure their seeds from the east which is saved from the pomice of the cider mills where the poor and immature fruits of weak and tender varieties are promiscuously ground up together. It would be much better if they would select the seed from perfect, well-ripened fruit grown upon healthy vigorous trees with sound constitutions. Were this practice followed for a length of time in this state I doubt not we might get back to the long lived, healthy and fruitful trees of the olden time.

It is obviously impossible for an unhealthy, feeble tree to produce sound and healthy plants from their seeds, and it is evident that from some cause our fruits are getting to be short lived and more subject to blight, mildew and other diseases. In growing seedlings for the originating of new varieties still greater care should be exercised. Experiment is demonstrating that the seed from new or ingrafted is more certain to produce a hardy and vigorous tree than the seed of old, long-propagated varieties. The stock is supposed to exert considerable influence upon the tree which will manifest itself in the seed of the fruit and if this be the case it would be well when we wish to grow seedlings from grafted varieties to first get the varieties upon their own roots, which may be done by layering a branch and when it has taken root it can be separated and will become a tree upon its own roots. Another method is to induce the tree to form roots by deeper planting above the point where grafted and afterward remove all roots of the foreign stock. Only the most perfectly developed fruit should be used from which to save the seed. When by this method we have suc-

ceeded in obtaining a valuable variety we can rarely reproduce it from seed, therefore to multiply it we resort to artificial processes.

If placed under favorable circumstances every bud upon a tree is capable of producing a new tree like that which it was taken from; the knowledge of this fact makes us able to multiply and disseminate new and desirable varieties with great rapidity. The methods now practiced, grafting, budding, layering cuttings and suckering, or division of the plants; or the production of a tree from a bud, graft, layer or cutting, is the same thing in effect, brought about by different methods, but all trees will not conform to the use of the same methods, else all propagation would be done by cuttings.

In propagating by cuttings, the cutting is put directly in the ground where it forms roots. The cion and bud is nothing more than a cutting, but is inserted in or upon the wood of a like

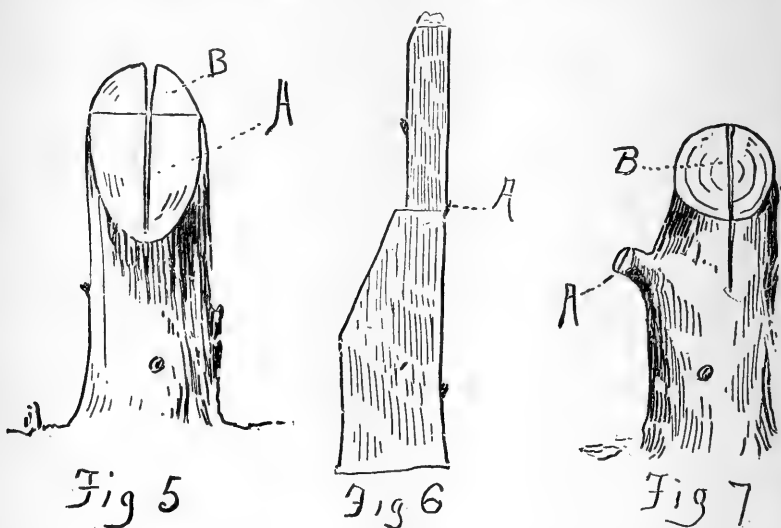


specie, where it unites with the wood of the stock; the difference is that one draws its support from the ground and the other through the tree to which it unites. In all cases it is a part of the parent plant and may contain one bud or several.

The apple, pear, plum and cherry seldom succeed from cut-

tings planted in the ground, hence they are propagated by other methods, grafting and budding being the most common. The process of grafting consists in the insertion of a cion of one variety or specie into or upon the stem or branch of another, which is called the stock. Cions are generally made from shoots of the previous year's growth, but sometimes those bearing fruit buds are used for experiment. They should be cut in the autumn, after the fall of the leaves, and carefully preserved through the winter by burying them in a pit in dry, sandy soil, with earth so piled over them as to turn water; or they may be kept in a cool, dry cellar, packed in sawdust, or some other material, to prevent shrinking of the bark. If kept too moist they will decay; if too warm the butts will callous over, which will weaken their vitality, and renders cherries and plums worthless. A moderate sized shoot, or cion, if well matured, is better than one that is large, pithy and unripe. Only perfect cions should be used, or incipient disease is started that no after treatment can eradicate.

Two methods of grafting that are most generally practiced, are, viz: whip grafting and cleft grafting. Whip grafting is the method mostly practiced in root grafting in nurseries. For this



purpose seedling stocks one or two years old are generally used of one-fourth to three-eighths of an inch in diameter. These seedlings are better for being dug in the fall and buried in the

cellar, or a dry bank outside, where they can be got at early in the spring.

The graft should always be made at the collar, and therefore the stems of the plant are cut away at that point when they are dug. When ready for grafting, first trim back the small top roots and cumbrous laterals, leaving the stocks six to eight inches long and wash them clean. (Our western nurserymen are accused of using shorter stocks and making two or more from each seedling root, a practice which has, I think, many objections.) The grafter then makes a smooth, sloping upward cut an inch long on the collar of the root (A Fig. 1), and in the center of this cut he makes a downward slit, or tongue (B Fig. 1). The cion, which should be three or four inches long, is cut on the lower end with a sloping, downward cut (A Fig. 2), and similar in every respect to that made on the stock; an upward slit or tongue is made in it (B Fig. 2) corresponding also with that on the stock, and they are then fitted together—the tongue of the one within the other (A Fig. 3)—and the inner barks of both placed in close and perfect contact, at least on one side. The fits should be so complete as to set close and firm at all points.

The next operation is to apply the wax, which is usually done by winding firmly with waxed thread or narrow strips of waxed cloth. I do not use wax on root grafts, but wind them with fine carpet yarn, and find it better than the old way.

Whip grafting on small trees standing in the open ground, and on the small branches of larger trees, is performed in precisely the same manner, but greater care must be exercised in waxing them, to protect from air and water.

The grafting of nursery stock is usually done in the latter part of the winter, and the grafted plants are put away as closely as they can be packed in small boxes, with sandy earth or sawdust among the roots, and deposited in a cold cellar, but where frost cannot penetrate, until planting time.

Cleft grafting is practiced on trees or branches too large for whip grafting, say from three-fourths of an inch upward. In this case the base of the cion is cut precisely in the form of a wedge (A Fig. 4.). The part for insertion in the stock should be about an inch or an inch and a half long with a bud (A. Fig. 4) at the shoulder, where it is to rest on the stock. The bud hastens the union of the parts in the same way as a bud at the base of a cutting set in the earth hastens and facilitates the formation of

roots. The outer edge should also be somewhat thicker than the inner.

For grafting in the trunk of the tree it is cut or sawed off horizontally, and if the stock is not too large, a sloping upward cut is made upon one side, about an inch long, and to the center (A Fig. 5). The stock is split just one side of the pith (B Fig. 5) by laying a knife or chisel on the horizontal surface and striking lightly with a mallet; the split is kept open with the knife or chisel until the cion is inserted, with the thick side out (A Fig. 6).

Large stocks or branches are sawed off in the same manner (A and B Fig. 7); the surface is then pared smooth with a knife, a split is made with a chisel nearly in the center and held open with a wedge until the wedge-like cions (A Fig. 4) are inserted (A B Fig. 8.) If they both grow and are afterward too close,

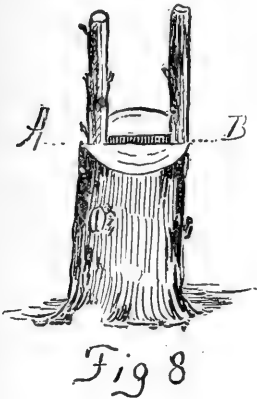


Fig 8



Fig. 9.



Fig. 10.

one of them can be cut away. The points to be observed for successful grafting are: Sharp instruments, which will make smooth, clean cuts; perfect contact of the inner barks of stock and cion, and covering the whole cut surface and every portion of the split with wax, to exclude air and water. Where convenient the wax may be put on while melted with a brush, or it may be put on with the hands.

The implements required in whip grafting are: A pruning knife, to trim up the roots, and a thin, sharp knife for shaping the ends and cutting the tongue in cion and stock. For cleft grafting, in addition to above, a sharp, fine saw and grafting chisel with wedge attached, and for large trees, a step-ladder.

Grafting composition is prepared in various ways. We gener-

ally use two parts of resin, one ounce beeswax, one ounce of tallow, melted together, poured into water to cool, and when cool enough worked with the hand, well greased to prevent sticking. If the weather is so cold when used that it will not spread, it may be brought to the right consistency by keeping it in a bucket of warm water.

PROPAGATION BY BUDDING.

Among the various methods of propagating varieties of fruits, no one is more simple or easily performed than budding. The operation is performed during the growing season, and usually upon trees having smooth, soft bark, and from one to five or six years old, but may be successfully performed upon trees of any age that are thrifty. For older trees grafting is a preferable method.

The operation consists in separating a bud with a portion of bark attached (see figure 9) from a shoot of the current season's growth, and inserting it below the bark of another tree or shoot and tying it in place with a string of baste matting, cotton or wool. When the bud begins to grow all that part of the tree or branch above the bud is cut away, so from the budded point up the tree will produce the same variety of fruit as that from which the bud was taken.

The season for budding in this region is between the middle of July and the first of September, the time depending upon the species and conditions of growth. Any variety that completes its growth early in the season, should be worked early, and such as continue to grow late in the autumn may be worked much later. Buds may be inserted in June (or as early as the bark will part freely from the wood), by taking the bud from cions cut the previous fall and kept dormant, but fresh while they are to be used; they will make considerable growth the same season, but this is hardly desirable except with varieties that are scarce. In my practice I have found them inclined to continue their growth later into the autumn and thus they do not get ripened up as well for enduring the following winter. When done in the proper season, the buds remain dormant until the following spring.

To make budding a perfect success, certain conditions have become necessary. First, the buds must be perfectly developed in the axils of the leaves upon the young shoots intended to bud

from; this is not usually the case until the first growth of the season is accomplished and the shoot has temporarily ceased to lengthen, as indicated by the perfect formation of the terminal buds. Second, the bark must rise freely from the stocks to be budded. This it will do only when the trees are in a thrifty, growing state; never after the growth of the season is completed.

Where buds are wanted before this condition of maturity, we sometimes hasten it by pinching back the tips of the shoots, and after a few days the buds will be fit for working.

TO PREPARE THE BUDS.

Shoots in the condition described and of the variety desired are removed from the tree at a point below the lowest plump bud; the leaves are then cut away, leaving a half or more of



FIG. 11.



FIG. 12.

each leaf stalk to handle the bud by. Then the shoot to bud from is taken in one hand and the knife in the other, the lower part of the edge of the knife is placed on the shoot half an inch above the bud to be removed; the thumb of the knife-hand resting on the shoot below the bud, a drawing cut is then made parallel with the shoot, removing the bud and the bark to which it is attached half an inch above the bud and three-quarters below it. The cut is made just deep enough below the bark to take a small portion of the wood with it, and if this adheres firmly it should be allowed to remain; if it parts freely it should be taken out, but in doing so the root of the bud should be carefully preserved, for if it comes out the bud is useless.

A smooth place on the stock to be budded is then chosen, where incisions are made just through the bark, one across the other so as to form a T, the bark on the two edges of the perpendicular cut is carefully raised with the smooth ivory handle of the budding knife, as shown in Fig. 10, and the bud is inserted between them; the upper end of the bark attached to the bud is cut square to fit the horizontal cut on the stock (see Fig. 11). The string is then wound around tightly, commencing at the bottom and covering every part of the incision, leaving the bud itself and the leaf stalk uncovered (see Fig. 12); the string is fastened above the horizontal cut, and the work is done. The success of the operation depends in a great measure upon smooth cuts, an exact fit of the bud, close tying, and the expedition with which it is done.

In ten days or two weeks after the buds are inserted they should be examined, and such as have failed to unite may be budded again, if the stocks have not finished their season, so that the bark will not lift. In about two or three weeks the strings should be taken off. Early the next spring, or as soon as the buds begin to start, the stocks should be headed down to within three or four inches of the buds, and all buds starting above or below them should be rubbed out. About the first of August the portion of the stock left above the bud at the time of heading down, should be removed with a sloping cut, smooth and close at the highest point of union between the stock and bud.

Nearly all of our fruit trees will do as well to be budded as grafted if the stocks are perfectly hardy, but the operation does not make them any hardier. All varieties that do not split straight, like our native plum and the cherry, are more sure to grow than when cleft grafted but not when whip grafted.

PROPAGATING BY CUTTINGS.

A cutting is a shoot or part of a shoot, generally of one season's growth. The length may vary from a single eye or joint to a foot or more, according to the nature of the species, or the circumstances under which they are to be grown. For the best success, the wood should be as stout and mature as possible and should be cut close and smooth to a bud or joint at the lower end. In our experience, cuttings taken off close to the old wood with the base attached have proved much more successful than

when cut at several joints above, and in many cases, where an inch or so of the old wood is left attached to the base they will be all the better. In this country cuttings should be prepared in the fall, and be buried in the earth out of doors for the winter, out of the reach of frost and carefully mounded over to throw off water. They should be planted very early in the spring or as early as the ground is in good condition for working, and, as a general thing, so deep that but one or two buds will be above the surface of the ground. At the time for planting, trenches are opened with a spade as deep as necessary, and the cuttings set in at the proper distance apart. When the cuttings are in the trench, the earth is partly filled in and trod firmly down with the foot, then the balance is filled in and leveled up. If cuttings are long they may be set sloping so as to be within the reach of heat and air. This method of propagation is peculiarly well adapted to the grape, currant and goosberry, as well as to many ornamental trees.

LAYERS.

The layer is similar to a cutting except that it is allowed to remain in partial connection with the parent plant until it has emitted roots. On this account layers are more certain than cuttings, and frequently considerable time is gained in fruiting. It is the best method for propagating the grape and goosberry. It may be performed in the spring with shoots of the previous year's growth, or in July or August with shoots of the same season's growth. The ordinary method is to spade the ground where the branch is to be laid, making it light and pliable. The branch is then brought to the ground and an incision made on the lower side, below a bud, through the bark and partly through the wood, and the knife is drawn upward splitting the shoot an inch or two in length; then the branch is laid in the earth with the cut open and pegged down with a hooked stick and the soil drawn smoothly over to a depth of two or three inches, with the end of the branch remaining out of the ground. After they are well rooted they should be severed from the the parent plant and are usually ready for transplanting the following spring.

SUCKERS.

Suckers are sprouts springing from the roots of trees and plants. They are oftenest found around trees where the roots have been injured by plowing or spading. The wounds conduce to the formation of buds, and these buds send up shoots. They are occasionally used for stocks to graft upon, but owing to their tendency to produce suckers should never be used when seedlings can be obtained. Our native plums are a little difficult to propagate by grafting, hence we frequently recommend our farmers to increase the best varieties by this method. If taken off when small and kept a year or two in nursery, they make fine trees with good roots. It is also the usual method of propagating blackberries and red raspberries.

DISCUSSION.

Mr. Pearce inquired why it was necessary to use long roots.

Mr. Harris said the sooner the practice of using longer hardier roots with short cions prevailed, the sooner would we get trees that would stand in all parts of the country.

Mr. Dartt thought an inch and a half root for grafting not long enough; if longer, it would go deeper and not dry out so easily. The reason trees leaned was because of prevailing winds, and it was often difficult to get well balanced trees where they were exposed to heavy winds.

Mr. Underwood thought they could be by trimming; he practiced cutting the limbs from the leaning side. He favored using long roots for grafting. He had tried crown grafting, but had not seen results to warrant the practice.

Mr. C. L. Smith recommended Duchess, Wealthy and Whitney for grafting, using roots four inches long and cions five to six inches, and was opposed to crown grafting.

Mr. Sias said he had experimented on grafting in different ways. Formerly he used long roots and short cions; his rule now, after twenty-five years' experimenting, was to get strong roots and cut them not over two inches in length, using cions about six inches long, and planting deep. He had visited a nursery some twenty-six years ago in Indiana, where they propagated entirely by layering; the results were the trees grew at an angle of nearly forty-five degrees, and were no hardier than those grown in the usual manner. By using long cions in grafting, they would take root, and the trees produced would be hardier and more thrifty.

Mr. Harris said it had been demonstrated that the roots of some varieties were hardier than others, and that was why long cions were to be preferred to short ones for grafting.

President Elliot said the fact was we grafted on tender stock as a rule; some recommended crossing on hybrids for hardy roots. It was necessary to go back to seedlings to propagate successfully, as by continued grafting from the same stock it would deteriorate after a while.

Mr. Sias thought there was some question whether stock would deteriorate. The Baldwin was originated about a hundred years ago; had been grafted extensively, and there was nothing ahead of it. The same thing might be said of the Wealthy, so far as tested.

Mr. J. M. Smith said the bearing life of trees in the East was much greater than it is here. They have trees there a hundred years old that are still in bearing.

Mr. Harris thought it was best, if practicable, to go to the original tree for cions. The quality of Baldwin apples in the market varied a good deal.

Mr. Pearce favored using Duchess and Wealthy for grafting; they were much hardier than seedlings.

Mr. Harris said for nursery purposes it was not practicable to raise trees from root cuttings, but they made nice trees. Any variety hardy enough to stand the winter of 1872-3 without root-killing was hardy enough for all practical purposes.

The meeting then adjourned till 7 o'clock P. M.

EVENING SESSION.

THURSDAY, JAN. 20, 1887.

The meeting was called to order at 7 o'clock P. M. by President Elliot.

Mrs. Van Cleve, from the Committee on Floriculture, presented the following paper:

WILD FLOWERS.

By Mrs. Charlotte O. Van Cleve, Minneapolis.

When the whole earth is white and cold and the bare branches of the trees bend or break in the fierce wintry blasts it requires a somewhat lively imagination to write of blossoming things,

and a degree of faith to realize that in the fulness of time the beautiful things which one has are now "keeping house underground," and the dry skeleton branches of trees and shrubs will again burst with greenness and beauty. But it is a salutary exercise of the imagination and a stimulant to the substance of things hoped for, the evidence of things not seen, and so we cheerfully take up our mid-winter talk of the flowers, the handicraft of Him who "hath made everything beautiful in his time."

For many years I have been impressed with the conviction that we should take more notice than we do of the wild flowers so lavishly scattered over our prairies and woodlands, and that we might with great pleasure and profit domesticate them in our lawns and flowerbeds. They are hardy and, once planted, would come up year by year and amply reward our care with their rich, bright colors and graceful foliage. The variety is endless and doubtless cultivation, in some instances, at least would increase their beauty. Bring from the wild woods the Columbine, set it out on good soil and watch its growth, its pretty leaves and graceful stems. When the buds are partly open observe the fine little heads, cuddled closely together like birds in a nest, and see then the significance of its name, from Columbia, a pigeon or dove, and you will learn to love it as a thing of life.

For early spring what is more pure and perfect than the Blood root (*Sanguinaria Canadensis*)? Every part of it beautiful and the mystery about it from the fable which gave it the name of Devil's-bit increases our interest in it.

And while we would not cultivate the little thistle which farmers hate and all despise more or less, still it is a plant entitled to a degree of respect from its having a place with the Rose and Shamrock as the national emblem of Great Britain. The story of how it found its place there is as follows: When the Danes invaded Scotland it was deemed unwarlike to attack an enemy in the darkness of the night instead of a pitched battle by day; but on one occasion the invaders resolved to avail themselves of a stratagem and, in order to prevent their tramp being heard, marched barefooted. They had thus neared the Scottish camp unobserved when a Dane unluckily stepped upon a sharp thistle and uttered a cry of pain which instantly aroused the Scotch, who discovered the stealthy foe and defeated them with great slaughter. The thistle was immediately adopted as the emblem of Scotland. The earliest authentic record, however, of its appearance in Scottish history is 1458, when it is referred

to in an inventory of the property of James III., of Scotland, as one of the emblems on a child among the royal possessions.

The Partridge Berry (*Mitchella repens*) named by Linnæus in honor of Dr. John Mitchell, a learned botanist of Virginia, would be highly ornamental in a flower bed or hanging basket; and surely its near relative, the Trailing Arbutus, if it could possibly be tamed, would win the admiration of all.

The Pitcher plant grows in low, wet places, but in our well-watered State it would be no difficult matter to accommodate it. This is a beautiful and wonderful flower, called botanically *Saracenia Purpurea*, from Dr. Sarragena, of Quebec. It is known often as the Side-Saddle Plant. It is related to the *Darlingtonia*, a hooded Pitcher plant of the Sierra Nevada mountains, and the still more wonderful *Nepenthus* of the islands of the Indian ocean, whose leaves, with tendril-like prolongations, sometimes two feet or more in length, become at the ends perfectly developed pitchers. These plants are—some of them—insectivorous, and very interesting as a study.

The different varieties of the *Kalmia*, known as the Laurel, were named for Kalm, a friend and pupil of the great Linnæus, who was born in Finland in 1715, and after attending a course of lectures by Linnæus, devoted himself to the study of natural history. He was sent by the Royal Academy to explore the northern part of the American Continent, and made many valuable discoveries in the flora of that region. Although the plant was named for him, it is said that Banister, a Virginia botanist, had made Ray, the great English botanist, acquainted with it, and a living, growing plant was sent by Bartram to Collensin, in England, as early as 1730. There are many interesting facts in the study of this beautiful flower. The very name of *Kalmia*, or Laurel, seems to bring before me the irregular shores of the Big Sandy among the Cumberland mountains in Kentucky, all glorious in the profusion of these wild, uncultivated beauties.

The Meadow Beauty, or *Rhexia Virginica*, is a very bright and ornamental flower, and grows freely in the Eastern states. The Beet Marigold (*Bidens Chrysanthemoides* of Michaux) is found in the Montana swamps, with its brilliant flowers, and is an interesting plant. Mr. Hulme, in writing of it, says: "The pansy and marigold are associated together as emblems of sorrow, and in some places wreaths of these flowers on cards, with such mottoes as 'May you ever escape them,' are presented to each other by friends as expressive of kindly feeling." The

French word for the marigold, "Souci," means also care and anxiety, and the flower is dedicated to the Mater Dolorosa. It is also a good barometer, closing its petals at approaching rain.

The Climbing Hemp weed (*Mikamia Scandens*, named for Joseph Mikane, of Prague,) is an exceedingly pretty vine, with clusters of minute vari-colored flowers not unlike the heliotrope, and is common everywhere in the United States east of the Mississippi. It must be very easy of cultivation and very hardy.

The White Bay *Gordonia Pubescens* is a beauty, and if it were difficult to obtain, it would bring a great price to the grower. It is a southern flower or shrub found in the everglades of Florida. It was named for Dr. Gordon, a botanist of Aberdeen, Scotland; belongs to the order of Camellias, and is first cousin to the tea plant.

The cardinal flower (*Lobelia Cardinalis*) is one of the most brilliant of wild flowers, and is common in New England and all through the eastern half of our country. It grows luxuriantly beside streams and brooks. The poet sings thus of this forest beauty:

"The cardinal and the blood red spots
Its double in the stream,
As if some wounded eagle's breast,
Slow throbbing o'er the plain,
Had left its airy path impressed
In drops of scarlet rain."

Its generic name was given in honor of L'Obel, a famous Flemish botanist of the sixteenth century. Nor must we omit the elegant Golden Red and Purple Aster which light up and glorify our prairies and wild woods in the autumn; nor yet the fringed Blue Gentian, the royal flower, namesake of a *king, all of which are especially valuable, blooming long after many others have faded and gone into winter quarters.

Among the countless mercies and pleasant incidents which my King scatters along my path of duty, I name a delightful day's ride two years ago in the extreme northern part of Dakota, very near the 49th parallel, in company with the Rev. Mr. Scott, of Wathalla, a learned botanist and an enthusiastic lover of flowers. He knows the name and habits of every leaf and blossom, and as we rode leisurely along through that strangely beautiful region among the Pembina Mountains, he stopped frequently to

*The Illyrian king, Gentius, who is said to have first discovered the medicinal properties of this plant. The genus comprises several varieties.

gather some pretty thing which others might not have noticed, and entertained me with its history, its origin, its uses, its time of blossoming, etc. I never so fully realized how lavishly the Creator has scattered beauty, even in unexpected places, all over the world. The old man rides from place to place, preaching of the love of Him who used the flowers of the field to illustrate the care of the All-father over His children and striving to lead his hearers "from nature up to nature's God," and, although his life is a toilsome one and his way sometimes very rough, yet he finds a sweet solace and strength in this beautiful "silent teacher," with whom he holds intimate converse.

He showed me some beautiful things; a lovely little white bulb, whose name I do not now recall, almost equal in beauty to the lily of the valley, so precious to us all, and told me of many others not then in blossom, and of a variety of easily cultivated shrubs which would be highly ornamental in our public or private grounds.

That summer day's ride opened up to me a new and beautiful page in floral lore, and, though always very fond of flowers, I have ever since felt a deeper fondness for them, and have been persuaded in my own mind that it would add much to the gratification and real pleasure of those who love them to bring in these beauties, which "seem born to blush unseen and waste their sweetness on the desert air," and domesticate them, if practicable, for our continued enjoyment.

A vote of thanks was given Mrs. Van Cleve for her interesting and able paper.

President Elliot said the Society could appreciate the pains taken in the preparation of this paper, and Mrs. Van Cleve had called attention to matters of much interest to all. There are many wild flowers and things about our doors that appear common that are worthy objects for our consideration.

Mr. J. M. Smith said he had often been surprised that so little attention was paid to wild flowers, as many of them were more beautiful than some obtained at high prices. Under the microscope a common flower was an object of perfection scarcely to be found elsewhere in the world.

The following paper was then read; the headlines are inserted by the secretary:

RECOLLECTIONS OF FIFTY YEARS AMONG OUR
SMALL FRUITS.

By J. M. Smith, Green Bay, Wis.

Mr. President, Ladies and Gentlemen :

Sixty years ago I was a pale, busy, white-haired little boy, spending most of my time with my grandparents. My grandmother, a kind-hearted active old lady, had the entire charge of the garden. She was a dear lover of fruit of all the varieties grown in our climate. This love of fruit continued to her extreme old age. After she had completed her hundredth year, she would still go out and gather some of the choicest varieties and keep them in her room to distribute among her friends and relations. It was in her garden that I saw the first and only strawberry bed that I ever saw until I had grown to manhood. It was a little plot perhaps twelve feet square, of, as I now suppose, some of the Alpine varieties. They were white, and would with us be considered very small and very poor berries. The largest picking that I remember ever seeing was about one pint that my grandmother picked to give an extra treat to some friends who were visiting her. In short, strawberries at that early day were a luxury only to be enjoyed by the favored few, and by them only on extra occasions, and in small quantities.

SCARCITY OF STRAWBERRIES.

In the days of my childhood it never occurred to me, even in my wildest dreams, that I should live to see the day when strawberries would be as plenty and as free on my table as potatoes or bread and butter. If some good angel had appeared to me at that time and told me that I should at some time in the future be transported to Heaven in Elijah's fiery chariot, and another that I should some time have strawberries in the greatest abundance, not only for myself and friends, but thousands of bushels to sell, I should have believed one just as readily as the other; but if I had been called on to choose between them, I should certainly have taken the strawberry angel as my chosen friend.

My early home being only about twenty-five miles from New York City, I was often there when a boy, as nearly all the produce of my father's farm was carried there for sale. New York City was then the one and only one great market metropolis

of the United States, yet I have no recollection of ever seeing any cultivated strawberries, even there, until after 1840. Previous to that time the market was supplied (as far as it was supplied at all), with wild berries, many of them coming from the meadows about Hackensack, some five or six miles from the city. As to a supply, as we understand the word, there was no such thing known. Although I have no means of knowing positively, I have little doubt that there have been days within the past four years in which more berries have been received in Chicago in a single day, than were ever seen in New York City in its entire history previous to 1840.

EARLY EFFORTS.

In 1844 a friend of mine in Morristown purchased a few strawberries from New York, a great piece of extravagance as it then seemed to me, as wild ones were growing on many of the hills and meadows near the town. About 1847 or 1848 a friend of mine commenced growing strawberries for market which he sold in the town near by. The berries were hulled and then sold by the quart or peck, dry measure, as required. The price was usually twelve and one-half cents per quart, or one dollar per peck. About this time two new varieties made their appearance in the markets, viz.: Hovey's seedling and the Early Scarlet or as it was sometimes called, Jersey Scarlet. They were great improvements upon any varieties previously known, and soon after this berries in our Eastern markets became more plenty. Still, the season was a very short one, as shipping them from place to place, or from the South to the Northern markets, was quite out of the question. So three or four weeks was the extent of the season.

WILSONS IN WISCONSIN.

There was no one variety that was in general cultivation until Wilson's Albany Seedling made its appearance, I think some time between 1854 and 1858, the last named date being nearer than the former, though I have no means of obtaining the exact date. It became somewhat disseminated previous to 1861, and in 1862 it was often seen in the market. In 1863 it took almost entire possession of our markets, and for many years there were comparatively few of any other variety seen in any of our large fruit centres. This modest little plant created an entire new era in strawberry culture. It was the one variety that seemed adapted to every variety of soil and climate from the Atlantic to

the Rocky Mountains, and from Lake Superior to the Gulf of Mexico. In size it was equal, if not superior, to any of its predecessors, and in firmness and keeping qualities while being carried long distances, it was far ahead of any hitherto known variety. Its productiveness when upon rich soil and well cared for seemed almost to be marvelous. My own success, such as it has been, is in reality due more to my getting this variety at an early day, and then caring for it almost as a mother does her pet babe, than to any other one cause.

My first bed in Green Bay was set in 1859. It consisted of several varieties, such as were to be obtained, and we succeeded in growing one or two fair crops from them. I remember well our first attempt to sell the fruit. Our oldest son, then a boy of thirteen or fourteen, was sent to the city with a few of them nicely hulled and measured up in dry measure, and told to sell them for twelve and a half cents per quart, but the best he could get was an offer of ten cents for one quart, and he brought them home.

The following year I sold the first bushel to one man, delivering them to him as he wanted them, nicely hulled, for one barrel of flour. In 1862 we had our first Wilson berries, and in 1863 the first crop of them. In 1864 the size and yield was beyond anything I had ever supposed possible to obtain from any variety or by any known system of cultivation.

In 1875 I measured off an exact quarter of an acre of them, and picked the fruit by itself and kept a careful and accurate account of the different pickings. The result was 3,571 quarts, or at the rate of four hundred and forty-six and a half bushels per acre.

Last season, although one of almost unprecedented drought, having but two light showers upon the vines from the time they came into bloom until we were done picking, the average yield was a little over two hundred and fifty bushels per acre. About one-third of the ground, which was more light and sandy than the balance, was aided somewhat by artificial watering. With two or three more good showers, the crop would doubtless have overrun three hundred bushels per acre.

It is said that in many places this magnificent plant fails to do as well as in former years. I see no signs of failure on my grounds, and never had a finer showing for a large yield the coming season than when we put them into winter quarters last month. Still, with all of its fine qualities, it is not the perfect fruit that we all have been and are still looking for. Speaking

within bounds, I believe I have spent about \$1,000 in trying to get a more perfect fruit, but so far have been unable to find any variety that, all things considered, is its equal upon my grounds, and with my system of cultivation.

Soon after the introduction of the Wilson, new varieties began to appear in greater numbers than before, and of every year since it may truly be said "still they come." The new varieties introduced within the last twenty-five years would, no doubt, run into thousands. If I should try to name them it would be about as interesting as reading a dictionary up side down.

Since it has been proved that with our present facilities for shipping, and with care in picking and handling, strawberries may be brought from the Gulf states and reach us in fair condition, the season for this delicious fruit is lengthened from three or four weeks to more than as many months, in fact from February until July.

CONTRASTS IN COMMERCE.

The quantity consumed now as compared with even thirty years ago, is almost past belief. I quote the words of President Earle in his address to the American Horticultural Society at Cleveland, Ohio, last September: "Thirty years ago the daily receipts of strawberries in Chicago, now the second greatest fruit market in the world, could all have been carried in one wagon, at one load, and it would not have been a large load either. Now, whole railway trains are engaged to carry the daily supply to that market, which often amounts to three hundred tons per day, and sometimes to twice that quantity. Thirty or forty years ago it would be safe to say that all the strawberries marketed in the United States in one day could have been gathered by a force no larger than I have seen bending over the smiling rows of a single plantation."

RASPBERRY BECOLLECTIONS.

But I must leave this branch of my subject and return for a moment to my grandmother's garden. In it there were, in addition to the little strawberry bed, two varieties of raspberries. One of them now known as the old Golden Cup, and the other a red variety which I presume was the Red Antwerp. The old red and white Dutch currants were in the greatest abundance, and

according to my recollection of them as good as the same varieties are to-day. Little fellows like myself were allowed to help themselves to both currants and raspberries from the bushes, but the strawberries, which we desired most of all, were to us the forbidden fruit, which we must not touch without enduring penalties that we imagined would be about as severe as those pronounced upon our first parents upon their violation of the first fruit command known in the history of our race. It will readily be seen that the improvement in currants and raspberries has been by no means comparable to that of strawberries. The Red Antwerp was for many years the standard raspberry in the Eastern markets, and they were supplied with it, as far as they were supplied with any variety. It was really an excellent berry in those portions of the East where it did its best, which were somewhat restricted even then, its favorite home being along the Hudson River, and I have never heard of its doing as well anywhere west of the Alleghany Mountains.

The improvement in raspberries has been confined principally to the last twenty-five years. Within that time many new varieties have been introduced, and some of them are of great value. Among the reds, I have found nothing that seems to me equal to the Cuthbert. It is a large and beautiful berry, of very fine flavor, an excellent bearer, and with me continues in bearing about five weeks. A year or two since I wrote to an old fruit grower inquiring how a certain other variety compared with the Cuthbert. He concluded his reply by saying, when I got a raspberry, all things considered, better than the Cuthbert, I would have something bordering on the marvelous.

I do not remember ever seeing any blackcap variety cultivated until after 1840, and very few of them were cultivated until within the last twenty years. Since that time many new varieties have been originated. Among the new ones I prefer the Gregg. It is a large, fine looking berry, a good bearer, and of fair quality, but does not continue in bearing as long as the Cuthbert.

I have no recollection of seeing blackberries cultivated before 1855 or later. I obtained a few Lawtons about 1860, but found them unsatisfactory and destroyed them. The Kittatinny used to grow wild on my father's farm, and I presume they may still be found wild in that vicinity. Among the new varieties introduced within twenty years I doubt if there are any superior to the Ancient Briton. Many new varieties of currants have been

introduced, or at least many new names come out yearly, but the real improvement, so far as I can judge, has been much less than in any of the other small fruits upon our list. I am now testing some which may prove a success.

GRAPES IN THE GARDEN.

It is about fifty-five years since my father set the first grapevines in his garden. They were the Isabella, which was then about the only variety grown in that section. The vines made a fine growth, and regularly each spring and early summer loaded themselves with fruit, and as regularly in autumn the fruit rotted and fell from the vines. Rarely was a nice bunch of grapes gathered from them during all the years they were cared for. The introduction of the Concord among grapes marks very much such an area in grape growing as the introduction of the Wilson in strawberry growing. The increase in the consumption of grapes has, as I believe, been greater than any other of the small fruits, strawberries excepted.

Last September I stood upon a hill a few miles outside the city of Cleveland, Ohio, and looked over what seemed to me an almost endless number of vines, most of which were loaded with choice fruit. I asked a gentleman who owned one of the near vineyards, how many acres of vines I could see from where I then stood? After thinking a moment he said, not less than 2,000 acres. Fifty years ago there were not probably half that number of grapevines cultivated in the entire United States. New varieties have been and are continually being introduced until their name is legion.

Fifty years ago we had cherries in the greatest abundance. The variety most common was a small black cherry, indifferent as to quality, but the trees sometimes grew to an enormous size and rarely failed to load themselves with fruit. In my native neighborhood were two that were not less than five feet in diameter at four feet from the ground, and I believe they sometimes bore not less than one hundred bushels of cherries in a single year. One of this variety still stands near my brother's home that is over three feet in diameter. There were other varieties of both black and red far superior to these in quality, in fact, it seems to me, none of the varieties now grown are superior to some of those grown on my father's farm fifty years ago.

A few words in regard to the larger fruits. Plums, peaches, apples and pears grew in the greatest abundance. I think the

plums began to be affected as early as 1835 with the black knot and other enemies, which in the course of a few years nearly destroyed the trees. Since that time, growing this excellent fruit has been accomplished in most places only by intelligent and persevering work in fighting its enemies, and then in many, if not the majority of cases, the perseverance of its enemies tires out the patience of the would-be grower, and the crop is given over as not worth the cost of so much time and labor.

My early recollections of peaches are, that we all had all we cared to use, and that the hogs had a good time with the balance of them. The average quality was not, of course, equal to those of to-day. The peach growing district fifty years ago was almost entirely limited to small portions of the states of New Jersey, Delaware and Maryland, and even in these states, to be of any market value, they were restricted to within hauling distances of New York and Philadelphia, or within a near distance of the steamboat landings, as there were no railroads at that time running through the inland portions of these states.

PEACHES AND PLUMS.

One of the incidents connected with peach growing in those days may be worth relating. It is something over fifty years since that an enterprising Jerseyman concluded that it would be a nice thing to buy up the entire crop of the country, and in that way get control of the market, or in other words get up a corner on peaches. As the operation required more money than he had of his own, he persuaded his widowed mother, who had some property, his brothers and sisters, and some of his wife's relations to back him up in his brilliant scheme of compelling the people of the United States to eat high-priced peaches or to do without them. He commenced operations by purchasing and making small payments on, what he supposed was enough of the large growers' crops to give him the control of the market. Peaches did not go up worth a cent, but did on the contrary go down almost immediately to less than he had agreed to pay the growers for them in the orchard. The public generally probably never knew of any corner on peaches, but the originator of the scheme and his friends soon found themselves very effectually cornered. Judgments that buried them all in hopeless and irretrievable ruin was the result. It may be seen from this incident that the desire for making money at the expense of the public is not the exclusive growth of the last twenty-five years.

CHEAP CIDER.

Apples and pears were grown in the greatest abundance and with but little care. Sixty years ago apples were the main crop of the farmers of my native county, and in fact of that portion of the state. The large majority of the trees were seedlings. The apples were hauled to the mills and then ground and first made into cider, which was afterward distilled and converted into cider spirits. (I believe some of the wicked people of our day call it Jersey lightning.) The standard price of apples in those days was one barrel of cider for ten bushels of apples, or one quart of cider spirits per bushel, or six and one-half cents per bushel in money, payable after the spirits were made and sold. In seasons when the crop was extra large apples were sometimes as low as five cents per bushel. I have no recollection of any of even the Rhode Island Greenings or Newtown Pippins being carried to the New York market until 1840, although the distance was less than thirty miles. This may seem a very strange statement, but it must be remembered that the amount of fruit used per capita in those days was very small as compared with to-day. Another reason was that the masses of the people were far from being as able to purchase anything beyond the barest necessities of life as they are to-day. Wages were very low and money very scarce. But the days of the cider distilleries have nearly passed away. There is at present but a single one standing in a district of country where in my young days there were not less than fifteen or twenty, and I think more than that. There are not as many bushels of apples grown there as fifty years ago, but they are of a much better quality and put to a better use, bringing the owners much better compensation for growing them and caring for their trees.

PEDDLING PEARS.

There are pear trees now in bearing on the home farm which have rarely failed to yield their crop for one hundred years. In my boyhood every one used all they chose, and the hogs had a good time with the balance of them. The first sale of pears of which I have any recollection, unless an occasional peck or bushel to some one near home, was as follows. When I was a boy, perhaps thirteen or fourteen years old, my father loaded a wagon with pears, and told me and a brother two years younger to take them to Newark and peddle them out at private houses for the

best price we could get. Thus my brother and I started out on our first business trip outside of our native village. We had but fairly commenced trying to sell, when I saw the governor of the state in conversation with a few gentlemen; I knew him by sight, having seen him at my father's house though he did not recognize me; I stepped up to him and asked if he did not wish to buy some nice pears. It was during the great national contest between the Whigs and Democrats. The governor looked down upon me with a pleasant smile and replied, "Well, my boy, I don't know but I will take a bushel, provided you are a good Whig." I replied at once, "Of course I am a Whig, my father is a Whig, and my grandfather is a Whig; and we are all Henry Clay Whigs at that," which of course meant that we belonged to the most radical wing of the Whig party. The gentlemen present laughed and one of them said, "Well, governor I think the boy has got you." The governor took out one dollar and fifty cents, the price of two bushels, and directed me to take them to his house, at the same time telling me where he lived. Of course we used this as a lever to sell the balance of the load which we soon disposed of, and returned home in high glee and gave father about twenty dollars as the net result of our trip, and for some days after I was the hero of the neighborhood. No more pears for the hogs, or at least not for four-legged ones, they must be restricted for plainer diet, and pears be kept for governors and their constituents.

There were several varieties grown, some very good, and others worth very little. The Virgalien stood first in quality, and I doubt if in this respect it has ever been surpassed.

CONCLUDING COMMENTS.

Gentlemen, I have occupied more of your time than I intended and will bring these remarks to a close. It will readily be seen that the increase in the consumption of fruits, after allowing for the great increase of population, is very large; fifty years ago, as a rule, only those who grew fruit used it in large quantities, and their supply was mostly limited to apples, pears and peaches, and these not nearly equal in quality to those grown at the present time. We sometimes hear the "good old times" spoken of as preferable to the present, but for my own experience and observation, combined with the best information I have been able to obtain, I believe this is a much better country to live in than it

was fifty years ago. That we live better, are happier, and are as moral and religious as those who lived in the good "old times."

Then let us each use our influence to induce others to cultivate fruit of all kinds suitable to our soil and climate, and in such abundance, that the entire family may enjoy it, either fresh or canned, every day in the year. Such a supply would mean better health for old and young, less doctors' bills, less butchers' bills, and the good wives and mothers might soon banish from their tables and storerooms those everlasting and indigestible pies and cakes over which they now spend so many weary hours. Let them spend the time thus saved in interesting reading and pleasant recreation, and it would go far towards bringing back their faded beauty and their youth.

Farmers who have not tried this course, begin at once, and when you order choice fruit trees or plants, don't forget to order a few nice rose bushes and choice flower seeds for your wives and daughters. You will surely find the acre devoted to fruits and flowers, and well cared for, the best paying acre on your farm, and you will wonder how you ever managed to get along in any other way. Meet together in each others' homes, compare notes and profit by each others' experience, and you will in this way gather up sunshine to cheer you in some of the dark days of which we must all have our share.

The following report was then presented by Prof. Oestlund:

ENTOMOLOGIST'S REPORT.

By Prof. O. W. Oestlund, Minneapolis.

Having the honor of being elected your entomologist at the last annual meeting, it now becomes my duty to report on such work in this direction that may be of interest or value to you. Time and circumstances have not allowed any special observations to be undertaken during the year on insects injurious to fruit trees, and therefore of special interest to the horticulturist. My correspondence with members of this Society, as well as other fruit growers of the state, in reference to entomology, has not been very extensive either; but I would ascribe this in a great part to the fact that I am as yet almost a stranger to most of you, and that what is being done in this direction is as yet very little known to the people of this state. As this is

something that should easily be remedied, it is hoped the same will not apply for another year.

During the year, two of the injurious insects, well known east of the Mississippi, have been discovered within the boundaries of this state. Although both of these do not, in the first case, concern the horticulturists, as they are insects injurious to wheat and corn, yet the injury of at least one of them is of such a nature that I consider it as worthy of your attention.

The first of these is the Angaumois moth, so well known as injurious to stored grain on the continent, in England, as well as in many of the Eastern states of this country. My attention was first called to it from this state by specimens forwarded to me by Mr. E. V. Beales, of this city. Soon after I received the same from Prof. Porter for determination, sent in from some other part of the state that I have not yet succeeded to learn. This is one of the most destructive pests known to infest stored grain. In the district of Angaumois, in France, it appeared in such great numbers in the latter part of the last century that the whole population was threatened with famine, and the attention of the government was drawn to it and commissioners appointed to investigate the matter. It is undoubtedly an imported insect to this country, though it has been found here for more than a century and has shown itself quite as destructive here as on the continent. Mr. F. M. Webster, who has studied this insect in Illinois, quotes an opinion from the *New York Sun* that if the progress of this pest could at that time (a few years ago) be arrested by the government at an expense of \$5,000,000, it would be the best investment ever made for the people. As the ravages of this insect often will reduce the weight of grain from twenty-five to fifty per cent, the estimation is probably not much exaggerated.

I wish not only to call your attention to this insect, but to make you familiar with it by presenting some of its life history, and by your investigating the specimens themselves, with the nature of the injury done from specimens that I have brought here for that purpose, that if you should find it in your own grain or in that of your neighbor, you shall know what the enemy is; and if we yet can not exclude this pest from our boundaries, as he has now once entered, we can nevertheless do much to check a too rapid spread by not allowing him to breed too freely.

THE ANGAUMOIS MOTH.

The first communication on this insect in reference to its occurrence in America, was presented to the American Philosophical Society, of Philadelphia, in 1768. Soon after it was found in such great numbers in North Carolina as to extinguish a lighted candle when a granary was entered at night. It has since that time spread over a great part of the United States, and the state of Minnesota will now have to be added to this territory.

The insect is especially known to be destructive to wheat, and hence to be so much the more dreaded in Minnesota, though I am not aware that it has yet been found to attack the wheat here. It is also known to attack barley, oats and corn, the last of which is the nature of the injury as far as known in this state.

I will not here attempt to describe the insect in its different stages, as I think you can get a better idea by inspecting the specimens themselves, I shall only add a summary of the life history as given by Mr. Webster in the twelfth report of the state entomologist of Illinois.

SUMMARY OF THE LIFE HISTORY.

“The insect passes the winter in the lava state, pupates in the spring, and the moths appear in May or June. These pair immediately, and deposit their eggs on the young grains of the new crop in the field, if they are allowed to escape, or, if not, on the grain in the bins where they originated. These eggs hatch in from four to seven days, and the larvæ burrow into the grain and themselves transform to moths, about August, or often during the latter part of July. These moths pair and deposit their eggs after the manner of the previous brood, and the larvæ from these, nearly, if not quite all, reach maturity during the fall and transform the following spring. The number of broods and time of appearance vary greatly, with climate and season; in warm countries broods follow each other in rapid succession during the entire year.”

REMEDIES.

There are several parasites known to attack this insect, notable among which is a mite that has been found very destructive to the larvæ. None of these parasites have yet been found in Minnesota, but we can expect in due time to find them also.

It is a known fact that parasites, or the natural enemies to an injurious insect, always travel a great deal slower than the insect itself, the cause of which is obvious to the student of entomology.

Of artificial remedies, as might be expected, a great many have been proposed and experimented upon. The only one that seems to be practical and efficient is by heating the grain. It has been ascertained by careful experiments, that grain can be submitted to a temperature of at least 140° Fah. without any injury to the same, while a much lower degree, kept up for a somewhat longer time, is just as effective against the pest, and is undoubtedly superior for the grain. One hundred and twenty degrees Fah., kept up for four hours, has been found fatal to the insect in all its stages. When but a smaller quantity is affected, as in case of seed corn, or samples of grain, the pest can also be destroyed by fumigating in some closed tank or vessel.

The other species, that at times has shown itself quite troublesome in some places, though never to such an extent as the foregoing, is the Spindle-worm moth (*Achatodes zee*, Harris.) The species was first described by Harris from the eastern states from whence it has spread to most of the states where corn is cultivated. My attention was first called to this insect from the state by specimens sent by Mr. S. K. Odell, of Vivian, Minn., with some of his own observations in regard to its habits. The mischief done by this worm consists of its boring into the stalk of the growing corn, causing the top to wither and become detached, so that it can be drawn out with the included spindle without any special effort. This worm, or larva, is, when full grown, about one inch in length, or often more, and is capable of completely destroying the stalk it enters. All the stages are passed through in one season, the moth coming out in August, when the eggs are deposited for the next season. Probably the best remedy against a too rapid increase or spread of this insect would be to cut the stalk of corn, as soon as it is seen to be affected by the withering of the leaves, and feed to hogs or cattle so as to destroy the worm before it is yet developed.

As my report contains very little that is of special interest to you as horticulturists, let me make a few general remarks on the subject of entomology in Minnesota.

ENTOMOLOGY IN MINNESOTA.

What has been done in the field of entomology for the State of Minnesota is very little, and can be summed up in a few words. As Minnesota has not yet had a state entomologist, nor any one that has systematically undertaken the study of insects, with the exception of Mr. Whitman's work on the locust, found in the annual reports of the survey, all that has so far been done is due mostly to the efforts of individuals, as found in the entomological reports of this society, and by writers in the several papers and periodicals. What other entomologists of this country have done that is of special reference to this state, is also very little. The work of entomology, so far undertaken by the geological and natural history survey of the state, can hardly be said to be more than begun in comparison with what remains to be done. During the short time that I have been in connection with the survey, it has been my privilege to use such spare time as I could find outside the routine office work in connection with the laboratories of the survey and the care of the general museum, to the study of entomology. Making the best possible use of this time, I have so far collected something more than 2,000 species from Hennepin and Ramsey counties, to which locality it has been necessary to restrict my work. These are now in the possession of the survey, but to the greater part as unworked material from the lack of time and literature for their proper identification. What scientific work has so far been accomplished is almost exclusively confined to one family — the *Aphididæ*, or plant-lice. A preliminary report on this work is found in the fourteenth annual report of the survey, and a more extensive report on the same, being a synopsis of the one hundred species now known from this locality, is to the greater part in manuscript, ready for the next annual report.

Competent entomologists now generally believe that the number of insects for the whole world will not fall short of one million species, of which already more than seven hundred thousand are in the different collections of the world. Taking this as a basis for the estimation of the number of insects for this state, I cannot put the whole number at less than 20,000, or ten times the number that have already been collected. The work that therefore remains to be done is much, and can probably not be correctly estimated by the professional entomologist himself.

The law creating the geological and natural history survey of

Minnesota, drawn, as it is, on a broad basis, makes provision for the study of entomology. Section 3 of this law states that the natural history survey shall include: first, an examination of the vegetable productions of the state, embracing all trees, shrubs, herbs and grasses, native or naturalized in the state; second, a complete and scientific account of the animal kingdom as properly represented in the state, including all mammalia, fishes, reptiles, birds and insects. But as this law also calls first for the geological survey proper, it is obvious that most of the efforts at present are concentrated on this work so as to bring it to an end; and the work of natural history can only receive secondary attention. Moreover, a complete and scientific account of the animal kingdom, including the insects, is an undertaking that will require a great deal of time. The result of such work is the best and fullest that can be got, and this state is to be congratulated for having made provision for the undertaking of such a work.

But the farmer, horticulturist, and many other industries to which insects are found to be destructive, can not afford to wait for such results. What they mostly want is the study of special cases as they present themselves from time to time. In a state that is being so rapidly developed as Minnesota, great changes must annually be brought about in that large tracts of land are put under cultivation, others drained, or the timber taken off. Such changes we know tend to destroy the balance of nature, and bring about abnormal conditions, that makes it possible for a species of insect, that before, probably, was hardly known, all of a sudden to increase in such great numbers as to become destructive, as is well known in the case of the Colorado potato-beetle and many others of our injurious insects indigenous to this country. Every year also brings new insects here from other parts of the country, that often prove quite as destructive. What you therefore want is not so much the collecting and naming of insects from the state, as an investigation of such abnormal cases, with special study of the life-histories and habits of such insects that are found to be injurious, not only to the horticulturists and agriculturists, but also to the forester, stock breeder, and many other industries to which the destruction by insects is more or less extensive; such observation to be published for immediate distribution to all it may concern.

Much valuable service could also be rendered by determination of insects sent in from all part of the state, and by giving

full answers to all inquiries in regard to them, recommending such remedies or treatment that are known to be most effective. By the formation of biological collections of all insects found to be injurious to some crop or industry, much would also be done to disseminate a correct knowledge of insects among the people; such collections to be placed for convenient study or inspection to all it may concern, by being exhibited at the meetings of the different societies, or at the annual fairs. To give you an idea of what I mean by such biological collections, let me call your attention to the two cases of insects that were hastily put together from such material as was at hand, in order to illustrate this point. The one containing insects injurious to the cabbage, illustrating a paper on this subject in the thirteenth annual report of the survey; and the other containing some of the insects found to be injurious to the apple tree. As I have not yet had opportunity to study the insects injurious to the apple, I have most of these only in the imago state, though a properly arranged collection of this kind would contain each species in all its stages, from the egg, larva, or worm-stage, during which most of the injury is usually done, the pupa or chrysalis state, to the imago, or fully developed insect. Such a collection properly named, and if reference to published articles on species be added, would give a great deal of information in the shortest time possible, and be profitable to every intelligent observer.

Although it is the aim of the survey, in as far as it is able to undertake the work of entomology at present, to reach the best and most practical results that are consistent with good scientific work, yet I think the immediate wants are such, not only for you as horticulturists, but for many others, as would call for the appointment of a state entomologist with the necessary appropriations to enable him to devote his whole time to this work.

DOES IT PAY TO HAVE A STATE ENTOMOLOGIST?

From the conduct of such states that have already undertaken this work, we would say that it does pay. Illinois has for the past fifteen years had her state entomologist, and twice on the death and once on his removing from the state, has his successor been immediately appointed. New York, the Empire State, had her state entomologist in the life-long work of Dr. Fitch,

and when he from impaired health was not longer able to discharge the duties of the position, the office was abolished, only to be in a short time again resumed, and is now ably filled by Prof. J. A. Lintner. Many other states have undertaken this work, which show the most gratifying results. It is from this that we have the noble life work of such men as Harris, Fitch, Walsh, Glover, and many others that are still at work, to show up for the study of entomology in this country.

Besides there are some special reasons why Minnesota should have a state entomologist. Situated, as we are, on the boundary to the North, we are still, in several respects, the central state. Here the three largest and most important zoological provinces of this country find a common center. To the north we have a portion of the Canadian province, with the many insects that are destructive to the pine and other coniferous trees. And as more than one-half of the state is covered with the valuable pine, making its lumber interest one of the largest, this alone should justify the appointment of a state entomologist. To the west the central province passes our boundaries, and many of the injurious insects peculiar to the great plains of the west threaten the destruction of our crops, especially the cereals. Under this class I would mention the Colorado potato-beetle and the locust; the ravages of which I doubt not all of you have more or less experienced. The south eastern half of the state is contained in the great eastern province, where most of the well known insects east of the Mississippi, both injurious and others, are to be found. And most of those that are imported from other parts of the world, will at least invade this part of the state after a few years of steady march across the country. Here we find most of those insects that are destructive to the horticulturist as well as the agriculturist. We have, therefore, to become familiar with, and to fight not only the host of insects known east of the Mississippi, but to the north we have many of those peculiar to the northern parts of this continent, and to the west we are threatened with incursions from many of the destructive species found on the great plains of the west.

But although it can be said that we are beset with enemies from three sides, all of which are formidable and must be fought separately, I do not think it will warrant us to draw the conclusion that Minnesota is subjected to greater loss from depredation by insects than any other state or country. The fact need not therefore be discouraging to any one of the many industries

that are flourishing here. But it will make the study of entomology a more difficult and complicated undertaking, than probably for any other state of the Union. As a compensation to this we have for the entomologist a richer field, together with the opportunity to solve many questions of the highest scientific interest, here at the commingling of the three greatest zoological provinces of North America.

In conclusion, gentlemen, let me thank you for all the aid and courtesy that has been shown me in this work, the study of entomology. In return I wish you all success in the noble work that you have undertaken, the most gratifying results of which are already apparent, not only to many of our own people, but it can well be said, to the people of the United States, as I think all will concede that had the opportunity to see some of your results at the New Orleans Exposition. To your Society also belongs the honor of first advocating the need of undertaking the study of the injurious insects of the state, and I hope that your endeavors in this respect shall be crowned with full success by the appointment of a state entomologist. In the meantime it shall be my endeavor, as time and circumstances will allow, to work out some of the insect problems that may be of interest to you. I hope, therefore, in the future, not only to keep your good will, but to have your active co-operation in this work. You are the ones that are first likely to discover the enemy, be he an invader from the East, the North, or the West, or be he one that for years has hovered around your premises, and now thinks he has found a weak spot and therefore makes a desperate effort to take possession of what belongs to you. In cases like this, if you would catch some of the enemies, forward them to me at the state university for investigation, it shall be my delight to examine the annals of warfare against such a species, and in return give you such information and advice that might be of some value to you. The appearance of such an insect in your locality would also be put on record, and be of much value to the work of entomology on the survey, and hence be of mutual benefit to both of us. Moreover, all such insects properly named and exhibited at your meetings would illustrate the report of the entomologist, and make the discussion of insects much more intelligible and profitable to all.

DISCUSSION.

Mr. J. M. Smith. I would like to ask the professor about an insect that has been destructive in Wisconsin. He spoke about insects destructive to cabbage. I noticed this last season an insect the size of a small fly, in the neighborhood of half an inch in length, as large around as a small darning needle, that attacked the cabbage, laying its eggs on the leaves of the plant. They came in countless numbers in the dry weather and destroyed the plants by the thousands.

Prof. Oestlund. What was the nature of the injury?

Mr. Smith. They ate into the leaves and destroyed them so the plant would not head at all.

Prof. Oestlund. With reference to insects injurious to cabbage, I would say that I studied those two years ago on the experimental farm. I found there nine species that were injurious, four of which were worms, and all of them quite injurious.

Mr. Smith. The insect referred to when on the plant is green.

Prof. Oestlund. From the description given it might perhaps be the cabbage *Plutella*. I have a sample of those here among my collection of insects.

The meeting then adjourned till 9:30 o'clock, Friday morning.

MORNING SESSION.

FOURTH DAY, FRIDAY, JAN. 21, 1887.

The meeting was called to order at the usual hour, President Elliot in the chair.

Mr. B. S. Hoxie, Corresponding Secretary of the Wisconsin Horticultural Society, was here introduced and on motion of Mr. Sias made an honorary member of the Society for five years.

REPORTS FROM EXPERIMENTAL STATIONS.

THE STATE UNIVERSITY FARM. REPORT OF PROF. EDWARD D. PORTER, SUPERINTENDENT, ST. ANTHONY PARK.

Mr. President and Gentlemen:

I suppose the establishment of these different experimental fruit stations is for the purpose of getting as wide a distribution of trees, plants, vines and shrubs as possible, in order that their

merits may be tested thoroughly, so that the effects of climate, soil, etc., may be observed in all these different localities. In order to be of value this work needs to be continuous, and in order that the information may be of greatest advantage there needs to be a report presented from year to year as to actual experience and observation during the year. Then, when these are collected, a person by looking back at the reports, extending over a series of years, will be enabled to form an estimate as to the progress made.

I would state that I have not prepared a written report to present at this meeting, but I have made a report to the board of regents which is now in press and of which I have here proof sheets of such portions as relate to this experimental work. I shall not take up your time by reading this report at length but wish only to glance briefly at the different lines of work. Copies of the work, which will contain over five hundred pages, will be mailed to members of the Society.

THE EXPERIMENT STATION.

An agricultural experiment station is an institution provided with a suitable equipment of lands, houses, stables, plant houses, apparatus for testing seeds, laboratories for chemical investigations, farm stock, implements and machinery, and provided with a working force of intelligent, enthusiastic, scientific and practical men, well trained in the several departments of agriculture, horticulture, stock and dairy management, forestry, chemistry, botany, entomology, and veterinary science.

The object of such an institution should be to conduct original researches or verify experiments on the physiology of plants and animals, the diseases to which they are subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of different systems of rotation of crops; the adaptation of trees, plants and shrubs to the conditions of soil and climate of the locality of the station; the analyses of soils and water; the influence of drainage and irrigation; the chemical composition of manures, natural and artificial, and their adaptation to different crops.

RUSSIAN APPLES.

Undoubtedly the greatest horticultural need of Minnesota is a good list of hardy apple trees. Experiments with a view to fill-

ing this want have been conducted by private citizens and many creditable seedlings obtained — notably Gideon's Wealthy. But there is yet to be found a single late-keeping winter apple of even medium quality among the whole list of seedlings which will endure our severe test winters.

It was deemed best for this experimental department to take up the Russian apples and endeavor to determine their hardiness, season, quality and adaptability to our climate. It had been known for many years that the climate and soil of Central Russia corresponded in many particulars to that of the great central basin of America.

Prof. Budd, since his visit to Russia, has made large importations of what he regards as their best sorts for American planting. Other importations of greater or less value have also been made, so that there are probably over five hundred varieties of Russian apples in this country to-day. The great majority of these will not prove equal to our need; many come from the coast sections of Russia; others, again, have grown where cooler summers were the rule, and thus their fruit is found to ripen too early here. It is not probable that all will be found adapted to the requirements of this State, but if only one out of all the immense list we have is found to possess the necessary qualities, the expense and labor will have been amply repaid.

In the spring of 1885 we received from Prof. Budd cions of Russian apples. Discarding all injured varieties, a list was secured comprising 179 varieties of apple grafts.

These were root grafted at Ames between the twentieth of March and first of April. They were packed in sand two weeks, then repacked in sawdust and shipped to Minneapolis, and considering their rough usage a very good stand was secured.

In addition to these root grafts, fifty-six varieties of two-year-old trees were obtained of Prof. Budd at the same time. The experimental orchard stands on an almost level piece of prairie, with a low wet spot in the centre — exposed on all sides to the winds.

Of fifty-two Duchess apple trees — three years old, planted at the same time in the same orchard as the above, but five died, — or not quite ten per cent., — which would indicate that not more than one in three of the Russians is as hardy as Duchess. The past winter shows the following result: Total number of trees set, 114; total varieties, 57; per cent of trees dead, 32½.

In this list those trees which up to the present time (Decem-

ber 1st), have made the best growth and seem best suited to the situation are as follows:

177	Green Streaked,	457	Klineff's Apple,
	Borovinka,	361	Pointed Pipka,
	Grucherka,		Yellow Transparent,
	Antonovka,	200	Rosy Little Turnip,
	Rulut's Nalin,	496	Babuschino — Grandmother's,
	Aport Orient,		Arkad,
934		22 M.	Blushed Calville.

In the spring of 1886, thirty-four additional varieties were set and the orchard now contains eighty-one varieties of apples.

THE HILLSIDE ORCHARD.

This orchard, planted on a northwest slope, is protected on the south and west by a natural grove of oak; the ground was cleared three years ago and planted to rutabagas. The trees were set in the spring of 1885. The list comprises apples, crabs and plums. The apples and crabs have all grown well — Duchess and Wealthy being very good.

The list of Russian apples growing on the farm has been already published in the report of last year. There are certain varieties that have proven worthless and which should be rejected as such. Varieties that fail in one locality may, however, succeed elsewhere. It is going to be impossible for any one station to do this experimental work satisfactorily. We have not only a large area of country, but wide diversity of soil and climate in Minnesota. The conditions in the southern portion of the State are entirely different from those we have here. Instead of having two fruit stations under state control, we should have at least four, with dozens of other experimental sub-stations. Varieties that prove to be valuable under these varying conditions could then be generally recommended.

We have given considerable attention to Russian apples, have secured a few Russian pears, a collection of Russian shrubs and ornamental trees. Some of the Russian importations promise to be very valuable additions; two or three of the willows are specially promising. The same may be said of some of the ornamental shrubbery.

THE VINEYARD.

The vineyard was planted three years ago. It is purely an experimental collection of those varieties which would seem to be

best adapted to growth and maturity in Minnesota. The collection consists of twenty-two varieties. A small crop was grown last year, but the present season brought an abundant one, and afforded an excellent opportunity for judging the relative merits of the different kinds.

The vines stand eight feet apart both ways and are trained to trellises running north and south. During the first half of the growing season very thorough cultivation is given with cultivator and hoe, and at no time are weeds or grass permitted to grow. There is nothing on a fruit farm that demands and so well repays good care as a vineyard. Thus far we have practiced the long cane renewal system of pruning with very gratifying results.

Concord.—This variety has been justly called the “Grape for the million.” It is hardy, having thick leaves that insure healthiness during the hottest summer, and is one of the most productive sorts known.

Niagara.—This is a new white grape, for which great things are claimed. Our vines, set in the spring of 1885, have made excellent growth, and are perfectly healthy. The vine resembles the Concord, of which variety it is a seedling. It is not quite so strong a grower as its parent and the leaf, though good, is not as thick as Concord.

Janesville.—The vine is very hardy, a rather slender but vigorous grower, with thick, healthy foliage. The clusters are quite small, very compact, sometimes shouldered; berries medium or small, black with some bloom. In flavor, as in size, it is much inferior to Concord, having a decided foxiness.

Pocklington.—This is a seedling of the Concord. A moderate bearer; berries large, of a yellowish white color, borne in medium to large shouldered bunches. The skin is tough and the pulp too solid; it wholly lacks that melting quality that is so noticeable in the Lady.

Delaware.—The Delaware is one of the best grapes of our collection. It is not a strong grower. The clusters are small, compact and shouldered. The berry is small, of a dark red color, covered with delicate bloom. Skin thin and tough, pulp very sweet and melting.

Martha.—The Martha has proven the most productive of all the “white” grapes in our list. The berries are medium in size, having a very thin, tough skin. In season it is five days later than the Concord, and may therefore be considered as on

the verge of, if not beyond, its latitude. The vine is a good grower, with dark green healthy foliage.

Lady.—The Lady is the best of the white grapes, though with us not so productive as the Martha. The berry is almost as large as the best Concords, and when ripe is very light yellowish green in color. The bunches are rather loose, of medium size. It is a very sweet, melting grape, and as it ripens a little earlier than Concord, may be safely planted in this section. It is not a good bearer, and would not prove profitable for a market grape for that reason.

Moore's Early.—This is a black grape, that is deservedly popular where known. It is, perhaps, the earliest grape in our vineyard. It is a vigorous grower, giving heavy canes with large thick leaves, which drop long before all others in the fall. In quality, Moore's Early surpasses the Concord, and is the best black grape in our vineyard. All things considered, we regard it as the best grape for general planting in this State.

Ives' Seedling.—In this variety we find little to recommend. The berries are medium in size, black, with no bloom, rather sour, with a strong, foxy flavor.

Worden.—This is, after Moore's Early, the most promising of the newer black grapes. In habit of growth it closely resembles Concord, of which variety it is a seedling. Our vines bore well the past season, and we can safely recommend it for planting in this State. It is to be preferred to Concord on account of its earlier maturity.

Brighton.—It bore a fine crop; berries of medium to large size, dark red, with delicate bloom. The skin is thin, the pulp very melting and sweet, with a delicious vinous, slightly spicy flavor.

I advise the planting of the following varieties:

For the extreme north, Janesville and Moore's Early. For the State at large, for general market and home use, Moore's Early, Worden, Delaware, Brighton, Concord.

I have about 2,000 Russian two-year-old grafts that I wish to distribute this spring, and have received authority to make a distribution from our younger orchard and nursery ground, according to my own wishes. My plan was to take up two or three specimens and distribute to horticultural stations throughout the State; in the next place to gather and send a collection to county horticultural societies; in the third place to find the most intelligent cultivators and send a collection to them. Can you suggest any better way? I thought I would not send out yearlings, of

which we have about 5,000. I should be glad to make up bundles of willows and poplars to send out where I can do so. These trees have been covered with snow and are in better condition than if cared for in any other way.

Mr. Pearce. We think trees kill before the snow comes.

Prof. Porter. I know these are not killed.

Mr. J. M. Smith. You are going to have the killing down at home?

Prof. Porter. Yes; I got our stock in Northern Iowa; we used long stock for grafting; we took no short pieces. I have not been in the nursery business much myself, but have lived next door to two of the largest nurseries in the country and know it is impossible for any one man to do everything; he has to delegate his work to assistants, such men as can be had at \$25 a month, men who are careless and who will disobey most positive instructions. It is not to be wondered at that varieties are not always true to name. I have bought grapevines from one of the best growers in the country and found six kinds in the lot not true to name; I suspected it soon as the foliage came out; I *knew* it as soon as the fruit appeared.

Mr. J. M. Smith. You did not get any wild grapes, I suppose?

Prof. Porter. Yes, sir, I did. I got two wild grapes among the number. Some of the gentlemen present are among the number who have been humbugging me and haven't sent me varieties true to name. I don't wish to apologize for May & Co. at all. I think the burden of proof is very strong against them as it has been brought in here. But I say that there are nurserymen here that have sent me false stock and they are in this room. [Laughter.]

President Elliot. They haven't any paint on the nose!

Prof. Porter. I paid full price for the stock and yet found there were mistakes made. So we must exercise a little charity and do unto others as we would have others do to us. If we find a man persistently dishonest and refusing to make the proper amends when his attention is called, then brand him with as black letters as you can put on. I have had all sorts of complaints sent me about our nurserymen and I have sent these to the parties, and without explanation they have made the correction; where they had improper agents they have been ferreted out. If a principal will not do that, after a dishonest agent is reported, then I say go for the principal.

FOREST TREES.

In regard to forest trees I would say that I have been trying Catalpa and Black Walnut, and thus far they are doing splendidly. The former has made a very fine growth. We have a good many ornamental trees and shrubs.

RUSSIAN WILLOWS.

Salix fragilis—*Red Willow*.—This variety is said to take the place of pine in many parts of Russia, the wood being light, strong and easily worked. It is a rapid grower, and is propagated easily from cuttings. The twigs are quite red in winter, whence the name.

Salix Napoleonis is a drooping form of peculiar beauty. The leaves are small, linear, with a bluish green color. The branches are very slender. It has not yet been grafted, but when a good stock is found we will have no "weeping" tree superior to it. Perfectly hardy and easily grown from cuttings.

SMALL FRUITS.

STRAWBERRIES.

The past season proved very trying for strawberries, and resulted in an almost complete failure of the raspberry crop. We had no rain from the time the plants began blooming until near the end of the strawberry season. The result of this was a fair opening of the season, with fine large berries. A few very warm days ripened much of the fruit prematurely, so that, with a glutted market and later on very small, immature berries, the crop was far less profitable than the first days of the season promised.

In order to test the relative merits of matted row and single planting, two beds had been set in the spring of 1885. The "matted row" bed contained the following varieties, so planted as to secure ample fertilization for the sterile sorts: Crescent, Countess, Manchester, Chas. Downing, Windsor Chief, Captain Jack, Ironclad, Minnetonka Chief, Bay's Prolific, Wilson, Glendale, Jas. Vick, Green Prolific, Jersey Queen. Of the last three varieties only a few plants were set. From one and a half to four rows, three hundred feet long, were planted with each of the other sorts.

When the plants fruited last spring it was found that certain sorts were badly mixed;—Countess and Crescent occupied the same row; Glendales proved in the main to be Crescents,—the other sorts being in the main true to name. Dealers and buyers can not be too careful in regard to this matter of keeping varieties distinct and true to name. As soon as the mixture was discovered labels were placed defining exactly its extent, and any further mistake thus prevented.

The following notes may be of value to new planters:

Crescent.—This is the most popular variety grown in the State. It succeeds well in a great diversity of soils, bears large annual crops, has a bright red color, and when fully ripe a pleasant flavor, though not so sweet as some others. It is sterile in flower, and must therefore always be planted with fertile sorts—that is, with varieties whose flowers have both stamens and pistils. The best method is to plant every alternate row with the fertile kind, although it is not uncommon to secure good crops when only the fourth rows are thus set. It is one of the earliest varieties, and this, with heavy cropping, has made it the most valuable market sort grown.

Countess, or Downer's Prolific.—This berry is lighter colored than Crescent, and hence does not sell so readily. It is round, very tender, and when fully ripe has a fine, delicate flavor. It did not bear well for us, requiring a heavier soil.

The Manchester is one of the largest sized berries grown. It produced the largest berries of any we have. In color it is very light—a coral red. It is flattish conical, oblate, and is not as good as Crescent, and a medium cropper.

Chas. Downing is one of the older sorts, justly celebrated for its sweet, delicate flavor. It is a dark red, rather long, conical berry. It bore a very light crop this year, and the fruit, which is only average in size at best, was very small. Later in the season the leaves were slightly troubled with rust.

Windsor Chief is a flattish, oblate berry, of very dark red color throughout. It is very rich, and in good seasons doubtless a good bearer, as much of the fruit was set which, owing to the dry weather, was very small and “knotty.” The plant grows very close to the ground, and should be carefully mulched to keep the fruit from being soiled.

Capt. Jack was almost a failure this year. But little fruit set, and it was very small and crude. The plants are not healthy on our light wood loam.

Ironclad.—This variety has the best foliage of any in our list. It blossomed sooner than any of the others, but owing to the drought very little fruit was set, and it was of poor quality. It is doubtless a good variety.

Minnetonka Chief.—This variety gave great satisfaction. The bulk of the crop was gone when it began fruiting. It gives a large number of medium, even-sized berries—quite acid, when fully ripe, and its high flavor surpasses the Crescent. It grows well, has good foliage, and is a very good late variety.

Ray's Prolific.—This berry is prolific only of plants—its fruit is too small and too scarce to be of any value. Not worth the ground it occupies, but we shall test it again next season.

Wilson.—This old-time favorite remains one of the best berries in the list. A row of Wilson and Crescent—about an equal mixture—gave a remarkable yield. Its firmness and its bright color make it one of the best shipping berries grown. It is early, and is thus one of the leading sorts for the home market.

Glendale.—Our plants of Glendale nearly all proved to be something else. The few plants that were true to name gave large, firm fruit, of a rather dull red color. In size it is very good, and when fully ripe has an agreeable flavor, but it seems, from this year's test, scarcely equal to our other late sort—Minnetonka Chief.

James Vick, Green Prolific, and Jersey Queen.—Our plants of these varieties were too few to give a fair idea of their worth. None of them are as good growers on light loam as Crescent.

HILL CULTURE.

In the spring of 1885 a large bed was set from which the runners were carefully trimmed. Crescent, with every third row Wilson, was planted. The growth was very fine. The plants were set fifteen inches apart in the rows. In autumn they had filled the intervening space—all runners having been cut off.

The bed was given a light mulch of cornstalks in December. The snow drifted badly over it and in March a few weeks of freezing and thawing made ice cakes here and there over the patch. The result was that wherever the ice had thus formed the plants were killed. A very poor crop was obtained. During the past season the dead plants were reset with all fertile sorts and the bed changed to matted row system.

RASPBERRIES.

The following raspberries were set in the tree rows of the hill-side orchard in the spring of 1885: Red: Superb, Cuthbert, Turner; Black: Gregg, Doolittle; Yellow: Golden Cup.

To these were added in the spring of the present year: Brandywine, Marlboro, Tyler, Mammoth Custer.

Neither the Superb nor Turner, which resemble each other in their habit of growth, produces such strong canes as Cuthbert. Both are good healthy varieties and have made an excellent showing this season. Only a few plants of Gregg lived, they being in very bad condition when received. Those few, however, were covered with fine, large berries of good quality.

BLACKBERRIES.

Owing to the very bad condition of our first setting when received very few lived. Those few, however, made excellent growth; they were covered with earth last winter, came out this spring in excellent condition and should give a fine crop another year. The variety is Snyder. Last spring we planted Ancient Briton and Stone's Hardy, both of which have grown very well during the summer. There is scarcely any doubt but that all these varieties, with proper protection, will be successful here.

CURRANTS.

We have fruited this year Red and White Dutch and Black Naples currants. Red Dutch, one of the oldest varieties known, remains one of the best for general culture. It is a great bearer and stands the neglect, to which the currant bushes are usually doomed, better than any other sort. We have added this year Stewart's Seedling and Fay's Prolific, both of which have done well, Stewart's being the more rapid grower.

CONCLUSION.

In this experimental station we have just got barely ready for work. The state passed a law two years ago requiring the board of regents to establish a state experimental station. But as yet no appropriation has been made to meet the expenses of this experimental work and we have done the best we could with the means at our command. This meeting should pass a resolution

asking the legislature to take action looking to the support and equipment of our experiment station; the results would inure greatly to the benefit of the people of the state. In view of the importance of this matter I submit to you if it is not proper that this work should be urged to its fullest degree of development; give us \$5,000 and we will show better results. We want intelligent laborers; we have to label everything carefully but we don't want to put a "bell on a burbank;" they should know these different varieties at sight, and be able to pick out a Wealthy from five hundred other varieties. Great care is required in making these experiments in order to be of value. It is not expected that it will be profitable work except in the results in general.

Mr. J. M. Smith. In regard to the Black Walnut my impression is they will be found to grow well for a few years and then to fail; this has been the experience of some friends of mine. Their native habitat is further south where the winters are warmer.

Prof. Porter. I am a little doubtful of success with them, but we propose in a small way to continue to experiment.

Mr. Sias. I have found a black walnut tree in this State that was about four feet in diameter, and there were many of smaller size.

Mr. C. L. Smith. There are many of them growing in Rice County. But I have tried to raise trees from Illinois seed and failed.

Mr. Hoxie. They grow well in Brown County, Wisconsin, and I have seen them planted by the roadside.

Mr. Gould. Black Walnut does well in some sections of the State. It grows very readily in Le Sueur County. A party at Waterville gathered twenty-five bushels of nuts one season.

President Elliot said he had had experience with the Black Walnut; it was necessary to use Northern seed to propagate from. There used to be a good deal of the timber in our native forests.

The following interesting paper was contributed by Mr. Luedloff in lieu of a report on fruit growing:

THE USE OF FORESTS.

By Chas. Luedloff, Carver.

The forests are the most beautiful ornaments of a country. Even if their use for mankind and their signification in the economy of nature need to be proposed, still they remain the most beautiful pictures in the country; the most magnificent constructions of the vegetable world, the graceful halls in which one willingly tarries. The living monuments of the fathers, the stately trees, they have another purpose than merely to become a source of income. The hearts of the travelers and invalids rejoice as they throng the threshold of the forest, and the multitude would rather celebrate their festivals under the canopy of the worthy old trees than in moist halls or under tents. It will be entirely suitable to show how the forest has both a direct and an indirect use, inasmuch as very many people are still under the influence of the tradition of the claim period, and feel themselves justified in destroying the forest although the circumstances have very much changed. The nearer the people are to those primitive circumstances, the more inconsiderately is the forest made use of, not only, indeed, in an improper, but also in a proper manner. The latter takes place where the frequently misunderstood idea of freedom and the misunderstanding of the peculiarities of the forest have united to enable the possessors of the forest to dispose of it as they please — a mistake against which the Swiss have guarded themselves. There the owners of the forest, when they make use of it, are obliged to reflect upon the effect that its destruction will have upon the country.

An indirect use of the forest is the compacting of the soil. The roots of the trees become united with the surface soil, which prevents the washing away of the fine soil. Whenever this is exposed it is washed away into the valleys. Gutters are formed which become deeper and wider from time to time, so that finally only the bare rocks are to be seen. The earth and gravel that has been washed away remains in the valley and renders it unproductive (*vide* California), or they are carried still further and fill the beds of streams. They cause inundations, and in order that they may be averted a great expense for dams and for their repair is entailed. The forest serves to compact a loose, sandy soil and make it useful, which would otherwise be unproductive. The sections of cultivated land contiguous to forests are pro-

tected from dry winds on the lowland and from avalanches on the upland.

Experience has shown that denuded countries suffer more from storms than do those where the forests have remained standing, and that farm and garden crops become uncertain. As soon as the plateau became covered with trees, the ground could be profitably cultivated. Normandy, in France, is an example of this.

The forest, also, has a positive effect on the climate and on the heat. It serves to prevent extremes. With regard to its effect on hail storms nothing definite has been ascertained. It was observed in France at a certain time that a hail storm raged with great fury until it reached a pine forest, when the hail stones ceased to fall, but began falling again when a section of country was reached where there was no forest. An ordinary forest has not as much power in this respect as a pine forest.

The influence of the forest in the moisture of the air, on the amount of rain-fall and on the dew is of untold significance. Exact examination has shown that the atmosphere in and near a forest is more moist than elsewhere. How dew, mist and rain are formed can be seen in the forest on a damp summer's day. Here and there small clouds of mist become visible, which grow larger and larger and cover more and more of the forest streams. Along on the plateau this occurs much later or not at all. The most important use of the forest consists in the regulation of the water courses above and under the surface, especially in the mountains and high land, but also in the low land. The springs and streams depend upon the forest. This was demonstrated on my farm. As I was walking along the edge of the forest I unexpectedly stepped into a spring which was hidden by grass. Years afterwards a house was built near this place and from the spring the water was to be obtained. But there was no water to be found owing to the cutting down of the trees.

The water supply is kept up by the water forcing its way along the roots of the dead and living trees. With regard to the quantity of water in a country of forests and in one where there are none, I have noticed this statement somewhere: If there is a quantity of water beneath the soil covered with litter, and the water be represented by 100, then there will flow into the strata the quantity of water that can be represented by 85.8 beneath the littered surface, whereas the water from the unlittered surface would be represented by 56.5. These figures

show that the water supply in a forest is slower but more durable, equal and copious than in open, forest-covered regions.

The forest has an influence on the flow of water above ground. The moss, vegetable growth and layer of leaves aid in restraining and regulating the onward flow. This occurs only on the mountains and in the high land. The opposite is not the case at such places. Government Officer Growig has made the following observations with regard to the relation of the water to the moss in the forest: Five ounces of dry moss were placed under water, and in the first minute they absorbed 30 ounces of the water, and in the following 9 minutes $1\frac{1}{2}$ more ounces. A quantity of moss of this sort would then contain at least 4.47 more rainwater. In the mountains the quantity would be 10 m. m., not including what would be retained between the stems and twigs of the moss by capillary action. On account of this a forest thus covered would have a water strata of 2-3 c. m. in a short time.

A forest a quarter of a mile long can retain from 1,000,000 to 1,500,000 c. b. m. of water. The author remarks the following: In many instances a difference of 20-30 c. b. m. in the water flow in a second on the surface for a quarter of a mile, will decide whether high water will be injurious or not. The treeless surface will yield from 20-30 c. b. m. fifteen hours sooner than the one covered with forest. If one remembers that the floods are mostly of short duration, then it will be discovered that the water strata in a moss-covered declivity has an important function to perform. Where the forest should be naturally, it should be preserved and cared for. The height which would otherwise be unproductive, the steep declivity will be of benefit to the water surface.

There are undisputably proven cases on record where the removing of the forest or the planting of trees has an effect on the water supply. They are somewhat scarce. They are observable only occasionally. In France and in Switzerland there are such examples. In consequence of the cutting away of the forests the flow of water became so irregular that the factories had to remain idle during a large part of the year. As soon, however, as the forests grew, this condition was changed. Just how much influence the forests have upon the general health has not been shown. It is desirable that the mountains and slopes be covered with forests on account of their effect on the climate. The surface should be used for general culture. This would nat-

urally be the case, and yet a third or a fourth should be devoted to forest culture. That the country can [not flourish without timber should be known by every farmer. Let every one be engaged in planting trees and extending timber culture, not only because it will benefit the present generation but because its effect will be lasting and of benefit to generations to come.

EXPERIMENT STATION AT MINNESOTA CITY.

By O. M. Lord, Superintendent.

The appointment of these stations by the State Horticultural Society was no doubt one step in the right direction. Reliable information in regard to new fruits is difficult to obtain, and the best manner of cultivating such as we have, can not be determined without thoroughly testing under different conditions of soil, location, and methods.

When this work reaches its highest point of usefulness, we shall be able to plant with some assurance of success; instead of wasting time, money and labor, with what is worthless when grown, or with what will be likely to result in failure if ever so desirable. The results of some experiments have become of very great importance, having changed the entire character of some productions. Notable examples are the Early Rose potato, the Concord Grape, The Wilson and Crescent strawberries, etc.

These stations having been organized by the State Society are supposed to be largely engaged in the interests of the public; but having barely entered the formative stage, no great progress has been made, and consequently no elaborate report can be expected. One of the first difficulties we meet is the want of means. New fruits cannot be had without money, and we do not know that the results will justify the outlay. It may be well for the Society to indicate, by resolution or otherwise, what means are to be used and what course is to be pursued on the part of these stations; that we may have some uniformity of action, and also be informed as to the direction of our individual efforts. Methods of culture may be left entirely to the experimenter, but varieties may well be considered by the Society, and distributed according to location, facilities, etc. In addition to the general culture required, each station might be given a specialty if thought best.

As no instructions have been given, and as a matter of taste

and convenience, this place has been started with native plums as a specialty. About twenty varieties are now growing. Additions were made last spring of *Prunus Simoni*, Mariana, Robinson and some others without names, but having some local celebrity.

In a late report, Prof. J. L. Budd says: "Whoever grows *Prunus Simoni*, expecting a good dessert plum, will be disappointed, but it is very good for cooking." It is doubtful if this plum will stand our climate. We have a good list of natives, excellent for cooking, but not very desirable for general planting. From present appearances, none of the Chickasaws will succeed as well as the De Soto and several others of this vicinity.

EXPERIMENT STATION AT ROCHESTER.

By A. W. Sias, Superintendent.

Mr. President:

In referring to my report of this station, made a year ago, I see I made a mistake in not heading it "*An Obituary Notice.*"

The mortality was so sweeping in its results two years ago that we have but little to report upon at this time. But in this great loss we are again forcibly reminded of that saying, so full of meaning to the intelligent horticulturist, "the survival of the fittest." We are also reminded of another saying sometimes found in obituaries, viz.: "Death loves a shining mark." This also has great weight and significance with observant students of our Northern trees and plants. If you happen to have a tree in your orchard that has a thin leaf, with no hirsuteness about it, one that the sun can shine clear through with no obstacles in the way, then rest assured, "death loves that shining mark and will close its arms around it."

Without stopping to itemize, will say that all of our trees with thick pubescent leaves came through the severe winter two years ago in good shape, and have behaved first rate ever since, notwithstanding they had to pass through a "fiery ordeal" last summer. Such trees are equal to every emergency.

The thick leaves of such hardy American seedlings as McMahan White, Giant Swaar, Brett Seedling and some others would indicate Russian blood. The Brett Seedlings are straight, fine-growing trees, and promise well. They are supposed to be from the seed of Talmon Sweeting, fertilized by Duchess. The tree of

McMahon White resembles the American Golden Russet very much, while the leaf would pass for a good Russian.

Please to bear with your servant while he gives a little "fatherly advice" to other experimental stations. It is this — put in all the time you can possibly afford to do in growing all the different varieties of fruit that are hardy in our climate *from seed*, and as far as possible, select your seed from *thornless varieties*. Let the apple seed come from the thickest and most pubescent-leaved tree, providing the fruit is good, and if the leaves are of an upright habit, all the better.

I discovered a thornless blackberry in our county last fall, hardy enough to carry a good crop without having been covered. I am in correspondence with a certain horticulturist at Columbus, Ohio, who claims to have a collection of over forty varieties of the blackberry, and I have made arrangements with him to furnish me with a start of each of his thornless varieties, and also the Lucretia Dewberry from the original stock, so in the spring I am in hopes to be in condition to make a specialty of thornless blackberries.

We also have received a few plants of the Hardy Blackberry for experiment from DeWain Cook, of Cottonwood County, Minnesota.

F. K. Phoenix, the veteran pomologist of Wisconsin, had the kindness to donate a few choice new varieties of the apple for my experimental station, a year ago last fall. Among them were Shields' Crab, Stubbs, Rucker, and others. They appear to be hardy and all right, so far.

The Ostheim Cherry, from Chas. Luedloff, is still in a flourishing condition. American Yew is a hardy, native dwarf. I set a plant of it in an exposed place on my grounds some twenty years ago. It lived several years, and fruited, but finally died, as I believe from drought. So last year I set several more, but put them where they were well shaded by large evergreens. In such situations I have no doubt they will do well, especially if kept mulched.

We have a fine lot of yearling Shellbark hickory trees, grown from a basket of nuts sent us by John S. Harris, and grown on his grounds, and said to be superior to the ordinary hickory.

D. S. Grimes, of Denver, Col., who gave us such an interesting and instructive paper for our last report on "Coniferous Trees of the Rocky Mountains," also gave us at our state fair and at the Southern Minnesota fair, at Rochester, some of the

most remarkable "object lessons" consisting of exogenous plants, the best fitted by nature to withstand a long and severe drought of anything, perhaps, we have ever seen. I allude to his splendid exhibit of many varieties of the Cactus family from Mexico and Colorado. It occurred to us that we might possibly get a good suggestion from these "Children of the Sun," in regard to what sort of a leaf we wanted in an arid situation for orchards. But come to look the subject up we find there are five hundred species of the Cactaceæ, all natives of America, and most of them leafless. But in lieu of leaves they have clusters of hairs or prickles in great and "touch-me-not" abundance, as many of you know to your sorrow and your neighbor's delight.

Now, it is well known that the most of our Northern trees and plants would die if deprived of their "summer clothing" (their leaves) for a single season, hence the question arises to one of limited botanical knowledge, whether these little hairs, or prickles, possess the characteristics of ordinary leaves and perform any or all of their vegetable functions? This question is intended to show, first that people who have not made a regular study of botany, and have no five hundred-dollar-microscope to aid them, know but little about leaves or their uses; second, to show the necessity of appointing at this meeting a committee of at least one scientific botanist to give us next winter a paper on leaves, showing the comparative value of thick and thin leaves, etc.

Robert Douglas is doing a most praiseworthy work in introducing into this Northwestern country hardy evergreens from the Rocky Mountains. I put on trial at this station, last spring, one hundred each of *Picea*, *Pungens* and *Abies Douglasii* from his collection of seedlings, with satisfactory results.

EXPERIMENT STATION AT LA CRESCENT.

By J. S. Harris, Superintendent.

Mr. President and Members of the State Horticultural Society:

I can only report that we are making progress slowly. We have made but few additions to the varieties under trial since the report rendered at the last annual meeting. Among such are a few trees of Ostheim Cherries from Chas. Luedloff, doing well. Put in a few cions of Dartt's hybrid apple; doing well. General Le Duc's favorite plum, top worked on wild native, has done very well.

Have not made any additions to the Russian or seedling varieties of apples, except one tree of Gideons. Of the varieties reported last year none seemed to be injured by frost last winter, although upon one day the mercury reached as low a point as any time in twenty years.

The Giant Swaar, Rollins' Pippin, Wabasha and McMahon's White appear to have ripened up the season's growth as well as the Wealthy, Red and the Yellow Anis and one or two other varieties of Russians, from Sias, appear to be in the finest possible condition and I think some of them will show fruit the coming season. Of the Russian trees procured from the Iowa Horticultural station, thirteen varieties in all, a few have made a fair season's growth, while some are not perceptibly larger than when planted two years since. Of Ostrokoff's Glass, four trees have made the finest growth of any, and of the Antonovka, four trees, the next best, of the Anis family nearly as good.

SMALL FRUITS.

The Cuthbert raspberry produced a fair crop of fruit without having had winter protection, and we have left a portion of them up again this winter to continue the comparison of hardiness with the Turner. When frosts set in they were well filled with blossoms and fruit in various stages of growth, which was probably caused by their starting into growth after being prematurely ripened up by the drought. With the Turners, but few canes had made a second growth. We are satisfied that both varieties are better in this climate for having winter protection. Blackberries were laid down and lightly covered with soil, and, although considerably injured by the drought, fruited very well; Snyder being several days the earliest, gave the most fruit. Ancient Briton gave the best quality of fruit at the first pickings, and but for the drought would have yielded the most. Stone's Hardy was the latest and poorest of all; but had we been favored with rain would probably have matured a fair crop. Our two plants of Wilson Junior blackberry were very unsatisfactory. They bloomed well, but did not seem to get properly fertilized, and did not mature a perfect berry. We are well pleased with the Ohio raspberry and think it promises well for the clay loam soils of this part of the State.

A few one-year root grafts of the Brett seedling apples wintered well, and the variety named Hart is making a strong, vigorous growth.

In strawberries the old Ironclad was the earliest to ripen and the first berries were fine, but the main crop was cut short by the drought. The Foundling appeared to resist the drought best of all, and retained the vigor of the plants to the last, but we have too few plants to decide upon its merits. Sharpless and Cumberland Triumph were very nearly a failure; Jas. Vick better than the previous year but hardly satisfactory. The Crescent, fertilized with Old Ironclad and Wilson, gave the best results of all.

PLUMS.

Our native plum trees are all doing well. The De Soto bore some fine fruit which was awarded the first premium at the state fair. It is a good fruit and has been sufficiently tested to warrant its being recommended for general cultivation in the eastern and southern parts of the State.

Our facilities for testing varieties and conducting experiments are better than ever before, and we intend, as fast as possible, to secure every variety of native plum, and in conjunction with O. M. Lord, of Minnesota City, whose soil is very different from ours, to give them a most thorough trial, and also to commence raising seedlings from them, selecting with the view of originating improved varieties.

RECOMMENDATIONS.

In closing our report we take the opportunity to urge the establishment of more systematic experiment stations for the testing of varieties upon varied soils and assigning to different individuals such portions of the work as they seem best fitted for conducting and would request detailed written annual reports from each. Thus far our experimental work has been a labor of love, performed at private expense by generous individuals who could ill afford it.

Our State is rapidly increasing in population and wealth, and good fruit in abundance is one of the prime requisites of happiness and prosperity, costing too much to be imported from other states. In view of this fact we ought to be able to induce our state legislature at the present session to increase the appropriations to our State Horticultural Society that the stations might be increased and the line of work extended. Trees, shrubs, plants and seeds ought to be furnished to these stations without cost to the managers, and the Society ought also to be

able to offer premiums to encourage the production of new seedling varieties, the planting of groves and shelter belts and the outward ornamentation of school and other public grounds, and even farmers' homes. All of which is respectfully submitted.

CARVER COUNTY EXPERIMENT STATION.

By Andrew Peterson, Superintendent.

I can not send any apples to the exhibition to be held by the Society in St. Paul, because they are all gone. Apples don't keep this winter as well as they used to do. I don't know what is the reason; I kept them in the usual way, and they were all rotten at Christmas time.

As I am not well enough to come to the meeting myself, I have to give a written report concerning fruit, but I have not any report of particular value to give. The Russian Hibernial, Ostro-koff's Glass, Charlamoff, and Winter Lowland as usual bore a heavy crop of fruit. The Christmas apple, Red Cheeked, did not bear so much. Winter Pear tree is half dead, but had a heavy crop of large-sized, middling good fruit. Duchess had a heavy crop; some of the trees are damaged a good deal, but some of them will recover. All the Wealthys are half dead and the apples were very small and don't keep as long as usual.

SMALL FRUIT.

Raspberries — Philadelphia and Turner had a very nice and heavy crop this year.

Strawberries — Wilson: I never had so nice and heavy a crop of them before. I think that was dependent on the manuring I gave them from the chicken house.

All the young trees of the new Russians, about thirty-five varieties, look very nice; also the Russian pear trees show no damage yet. Among the sixty varieties imported from Sweden there is only one among them which is hardy enough for Minnesota climate.

EXPERIMENT STATION AT LITCHFIELD.

By G. W. Fuller, Superintendent.

The only cions received for trial were from the Russians, obtained from Mr. Andrew Peterson three years ago by Mr. Gibbs. These thus far have proven perfectly hardy.

and a credit to the State they would favor the adoption of the Some of the fruit and forest trees from Prof. J. L. Budd, of Ames, Iowa., are very promising, but it is too soon to estimate their real value. We propose still to "experiment."

EXPERIMENT STATION AT MOORHEAD.

By R. M. Probstfeld, Superintendent.

In explanation of my meagre report this year I would refer you to my report in 1886 (see page 332, volume 14, of the Society.)

RUSSIAN VARIETIES.

In regard to the varieties of Russian apple trees on trial at this station, I would state that in addition thereto I received from Prof. J. L. Budd, of the Iowa Agricultural College, Ames, Iowa, the following varieties of Russian apple trees: Two, 30 M.; Five, †599; Five, †984; Three, *200; Ten, 26 M.

All those trees have done well, notwithstanding the dry, hot summer. They went into winter quarters with wood well ripened up, but it is impossible to state at this date what effect this cold winter had on them, but on examination of them I have great hopes for all, including those received from A. W. Sias and A. G. Tuttle.

Transcendents bore a heavy crop last summer, but the blight is thinning them out very fast. I am now corresponding with Chas. Luedloff, of Carver, and he offers to send me his entire collection if I promise to undertake the task of testing them.

SMALL FRUIT.

Raspberries (Turner's Red) came out all right from the winter but bore no ripe fruit on account of heat and drought last summer.

Currants (Red and White Dutch), good crop; have no others in bearing so far.

Strawberries having failed with me on account of hot, dry winds at the critical time in summers of 1883, 1884 and 1885, have abandoned their culture, but there is no trouble to winter them with very slight covering.

EXPLANATION.—30 M., M. means Moscow importation; a star (*) indicates Prof. Budd's numbers, and dagger (†), Department of Agriculture numbers, as given in Iowa Agricultural College Bulletin, by Prof. Budd.

Gooseberries I abandoned; had Houghton's Seedling; they did well for about three years, but the winter of 1884-5 was too much for them. They sprouted from the root again, but I considered their place worth more than the berries, and dug them out. I would not discourage whoever wants to try them. I think they are hardy enough for most winters we have here.

I have also the Cottage and Coe grapes from Prof. Budd. Out of ten set seven lived last summer; but they did not ripen their wood well last summer — planted in May, 1886. When I covered them, November 1st, they looked badly. Can not tell how they will come out. Am of opinion that it is safe to cover grape vines here about October 20th.

I will here add that I have great faith for the hardiest Russian apples in this climate.

STATE EXPERIMENT STATION.

Mr. Cutler presented the following preamble and resolution and moved its adoption:

WHEREAS, The legislature of Minnesota at its last session passed a law, requiring the regents of the State University to establish an agricultural experiment station in connection with the college of agriculture of that institution; and

WHEREAS, Such an experiment station has been established and put into successful operation and the work then begun promises to be of the greatest advantage to all departments of agricultural work, and

WHEREAS, This work has been performed under difficulties, owing to a want of specific appropriations. Therefore be it

Resolved, That this Society earnestly request the legislature to make such provision for this station as will enable it to perform such work in original investigation and experiment as will keep our State abreast of the communities in everything pertaining to agriculture.

Mr. Cutler stated there had been a feeling manifested in certain directions that no benefit was being derived from the agricultural college of the State University and in favor of a separation of the two institutions, and referred to the action taken in this regard by the State Farmers Alliance; a desire was expressed that something practical and tangible should be accomplished; as a member of that organization he had voted for such separation. The agitation of the subject would perhaps prove a benefit, as there had been a change of sentiment with regard to this matter. It was believed that something tangible would be secured from the agricultural college as at present conducted; otherwise there would be a separation, or the institution would be abolished. He agreed with what had been said by President Northrop that there were too many state institutions. With proper legislation to facilitate the work and plans of the agricul-

tural college he thought practical results would be speedily secured.

Mr. Dartt thought there should be action taken in this matter without delay.

Mr. Gould said it was best not to make haste too rapidly in this matter, and it was better to see where we were likely to land before "we jump." He was not prepared to vote for the resolution at present.

Mr. C. L. Smith said nothing was to be gained by delay. No reading and thinking man who had given the subject attention could have failed to comprehend the situation. The question as to the propriety of a separation of the agricultural college and the university had been thoroughly agitated. If the members of the Society were in favor of the legislature giving encouragement and support to the experiment station to make it a success resolution; if on the other hand they were in favor of tying the hands of its superintendent so that he could accomplish nothing they would oppose it. For one he was in favor of its adoption.

Prof. Porter said the state legislature had passed a law requiring the establishment of the experimental station but had thus far failed to make an appropriation for carrying on its work. Other states were aiding similar stations by liberal appropriations, and there was no other way to give it the efficiency for accomplishing the work required except by the methods indicated.

The resolution was adopted.

Reports from members of the General Fruit Committee being in order the following were presented:

REPORT FROM WABASHA COUNTY.

By Sydney Corp, Hammond.

S. D. Hillman, Secretary, etc.:

As a report is desired from me with regard to my method of preserving fruit I send you the following: I can only account for my apples keeping well by the plan I follow of picking and preserving them. Owing to the hot, dry weather, which advanced the ripening process, they have not kept as well as usual this season; and they may have been left on the trees too long before gathering them.

My way of gathering my winter apples is to go over the trees about three times, first picking the apples that grow in the sun

and are ripe; then in a week or so to go over them again, gathering those that have ripened, letting those in the shade and on the under side of the trees stay till they are ripe. One needs to exercise care that they do not get too ripe, for I think here is where we sometimes make a serious mistake.

Again, if we gather all the apples on a tree at the same time, especially the Wealthy, about one-third of them will usually be found to be too ripe to keep for any considerable length of time, while another third will be so green as to lack in flavor.

I prefer putting my apples in a cool, dry cellar, as soon as gathered. My cellar has a thick stone wall outside and is lined on the inside with one thickness of brick, with some two inches of air space between the walls.

I have kept Wealthy and McMahon White apples in my cellar, in good condition, until well into the summer months.

REPORT FROM FREEBORN COUNTY.

By Clarence Wedge, Albert Lea.

My report as member of the General Fruit Committee can not rank with the reports of those who make the growing of fruits and flowers a specialty, but must rather be considered as the observations of one who, although keenly interested in horticulture, depends for his livelihood upon the general products of the farm.

The seedling orchards of this county have proved a complete failure. I have seen and heard of a great many seedlings but do not know of one that to-day is worthy of mention. Indeed of standard apples there is but one that stands the test of time and is everywhere a success, and that is the Duchess.

And now, since we have no way of judging of the future but by the past, and since in the past everything of value has come to us from Russia, will it not be wise in us to pin our faith to that noble list of apples which has lately come to us from the "Upper Mississippi Valley" of Europe?

This endless experimenting without results is wearing out the patience of our planters. Some of these new Russians are pretty well out of the experimental stage even in this country. Why should we not accept the work of centuries which the Muscovite has sent to us, and with this firm foundation go on improving?

GRAPES.

Our grapes were a very complete success last season. We have about one hundred and twenty-five vines planted, about two-thirds of them in bearing. Agawam, Massasoit, Lindley, Champion, Moore's Early, Delaware, Concord, Cottage and other varieties are represented, and have fruited. If I was limited to one variety I should choose the Cottage, a sweet, meaty grape resembling the Concord in style of growth and very much earlier. Of the above varieties the Concord ripened the last of all, and in most seasons barely escapes the first freeze. My method of raising grapes is the simplest possible, and consists in a word of a sunny spot, cultivation as for corn, a wire fence trellis, cane renewal pruning, summer pinching back to the third bunch, covering with a little dirt for winter, and last, but not least, standard varieties.

I find that one of the great drawbacks to the success of this fruit among the farmers is their habit of buying one or two vines, at a dollar or two apiece, of some of the new varieties that no one, not already well supplied with fruit, has any business to experiment with.

Another reason why more grape vines are not planted is the idea generally had that deep trenching and manuring, and a deep insight into the mysterious art of pruning are necessary; while in fact very simple methods are quite successful.

My advice to farmers would be to plant in a sunny, moderately rich soil, a dozen vines of Concord, Cottage, Worden, or Moore's Early, eight feet apart each way, to make the acquaintance of his nearest grower, look over his vines, young and old, and he will soon get the few ideas necessary for him to raise enough of this luscious fruit for his family supply.

In these days, when old Borealis is ruling with a high hand, driving the cattle to their shed and the farmer to his fireside, and piling up snowy monuments to his fury, let us think how we can raise barriers to his authority, and resist his cruel monopoly. Some few have had the shrewdness and energy to oppose great banks of pines and spruces to this wintry foe, and now they and theirs live in quiet content with the healthful climate of our State. We must "educate the masses" on this subject. The natural winter climate of the prairies of Minnesota is a howling wilderness of snow and ice; under the protection of evergreens the same situations are sunny, quiet, and only 40° below.

REPORT FROM CHIPPEWA COUNTY.

By O. E. Saunders, Granite Falls.

I regret very much that I am unable to attend the meeting of the Society, but duty calls me elsewhere. I notice that a report is expected from me, so I send a brief one.

The past season was a severe one on fruit in this section. The severe drought came on so early in the season that it was disastrous to both plant and fruit. A very large per cent of newly set plants and trees were killed outright, as they dried up before they had become established. In favorable locations the strawberry crop was good, but in dry situations it was much injured.

Raspberry canes, especially the reds, were badly killed back, which weakened them so that they were not able to set a heavy crop, and the drought prevented the perfection of much that was set. In the early spring the canes looked all right and gave promise of a good crop, but in April we had one or two very hot days, and afterward they failed to start on the upper parts. We think this was more probably the cause of killing than the winter.

Currants and gooseberries gave a heavy crop.

There are but few grapes in bearing hereabouts, but they give promise of doing well under proper conditions and care.

Apple trees came through the winter in fair condition and have done fairly well through the season. But few standards are in bearing, yet we are still planting, and hope to make apple growing something of a success. We do not get very jubilant, over the prospect; but, on the other hand, we do not despair of success. We are endeavoring to study the conditions that surrounds us horticulturally, that we may make our labors a success. Of one thing we are very sure — no country can excel in quality and flavor Minnesota small fruits; so if the apple problem remains unsolved, we are not to be deprived of all home-grown fruits. Success to the "State Horticultural Society."

REPORT FROM MEEKER COUNTY.

By G. W. Fuller, Litchfield.

The past season, has been a very successful one with everything except the raspberries. For the first time the Turner failed us. The winter did not seem severe, but there was

something about the spring that destroyed the fruit and most of the bushes. In a few localities they escaped injury and bore well.

We had full crops of Early Strawberry, Transcendents, Beach's Sweet and Minnesota crabs, a very few Duchess and still fewer Wealthies.

Currants, gooseberries and strawberries were abundant and brought good prices.

REPORT FROM MURRAY COUNTY.

By O. F. Norwood, Balaton.

The past season was a very dry one with us, and it seemed that everything would be dried and burned up, but the apple trees tried to outdo each other in producing a big crop. We think well of the Transcendent. Each recurring year it brings its large crop and this year the trees could hardly carry their load. Currants, raspberries and gooseberries were a light crop, but strawberries were never better with us, but we made one discovery this year, that turkeys cannot be raised profitably on strawberries, so have abandoned the turkey industry and intend holding on to the strawberries. Grapes a light crop and of imperfect fruit owing to a heavy frost the latter part of May.

I will say in conclusion, that we feel very much encouraged by the fact that every tree and bush we have yet planted have grown well, and show no damage from either cold or heat. We shall keep on adding to our collection as fast as we can. Have on hand for spring planting eight of Gideon's seedlings and ten of different kinds of the Russians from Mr. Tuttle and expect to add about sixty more different Russians before planting time.

REPORT FROM RICE COUNTY.

By L. E. Day, Farmington.

MR. PRESIDENT: I have no written report and will make a short verbal one. Of standard fruits in our district the past year, the Duchess gave us a heavy crop. The few trees of Wealthy that stood the test winter bore a few apples, but there are very few trees that were uninjured, and the most of them were killed outright.

HYBRIDS, Transcendents and Hyslops were a very poor crop.

The Minnesota and Maiden Blush, Quaker Beauty and Beach's Sweet, all produced a fair crop, especially Minnesota. This may be opposed to the ideas of others, but I find the Minnesota in the vicinity of Castle Rock has been producing well for several years and appears to be very hardy.

SMALL FRUIT.

We had an abundance of strawberries. Raspberries did not seem to winter-kill but produced very fairly. Of the blackcaps, the Gregg has done remarkably well with us, and also some other varieties mentioned here. I have one variety called the Elmira, a seedling originated by Rev. M. L. Tibbets, which I consider about the best variety on my grounds.

REPORT FROM WASHINGTON COUNTY.

By M. C. Bunnell, Newport.

MR. PRESIDENT: I have no written report. During the past year, from what I have observed during my travels through the counties of Washington, Ramsey and Dakota, I find the principal variety of standard apple to be the Duchess. Wealthy was very badly injured by our hard winter of two years ago. Some orchards in the town of Woodbury bore good crops—one about fifty bushels of apples. I find Whitney is doing about as well as any variety planted in this vicinity.

A good many farmers are considerably discouraged with standard apples while others are re-placing their dead trees. As regards the crab species, Transcendent bore well, but the fruit did not bring a very large price; Hyslops brought a far better price than Transcendents, although the former did not stand well for hardiness.

PLUMS.

As regards plums, De Soto and Weaver give the best satisfaction of any variety planted in those counties and I am experimenting with them considerably. They seem to stand our climate and we have been much pleased with the quality of fruit produced and the productiveness of the trees.

GRAPES.

The grape crop in many localities was very good. Mr. F. C. Dick, of Washington County, has been giving some attention to grape culture and is succeeding well with a number of the

Rogers varieties. I was at his place when he was gathering his grapes and they were very fine and large. His market is Stillwater.

SMALL FRUIT.

I laid down my raspberries a year ago this last fall — Turners and Philadelphias — and of course they came out all right in the spring. The latter variety were badly affected by the drought and the fruit dried up before coming to maturity. I have Cuthbert but it has not yet fruited. I find it pays to lay down the canes and give them protection in the winter.

There has not been much done as yet with blackberries. Mr. Ford, of Newport, has one or two varieties. the Lawton and perhaps Ancient Briton. He gives them protection by covering the canes.

Of strawberries, Wilson and Crescent are the leading varieties in this vicinity. The crop produced was very fair, but prices were lower than usual.

REPORT FROM HENNEPIN COUNTY.

By N. J. Stubbs, Long Lake.

The "survival of the fittest" seems to be well illustrated in trying to produce ironclad varieties of apple trees that will withstand the ordeal of our terrible climatic influences and is as true in this department of evolution as in the animal and human kingdoms.

History, I think, will demonstrate to anyone that wherever civilization has planted her standard for any length of time, the product of the orchard and garden has likewise been found. Therefore, our climate can be no exception to the general law. The coming generations will, therefore, consummate what some have so nobly begun. This seems to me no guess work, but a future certainty and should encourage everyone to this end.

I may say there has been but few apple trees planted in this part of the county the last year. As a standard, everything considered, the Duchess of Oldenburg stands at the very head; Wealthy next. Crab apples: Virginia, Transcendent and Whitney seem to succeed the best, and are the most valuable in order named. These varieties have all done very well and have borne some apples every year, especially when planted on high clay soil and heavily mulched or cultivated. If those who are grow-

ing apple trees knew how important a heavy mulching of chips, cane bagasse, or anything to hold the moisture is, it would not be neglected.

SMALL FRUITS.

Strawberries are grown more extensively here than any other fruit, and the industry seems to be steadily on the increase, withal the prices ruling so low. The last two seasons the varieties that gave the best results are Crescent seedling, Wilson, Capt. Jack, on clay soil; on sandy loam, Crescent, Manchester, fertilized with Sucker State, and Downer's Prolific, properly fertilizing being the true secret of success with pistillate varieties. If we wish to be successful in growing small fruits, we must adopt the "intensive" plan, plant only what we can cultivate and do it well; then we may expect to command a paying price in our markets — not otherwise.

So far as I have noticed, raspberry culture has not been very successful, in consequence of our finest berries being too tender to stand without winter protection. The majority of people think this will not pay.¹

I was talking with a neighbor, a Swede, who had about half an acre of Turner and the same of Philadelphia; he gives high cultivation, keeps the hills thinned to only three canes, gives no winter protection; claims he obtained \$5 per 24 crates for Turner. The Philadelphia he makes into wine that brings him \$3 per gallon. This shows what good management and skill will accomplish.

Souhegan is the hardiest and best blackcap raspberry, that I have seen tried. It is very early, wonderfully prolific, and very good quality when fully ripe. The Marlboro has made a vigorous growth the past season and borne a few large handsome berries which look very attractive, but in quality I call it poor. The Cuthbert for red and the Gregg for black, planted out and given good cultivation and protected over winter, will always command a fancy price in our markets, and will repay for the protection.

Red Dutch currants for profit, certainly stands at the very head. Fay's currants have borne some fruit, which is very large and attractive, but I doubt very much if it will ever supplant the old stand-by; its flavor is very poor; that, I think, will always prevent it from becoming popular. However, it may prove to be more valuable on further trial. The White Grape currant is

a most valuable fruit. Its beauty and excellence is not yet appreciated, I think, here in this part of the county at least. Victoria has large, nice clusters, and will hang on the bushes the longest of any variety without taking harm.

The currant is being planted more the last year or two and will always succeed better than most other fruit in consequence of its generosity, always giving you fruit with ever so poor treatment. I must add that Stewart's seedling currant is likewise very valuable on account of its large size, good quality and productiveness, and will be planted largely when its value is better known.

GRAPES.

The past season has been a great year for the growth and ripening up of grapes in Minnesota. I have been raising grapes for fifteen years and have not seen a better one. The season being so dry but little disease made its appearance on the vines. The Delawares still take the lead in planting for market. I think Moore's Early and Worden will largely supersede the Concord for market in this climate. Of the newer grapes the Empire State, Jessica and Niagara, have made a nice growth of well-ripened wood, promising me some fruit another season. But the planting of the vine is limited to certain localities, and to a few enthusiasts who are in love with the calling; not but what our earliest, hardiest grapes can be grown in many localities all over our great State, but extra care and attention are demanded to succeed in this direction.

Then let us ever encourage planting the vine both by word and deed, so that when our labors on earth are done we may know one little spot has been made more beautiful and fair by our having lived.

REPORT FROM RAMSEY COUNTY.

By Wm. E. Brimhall, St. Paul.

Apples in this county were a light crop, rather under size and irregular in form. The Duchess is the hardiest variety and they winter kill more or less every winter. While young and healthy they are the most profitable fruit grown here. To grow them successfully requires a high location and good cultivation and the trunks of the trees should be shaded from the sun. A piece of a fence board, four feet long, sharpened and driven into the

ground on the south side, before freezing of the ground, answers a very good purpose. Wealthy comes second on the list. It is very productive and often overbears so as to injure the trees and should have its fruit thinned out well while very small.

The two above named varieties are the only ones that I find pay to grow for profit. The Transcendant crab of all others is the best and most profitable one grown. It is hardy, bears young, and is what our people most universally like; more of them are grown and sold in this market than all other varieties together.

SMALL FRUIT.

Strawberries came into market the twenty-ninth of May, being about two weeks earlier than usual. The crop was a very good one and the berries were as fine as can be produced in any state on the continent. Wilson and Crescent seedlings were the most abundant, old Ironclad made a very good showing; Downing on light soil was fine; Glendale gave a good yield, but was not a favorite with many.

Of raspberries three varieties principally are grown. Philadelphia for productiveness is in the lead; Turner is the sweetest; Cuthbert is the latest and largest but is tender and requires covering through the winter to insure a good crop.

Currants were a fair crop; the late varieties, such as Prince Albert and Long Bunch Holland, prolonged the market season and commanded remunerative prices; Baily's White Sweet is another very productive variety and sells readily in market.

Gooseberries are very little grown, but are considered a paying crop, especially the American varieties, such as Houghton and Downing seedlings; Downing is extra large and showy.

Grapes were a medium crop, being injured by the late frost in spring. The season being a long one, most varieties matured and ripened their fruit. Concord still holds its own place as the best grape for the million. Delaware is yet the best table grape, while Rogers No. 4. is an excellent grape worthy of more cultivation. Its bunches were the largest of any on my grounds; the berries also were very large, handsome and nice flavored. Also Rogers No. 33 is an excellent grape on high land; both should be kept well pruned and the laterals pinched back, and only two bunches allowed to grow on one spire. All grapes need a southern exposure to insure early fruit.

Now, at this writing, as I am in San Diego, California, the

land of grapes and sunshine, I will say the modern style of growing grapes is quite an improvement. The first year's growth is cut back about one foot above the ground, which is as high as they are allowed to grow. The canes starting out on an angle reach the ground and produce wonderfully fine bunches resting on the ground, many of them, which, owing to the dryness of the climate and soil, do not become gritty or injured by resting on the soil and were as sweet and luscious as any that I have ever tasted. Am told that some clusters grown here weigh as high as eight and even twelve pounds. This is *hearsay*. I came here for the climate and the climate I feel is doing me great good. It is a mild, genial, health-giving, life-preserving climate. If it could be transported to Minnesota it would be a perfect Paradise—all that heart could desire.

I long to be with you at your winter meeting, but health will not permit it. Hope your meeting will prove to be a profitable one.

REPORT FROM WINONA COUNTY.

By Wm. McHenry, St. Charles.

Mr. President, Horticulturists and Friends:

As it was my misfortune not to be with you at the winter meeting I shall try to comply with the wishes of your secretary, and in as brief a manner as possible, give you a glimpse of the fruit crop and its prospects in this, Winona, County. There is perhaps no county in the State that has such a diversity of soils and locations as this. While in the valleys and many localities all the standard apple trees have succumbed to the extreme colds of the past, and the croaker thinks he can truthfully say apples can not be grown in Minnesota.

On the ridges and in favorable localities we visited orchards in the fall of 1886 where we found trees of Duchess, Tetofsky, Wealthy, Wabasha, Rollins Russet and Pippin, loaded with fine fruit; and some seedlings. Many of the trees are looking healthy.

To prove the above it was only necessary to go on our streets in September and see the wagon loads of apples, and in quality such as Michigan would be proud of, such as Duchess, Tetofsky and a few Wealthy. Upon interviewing our shippers we find that five hundred barrels were bought and shipped and as many more were offered, but there was no market for them even at twenty-five cents per bushel. The biggest humbug of the past

that has been played on our people is the Russian Mulberry. In 1885 we had them grow seven feet, and the next spring they were dead to the ground. Last year they grew six feet, and now are probably dead.

The only fruit I have grown was on trees that were dug in the fall and buried over winter. They are good for nothing but to feed worms for silk culture; are a humbug as a fruit-producing or an ornamental tree.

The drought of last May, June, July, and part of September gave us a very poor berry crop. Strawberries, unless well mulched, were very small and of inferior quality. Crescent Seedling, Windsor Chief and James Vick doing the best of any on our grounds. Of red raspberries Turner withstood the drought best though Brandywine did well. Of blackcaps we had more dead bushes than berries. Our blackberries were the best paying berry crop we had, as our bushes were well mulched, the dry weather only made the fruit small; yet we got about two hundred bushels to the acre. For early we had the Snyder (medium), Stone's Hardy (late) and Ancient Briton. We have the Wilson Junior blackberry and Lucretia dewberry growing, but have not fruited them yet. There are over one hundred acres in this county in strawberries, about fifty in raspberries and about twenty-five in blackberries.

REPORT FROM WINONA COUNTY.

By O. M. Lord, Minnesota City.

The strawberry crop, on the whole, was considered a good one, though the late ones were somewhat damaged by drought. The market at all times was well supplied and prices averaged low. Wilsons, Crescents and Downers were the leading varieties. Red raspberries were plenty and generally sold at a paying price. In the Winona market there was an unusual demand for Blackcaps. Nearly all that came to market were under size and wanting in flavor, owing to drought. The early market in blackberries was supplied by local growers, and readily sold at fifteen cents, but large quantities were shipped in from Wisconsin and Chicago and sold to the dealers at one dollar and fifty cents per case of sixteen quarts.

There was a fair crop of Duchess and Tetofsky apples on the high or ridge land, and generally a good crop of crab apples.

From the sales made of small fruit plants and apple trees, in this county during the last year we may conclude that the people are not wholly discouraged in fruit raising.

From careful inquiry it is believed the sales amounted to over \$5,000.

Some of this stock was worth more when delivered, than it will be in the future, as it was purchased of the typical tree peddler who, "though now lost to sight is still in memory dear." He is, however, entitled to some credit for awakening an interest in fruit growing.

Young trees and small fruit, though unprotected last winter, were not injured to any great extent, and from the increased inquiry for trees, and general interest shown in horticultural matters it is hoped we may reap a bountiful harvest.

REPORT FROM HOUSTON COUNTY.

By J. S. Harris, La Crescent.

The season of 1886 was noted as being the dryest on record since the settlement of our county. Nevertheless the earth yielded liberally of fruits to such as had set trees and plants and given them good tillage. Strawberries promised to be immense, and proved to be an average crop of the finest quality we have ever grown. The Crescent where properly fertilized gave the best results. Manchester, on rich sandy soil, produced a large crop.

Raspberries of all varieties bloomed well and set fruit for a large crop, but owing to the extreme drought, matured only about half a crop. The red species have done better than the blackcaps. Turner and Cuthbert are the best red varieties with us.

Blackberries were also considerably injured by the drought and perfected on the average less than half a crop — the quality varying according to the summer mulching given them; where neither mulched nor cultivated the fruit was small, hard and sour. Ancient Briton is getting to be the most popular with us, but the Snyder, ripening earlier, gave the most fruit.

The crop of grapes was average in quantity and very superior in quality. All varieties ripened their fruit well.

The crop of apples was not large owing to the great loss of trees during recent hard winters. The varieties are pretty

much confined to Duchess, Tetofsky, the Siberians and hybrids; Wealthy and several of the newer Russians are being planted freely.

Many of our farmers are anticipating wonderful results in the near future, as the agents of the L. L. May & Co., St. Paul, Nursery have been through here selling quite freely of the Gideon and other "ironclads," and some fellows from down south, representing the "Sparta, Wis., Chain Nurseries," have helped out the assortment by inducing them to buy liberally of "budded" and "whole stock" trees. (They are made hardy by this process, you know they say.) There may possibly be one drawback to these chain nursery trees, as unfortunately the Chicago, Milwaukee & St. Paul Railroad has two routes, and they were shipped via Savana instead of via Sparta.

INSECTS.

Some of the insect enemies were more numerous and destructive to our trees and fruits than usual, the dry season seeming favorable for their development. The tent caterpillar has been the most conspicuous and has done great injury to the fruit and shade trees, and even to berry bushes, by nearly defoliating them, and marring their beauty by the multitude of their webs. They live in communities of three or four hundred individuals, under a common web or tent, which is made against the trunk or underneath some of the principal branches of the tree. The eggs from which they are hatched are placed around the ends of the branches by a moth during the autumn, forming a wide kind of a ring or bracelet, consisting of several hundred eggs in the form of short cylinders standing on their ends close together and covered with a thick coat of brownish waterproof varnish. The young caterpillars emerge from their eggs about the time of the unfolding of the leaves, or by the middle of May, and the first sign of their activity appears in the formation of a little angular web or tent, somewhat resembling a spider's web, stretched between the forks of the branches a little below the cluster of eggs. They remain concealed under the shelter of these tents at all times when not engaged in eating. As they increase in age and size they enlarge their tent, surrounding it with new layers or webs, until it sometimes gets a diameter of eight or ten inches and a length of sixteen to twenty inches. They come out at stated times to feed and all retire at once when

their regular meals are finished. They take two meals a day, generally between 9 and 12 A. M. and 3 and 6 P. M. They get their growth about the middle of June, when they separate from each other, wander about for a while and then get into some place for shelter and make their cocoons, after which they are finally transformed into moths or perfect insects, when they deposit their eggs, just as the preceding generation had done.

The remedies are, first, look over the trees in the latter part of winter and destroy all clusters of eggs wherever discovered; second, destroy the nests wherever found. This can be done readily with a long mullein stalk (a plant that is apt to be found in abundance upon farms where this worm has been undisturbed), or a brush of twigs affixed to a long pole. When the caterpillars are beaten to the ground they can be crushed or as they collect together on the trunks in their last moulting period they can be slaughtered in great number. While young and tender they may be crushed in their nests by using a brush, small mop, or sponge affixed to a long handle and it will be all the more effectual if frequently dipped into a bucket of soap suds or whitewash during the operation.

The apple curculio or gouger was more numerous and damaging than ever before known. In some orchards three-fourths of the fruit was nearly ruined by them. Space will not permit me more than to allude to them. Unless remedies are soon adopted for their destruction the growing of apples will have to be abandoned.

The codling moth is on the decline; the proportion of wormy apples was much less than usual; probably some parasite is preying upon them.

Aphis of several species were unusually numerous and injurious; plum trees suffered severely from their attacks.

The grape vine flea beetle and grape curculio, both put in their work and did great damage; they need investigating.

Every variety of fruit we grow has its insect enemies, and as it seems our State is too poor to employ an entomologist to study them up and impart needful instruction on methods for heading them off, our farmers will soon have to purchase their supply of fruits or go without.

The following paper was then read :

ROSE CULTURE.

By F. G. Gould, Excelsior.

There is no work on the rose, so far as I know, which treats of outdoor culture in a climate like ours. There is reason to believe that there is a lack of faith in the experiment of rose growing in our severe climate. It is true that June roses are grown very generally, but they bloom but once. They are the hardiest of all roses.

Next in hardiness are the Hybrid Perpetuals. They require winter protection. Among these are to be found some of the finest roses known. Gen. Jacqueminot is a good type of the class. Though not quite full enough to please us, its brilliant scarlet color makes it a favorite with all. It continues to bloom well into the season, gives a few specimens in the fall, is fragrant, vigorous and hardy.

Fisher, Homes and Louis van Houtee are darker and fuller roses than Jacqueminot, and, to my mind, of richer hue, reaching to that point of loveliness that would be impossible to excel.

Tastes vary in these matters, and I must confess that I am perplexed to decide which I like best when in the company of Baroness Rothschild, Eugene Verdier, Comtesse of Serenye and Caroline de Sansal, when in perfection. The last named sorts are of light shades of color. Alfred Colamb, raised from Gen. Jacqueminot, is a crimson rose of nearly as good color as its parent; better built, deliciously fragrant, medium size, and a constant bloomer into past midsummer and again in the fall. To get the best results this rose should be worked on the Marnetti, or some other vigorous stock, as its constitution is overtasked by its constant habit of blooming. It is a comparatively new rose, raised about twenty years ago, in France. I regard this as the most useful rose within my knowledge for garden ornamentation, bouquets or personal ornamentation.

Tea roses and hybrid teas are charmingly beautiful, none surpass them in sweetness of fragrance or daintiness of coloring. Perle des Jardins, Sunset and Bon Silene are some of the best teas. La France and Bennett are perhaps the most popular of the new class known as hybrid teas. All of these do fairly well in the open air, but require careful treatment in the garden to carry them through our winters.

The teas, Climbing teas and Noisette teas grow to perfection

in the far south where the hybrid Perpetuals are nearly worthless. Moss roses thrive here, and with few or no exceptions are not inferior in the quality of their flower to the class referred to above; most of them bloom but once in the season, the same as June roses. The Salet moss, though not a superior rose, is one of great value, covering all its defects by its most constant habit of blooming throughout the whole summer.

The Bengals and Bourbons are neither of them up in quality to the standard of our views; though their color may be satisfactory and steadfast; their petals are too fluffy and their lives too fleeting when separated from the parent stem. These remarks apply more particularly to the Bengals, though the Bourbons fail as surely to win our admiration. These are commonly known as the monthly roses; they have their uses, as from natural and artificial crosses between these the Damask and Province, our grandest roses, have come. Who can say that this did not begin at the time of the crusades to the Holy land, as what souvenir should be more cherished by those chivalrous pilgrims on their return than a rose from Damascus?

The original stock of tea roses came from China. Their peculiar tea scent gives their origin away.

This occasion does not admit of the mention of but few sorts in any of the classes named. Other classes and sub-classes have been left out altogether, the chief object being to call attention to the comparative merits of some individual members of the classes most useful to us. Happily, some of the best can be grown to great perfection here in the open air.

Among all created things nothing perhaps so touches the gentler chords of our natures and more surely gains our affections than the rose. Their delicious perfume, beauty of form and delicate coloring are suggestive to us of chastity and goodness.

HORTICULTURAL SERMON ON FLOWERS.

By Mrs. Anna B. Underwood, Lake City.

The inquiries of a young friend have suggested the subject, or rather, text for a horticultural sermon. "Please tell me, Mrs. U., how you manage to have such a pretty show of flowers every summer and all through the fall up to heavy frosts. There is never a lack of them, no matter how dried and parched the ground. Mine I will fuss over and water and water; but no

flowers, and in spite of all they will die, and nothing to show for my efforts but the black earth, with here and there a dried-up plant, any thing else but a thing of beauty." Many besides this friend have made similar remarks, and I try to give them the benefit of past experience, but it too often proves useless, for no matter how forcibly the vital points of culture are placed before them, they are forgotten, failure follows, and they "never will try to raise flowers again" and so they must depend on their friends who have mastered the secrets of growing them successfully. But in this too, they often show a woeful lack of cultivation and refinement as they ruthlessly trample upon the plants so dear to our hearts, or pluck them with as little care as they would the commonest weed. Shall I ever forget letting a very dear friend go out by herself to pick some pansies, and my dismay when she came in with a large paper full of the whole branches of the plants? She said, "I tried to get all the green I could, the blossoms looked so much prettier." It is needless to say it was a good many weeks before I had many pansy blossoms. Some will pull a plant up by its roots, or break it off next to the ground or pick off so many buds with the blossoms that the show is checked for a long time. In order to keep up the beauty of the flower bed and at the same time have all the flowers one wants for decoration, they must be gathered judiciously.

The best teacher is experience, but there are those whom experience never benefits, one or two trials without success produces such discouragement that they settle back on the plea that they could never succeed, always had bad luck, etc. The old truism, "What has been done can be done again," should help every true lover of flowers. To love flowers truly is one great item of success. The mere liking of flowers for ornamental purposes cannot be construed into a love for them, while the love enjoys them wherever they are and is willing to sacrifice time and strength to grow them.

So don't depend entirely on your more successful neighbor but go to work for yourself and learn the secrets of success. If there is a special variety that proves a failure with you, try different methods, think, read, inquire, compare notes with friends until you find out the trouble. Nine times out of ten it can be easily removed. Once in a very great while the fault is in the soil or exposure, but it is usually in the management. Never undertake too much, better select a small plat of ground

and grow but a few kinds until you have learned how to grow them successfully, then add one or two kinds to your list, but do not discard the old reliable varieties for untried ones until you have proven them worthy.

In selecting seeds for a flower garden, choose only of the common varieties that flower continually through the season. For a new beginner I would suggest the following: One paper each of "Mixed," white and scarlet Phlox, Verbena (mixed), Mignonette, Tropacolum, Asters, Pansies and one ounce of Sweet Peas. Of these only Mignonette, Tropacolum and Sweet Peas can be sown in the open ground. The others must be started in hot-bed, or in boxes in the house. Then when your plants are nicely started you can see how many you have and will know how much ground to fit for them.

A word with regard to this. If the front yard is small, don't disfigure it with flower beds, rather go to the rear or side of the house. Select a spot away from trees or large bushes, where the sun will shine all day. If trees are large, the roots will draw so much moisture and life from the soil that plants will barely exist (if they grow at all) when planted near them. If the soil is not rich, put on a liberal dressing of well-rotted manure and plow or spade it in thoroughly. Then with a line, lay the ground out into straight beds, four feet wide, leaving a path two feet wide between them. Don't attempt any fancy beds and don't raise them above the paths, unless the garden is in a very low, wet place, for you will want all the moisture that falls on the beds to remain and not run off into the paths where it is not needed.

About the tenth of May, if the season is warm, set the plants out; if it is cold, or backward, wait a week or ten days. Plant the Phlox about one foot apart each way in the bed, pansies and asters the same. Verbenas need two feet, so they will have room to spread.

Plants ought to be set when they have four or six leaves. If much larger they are liable to wilt and become stunted. Select a cloudy day, if possible, for setting. If, however, it is sunny, set late in the afternoon and water well. The next day shade the plants with leaves and remove the shade after two days. Do not water after the first week but keep the ground well stirred with the hoe and free from weeds.

Stir the ground once a week for five or six weeks—after that only enough to keep it free from weeds. Pick freely and ju-

diciously and you will have all the flowers you want for yourself and friends until frost comes.

Sweet Peas should be sown as soon as the frost is out of the ground, the same as common peas, in double rows, with brush between. Be sure and put the brush in before the plants are three inches high, as they commence to run very soon and will spread out on the ground unless the brush is there to support them, and so become stunted and will not cling to anything readily. Do not plant them by the side of the house or porch or around a bush, but give them the free and open ground, well cultivated. If you want them to flower all summer, pick off the blossoms before seed pods begin to form, as they waste the strength of the plant and it will soon dry up and die. It is better to buy your seed than to sacrifice your flowers by raising it.

The seed of the Tropacolum or Nasturtium must be covered at least an inch and should be four inches apart. Plant in one long row allowing at least one foot on each side. They should not be shaded by near or tall growing plants, or they will grow too rank and run all to leaves. And last, but not least, a word for the pansies. Give them a warm place both in the ground and in your heart, for it is a dear, pleasure-giving plant, always responding so freely in return for a little care and attention. During the hot days of summer the flowers will be much smaller and rather faded, but if not allowed to seed, when the cooler days come in September, they will deepen in color and grow larger, and they will never fail you until the ground is frozen and long after all other flowers are gone. It is a gritty little flower, too, for when spring comes, just as soon as the sun gives it a chance, it is ready with its greeting of bright green leaves and buds already started. It is no common thing to pick some blossoms with the snow but a few inches away. The stem will be real short, not more than half an inch in length, but the little face is so bright and happy at the chance obtained at last of getting a peep at the sun and sky, that your face will beam with corresponding joy and the words will spring to your lips, "You dear, little, brave darling." And that is as it should be. Talk to your flowers when among them, and you will be astonished at the lavish manner in which they will bestow love and sympathy upon you. And at the same time they will remind you if anything is going wrong with them.

The following paper was read by the secretary:

NATIVE PLUMS.

By O. M. Lord, Minnesota City.

The origin of the European plums can only be conjectured. The origin of *Prunus Americana* may be given in the words of "Topsy," "They just grewed." The principal use of all kinds is for cooking. Comparatively few are used for dessert purposes. Few persons are aware of the commercial importance of some varieties. For the fiscal year ending last June were imported into the United States from the vicinity of the Mediterranean nearly 65,000,000 pounds of prunes, and the estimated product of California was 1,500,000 lbs. at the wholesale price of four cents per pound, amounting to \$2,500,000. When the probabilities of our native plums are fully realized we shall have no occasion to make such importations. Does this sound visionary? I may ask who would have dared to predict, thirty years ago, the small fruit business, of even one day, of Chicago, Minneapolis or St. Paul. Then, a carload would have supplied the market of either place. Now, thousands of bushels are daily marketed in their season. Fifteen thousand tons of strawberries were received in Chicago last year.

It is true that we have not, at present, a native plum closely corresponding to the foreign prune, but we have them so similar that slight hybridizing will accomplish it; and at the same time extend their culture over a larger area than that of any other perfectly hardy fruit bearing tree. The whole plum family is naturally very nearly allied, and the common wild plum is indigenous in all the soils and adapted to all the climatic variations of the country from east to west, and from the Gulf of Mexico to Lake Winnipeg, and possibly further. The wild parent of the Concord grape did not furnish as promising a basis for hybridizing as do many of the native plums lately brought to notice by cultivation, and some of these naturally compare favorably with European varieties. The Green Gage is generally considered as the standard of excellence for dessert, and the Damson for cooking. No native, as yet, claims to reach the quality of the Gage, but for cooking the Damsons have many a rival. The most serious obstacle to the general cultivation of plums is supposed to be the curculio. Advantage has sometimes been taken of this prevalent belief in advertising new kinds as curculio

proof. It is doubtful if any kind of plum is wholly exempt, but it is well known that the natives are not nearly so liable to be entirely destroyed as the kinds commonly cultivated. In cultivating the natives it has been found that by closely following their natural habits of growth, the depredations of curculio are in a great measure avoided and in many cases entirely obviated, where fruit is produced in great abundance when growing wild. The trees are found in groups growing closely together, and often forming a dense, shady thicket. Indeed it is a rare thing to see an isolated plum tree bearing much fruit. Failure has often resulted, where the trees have been planted too far apart, not only from curculio but from want of fertilization. The tree sheds its pollen very quickly and a high wind or cold rain during the process, entirely prevents the formation of fruit.

When different varieties, that do not shed all their pollen at the same time, are planted closely together and properly cared for by cultivation, an abundance of fruit is reasonably certain. Failure to get good fruit often occurs from an indiscriminate selection of trees for planting. The form or appearance of a tree is no index to the character of its fruit. Where trees are to be taken from the woods, they should be carefully selected for the quality of the fruit. Though the general character of the fruit is quite similar, it is rare to find two separate groups bearing precisely the same quality; the very best, in some cases, within a few rods of the very poor.

The opinion is prevalent that even poor fruit is materially improved by transplanting and cultivating the trees. The fruit may be increased in size, and the texture will be coarser, but the quality will remain the same. In what manner or to what degree the fruit may be influenced by foreign fertilization, is not well known. The seed, however, will always exhibit marked changes.

A recent writer on this subject, says: "When fertilization is imperfect, the fruit degenerates, or forms in irregular shaped bladder-like pods. The probability is, that if fertilization fails no semblance of fruit is formed. These false plums are caused by excessive cold after the fruit is set. If a frost occurs soon after the plums are set, the seed or germ may be destroyed, yet sufficient vitality left to continue an abnormal growth of the covering or outside." No scientific efforts have yet been long enough continued to demonstrate, with what varieties to hybridize, or even how to cultivate to secure the best results.

The Iowa Agricultural College, under Prof. Budd, has accomplished more than any other public institution. The experiments there appear to have been directed in selecting from all parts of the country such varieties as give the best promise, and carefully observing their comparative habits of growth, qualities of fruit and their adaptability to general cultivation.

One of the practical results is the conclusion that no better varieties are known than some that are found growing wild along the Mississippi River in Wisconsin and Minnesota, and along the Missouri in Iowa. The Northern Iowa Horticultural Society, however, recommend one or two Chickasaws. The Miner is the only one that has been planted to any extent further north, but its lateness and irregular habit of bearing will not allow it to be compared favorably with some of the northern kinds. Several other Chickasaws, that succeed further south, have been tried here, but are short lived. Among those that have attracted unusual attention are the Mariana, the Robinson, the Neuman, and from several quite extensive experiments in cropping the northern plum with the Chickasaws. No marked satisfactory new kinds have been brought to general notice. Mr. J. B. Rogers suggests that the best results may be expected from cropping the different varieties of the same family of northern kinds and not attempting to do so with the Europeans.

If one can afford to wait, a good way to raise this desirable fruit is to plant the seed of the kind desired. If the seed is from a natural tree, and isolated, the fruit will be like the parent. Trees of some varieties will begin to bear at three or four years of age.

For successful grafting the work must be done as soon as the frost is out of the ground in the spring, sometimes a short delay will prove disastrous. Quite large trees may be transplanted without injury, if the top is well cut back. Sprouts from the roots will invariably produce the same kind of fruit as the parent. The largest, finest, best fruit will be produced where the ground is naturally rich or well cultivated. In regard to varieties, it is possible that just as good may be found growing wild as any that are yet brought to notice, but several kinds have been so thoroughly tested as to bearing, character of tree, and habits of growth, etc., that it is desirable to select from them rather than risk those that have not been tried. Whatever the soil or location, any one would be safe to plant the kinds recommended by the State Horticultural Society, bearing in mind that

if for market, selections must be made from such as are large, showy, firm in texture, and fair in quality. If for dessert use at home, quality only may be considered. For cooking and preserving, those in which the skin disappears give the most satisfaction.

* A recent writer, one who has experimented largely with native plums, and who is as well informed as anybody in regard to them, says, he has received the finest varieties with which he is acquainted, from the woods of Northern Wisconsin. Prof. Budd says we have some that greatly resemble the best European varieties. Several varieties have been recommended by the Northern horticultural societies, so that the most fastidious need not go amiss in selecting this desirable fruit.

Mr. Sias, from the Committee on Nomenclature, presented the following report:

REPORT OF COMMITTEE ON NOMENCLATURE.

Mr. President:

Your committee on Nomenclature, in accordance with the recommendations of the late lamented Marshall P. Wilder, whose opinions, aye, whose whole life work, will ever be held in sacred veneration by all true pomologists, would say that we fully appreciate his counsel, when he says: "Let us have no more long, unpronounceable, irrelevant, high-flown, bombastic names to our fruits. * * * The cases are very few where a single word will not form a better name for a fruit than two or more." A member of your committee pleads guilty to the charge of naming the Giant Swaar, and would like to see it changed to a name consisting of a single word. Having the right, from the originator, to name this choice fruit, would like to transfer the same to the Society; but, in honor of the originator, who was born in the great city of Paris, will suggest the name of Soiree.

Respectfully submitted,

A. W. SIAS,

A. W. LATHAM.

Prof. Maginnis, from the committee on awards of premiums presented the following report, which was, on motion, adopted:

* D. B. Wier. Lacon, Ill,

AWARDS OF PREMIUMS.

The committee on premiums and awards submit the following report. We have examined all articles on exhibition, and awarded premiums as per premium list:

APPLES.

	Premium.	Amount.
Display Wealthy, Sidney Corp, Hammond.....	First.	\$3 00
Display Wealthy, F. G. Gould, Excelsior.....	Second.	2 00
Display Wealthy, A. W. Latham, Excelsior.....	Third.	1 00
Winter Apples, A. W. Latham, Excelsior.....	First.	2 00
Winter Apples, F. G. Gould, Excelsior.....	Second.	1 00
Collection Hybrids, Whitney, D. Day, Farmington	First.	5 00
Best plate Hybrids, Whitney, N. J. Stubbs, Long Lake.....	First.	2 00
Best plate Hybrids, Meader's Winner, Sidney Corp.....	Second.	1 00

GRAPES.

Display Grapes, A. W. Latham, Excelsior.....	First.	\$5 00
Best plate, Rogers No. 15, A. W. Latham, Excelsior.....	First.	3 00
Display fruit in jars, Wm. Lyons, Minneapolis.....	First.	5 00

CUT FLOWERS.

Floral Design, R. J. Mendenhall, Minneapolis.....	First.	\$5 00
Collection roses, R. J. Mendenhall, Minneapolis.....	First.	3 00
Hand bouquet, R. J. Mendenhall, Minneapolis.....	First.	3 00

VEGETABLES.

Potatoes, Early Ohio, Wm. Lyons, Minneapolis	First.	2 00
Potatoes, Beauty Hebron, N. J. Stubbs, Long Lake.....	Second.	1 00
Potatoes, Great American, Wm. Lyons, Minneapolis.....	First.	2 00
Potatoes, Burbank Seedling, H. F. Busse, Minneapolis.....	Second.	1 00
Onions, Wm. Lyons, Minneapolis.....	First.	2 00
Onions, Red Wethersfield, H. F. Busse, Minneapolis.....	Second.	1 00
Hubbard Squash, H. F. Busse, Minneapolis.....	First.	1 00

SEEDS.

Display seeds, H. Webster, Lake City	First.	5 00
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PANTRY STORES.

Display canned fruit, W. L. Parker, Farmington	First.	3 00
Display canned fruit, Wm. Lyons, Minneapolis	Second.	2 00
Display jellies, W. H. Brimhall, St. Paul.....	First.	2 00
Display jellies, Wm. Lyons, Minneapolis	Second.	1 00
Jar mixed pickles, W. L. Parker, Farmington.....	First.	1 00
Jar mixed pickles, W. H. Brimhall, St. Paul.....	Second.	50
Home-made vinegar, crab-apple. L. E. Day, Farmington ...	First.	1 00
Home-made vinegar, Wm. Lyons, Minneapolis.....	Second.	50
Comb honey, L. E. Day, Farmington.....	First.	1 00
Strained honey, L. E. Day, Farmington	First.	1 00

WORKS OF ART.

Fruit painting, Miss Mary Grimes, Minneapolis.....First.	3 00
Fruit painting, Miss Ella Grimes, Minneapolis.....Second.	2 00

We recommend first premium on seedling of Wealthy, G. S. Woolsey, Minneapolis, three dollars; also first premium on McMahon White, Sidney Corp, Hammond, two dollars.

REMARKS.

We found upon exhibition some improved varieties of Dent corn, produced by hybridizing, by J. C. Kramer, which bears the appearance of being a very superior variety, and is spoken of as being early and very productive.

When we consider the peculiarly unfavorable character of the past season, the display was creditable in the highest degree. The bulk of the fruit display was made up of the Wealthy apple, in fine condition, which indicates that the Wealthy, a seedling produced in this State, is still a leading variety for winter use. Besides the seedling varieties entered for premiums, there were four other seedling varieties on exhibition. The one named "Peerless," exhibited by O. F. Brand, we consider, from its appearance and history, to be the best of all seedlings exhibited. One named by Peter M. Gideon is of very superior quality, and gives evidence of being a valuable variety.

Another by Jacob Klein, of Houston County, is of excellent quality and has the appearance of being a much longer keeper than the others. There was one plate of very long-keeping seedlings shown from Massachusetts, by Wm. McIntosh, Langdon, that is evidently a long keeper and an apple of fine appearance.

The exhibition of apple tree woods, by A. G. Tuttle, of Baraboo, Wis., is an interesting feature of the exhibit. He shows sections of twenty-five varieties of Russians and a number of varieties of Ironclads which, in a comparison of the woods, shows about twelve varieties of Russians to be hardier than the Duchess of Oldenburg or any American varieties.

Two cases of insects, by the entomologist, were an important addition to the exhibit.

[Signed]

D. R. MAGINNIS, Chairman.

JOHN S. HARRIS,

C. L. SMITH,

Committee.

REPORT OF SUPERINTENDENT OF EXHIBITS.

ST. PAUL, Jan. 21, 1887.

The exhibit was good considering the cold weather. There were on exhibition fifty-six plates of apples, including some seedlings of much merit, one by O. F. Brand, of Faribault, and one by George S. Woolsey, of Minneapolis.

Seventeen plates of grapes were exhibited. There was also a fine display of canned fruits and jellies.

Mr. H. Webster, of Lake City, had on exhibition eighty-nine varieties of home-grown garden seeds. Densmore Bros., of Redwing, showed a model of sugar evaporater. Mr. Seth H. Kenny, of Morristown, exhibited samples of sugar and syrup made from amber cane. R. J. Mendenhall, of Minneapolis, had a fine showing of roses and cut flowers.

WM. H. BRIMHALL.

The meeting adjourned till 2 o'clock P. M.

AFTERNOON SESSION.

FRIDAY, Jan. 21, 1887.

The meeting was called to order at 2 o'clock P. M., by President Elliot. The following communications and papers were read:

FROM CANADA.

GRANTON P. O., ONT., Jan. 17, 1887.

My Dear Mr. Hillman:

I should have acknowledged the receipt of your proceedings of your annual meeting before this, but for being laid up with a severe cold. I had no inclination to attend to any correspondence, nor indeed to-day am I hardly able to collect my thoughts.

At any rate, I hope you will have a grand and profitable meeting. I would like you would bring the Jessie up at your meeting and let it have all the prominence possible. It is one of the best berries ever offered to the public.

When I am able to be out to get one of your bills I will send it to you for a membership in your Horticultural Society. Please give my compliments to J. S. Harris, and for yourself every happiness here and hereafter.

Yours, etc.,

JOHN LITTLE.

FROM MANITOBA.

STONEWALL, Jan. 17, 1887.

S. D. Hillman, Secretary, etc.:

It would have afforded me intense pleasure to be present at your meeting to-morrow and succeeding days to listen to the interesting discussions which your comprehensive program must call forth. Although an unasked correspondence may seem like presumption, I venture to write in the hope that through you the following *cranky* notions may have an airing at your annual gathering.

WILD FRUITS OF MANITOBA.

Blue, red, green and yellow plums, wild grapes, red cherry, choke cherry, sand cherry (a low dwarf about eighteen inches to two feet), red and black raspberries, gooseberry and black currants. Cultivated fruits—Turner, Hansel and blackcap (without protection) raspberries; Houghton and Downing gooseberries; red and white Dutch Cherry; Black Naples and other currants; and strawberries of many varieties, including "Manitoba Wonder." W. B. Hall, of Hendingly, has also, I believe, succeeded in raising several varieties of crabs, and out of quite a number planted some fifteen years ago, two Wealthy apples now survive. Other persons have tried apples, but having, as I contend, imported from southern nurseries unsuitable varieties, and perhaps been the victims of unscrupulous tree humbugs, have not succeeded in keeping trees alive beyond the third year.

I have not yet tested anything beyond raspberries, gooseberries and currants, but am now all aglow with zealous eagerness to test fruit growing north of your northern borders, for the following reasons:

1. If the orchardists of Minnesota have partially succeeded, the difference in climate is not so great but we may have a chance of success.

2. The Russian varieties give promise of hardiness, some of same not being perfect in leaf, etc., in Iowa, and Prof. Budd reporting that such will do in the "*far North*."

3. Trees that have died here in the third year have invariably done so from the top. Might this not have been from imperfect circulation of sap, the stem and part of the roots being thawed out and top roots in frozen ground? Would a flat stone

in the subsoil under the tree not cause roots to spread and ensure perfect circulation? Would leaning trees to southwest shade sufficiently to prevent too early thawing out? What is best method of protection in this climate?

4. Would not top-grafting on *hardy* seedlings be most likely to succeed? An old orchardist once told me that the north side of a tree is closer grained—that grafting should invariably be done by working scion right side before, that is north side scion to north side stock. Whether there be any truth in this theory I know not. This I know, “old orchardist” was very successful. Hoping my rambling communication may be found worthy of a hearing, I remain,

Yours, etc.,

THOS. FRANKLAND.

MILBURN, N. J., Dec. 31, 1886.

S. D. Hillman, Secretary, etc.:

Inclosed please find article on “Grape Growing for Farmers.” This is the last work in horticulture I shall do in 1886. Hope it will meet your approval. My best wishes for a successful meeting for your Society.

Wishing you a happy New Year, I remain,

Yours truly,

J. B. ROGERS.

GRAPE GROWING FOR FARMERS.

By J. B. Rogers, Milburn, N. J.

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

Last fall your Secretary wrote me, asking for a paper giving plain directions for grape growing. Before complying, in thinking over what subject I should select in compliance with such request, the one at the heading of this paper came to mind, and meeting with the approval of your Secretary, I will endeavor to pen a few words, hoping thereby to induce the farmers of Minnesota to plant grape vines.

That the farmers of Minnesota can grow grapes of a superior quality is an established fact. Why they do not grow them may be a disputed question. Let us examine into some of these disputed points.

First — What varieties of the grape can the farmers of Minne-

sota plant with a reasonable expectation of success? The varieties to be planted must be confined to those known as early, and even then two divisions should be made. In localities having a short growing season, that is, sections in which late frosts in the spring and early frosts in the fall are liable to occur, plant the Lady, Janesville and Moore's Early. The Lady is a pure Concord seedling, having almost the vigor of its parent; early in ripening, of good quality, greenish white in color, and especially valuable in locations subject to late frosts in the spring, owing to its buds being very late in starting, thereby often escaping the loss of a crop. The Janesville is a very hardy, vigorous black grape; prolific, and of poor quality. It begins to color some time before it is ripe, and when fully ripe is as late as the Moore's Early in some localities (that is, one to two weeks before the Concord), yet, when viewed from the farmer's standpoint, the Janesville for the beginner is safer when success is looked for than the Moore's Early. The Moore's Early is said to ripen from one to two weeks before the Concord, but experience proves that like its parent, the Concord, it is very unreliable as to earliness in ripening. Soil and location often renders it as late as the Concord, and in such instances it would be too late for sections where the Janesville would mature. Farmers should plant both the Janesville and Moore's Early, and if the latter variety succeeds and ripens well, discard by taking out by the roots the Janesville. The Moore's Early is a hardy black grape, of excellent quality; generally lacking in vigor the first two or three years after planting, but when once established grows very vigorously. In sections of the State where the seasons between frosts is longer the list of varieties can be extended by the addition of the Delaware and Worden. The Delaware is a small red grape of the very best quality, and too well known to need further description. The Worden is from Concord seed, and may be said to be an improved Concord, ripening a few days earlier than its parent (less than a week), and is fast superseding the Concord for home use or near market. No farmer needs to plant both, and as the Worden is the better of the two, I have omitted the Concord from the list.

Second—What age should vines be when planted to succeed the best?

They should not be over two years old. Those generally selected are either extra one year or extra two years old. An extra one year vine is one that has made eighteen inches or more

of cane growth and has been selected for its superior root growth. An extra two year old is selected with special reference to its superior root growth. An extra vine will cost a few cents more than an ordinary one, yet in the end may result in making grape-growing a success instead of a failure. Purchase your vines from a reliable nurseryman near your home, and deal direct with the principal and never with an agent unless you are certain that the agent has full power to bind the nurseryman he pretends to represent.

Third—Number of varieties and number of vines of each variety to plant. Prudence would dictate the planting of each of the five varieties named herein: Lady, Janesville, Moore's Early, Delaware and Worden, and should a selection have to be made from these, take them in the order in which they are given, and at least three vines of each variety should be set, as long experience has taught grape-growers that it requires three vines of a variety to ascertain with certainty the value of any variety in a given soil. I have given a list of varieties and have arranged them in the order in which, were I going to plant vines on a farm in Minnesota, I should expect the best results from, taking into consideration all the merits and defects of the several varieties named in regard to vigor, plant growth, time of blooming, maturing of the fruit, etc., and from the five varieties named should expect at least three to succeed well.

Fourth—Planting the vines. This point I respectfully refer to the Minnesota State Horticultural Society to fill out.

Fifth—Care of the vines after planting. Mulch the ground for some distance around the vine and allow all the top to grow the first year. In the fall, after the leaves are all killed by the frost, prune the vine to a single stem or cane, leaving three eyes above the ground, and cut the same about an inch above the third eye, as cutting the cane too near the eye may cause the last eye to die from the drying out of end of the cut cane. When winter sets in cover the cane as left with dirt, and this closes the work of the first year. It is not necessary to stake the vines the first year they are set, but early the second year they should have a support.

The length of this paper admonishes me that although much more might be said yet, it must be deferred, and as I see from your programme this is to be followed by pruning and training of the grape, I leave all that to Mr. Pearce.

Farmers of Minnesota, if this paper should incite you to plant

the grape that you may eat of the fruit thereof, I shall feel well repaid for the time spent in writing the same. There is no reason why you should not raise all the grapes you need for your own use. Will you try? As I am writing this the sun is sinking in the west for the last time for the year 1886. To-morrow will usher in the year 1887. How many homesteads in the great Northwest will have grapes growing on them at the close of 1887 no one can tell, yet one thing is certain, if they are not planted they surely will not grow.

FROM PRESIDENT WILSON, OF IOWA.

ATLANTIC, IOWA, Jan. 14, 1887.

S. D. Hillman, Secretary, etc.:

I inclose you an essay on varieties of grapes for the prairies of the West, in connection with some other hints. The points I wish to make are deep planting, winter protection, and the proper fertilizing of the Rogers grapes. If this meets the approval of yourself and Society you may have it. I wish you a large and profitable meeting. Remember me to your Society.

Yours truly, SILAS WILSON.

BEST VARIETIES OF GRAPES.

By Silas Wilson, Atlantic, Iowa.

This is a subject of the greatest importance, not only to the people of this commonwealth, but to the people of the Northwest generally. It has been but a few years since we had comparatively no grapes for the northwestern prairies. Not until the introduction of the grape for the million, the Concord, by Mr. Bull, of Massachusetts, whose name was made famous thereby. The success of Mr. Bull seemed to create a new enthusiasm in grape growing which has developed for us a long list of good grapes that are well adapted to the prairies.

The only trouble now, in my opinion, is in getting the people to carefully follow the directions of those who have made grape-growing a success. There is no longer any question in my mind about growing an abundant supply of good grapes in every county in Iowa by planting only the hardy varieties that have been tested in this State, of which I will name a few before I close.

The next important step is deep planting, thorough cultivation, careful pruning and winter protection. I am of the opinion that more failures in grape-growing can be attributed to shallow planting and lack of winter protection than any other cause. You cannot injure grape vines nor rob them of their surface roots by deep planting, for they will always throw out surface roots, and these roots are often winter killed. Thus you can readily see the advantage of deep planting for the original roots, which are deep down, will remain uninjured and your vines will start off vigorously in the spring, and in the summer, with good cultivation, they will throw out another supply of surface roots.

The best black grapes in their order named are Worden, Moore's Early, Concord, Cottage, Telegraph, Ives Seedling and Janesville White Grape, Lady, Pocklington, Elvira, Lady Washington and Martha; the most promising new white grape, Empire State.

RED GRAPES.

Agawam, Roger's No. 15, Salem, Roger's No. 22 or 53, and Dracut Amber. In new red grapes the Woodruff Red.

Prof. Budd speaks in the most flattering terms of Haskell's Seedling No. 234 as being a valuable red grape.

My recommendation here of Worden and Moore's Early may be critical. I have not done this until after a careful trial of five years in the same vineyard with the same treatment. The Worden is from one week to ten days earlier than the Concord, and will produce from one-third to one-half more fruit of decidedly better flavor. It is as hardy as the Concord.

Moore's Early is a strong, robust grower, not quite so prolific as the Concord, but ten days to two weeks earlier, quality very much like the Concord.

Cottage is a good grape of the Concord type, ripening ten days earlier than the Concord, and is better in quality, but not so prolific as the Worden.

Telegraph has been underestimated. It should be planted in every collection. The vine is very vigorous, with large, dark foliage, very productive, large, compact clusters, ripens a few days later than Moore's Early.

Ives Seedling is one of the strongest growing varieties of the *Labrusca* family; productive, early fruit, in quality only fair: the strongest rooting variety known. Hence it makes the best root on which to graft the more delicate growers.

Of white grapes the Lady is perhaps the best, its only fault being a delicate grower. It needs fertilizing and good cultivation to get the best results.

Pocklington, a good white grape, has not been overestimated, only in its season of ripening. It is no earlier than the Concord.

Elvira is a good grape. If it was ten days earlier it would be a treasure for the Northwest. However, I regard it as the king white grape for the southern districts in Iowa. It is the hardiest grape I ever saw.

Martha, or White Concord, is a good grape; three or four days earlier than Concord, but succeeds well with winter protection.

Lady Washington.—This beautiful white grape has been overlooked. It is a success in the south half of Iowa with winter protection. A vigorous grower, with good foliage, almost equal to Ives' Seedling in vigor. A grape of high quality.

RED GRAPES.

Agawam and Salem are the best. Both should be planted close to Worden or Concord, as they are deficient in pollen and will not fertilize themselves. This is an important feature in growing Rogers' hybrids, for they all have the same characteristic. Wilder, Rogers' No. 4, will perhaps succeed better than any other of the Rogers without fertilization.

Dracut Amber is a very vigorous red or amber colored grape; very hardy, with good foliage; considered by many of rather poor quality.

Woodruff Red is a very large, showy grape, with Concord wood and leaf—very promising.

It is interesting to note that all our very valuable grapes for the North are from either the "Labrusca" or "Riparia" families. Hence I have no faith in any varieties not akin to the above. You will notice that the Worden, Moore's Early, Cottage, Lady, Pocklington and Martha are all seedlings of the Concord. In conclusion, let me impress upon your minds the importance of deep planting, winter protection and fertilizing the Rogers.

DISCUSSION.

Mr. Pearce. I would like to discuss the subject of grape growing briefly, although our time is limited. Mr. Rogers is an excellent authority on grape culture and a man whom I estimate very highly. It is probable that the soil in New Jersey is some-

what different from ours in the matter of ripening grapes. The experience of others here will perhaps bear me out in saying that there is fully two weeks' difference in time of ripening of grapes. A point in regard to Janesville; it colors its fruit very early and a long time before it is fully ripe. It is very sour and foxy; I dislike the quality. It answers very well for jam; in other words it is better than none. The vine is hardy and prolific; needs little protection; earlier than Concord but fully as late when fit to eat.

Mr. Cutler. I would like to inquire about the Lady?

Mr. C. L. Smith. That is very nice; Prof. Porter can tell us about that variety.

Prof. Porter. I have made a pretty full report on grapes and perhaps the shortest method of getting my opinion is to read my report.

Mr. Stubbs. In relation to Janesville would say I consider it a pretty fair grape on account of its prolific habits, especially with those not accustomed to raising grapes. Its quality is against it. Have known it to sell for more in market than Delaware because of its earliness.

Prof. Porter. Moore's Early is a variety I would recommend for cultivation; it is of good quality and will ripen where anything else of the grape kind will ripen in our State.

Mr. C. L. Smith. I think Moore's Early is the best variety we have.

Mr. Harris inquired if the Martha was earlier than Concord at Excelsior.

Mr. Gould. On my place it is not quite as early.

Prof. Porter. Martha has proven the most productive of all the white grapes in our list; color light green, bunches medium in size; compact; it has a tough skin; not as sweet as Delaware, but better than Pocklington.

Mr. Gould. Brighton is one of the strongest growers and will make one-half more weight than Concord under the same treatment.

Prof. Porter. I consider the Brighton for all purposes the best variety in our vineyard. It is one we can grow in this latitude and ripen, and it would be safe for planting in this State generally, and should be planted extensively. It is a prolific bearer, although there is a claim made in certain sections of the country that it is a shy bearer; it was not so with us.

Mr. Gould. It is my experience that it is a poor bearer, and

it may be owing to the character of the soil, but it is an excellent grape.

Prof. Porter. Mr. Gould has mentioned one point that should be kept in view. Of course "two swallows don't make a summer," but it should be remembered that certain varieties are better adapted than others for certain kinds of soil and exposures; and yet we often find different soils in the same vineyard. That is the case with ours; it is on an eastern slope from the bluff; the upper part is almost a drifting sand and varying from that to excellent soil. A portion is a rich prairie loam, although there is more clay than we usually find. My varieties run up and down the slope so the same variety is tested on the different kinds of soil. I make my report from the average product,—not the best nor the worst. We want to lengthen, if possible, both ends of our season. For protection we cover the canes with earth, leaving them on or under ground, where they remain till spring, till all danger has passed from frost. Care should be exercised with regard to uncovering the vines in the spring, not to do it at an unseasonable time; but you may hit it right one year and miss it another.

Mr. D. Day. In regard to the Worden I would say, I was rather lazy last spring and I did not uncover my vines as early as usual, and my brother took his up first. The result was his vines came out with a vigorous growth and produced a bountiful crop while mine did not succeed well.

Mr. Wm. Lyons, from the Committee on Vegetables presented a report on vegetables and small fruits.

REPORT OF COMMITTEE ON VEGETABLES.

By Wm. Lyons, Minneapolis.

Mr. President and Members of the Horticultural Society:

When our worthy president placed me on the vegetable committee he chose the wrong man. I don't feel competent to fill the position and give you a satisfactory report on vegetable gardening. I am more of a worker than a writer or talker, but it is always better to do something than nothing. I will try and give you a short report.

The past season, in many respects was more favorable to the market gardeners than the one preceding. When spring opened it was warm and rainy, all kinds of vegetables grew

rapidly. About the first of May a hard frost cut off some tender vegetables, such as tomatoes, asparagus, potatoes, etc., causing quite a loss to some gardeners. But in my opinion the loss was not near so great as that caused by the cut-worms. The previous season asparagus was good and brought a fair price.

Beans and peas were good. The crop was not large, but prices ruled higher than formerly. Early cabbage and cauliflower did well, late was almost a failure, owing to the ravages of the cabbage butter fly. Celery but few try to raise, and still fewer make a success of it. Our market is supplied mostly from Michigan. This is a subject that needs more light.

Melons this season were particularly good. The crop was large and brought paying prices, consequently melon-raisers were happy.

Onions were a fair crop, but suffered from drought in some locations; brought a fair price. On the whole, I think the crop was satisfactory to the grower.

POTATOES.

More attention is paid to this crop than formerly, and deservedly so, for it is one of the most important crops that we can raise near large cities. Many of the gardeners near Minneapolis plant from ten to forty acres each, and nearly always find ready sale at paying prices. Varieties planted early gave the best returns, while the late planting suffered more or less from drought. On the whole I think there was a good average crop. For early I recommend Early Ohio, Clarke's No. 1, Pearl of Savoy, and Beauty of Hebron; for late, White Elephant, White Star, Burbank, and Empire State. These are the kinds I have found the most reliable and profitable to grow, for market or home use. The Colorado beetle was more numerous than for a number of years; but a few doses of Paris green finished them.

SMALL FRUIT.

The year 1886 to the horticulturist was not a profitable one in many sections, particularly with small fruits. Strawberries were lower in price than ever before known in our market. For several days the price was from three to four cents a box. The old reliable and productive Countess is the variety that overstocks the market. I have over twenty varieties of strawberries growing, mostly in small quantities, merely to test their relative

value. I buy the new varieties and keep them for two years. They receive but ordinary cultivation in the matted row.

The most profitable varieties the past season were Countess, Crescent, Windsor Chief and James Vick; total failure, Cornelia, Mrs. Garfield and Henderson; further trial, Jewel, Emerald and May King. I have a large lot of seedling strawberries growing, one of which, in my opinion, is going to be valuable.

Raspberries—Philadelphia, Turner and Cuthbert are the kinds mostly grown for the market. Turner is the earliest, hardiest and best in quality. Philadelphia gives a larger crop of good berries, but they are not so salable. Cuthbert is valuable, but must have winter protection. Marlboro having fruited with me but one year, I don't know much about it; the berry is firm, very large, color bright red; if it proves productive it will be a very valuable market variety. The birds took them in preference to all others. Reliance is large and better in quality than Philadelphia. The Caroline gives good satisfaction; hardy, healthy and productive; too soft to ship. But very few black-caps are grown in my neighborhood, neither soil nor climate seems to agree with them. I have a few hills of Nemaha which gave a fair crop of good sized berries and of good quality. I have a lot of seedling raspberries growing; if any of them proves to be of value I will report to this Society at some future meeting.

Of blackberries the Ancient Briton proves to be the hardiest and most prolific for this climate. When the people learn how to grow it and take care of it I think it will be extensively grown for market.

DISCUSSION.

Mr. Allen. This is a subject I have been waiting for. It is one in which I am greatly interested, and I have been anxious to hear from the gardeners. I am handier with the hoe than with the pen, but it seems to me there are some things to be said on this subject, for when we look over this vegetable industry it certainly comes in connection with the horticultural, and should receive its proper share of attention.

DECAYED VEGETABLES.

I want to mention one matter that it seems to me ought to be changed, in some manner, if possible. If you visit these cities in June or July, you may often find in the market tons and car loads of decaying vegetables, that are certainly unwholesome

and which should not be put upon the market, although they are fairly flooded at times with this kind of food. I have seen boxes piled up ten or fifteen feet high that had been shipped in from a distance, filled with provisions in a decaying and rotten condition. This stuff is shipped here, of course, to be sold, and the freight or expressage must be obtained in some way. The commission men don't want to lose it, and the result is the article, whatever it may be, is pushed upon the market.

Now, I have no objections to their shipping their vegetables here from the South, provided it is wholesome and good. But the shipping of such quantities of it here sometimes has a tendency to hurt our markets. It has that effect with us.

When these early vegetables and green fruits are shipped here from a distance, in the spring, many persons will hanker for the green trash. Very often it makes them sick to eat it and they don't recover their usual health for weeks afterwards perhaps.

It seems to me that we might remedy this evil in part at least, and if we can we ought to do it. We make a practice of shipping a good deal to these markets from Red Wing, and we try to place it on the market just as early as we possibly can. Beets and turnips are easily transplanted. We have grown and placed on the market nice beets by the first week in June, also early potatoes, which we have shipped to and sold readily on the Minneapolis market.

BEETS AND TURNIPS.

If you set out beets too early they are apt to run to seed. We usually set them about the middle of March. We plant them in shallow boxes by the thousand and transplant. We find it of great advantage to do this. We have the soil well prepared and find they will stand quite a hard frost. It is well to take them out into the open air and expose them as much as possible to harden them up before transplanting them. In this way we raise beautiful beets. We can do the same with turnips.

TOMATOES.

Of course my time is limited, but I would like to say a word on the subject of tomatoes. It seems to me they are the next to fruit in importance and value. They come in just after the small fruit is passing away, and we have obtained big prices for them. Have sold the first tomatoes as high as five cents apiece.

for the first of the season. We have sold them in Minneapolis at three dollars a bushel as fast as we could get them to market. After the market is once supplied, of course the prices decline rapidly. But we calculate our first pickings will pay us well for the whole crop.

I have tried various plans for securing my stock of tomato plants. Have bought them in New York, in Illinois, in this State, and I have never had as good success with plants obtained elsewhere as with those I grow myself. I will give you my method if you desire to know how I raise tomato plants. I use the Canada Vick; it does not grow to vines; the vine is small, and the tomatoes mature early. Acme is our next best in market. I plant the seed by the first of March in my hot house, planting Canadas first. In a week or so I plant Acme. When they show the third or fourth leaf I transplant and remove to a cooler place. Plan to get good-sized plants, transplanting into deeper boxes and hold them in my hot house until about the middle of April, when I put them out. We have our pile of compost and manage to control them very well by setting them about the fifteenth of April. Have found tomatoes a profitable crop.

The following paper was placed on file for publication:

LAWS GOVERNING THE HARDINESS OF PLANTS.

By J. O. Barrett, Browns Valley, Traverse County.

Every observing and experienced horticulturist reports something different from all the rest, sometimes contradictory, and yet is right from his standpoint. Special environment involves special phenomena with facts corresponding. But who absolutely knows? After we have compared notes and summed up the testimony as to the hardiness of such and such plants, we query still, and remain humble pupils amid nature's interminable mysteries. To dogmatize in horticulture is an unpardonable presumption. Better lay our ears close to our plants, and listen to what they have to say. If I can suggest something worthy of investigation, it is enough.

We know that tropical plants, like animals, can not be immediately transported into our latitude and live. It must first be graduated by slow and careful methods. After successive years of patient trial under the law of the transmission of qualities,

they may become acclimated. It is not too much of prophetic hopefulness to say that, in due time, what are now considered non-hardy here, but hardy enough for the South, will be iron-clads with our best. If we faithfully pave the way, generations to come will grow all over the Northwest the Baldwin, the Spitzbergin, the Greening and the like, with greater facility than we now grow the Wealthy, the Duchess, and the Russians.

There is no certainty that a highly perfected variety, whether plant or animal, will retain its original points when transplanted beyond its native environment. Hardy in Russia may not always be hardy with us, as experimentation proves. There are local influences everywhere at work that elude the grasp of the stethoscope or the thermometer. Evidently every plant, and animal as well, contains, germinally, the constituency and impress of its origin, of its species, of its variety, of its complex relations, through all the ages of its evolution. If this be so, it requires but a special environment to call out a corresponding force or quality. But here we are lost in mystery again. We are unable by any art or analysis to determine how a special tinge inheres with the germ in the seed; how plants are locally zoned; how the shadow of one tree upon another may strengthen or weaken it; how an underground pebble, shaping a fibrous root, may feed or famish the stalk; how the rustling touch of a neighborly leaf may divide the sunshine, depleting power of endurance; how the thermal reflection of a sheltering rock or sod, the kiss of a dewdrop or zephyr in the stilly evening, may give texture and mould to a plant, imperceptibly defining whether it belongs to the torrid, the temperate, or the frigid classification—hardy to live or non-hardy to die, when transplanted to stand alone.

As best we can let us look a moment within the circle of environment. Scientists have demonstrated that living things are in constant, tremulous motion; that whenever two bodies are synchronous, or in concord relative to each other, there is a manifestation of force or growth in new form. To account for phenomena they accept the ancient hypothesis of an ether, which, as Prof. Tyndall presents it, "conveys the pulses of light and heat, not only fills the celestial spaces, bathing the sides of suns and planets, but it also encircles the atoms of which these suns and planets are composed." The atoms are differently keyed in different bodies; hence, their resultant motion is different, as demonstrated by our sensations. Take, for instance, several pieces

of wood from different species of trees of the same size; strike each with a hammer, and we hear different sounds. If we could have an adjustment delicate enough, the same phenomenon would be observable in the same sized blocks clipped from trees of the same species and the same variety, proving no two things are alike in all respects. If we ask for the cause of this, we shall have to content ourselves with the fact, that by some mysterious, molecular structure, some bodies are more sonorous than others, and keyed unlike. So it is relative to the ether-conveyance of heat and cold waves. Some bodies are good radiators, and some are bad radiators; that is, some are so constituted and keyed as to communicate their motion freely with strong undulations of the ether that conveys such motion, while other bodies do not so powerfully communicate their wave-action. With a sun-glass focalize a solar beam in the air, not a particle of heat is sensibly evolved; put your hand in the focus, it may draw a blister; put wood in there and it bursts into a flame. Transparent bodies like pure air, or colorless glass, or ice, or snow, are incompetent to absorb luminous rays. A purely luminous beam cannot harm a single specula of an ice crystal. It is not the "shine" but a body of dark rays emitted by the sun, that melts the snows and the glaciers, and quickens slumbering forces into organic form.

As the atmosphere is a poor absorber and radiator of heat, and the ground a good one in this respect, the inference to be drawn from these phenomena, is, that protection to the roots of a plant is of more vital consequence than protection to its stem, as we have experimentally learned. A black body, like our prairie soil, absorbs and radiates heat more powerfully than a lighter colored soil. This scientific fact suggests that the frequent loss of our small fruit plants, such as raspberries and blackberries, dirt-covered for the winter in our prairie country, is due, largely, to the great heat-absorbing and radiating qualities of our black, sticky soil, and that a lighter colored covering or mulching, snow especially, or even sand, such as the Russians apply to their orchards, or old, broken straw is more protective. We have learned by a losing trial, that black tarred paper tied round our fruit trees for the winter, kills more trees than rabbits can; that white envelopes, such as newspapers, are safe every way. The difference is owing, doubtless, to the law in question.

Let us apply these simple discoveries relative to the wave action of things. Here is a clump of apple trees, apparently of the same degree of hardiness, healthful conditions being the

same. Keep in mind the fact that each possesses its own individuality, having an imperceivable constituency peculiar to itself, and locally occupies a different angle from all the rest in respect to its receptive or radiative force under the ethereal action of heat and cold waves. One tree responds, another does not so well respond; in other words, the undulations of the ether conveying the heat or cold waves are synchronous with the one and jarring in the other. Perhaps an analagous illustration will aid us here. Sing into a piano; a certain string responds. Vary the pitch of your voice; the first string is silent, but another answers back. Change again the pitch; the first two cease to vibrate, and a third awakes to melody. As you alter the pitch, you change the form of motion communicated by your voice to the air, which in wave-action trills upon strings that are in accord. If a heavy blow be struck upon the sounding-board, every string will feel it, catching up what molecularly corresponds in pitch, those of higher tension with sharper report, perhaps injuring their sonorous properties. If our data be correct and illustration applicable, it is obvious that it will make no material difference *where* the tree is struck by the calorific waves—unless position gives difference of temperature; but it is certain that all parts of the plant, from atoms to cells, by reflex action are affected; and the hurtful jar will be at the weakest point—in the root, or stem, or twig, or leaf, on the north or south side, or any other side that is vulnerable. As a blow or disease centres in the weakest organ, so any adverse influence lodges where the plant is weakest. It is no matter of surprise, therefore, that our plants, being diversely located and conditioned, are diversely injured by the same force at work. Whatever breaks down the nerve filaments of the human brain, or the cellular tissues of a plant, is sure ruin. Where a weakness obtains through starvation, gluttony, or other debilitating agency, a plant is, of course, the more liable to succumb under the trial of its strength. If one ingredient only is deficient, say carbonic acid, which furnishes mainly all the vegetable material out of which the plant is evolved, or if robbed of its sustenance by a too thick relationship with other plants, but a slight jar may hasten its death. To live in our battling world, a plant, like an animal or a human being, must inherit and acquire healthful tendencies. Calorific waves fall upon it like so many strokes of a hammer, and, if long continued, crumble or weaken its molecular structure. It is to a plant what a “sunstroke” is

to a man. When a magnet is subjected to a white heat it loses its polarity and can never be restored. Right here is a matter upon which our more learned professors should enlighten us—how and to what extent electric forces apply to plants, and what environing conditions will injure or destroy their circulatory polarities.

A critical period is when the sap goes up from the spangoles for the development of buds and leaves. These not being unfolded enough to educe a balancing exhalation, an excessive solar heat in a dry atmosphere may dam up the flow, overcharging the variform tissue, or circulatory ducts, resulting in a greater ruin than that from the combined forces of an Arctic winter.

Last spring I had occasion to remove some seedling apple trees. To all appearance they were generally in excellent condition, root and branch. In a few days the buds swelled into incipient leaves, and the same promising feature characterized the older trees of the permanent orchard. Of a sudden the heat of a midsummer burst upon us, growing hotter week in and week out. Ere the temperature lowered I noticed signs of wilting; the tender leaves dried up, and soon three-quarters of the old and the new orchard was dead. I detected a sour effluvia in all the dead candidates, indicating that the starch or saccharine properties of the sap fermented in the hot circulation. The few that survived the shock were more or less discolored, "black-hearted," traceable, no doubt, to the same cause. During the prior winter another killing force fell upon the plants in our section. We had no rains to any marked extent from August to March; now and then a shower of snow, soon melting away. The soil was so dry it could not freeze for many weeks, even in December and January. Of course thousands upon thousands of young plants winter-dried up—effect the same as in a summer drought. My first impression was that my apple trees were thus imperceptibly injured, the same as a field of one-year box elders, and probably they were thus weakened, there not being enough of the nutritive salts derived from water held back in the roots for the summer's vegetation. But on closer inspection I had to rank the winter calamity as secondary and not primal, for strawberry, blackberry and other small fruit plants, shipped in a perfect state of health, wilted and died in about the same percentage as the apple trees; after having developed their buds, looking green and promising, they were paralyzed by that

spring's intense heat. Cold and heat — heat and cold — are but relative terms; their molecular action comes under the same law. If the circulation is uniform throughout, irrespective of the general temperature — for circulation obtains, though feeble, in a frozen plant — there is less danger, doubtless, than when a part is clogged up by a freeze or sudden thaw.

In his interesting narrative of his "Voyage of Discovery toward the North Pole," Dr. Hayes, after citing to a like testimony of Dr. Kane, informs us that when the Greenlanders shoot a deer they immediately eviscerate it; otherwise it will soon putrify, even when the temperature is far below zero. His explanation is this: "The animal is immediately frozen on the outside, and there being thus formed a layer of non-conducting ice, as well as the pores being closed, the warmth of the stomach is retained long enough for decomposition to take place, and to generate gas, which permeates the tissues, and renders the flesh unfit for food; and this view of the case would seem to be confirmed by the fact that decomposition occurs more readily in the cold weather of midwinter (in the Arctic regions) than in the warmer weather of midsummer." His explanation appears tenable, and applies to plants as well. Such phenomena lead us to conclude that any great thermal disparity in the cell layers of a plant produce like results, irrespective of the season; that a gradual freeze or thaw is less dangerous than a sudden one; that when the entire plant is solidly frozen up, with the ground holding its roots, it may be safe; that the transition by heat to circulation is the perilous moment, always perilous if any weakness inheres; that the drought of summer or the dry chill of winter acts by the same law, resulting in injury or ruin.

Considering all the adverse circumstances and conditions which we have to encounter and try to avert, it is a wonder that in a climate like ours more of our plants do not prematurely "give up the ghost." But experimentation gives us hope. We know that some plants are adapted to almost any temperamental changes. Why, is yet a mystery. We know not how the entanglement of cohesion affects the hardiness of a plant; nor how air or fluid within the circulatory ducts clothes it with resisting power against heat and cold.

A propositional summary of the matter in question is this:

That a plant is safe when competent to respond to the calorific waves in a balanced circulation and development.

That danger ensues when the waves are too quick and intense for the strength of the plant, as in a "sun stroke."

That when, as in a hot spring, the radiation, or better exhalation, is not equal to the absorption, there being more ascending gap than the distributive channels can utilize, a gorging gas ferments in the cells, and decay follows.

That when a plant is so molecularly constituted as to be impervious to the undue action of calorific waves, their motion being intercepted, as though it were clothed with a heat-proof coating, like that of asbestos, it is reliable and entitled to the rank of "ironclad."

Whether these views be deemed correct or not, we are agreed in one thing—at horticultural success hinges largely upon temperamental uniformity. The extremes of heat and cold do not necessarily depend upon latitude or altitude. The maximum and minimum of temperature is greatest where the air is driest. In the far southern plains of India, in Australia, in Central Asia, or wherever drought reigns supreme, there is the intense action of heat and intense reaction of cold. In the Sahara of the torrid zone, the temperature rapidly runs down to freezing when the solar rays cease to infringe upon the burning sands. Where there is little or no vapor overhead to check the calorific drain, these extremes obtain. Being dry, our prairie climate is subject to them; hence the battle we have to fight. There seem to be two ways out of our difficulty—either to continue our long yet hopeful experimentation, acclimatizing a special class of plants, or else undertake the herculean task of changing our climate from a dry condition to one of a more uniform humidity, thus fitting it for the introduction and growth of a greater variety of plants, including cherries and pears, and perhaps peaches.

So long as we have to pet our plants and put dresses on them, while out in the cold, success is precarious and profits thin. In the long ago, when we were school folks in New England, or somewhere near the sea coast, nobody had to fret and stew as we do to make a tree live. It would grow in spite of us. We did not have to blanket the raspberries, and blackberries, and strawberries. They laughed at our neglect and proffered luscious fruits unearned. If we could have such a climate restored, with such a soil as ours and knowledge of plant treatment, would we not have in our adopted country a very paradise? But, you say, we are working in that direction; true, but at a "poor, dying rate." While we are building up, forest vandals are tearing down. The "big woods" of Minnesota that have exerted a

most beneficent influence upon plant growth in the more eastern parts of the State especially, are receding faster than our forests are growing in other directions. And when they are leveled down by the woodman's axe, not only will winds be fiercer in the upper Mississippi valley and the air drier, but your luck here in the fruit line will be more like ours on the now almost treeless prairie, fortuitous as our temperamental vicissitudes. Just beyond the western border of our State, in Dakota, are the Coteaux, a high and long rampart of hills, with innumerable ravines, heretofore thickly studded with forests, down which babble the crystal brooks.

The Sissetons there, who have land charters, follow the example of the pale faces elsewhere, cutting and slashing down the century trees for fuel-sale in our markets, and the prairie fires, set by careless Indians or whites, lap up the rest. Unless the national government soon interferes, prohibiting such vandalism, the now beautiful Minnesota will dry up at its more northern and western sources. There is a similar depredation, and on a more gigantic scale, in Montana, in Colorado and other Rocky Mountain states; if not speedily arrested and forests restored, not only will the facilities of irrigation be literally destroyed, but the more western plains will be transformed into dry and parching deserts. And what is still more alarming, congress intends to put on the finishing stroke by abolishing the timber-culture act, the enforcement of which—granting special abuses, as in everything else—has blessed the prairie country with here and there a growing forest. If there be a personal devil to "hand the wretch to order," he certainly is busy destroying our forests, for thereby humanity can be most cursed.

As an organized body that knows what it is about, let us storm our legislature, and by it storm Congress, to save our great forests from utter extinction. Let us demand appropriations to change our ravines and basins and lesser lakes and rivers, into a grand reservoir system, holding back the spring surplus waters now running to waste, whence to draw not only navigable depths for commerce, but aqueous refreshment for all the thirsty plains below. Let us demand a law that shall not only encourage by a money consideration, but compel landholders to plant forests, making such planting on timber claim or homestead inhere with title. When this feasible enterprise is put into execution on the vast scale that it merits, there will be less floods, evaporation checked, extremes of heat and cold mitigated, our climate

milder grown. When our rich Northwest is thus mantled over with a protective humidity, a new and more plentiful variety of plants will thrive alongside the old "ironclads" on the farm and garden and nursery, and

"The world will be the better for it."

TREE PEDDLERS.

Mr. Grimes, from the committee on the subject of tree peddlers, presented the following report, which was signed by all the members of the committee:

WHEREAS, Numerous complaints have been made before this Society during its present session that unprincipled tree peddlers have from time to time, and especially during the past year, represented that they were selling Minnesota nursery grown trees and stock from nurseries located in this State, and

WHEREAS, Such representations were entirely false in fact, and upon proof it was found that said nursery stock was propagated and grown in a distant state, far south and east of this, and was wholly unreliable here, and that disappointment and losses have been almost invariably the result from purchasing such trees and plants and that the people of this State have been and still continue to be swindled in open defiance of all honor and fair dealing;

NOW, THEREFORE, We, the Minnesota State Horticultural Society, petition your honorable body, the legislature of the State of Minnesota, to enact such laws for the better protection and well being of its citizens as shall compel all tree agents selling foreign grown trees and plants to take out a license in the county or district in which they intend to sell, such license to be granted only upon the sworn application of such agent stating the facts in the case, and especially by whom employed and where the stock is grown.

Second—Making it unlawful for any such agent to sell without first procuring a license; and upon conviction of making such sale without such license, before any justice of the peace having competent jurisdiction, imposing a fine in any sum not to exceed one hundred dollars, or imprisonment in the discretion of the court.

Third—Making false representations in the sale of nursery stock, in order to deceive the purchaser, and thereby induce him to buy of them, upon such false representations, making it a misdemeanor punishable by fine or imprisonment, or both.

Fourth—Also in making the principal accessory in all transactions where agents are employed by him, and to be held responsible for his acts where fraud has been practiced and sales effected thereby and wherein the purchaser has suffered loss.

Fifth—Nurserymen who reside in the State and are doing

business exclusively in Minnesota nursery grown stock shall not be required to take out such license, but shall in all other respects be subject to the provisions in the preceding sections.

Sixth—Requiring the applicant for license to pay all reasonable fees for the same, and also to give bonds that he will fully comply with the foregoing.

DISCUSSION.

Mr. Dartt. I suppose the report is before the house for discussion. There is one point that strikes me as not being exactly right, and that is where it proposes to hold the principal responsible criminally for the criminal act of his agent. I move the adoption of the report.

Mr. Latham. By this report it seems the object sought to be brought about is to secure legislation to prevent parties from putting upon the farmers of the State, nursery stock grown somewhere else, under the representation that it is grown in some nursery in this State. I don't understand how that object is to be secured. It simply requires a license of the agents, and they will go around and sell as before and will still sell shrubby trees, etc.

Mr. C. L. Smith. We will be better off in this respect: when the agent attempts to sell foreign grown stock attention will be called to the character of the stock he is selling; and we desire to have it made a criminal offense to represent it as Minnesota stock; if he makes such representations he commits a misdemeanor and is liable to fine and imprisonment for such offense.

Mr. Latham. I don't think people generally will understand that; it seems to me the license itself should be extensively advertised to show where he was from. To make any law efficient, to protect the buyer, it seems to me a bond should be required as is done in the case of an insurance company; a sufficient and satisfactory bond should be deposited with some state official, holding him to accountability for the results of his agency.

President Elliot. That is contemplated.

Mr. Harris. We expect a man will deposit a bond with the secretary of state.

Mr. Dartt. There is a question I was going to raise in regard to an agent selling stock that was partly Minnesota grown and a portion of it, or the bulk of it, grown somewhere else.

Mr. Grimes. It would be just as much of a fraud if it was represented as being all grown in this State.

Mr. Latham. That hits every man in the State; it is absolutely impossible to comply with the requirements; everybody knows that no nurseryman can keep all the stock he advertises; if he cannot buy in Minnesota he has to go to Wisconsin, or Illinois, or somewhere else, for it must be had.

Mr. Cutler. Mr. President, it seems to me the object is to prohibit a man from misrepresenting. Suppose a man who is a nurseryman has an agent on the road; I ask him where the stock he sells is grown; he says part in Minnesota, part in New York; that would be all right, I would buy it knowing what I was buying. But when he says it is wholly grown in Minnesota, according to the provisions of the proposed act he would render himself liable; I don't see any injustice in that at all.

Mr. Latham. Mr. Chairman, I think that ought to be changed; it is impossible for the agent to know where all this stock comes from.

Mr. Cutler. He might countermand his order in such case.

Mr. Latham. An agent can not know where all the stock he sells is grown, whether at Excelsior, at Lake City, or any other particular place, but he has to get his stock somewhere and if he takes an order he will get it filled somewhere. I don't believe there is a delivery made of any amount where the stock is all grown by the party selling.

Mr. Gould. So far I have avoided taking any part in this "controversy," which I will refer to in that way. I have no doubt it is well intended by the parties who have pushed this scheme; but I have been in the nursery business to some extent for sixteen or eighteen years. I am rather out of it now. But I do pretend to know something about the business and the men that are carrying on this business in Minnesota; and I regard this whole business as a sort of boy's play, when we undertake to secure legislation to fit the case; it is impossible to do it. While it is perhaps well enough to agitate the question here—I suppose more or less of it goes into the record—I think it is expecting a little too much to suppose that the legislature will pass any enactment to protect farmers from the ravages of tree peddlers.

Mr. C. E. Smith. Well, they *will* do it.

Mr. Gould. I want to say further, until you can educate the farmers they will be imposed upon. You might as well have the lightning-rod men licensed and with just as much propriety, and these washing-machine men, the dairymen and horsemen and

new cattlemen, and thus go through the whole list of everything they buy. Why, I should think the farmers would resent all this thing. They will buy of a man who will charge them about three or four times what a thing is worth quicker than they will buy of one of us poor fellows, who sell just as low as we can and live, and sell them stock that we raise, and at a much lower price than that brought from a distance. People favor the agents every time who charge high prices. This is no theory of mine; I know what I am talking about, and I am telling the truth. An agent, for instance, tells about what I have got; how it will compare with anything that can be procured elsewhere. They are looking for something better; they want a gooseberry two inches in diameter, as big as a Wealthy apple, and if they can see a nice picture of one, greatly magnified, they are bound to take it. One of these same men who had given an agent of mine an order for three or four dollars' worth of stock and thought it was a pretty large price to pay, gave one of these travelling agents an order of twenty or twenty-five dollars. This man came by my place after that and told me he was fool enough to buy some of their stuff, and I told him I was glad he did so—possibly after he had a little experience he would know who to buy of; I didn't pity him if he was victimized, as he did not seem to wish to favor his neighbors, but expected to get something which it was impossible to obtain.

Now, I don't believe we can accomplish anything in this direction further than the discussion of the subject may develop something that may tend to put those on their guard, who may have an opportunity to read it.

Mr. Pearce. This is a good deal like locking the door after the horse is stolen. It is said that lightning never strikes but once in a place. I would say, let the innocent individual throw the first stone. As a matter of fact I know that trees are imported by our nurserymen; I have done it myself. I buy stuff raised elsewhere, although I never import trees. I think this thing will regulate itself in a short time. Agitate the question and get it before the people. They are not buying much of agents of late. In some places they would almost go for an agent with shot guns and dogs. I think passing a law of this kind would be of no benefit whatever. It would help every nurseryman in the State—I know it would. It would stop the retail business over the country. The best way is to go straight along and do a steady business. That is the true way. It will be a dead let-

ter. It will not be a popular law and will never operate as you think it will, at all. You pass a law requiring a license and it would put a tariff on the stock sold which would come out of the consumer.

Mr. Cutler. Mr. President, I can not see why the gentlemen who are in this business of selling nursery stock can oppose this measure. As Mr. Pearce has stated it is going to help him because it will drive these other fellows out. I believe we have laws for our protection and for the protection of the poor. Mr. Gould's orchard is protected by law from the depredations of thieves; a stringent law has been passed to prevent stealing of fruit. A few years ago a law was passed in regard to patent rights, and have we seen these men running over the country lately as we used to? And now, for the protection of the poor, living out on the prairies, I would like to see such men protected, as well as the nurserymen. They will buy trees when they want them. If I want a dollar's worth of sugar I go to the store and buy it, and I know where to get it. We can get along very well without the help of these sharks that come here from some other state to impose worthless stock upon us.

Mr. C. L. Smith. The saving in one year would be enough to pay the running expenses of our Society since its organization.

Mr. Sias. In regard to one point my friend Pearce made. He says there is no use of locking the stable after the horse is stolen. There are a great many horses in the stable that have not been stolen. It is our duty to protect those animals. Laws are made for the lawless. There is nothing in this measure that can harm an innocent dealer. It is not intended to injure our nurserymen. I can not see anything that would injure my business, or Mr. Gould's, or Mr. Latham's. If you will study it carefully I think you will reach the conclusion that it can not hurt anybody except those who are doing a fraudulent business. It has been shown that these operations complained of have been going on here for years. I have been trying to compete with these fraudulent tree dealers for about twenty-five years. We have tried repeatedly to pass something in this State Horticultural Society, that looked a little as though we didn't believe in such practices. Last year our president, I am sorry to say (and he is an old friend of mine), threw "cold water" on the whole thing. We could not pass a single thing that looked like taking any action in the matter. We have a chairman now who is willing to do something. He is not afraid of these men. He has

told us plainly that he is willing that we should express our sentiments in regard to fraudulent transactions. There will be no difficulty in getting something accomplished in this matter if we look at it in the true and proper light.

Mr. Dartt. So far as the canvassing is concerned I am not much interested in it. I have looked the matter over and I made up my mind that a good, straight, honest man wouldn't be a successful canvasser, and one who was not such I did not wish to trust; so I don't have any canvasser. That is the way it used to be and the same thing still exists; it is almost a necessity for a man who would be a successful canvasser to tell all about the bright side of the story and not say a word on the other side; in other words that he shall misrepresent. Whether this will be the best thing to remedy the evil, I do not know; but I do know that there is danger in asking the legislature for something that you don't want. This is the proper place and time to see and understand where any defect may be, for the presumption is that our representatives in the legislature don't know as much about this as you do. They might pass a law that would be a damage to the best interests of the State, in regard to fruit culture. A few years ago there was a bill before the legislature making it a criminal offense to sell blackhearted trees; I don't know but it came very near passing. If such a law were to be passed I could not sell a tree, for after every severe winter every tree is blackhearted; I think I am safe in saying that every standard apple tree is more or less blackhearted. We should not ask for a thing that is not well considered; we can better trust the Society to say what legislation is needed than to trust to the legislature. It may be that this is just right, and if it is it is just what I want; I want fraud punished.

Mr. Cutler. We have a "farmer" legislature and there will be no difficulty in securing such legislation as is in the interest of farmers.

President Elliot. I see this is going to clash with some of our ideas as to the method of selling trees. Last winter when this subject came up I was very much interested in it and watched the discussion very closely as well as those who took part in it. I see we are selfish beings and we are apt to work for selfish objects. I have taken pains to look over the record a little in regard to tree peddlers. We can go back to 1852 and then back to 1840 and we shall find this same "pestiferous" tree peddler. He started out in Indiana with a bundle of cions; he was top-

working trees and would not only put in cions that were untrue to name, but would take several varieties out of the same bundle. These fraudulent practices have been continued year by year; they have the thing down so fine now that they will take most anyone—I don't care how well he is posted in horticulture—and they will swidle him from the word go!

In order to put a stop to this thing, and the only way in which to reach the thing, it seems to me, is through legislation; and if we can not get our rights through legislation, perhaps the sooner we quit business as a Society the better. When people can come in here and throw out insinuations that unless we do as they say that they will stop our appropriations, why I think it is time for us to move. I have corresponded with parties in other states and find others of the same opinion with myself in regard to this matter. If Dakota, Iowa, Wisconsin and Minnesota will unite to secure legislation in this regard, I think we may get a law that will protect our poor people; our immigrants that are coming in here, those who can not speak the language, who can neither read nor write, those who fall easy victims to the wiles of these irresponsible tree men, those who are an easy prey. I think we have a legislature now that will act in the interest of poor people and the farmer, and the members of that body will gladly help us out. While this proposition, as set forth in the report of the committee, may not be exactly what is desired, the subject can be brought before the proper legislative committee to formulate an act that will be for the best interests of the State at large.

Mr. Dartt. I suppose our committee on legislation will look after the matter.

Mr. Latham. I do not feel fully satisfied with this yet; I think the matter should be well considered before definite action is taken. If the motion is insisted upon I think I shall move to indefinitely postpone action upon it at this time.

Prof. Porter. It strikes me that we are claiming a monopoly in this interest. This discriminates in favor of Minnesota men; this contemplates the passage of a law for the regulation of the transactions of outsiders, but it seems to make no difference as to the character of the operations of the nurserymen of Minnesota.

Mr. Gould. I want to repeat some things I said before. It seems to me this is going to interfere largely with the operations of nurserymen in this State. I am not in the nursery business myself, but don't like to see a foolish thing done. If it was not

for agents there would not be much stock sold. If it had not been for tree agents there wouldn't have been enough trees in the State to build a crow's nest.

A Voice. There isn't now!

Mr. Gould. I believe the only thing to do is to let the thing regulate itself. I don't believe in protecting fraudulent operations — I don't believe in that; I will set my business up beside that of any man in this building or anywhere else; people know what I have been doing. I believe in the tree peddler just as much as in the Methodist preacher. You pass a law that ties this thing too closely and you destroy the business of nearly every nursery. A man must grow everything he sells. He can't always do that, and it is not best that he should; one man can't do everything. When an agent comes around and the people want to buy their stock they have a right to have it.

Mr. Harris. I was raised in Ohio. Some forty years ago that state was overrun with horse thieves. They didn't dare to own a horse worth over forty dollars until they went to work and drove out the horse thieves. After they did that they could raise and keep as good horses in Ohio as in any other country. I do not believe in building up monopolies at the expense of the people, and this proposed measure is intended as a partial check on the monopoly business. These deadbeats get together and organize a corporation and send their agents broadcast over the country, selling the most worthless and miserable stock that can be produced. They have carried on these operations so long and so boldly, robbing farmers of their time and money, that farmers are about discouraged in trying to grow fruit, and those who have been trying to do a legitimate business as nurserymen have also become very thoroughly discouraged. It is time that some action should be taken in this matter.

The report was then adopted.

Mr. Cutler. I wish to call attention to the action taken yesterday by the Society, in passing a resolution in effect requiring the secretary to omit the names of nursery firms from the report of the discussions on this subject. (See page 280.) It seems to me to strike out the name of L. L. May & Co. wherever it occurs in our proceedings will require the striking out of the whole proceedings in regard to this firm. I believe this resolution was adopted without being properly understood. I did not come down here to spend my time and work for nothing, and I do not suppose the members desire the larger portion of our dis-

ussions on these matters stricken from our records, I therefore would move to reconsider the vote whereby this resolution was adopted.

Mr. Sias. Before this motion is put I wish to say a word. No doubt Prof. Porter, in offering this resolution, did so in good faith. He is a friend of this Society and has admitted here that he knew nothing of this firm of L. L. May & Co., that he never had any business transactions with them. There are others who have had transactions with them and are fully aware of the facts of the case. Had he known all the facts I am satisfied he would not have offered the resolution. I do not suppose the Society understood fully the nature of the action being taken and therefore would be willing to rescind the vote then taken.

The motion of Mr. Cutler was adopted.

Mr. Gould. It seems to me this is going on in a curious way; I should like to have a record of the vote taken so it will be known how we stand in this respect. It has been the custom of our Society to keep out personal matters and I fear we are getting ourselves into trouble. I hardly know how to act in the matter.

Mr. C. L. Smith. Mr. May came in here and requested personally to have an opportunity to be heard; having gotten much the worst of it he was pleased to have someone get up and help him out of it; that is exactly what we did by passing that resolution of Prof. Porter's. I want the discussions had to go on the record as they occurred. I am not ashamed of it at all, and those who are opposed to this can vote against it.

The motion then being upon the adoption of the resolution offered by Prof. Porter the motion was lost.

Mr. Brand offered the following resolution, which was adopted:

Resolved, That a committee of three be appointed by the chair to investigate the extent and quality of pine lands belonging to the State, from which the timber has been cut, their location and the practicability of their protection from fire and improvement by planting, thinning and cultivation, said committee to report at our next annual meeting.

Upon the foregoing resolution the following committee was appointed, *viz*: O. F. Brand, J. W. Boxell, and C. L. Smith.

Mr. Smith was then called upon to address the Society on small fruits.

THE CULTIVATION OF STRAWBERRIES.

By J. M. Smith, Green Bay, Wis.

MR. PRESIDENT: I will try and be as brief as possible, and if I don't make myself understood I hope the members will not hesitate to ask questions and I will try to answer them if I can. I shall aim to talk to you briefly upon what I take to be the needs of farmers.

People in the cities can learn to grow strawberries for themselves, or they can buy them. There is no great secret about growing them. But I shall speak more directly of their culture on the farm. Any man that can grow a crop of corn ought to be able to grow strawberries successfully, and any man who will grow a good crop of potatoes will grow a fair crop of strawberries, providing the conditions are right. The question is, how will you do it?

METHOD OF SETTING.

When I can have plenty of manure, I manure heavily. Make your land rich enough to raise a good crop of corn or potatoes, and set it to strawberries. Upon a farm where land is plenty and labor is often scarce, I would recommend to plant them so as to do most of the work with a horse, or as much as possible. Hence it will be necessary to put your rows a greater distance apart. I would plant, say three and a half feet apart—three feet at least; plant in long rows, so you can cultivate more easily. Set the plants from twelve to fifteen inches apart in the rows. If you are going to set Crescents you may set them safely two feet apart in the row, and they will cover the ground during the season.

We will suppose you are getting Crescents with a few Wilson, or with a few Sharpless among them for fertilizers. The Crescent being a pistillate plant, it is best to set something near it for a fertilizer. Staminate varieties ought not to be used as they are great runners and destroy the bed. Wilson is a perfect flowering berry, the most so of any I have seen, having a perfect pistil and stamens; the stamens of Crescent are very small.

In my experience I have found it pays to pick off the blossoms the first year; it is not much work to do this. Amateurs don't like to do it after there is promise of some fruit; but it is better

to take off all the blossoms, keeping the strength in the plants the first season.

PROTECTION.

In the fall, as soon as the ground is frozen, I take marsh hay or straw; straw is just as good if there are no foul seeds in it. In Wisconsin straw has foul seeds in it generally so I prefer marsh hay. I cover the plants just so you can see the leaves. That is all there is to do till spring. In the spring do not be in too much of a hurry to uncover; the object of the covering is to protect the plants, for as you all know, in the spring we have freezing nights and it thaws day-times; consequently the ground will heave up and become very loose; in doing this it raises the plant a little breaking the roots of the plants, and this is a serious matter for your future crop. Hence I say don't be in a hurry to remove the covering.

DRAINAGE.

I should have said before that the ground should be well drained, either by surface or under-draining, or both; you can do both, but you should certainly use surface draining. No water should be allowed to stand upon the surface of the land or about the roots of the plants if a large crop of fruit is to be expected.

In the spring leave the plants covered till all danger from freezing nights is past, then remove the covering, and if you wish to leave it in the alleys you can do so, or if you can as well as not, take it off and sprinkle on some fine manure. If you have wood ashes you will find them a good fertilizer and a protection in time of drought. I had a very fine crop last season which I attributed largely to the fact that I used ashes for a dressing, putting on about one hundred bushels to the acre.

Mr. Hoxie. How can you get them?

Mr. Smith. Farmers generally burn wood and they can save their ashes. I am talking for the farmers of Minnesota. If you cannot get ashes then you can get fine manure and sprinkle it on the ground, and if your plants are not thoroughly protected by standing up against each other, put some of the covering back to serve as a mulching for the plants. Put on enough to protect from dirt and dust in very dry weather, and from the splattering of rain. Keep all weeds out.

By following this plan I do not think the ordinary farmer will

fail one year in twenty of having a good crop. I have myself failed but once in twenty-five years of having at least a good paying crop. Good sense and good judgment is all that is required in order to grow strawberries.

ABOUT VARIETIES.

A good deal depends upon using good plants. I wish to repeat what I said in part yesterday, don't be in a hurry to get these new varieties that come out and are being recommended by this man or that; wait till good reliable growers in your vicinity, or some men that you know are reliable, have tried them. You can grow varieties that will answer your purpose from those kinds now in use. If you have plenty of time and plenty of money, and like to experiment with new varieties that come along, you will find plenty of use for your time and money, and by the way, get very little in return for either! [Laughter].

Mr. Allen. Do you find any difference in using leached or unleached ashes?

Mr. Smith. Yes, sir; the leached ashes have the potash taken from them and that is an element that is very abundant in ashes and is beneficial to the plants.

RUST AND INSECTS.

Mr. Bunnell. Have you ever had any experience in burning over?

Mr. Smith. No, sir; I never could see any particular advantage to be gained by it. I wish to say to farmers don't plant strawberries twice upon the same ground, and don't allow your beds to get too old, as the insects are apt to get in and destroy the bed.

One of the most damaging things in strawberry culture in the United States is the practice of leaving the beds too long on the same ground, or if they are plowed up the ground is re-set to plants. In southern Illinois it has become a very serious question how to prevent damage from rust and from insects of one kind and another, until it is almost impossible to get a good crop there, or such as we in the North call a good, fair crop.

In my own experience I would say that I never re-set the same ground until it has been cultivated a year or so in other crops, and I don't try to get more than one good crop from a bed. I raise the Wilson, because all things considered they have succeed-

ed better with me than any other variety. Where they do reasonably well I think you will find nothing to equal them. I understand it to be the fact they do not do as well in some portions of the country as they used to. But they do better with me, as I have said, than anything else. I never saw finer plants than mine were a month or so ago when I covered them, and never had a finer prospect for a crop another year than I have to-day.

Last year my crop averaged over two hundred and fifty bushels per acre, on three and a half acres of land. As I said, I have the Wilson; but if it does not do well in your neighborhood set the Crescents; if you want something nice, get the Manchester. It is later than Wilson, it lengthens out the season, is larger than Crescent and in form and color on the table I think it is the most beautiful of anything that ever I have seen. I have picked quarts of them that were just about as perfect in form as anything ever turned in a lathe; but they won't bear shipping as well as the Wilson, although they are fairly firm.

I have tried many new varieties and not a year passes but I turn under a lot of varieties that I have worked with three to five years and that I discard as worthless. I had a bed of James Vick of trial plants which I turned under as soon as the fruit was picked. I had Windsor Chief, Jas. Vick, Bidwell, Piper's Seedling, Sharpless, Kentucky, and several other varieties. I don't say they were all worthless, but as compared with Wilson they were not worth planting on my land.

MULCHING.

Prof. Porter. Have you ever tried mulching by sowing oats and allowing them to grow up so as to cover the plants?

Mr. Smith. No, sir; I spend money enough to get rid of weeds without planting them.

Prof. Porter. I have known it to be tried in several cases where it proved very effective. The oat plant grows up and in the winter makes a covering for the plants, and serves afterwards as a very fine mulch for them. Another question: Do you not consider in the prairie district that snow makes a very good covering?

Mr. Smith. The best of anything.

Prof. Porter. Yes, I have found that to be so, and for that reason it seems to me the oats would prove of advantage as the stalks would catch the drifting snow and hold it. Sugar cane

may be planted after the plants are well established and cleaned, allowing the stalks to grow up and afterwards to fall down to serve as a covering for the plants. They catch the drifting snow and serve as a bedding until they thaw out in the spring. In growing oats among plants you have to watch the oats that they do not get up more than eight or ten inches high.

Mr. Smith. I don't think that plan a feasible one. We depend upon September and October for the plants to make a certain amount of needed growth, which would be prevented by the proposed method of giving them protection.

Mr. Pearce. I noticed a bed of strawberries last fall that was treated in the manner described by Prof. Porter. The patch was sown in oats which grew some fifteen inches high and was then killed by the frost. What the result will be another spring remains to be seen. Another plan that might be tried would be to use dwarf sweet corn in place of the oats.

Mr. Cutler. I have had the best results where the snow drifted over the plants early in the winter, mixed with dirt from the fields. In the spring it served as a mulching for the plants. I prefer to have the snow cover them before the ground freezes. I had Crescents that were ripe the first of June this past season. It was the second crop. I got sixty dollars worth of berries from a small patch. If farmers on the prairie would always plant their strawberries on the south side of a grove of trees, they would be covered with snow and could raise berries without much trouble.

Mrs. Stager. We have had trouble for two years with what we supposed was caused by a small fly. The blossoms turned black.

Mr. Smith. The trouble was probably from frost or from a chilling of the blossoms. The Sharpless chills very easily. If you set Wilson's don't set anything with them, they are not as strong growers as the most of all other varieties. If you set Sharpless with them they will overrun and choke them to death.

Secretary Hillman. Have you had any experience with the leaf-roller?

Mr. Smith. Yes, sir; some years ago I discovered them on my grounds. I went over the bed with Paris green. That was years ago when I was trying to raise two crops from a single planting. I noticed the second year, as the plants were blooming, the leaf-rollers were at work again. I went over them a second time, having been over the field before, and gave them a

thorough sprinkling of Paris green. There were perhaps one-tenth of them in bloom. I don't know that I have seen a leaf-roller on my grounds since that time till last fall when I noticed a very few. I think it was the Paris green that destroyed them.

On motion of Mr. Cutler the chair was requested to appoint a legislative committee, the president to act as chairman of said committee. Prof. E. D. Porter and J. T. Grimes were named to compose said committee, with the president.

PLACE OF NEXT MEETING.

Prof. Porter moved that the place of holding the next meeting of the Society be left with the executive committee.

Mr. Cutler thought it was not good policy for a state institution like this to be placed on wheels and set running around the country. St. Paul and Minneapolis were the most central and the best for the interests of the Society, as well as most convenient for members.

Mr. Dartt thought the Society was a benefit to the locality where its meetings were held, and there were other sections of the State that were entitled to receive such benefits besides the cities named. Good meetings had been held in other parts of the State and quite as much had been accomplished for the cause as when the meeting had been held here. Although he had been pleased with the entertainment afforded at meetings held in Minneapolis, he could not say that he had been always satisfied in that regard with St. Paul. The Society ought to go to Mankato, as new fields were said to be good fields to work in; that was a thriving, growing town. The people of St. Paul did not need, perhaps, any more enthusiasm in horticulture. If the Society went to Mankato they might find a lot of horticultural "sinners," who if brought to "repentance" would help the cause. He favored the motion, as he would like to investigate and see what Owatonna could offer as an inducement for the next meeting.

The motion of Prof. Porter was adopted.

On motion, the following delegates were appointed to represent the Society at the meeting of the Wisconsin State Horticultural Society, to be held at Waukegan, Feb. 16—18, 1887, *viz.*: J. S. Harris, Prof. D. R. Maginnis and C. L. Smith.

On motion, President Elliot was named as delegate to represent this Society at the meeting of the American Pomological

Society, at Boston, in September next; Prof. E. D. Porter was named as alternate.

On motion of Mr. Harris, the proposed amendment to the constitution was adopted, authorizing the fee for life membership in the Society to be paid in two equal annual payments of five dollars each.

On motion, a resolution was adopted favoring an increase * in the number of reports of the Society published to 5,000 copies, of which number 2,000 should be bound in cloth.

On motion of Prof. Maginnis, the following preamble and resolution were adopted:

WHEREAS, The forests of Minnesota clearly have an important and beneficial moderating influence on its climate, and their preservation and conservation is of the highest importance to the horticultural and agricultural interests of this State in modifying extremes of heat in summer and of cold in winter, as shown by signal service records, and as a proper percentage of forests have an important influence in preserving the moisture needed for plant growth and in supplying springs and rivers, and as in our judgment the time has now arrived for prompt and decisive action needed for the preservation of the forest area we now have and by reforesting such portions of the State as have been denuded of their forests and are naturally unfit for continuous cultivation; Therefore, be it

Resolved, That the legislature now in session be memorialized to enact a law organizing a department or bureau of forestry, and furthermore, that we respectfully request the State Horticultural Society, the State Agricultural Society and the Forestry Association to appoint committees together, and to appear before such committee of the legislature as has jurisdiction in the matter, in order to bring about immediate action thereon; and furthermore, that Friday, the twenty-eighth day of January, be named as a date for the meeting of the said committees.

The chair appointed Messrs. Maginnis, Boxell and Smith to represent the Society.

Mr. Brand presented the following resolution which was adopted:

Resolved, That we believe our timber culture law should be so amended as to contain the following provisions, *viz*: That for every acre of the following evergreen trees, planted with not less than 2,700 trees to the acre and well cultivated for one year, the person so planting such trees shall be paid the sum of five dollars per acre for all land so planted, not exceeding ten acres; when said trees attain the height of four feet said planter shall

* Senator Hoard's bill providing for an increase in the number of horticultural reports, asked for by the resolution, passed the senate but was not reached for final passage in the house.

be paid another like sum per acre, if in good condition and standing not more than eight feet apart each way; and a like sum of five dollars per acre for the next five years thereafter, provided said trees are kept in good thrifty, growing condition. The varieties to be planted shall consist of either or all of the following: American White Spruce, White Pine, American Arbor Vitæ, Red Cedar.

Mr. Sias stated that Mr. C. H. Brett, of Henry, Dakota, the originator of the Brett Seedling, had written him that he intended to be present at this meeting of the Society; that he came as far as Mankato where he received word of a death in his family, causing his absence from the meeting. In view of the interest manifested by him in the cause of horticulture, he moved that the name of Mr. Brett be added to the roll of honorary members of the Society for five years. The motion was adopted.

Mr. Sias from the committee on Revision of Fruit List presented a report which was taken up for consideration and adopted. The list as revised is as follows:

FRUIT LISTS.

Following is a recapitulation of fruit lists adopted:

APPLES.

For general cultivation in favorable localities — Duchess, Autumn Streaked, Wealthy, Tetofsky.

For trial in limited quantities — White Russett, Russian Green, White Pigeon, Hibernial, Lieby, Red Cheeked, Red Anis, Green Transparent, Yellow Transparent, Thaler, Autonovka, Vargul, Raspberry.

HYBRIDS.

General cultivation — Whitney, Beach's Sweet, Early Strawberry, Orange Trancendent, (liable to blight), Powers Crab.

For trial — Florence, Martha, White Russett, Dartt's Hybrid, Pearce's Hybrid.

GRAPES.

For general cultivation — Worden, Moore's Early, Concord, Delaware.

In limited quantities — Martha, Rogers' 39, Brighton, Lady.

STRAWBERRIES.

For general cultivation — Wilson, Crescent Seedling, Downer's Prolific, Chas. Downing, Ironclad, Glendale.

For trial — Manchester, Windsor Chief, Minnetonka Chief.

RASPBERRIES.

Blackcaps; for general planting — Ohio, Doolittle, Gregg.

Red — Turner, Cuthbert, Brandywine, Philadelphia.

BLACKBERRIES.

Ancient Briton, Snyder, Stone's Hardy.

For trial — Thornless, Lucretia Dewberry.

CURRANTS.

Red. — Red Dutch, Stewart's Seedling, Victoria.

White — White Dutch, Bailey's White, Long Bunch Holland.

Black — Black Naples.

GOOSEBERRIES.

American Seedling, Downing's Improved.

NATIVE PLUMS.

Harrison's Peach, Forest Garden, Weaver, De Soto.

For trial — Rollingstone.

Prof. Maginnis, from the committee on final resolutions, presented the following report, which was adopted.

FINAL RESOLUTIONS.

Resolved, Before final adjournment the members of the State Horticultural Society desire to thank the city of St. Paul for courtesies extended, the various railroads for accommodations so kindly given, and the committee congratulates the Society for the spirit of industry and harmony with which its proceedings have been characterized throughout its sessions.

Mr. Hoxie, of Wisconsin, said. He desired before the meeting closed to say a few words and to extend to the Society the hearty greetings of the Wisconsin State Horticultural Society. We feel in our state that it is only an imaginary line that divides us, and it seems to me in our work and spirit there is nothing that

divides us, the climate and soil of Wisconsin and Minnesota are similar. I am very sorry I could not have been here through all your deliberations as I have enjoyed the meeting greatly since I arrived, and though I have been here only a short time I feel as though I was entirely at home among you. Although many of the faces I see do not appear familiar, some of them I have seen before.

I may say here that we of Wisconsin and you of Minnesota have a work to do. The people should become interested in the work we are striving to accomplish. I do not know just how we are to do it. We are not gathered together as a set of lunatics merely to talk about trees and apples and to convey the idea that there is nothing to do in order to grow fruit. There is much to be learned in every department of our work. The utility and value of our ornamental shade trees, and everything of this kind has been brought to our notice at such meetings as this; we here obtain ideas as to how we may beautify our homes and make our lives pleasant, and how we may accomplish something that shall be of benefit to our race; we are not simply to look after the "almighty dollar" and strive for simply present needs alone.

I want to thank you as members of this Society for the hearty greetings received to-day and that we have always received from this Society in the past and we hope to reciprocate by extending as cordial a welcome to your delegates who may at any time attend our meetings. I am very glad to have had this opportunity to meet with you.

Mr. Cutler said he was much pleased with the discussions had and with the work accomplished at this meeting. There had been a desire manifested to do something that would prove a benefit to the farming community and he hoped in the future the Society would continue to prosper as it had heretofore in the past.

Mr. Dartt said there had been a resolution adopted with regard to establishing an experiment station at Owatonna and recommending that he be appointed as manager; he wished to say that if lightning should happen "to strike" in that direction that he wished to be in perfect harmony and accord with all the horticultural interests of the State. He hoped there would be no rivalry among members except a laudable one—to work for the best interests of the State. It was said that there was a good deal of rivalry between the cities of St. Paul and Minneapolis, but it was quite commendable in its way. He was

under obligations to the Society for the action taken and for this mark of confidence, and if there should be no practical result from the action taken he was still under obligations to the Society which he should not soon forget.

Mr. J. M. Smith. Mr. President, I have been with you before—some years since—and I want to say that I never attended a meeting of the Society with so good an impression of its power and of its value to the public, not only to the people of Minnesota, but to the people of our own state, as I shall carry with me when I take the night train this evening. The work you have done here—a part of it—has put me in a position that I can go home and know that I can root out one swindling establishment that has been selling trees in my county. I have known that the people were being robbed but I didn't know the entire facts of the matter as I know them now. The action that you have taken here in regard to these matters has put me in a position so that I can go home and act; I propose to do so and reform that matter so far as our county is concerned and to do it at once, or have the men taken care of—that is all there is of it.

I think Mr. Hoxie and myself will both feel that we have gained information that will enable us to assist in placing our horticultural work in Wisconsin on a better basis than ever it has been before. It has been an annoyance to me ever since I have been president of our society to think that we could not get hold of these men that were robbing our people, especially when I see car loads of stock coming in and know of its selling at three or four times its value, and its value little or nothing sometimes. I think this movement will end in something that will put our horticultural work on a firm basis—putting it on a straight, square, honest business basis; so that men who wish to engage in the business will meet with some encouragement in conducting a business in that manner.

I want to thank the Society for their courtesies and kindness to myself and to repeat the invitation extended by Mr. Hoxie to attend the meeting of our society; we shall be glad to meet just as many as see fit to come; we may not be able to teach you but we will guarantee to have a good time.

President Elliott said he ought perhaps to say a word in closing this meeting. He had always tried to do that which he thought to be for the best interests of the Society and of the public at large. He was gratified with the harmony which had always prevailed. If there was anything that had arisen at this

meeting that looked as though they were trying to ignore one class for the sake of advancing the interest of another he hoped it would be looked upon with charity. We are all selfish beings and we all have personal interests and they sometimes clash to some extent, but we are trying to accomplish the greatest good to the greatest number. He was gratified with the words of encouragement received from Mr. Smith and to know that there were others ready and willing to assist us in the good cause. We have had up-hill work in this calling of horticulture, but if we persevere and press forward we shall yet be successful, and will succeed in raising many fruits in Minnesota, that are considered of doubtful value at the present time. If we can prevail upon members of the legislature to look upon the interests we represent in a proper manner there will be no trouble in obtaining such assistance as may be needed in carrying forward the work. In conversation with our governor recently he said we must not be too modest in our demands, and we have in him one who is willing to do all in his power to aid the producing classes. I hope the members of our Society as they depart to their homes will go with a determination to increase our membership and extend our influence, to do what they can to establish and build up a strong and efficient horticultural organization in our State.

Mr. C. L. Smith. I want to say that I feel gratified with the action taken by this Society in regard to the sale of foreign-grown nursery stock. While it may appear that some have been persistent in pushing this matter, yet those who have been out among the people on the prairies and have seen them suffer loss in time and money, will understand the reason. No act of the Society, it seems to me, will have a greater influence for the interests of the people than the action taken in regard to the fraudulent selling of trees and shrubs. The influence of our Society is growing and it is extending its influence into more homes and communities than ever before. We are now changing from the condition of pioneers, with our sod houses and straw sheds, on our open prairie farms, to the more intensive system of farming. These marks of the pioneers are giving way to more comfortable dwellings and barns, with neat sheds, all surrounded with trees and windbreaks. We have a better system of farming, better breeds of stock, and the work upon the farm generally is carried on more upon an intensive plan than formerly; more attention is given to small fruit and vegetables. The State is ripe for the work to be done by our Society; I believe the legislature will

grant us any needed assistance that may be asked at their hands. It seems to me we have a bright future before us and we may make our Society more useful in the future than in the past. I am sure the people are well satisfied with the progress made and the work we are doing.

Mr. Hoxie. I have sometimes thought we might accomplish more by adopting the methods used by the Massachusetts society; they hold weekly meetings and issue bulletins giving an outline of their proceedings, thus getting their transactions before the people at once. Farmers are eager to get these reports, and if some such system could be adopted here, I think much benefit would be derived from it.

Mr. Smith. At the meeting of our Hennepin County Horticultural Society, this plan has been practiced to some extent. One of the city papers sent a shorthand reporter to write up the proceedings, sometimes giving two or three columns in their reports. The proprietors of the paper were well pleased with the result of that work. They found their readers appreciated the enterprise. I understand these meetings are to be revived.

Mr. Harris. I think I speak the sentiments of all present when I say this has been an interesting and profitable session of the Society. There has been as good a degree of harmony as could reasonably be expected in so large a company of men from so many different portions of the State, pursuing so many different branches of horticulture. It is for our interest to work in harmony with regard to the general objects had in view. I hope when we go to our homes we may not forget the many lessons learned while here, but be like the ministers who have been up to the general assembly, that we may carry some of the spirit of our work with us and make it a leaven that will work in our several neighborhoods, encouraging our neighbors and friends to plant trees and to give them proper cultivation, and eventually to become active members and workers of this Society. It is one thing to be a member, to pay in a dollar and receive the annual report of the transactions, and quite another thing to make it the leading aim and object of your life to carry forward the work in which you have enlisted after once having identified yourself with this organization.

I may say that I have to some extent made this a life work. Our Society has been in existence for more than twenty years; and I have often felt gratified that my name was at the head of the list of names first enrolled of its members, and that I could

do something to encourage the people in horticultural pursuits, and be a co-worker with those who would fill our homes with fruits and flowers, and add their mite to make the State better and more attractive for their having lived in it. I have tried to add to the membership and to extend the influence of the Society; if I have accomplished anything I am thankful for it, because I feel that my ability is but little. But we have all more or less influence. If we would all make it an object to encourage the growing of flowers in and about our homes and beautifying the grounds about our churches, and in our cemeteries, our lawns and parks, we would accomplish a great work for the State of Minnesota and give it a more enviable name than it now has. It seems to me the "North Star State" is one of the finest states of the Union. I have said before this that if we would follow the advice of that venerable horticulturist the late Marshall P. Wilder who said, "Plant the most mature and perfect seeds of the most hardy, vigorous and valuable varieties, and as a shorter process, insuring more certain and happy results, cross and hybridize our finest kinds for still greater excellence," that the time is not distant when we should have a long list of fruits perfectly hardy, adapted to the climate of the Northwest. I believe the time may yet come when Minnesota apples as well as other fruits will be sought for in eastern markets and perhaps across the great waters in Europe. If we work in harmony and are persistent in our efforts we can at least promote the objects sought and hasten the fulfillment of our plans.

Gentlemen, I wish you to extend a vote of thanks to our worthy president. He is one who has always stood by the Minnesota State Horticultural Society. When I was in such poverty that I could not attend its meetings his purse was opened widely, and he has rendered me and other members of this Society encouragement and help in building up the Society. He has ably presided at this meeting, and perhaps treated us with greater courtesy than we deserve; I therefore move a vote of thanks be given him for his faithful service during the past year.

Mr. Smith suggested that the secretary be also included. The motion was adopted.

The secretary responded briefly, returning thanks to the Society for kindly assistance rendered him in conducting the duties of the office which had again been intrusted to his hands, and for this mark of their confidence and esteem. He had somewhat reluctantly accepted the position of secretary for another term,

as he feared a press of other duties would prevent his giving such attention to the work as was properly demanded by the Society. He hoped, however, any seeming lack in this regard would be viewed with charity, as it would be his endeavor and earnest desire to serve the Society as their secretary faithfully.

On motion of Mr. Brand, a vote of thanks was given Mrs. E. J. Stager, of Sauk Rapids, for her constant attendance and the interest manifested by her in the meetings of the Society.

The fruit list was then taken up for revision and adopted in the form already given on a preceding page.

On motion, the meeting adjourned *sine die*.



THE LAW RELATING TO THE PRINTING AND DISTRIBUTION OF THE HORTICULTURAL REPORTS.

Chapter 8, General Laws of 1883.

AN ACT TO AMEND CHAPTER SEVENTY-TWO (72) OF THE GENERAL LAWS OF ONE THOUSAND EIGHT HUNDRED AND EIGHTY-ONE (1881), RELATING TO THE STATE HORTICULTURAL SOCIETY.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. Sections one (1) and two (2) of chapter seventy-two (72) of the General Laws of one thousand eight hundred and eighty-one (1881) relating to the State Horticultural Society shall be amended so as to read as follows:

Sec. 1. There shall be annually printed and bound thirty-five hundred (3500) copies of the annual report of the State Horticultural Society, provided the number of printed pages of the same shall not exceed five hundred (500); which report shall be transmitted to the governor, and shall be distributed by the State Horticultural Society, as follows:

One (1) copy to each of the State officers, members of the legislature, judges and clerks of the supreme and district courts, county auditors and members of the board of regents and faculty of the State University; fifty (50) copies to the State Historical Society; one hundred (100) copies to the State Board of Immigration; one hundred (100) copies to the State Agricultural Society in exchange for a like number of its annual reports; and a sufficient number of copies to each county horticultural society to supply one (1) copy to each of its members; provided, such county society shall be in active existence, and shall have filed with the secretary of the State Horticultural Society a list of its officers and committees, and an abstract of its proceedings for the year preceding; and the remaining copies shall be distributed by the State Horticultural Society, in such manner as it shall deem best, after retaining a sufficient number for its library and to supply future members and exchanges.

SEC. 2. This act shall take effect and be in force from and after its passage.

Approved February 28, 1883.

SECRETARY'S PORTFOLIO.

DEFERRED PAPERS, REPORTS, NOTES, EXTRACTS, ETC.

INTRODUCTORY NOTE BY THE SECRETARY.

The following pages are presented in addition to the routine report of proceedings at the summer and winter meetings of the Society, embracing reports, additional papers, extracts, etc., of more or less interest.

As will be seen upon inspection of the foregoing pages, in the discussions had at the various meetings, and in the papers read, some effort has been shown to gain conciseness and brevity of statement, while seeking to preserve the substance of the subject or the matter had in view. There is a gratifying lack of needless repetition as well as lengthy, prosy papers, made up of measured words and sentences, which might be calculated more to "lumber" up the work than adding to the interest and real value of the same.

In this enlightened age, when knowledge is so much advanced and spread abroad in all departments and avenues of trade, as well as in the boundless realm of art and science, there is the greater need for special training in varied lines of work. And it is more imperative than ever heretofore that those who would succeed in any avocation be *specialists* and thorough *masters* in their chosen field of work. Horticultural science, too, is no exception to the rule; for he who would succeed and make the most of opportunities within his easy reach must use those means of gaining information which are alike most practical and simple, and which may easily be understood and readily applied.

The Society's transactions, as well as other matters to be found in this report, should be directed mainly, we presume, to that which properly relates to Minnesota horticulture, and hence there should be no desire to cumber our transactions with foreign and extraneous matters, which would perhaps require much space and at the same time be of little interest or real value to the general reader. Our members much prefer, we apprehend, that their report should be directed to the presentation of those things which are most intimately joined with their material welfare.

The Society is under obligations to *Farm, Stock and Home* for use of cuts to illustrate papers on grape culture and grafting.

We might here add that while there may be very many valuable suggestions to be found in horticultural periodicals, as well as in reports received from other kindred organizations, still lack of space precludes the possibility of giving these a place or even passing mention. We read all these with pleasure, and profit from the many useful lessons to be found therein, and heartily commend them to the thoughtful reader, since most of these are in the easy reach of all.

REPORT OF DELEGATE TO WISCONSIN.

The annual meeting of the Wisconsin State Horticultural Society was held at Waukesha, Wis., Feb. 16, 17 and 18, 1887.

For many years the annual winter meetings of the society have been held at Madison in the first week of February. The annual conventions of the State Agricultural Society, State Dairymens Association and State Amber Cane Association were also held at the same time and place. It was found that where so many conventions were being held at the same time and place the stronger and greater attraction proved detrimental to the others. Therefore, this year the horticulturists chose a later date and a new place for their meeting, which was held in the thrifty town of Waukesha, situated about twenty miles west from Milwaukee.

The program for the occasion was very complete, and the subjects presented were such as would tend to instruct and enthuse the members present. The attendance of Wisconsin horticulturists was very good, and included most of those who had been prominent workers in the cause for many years. There were present as delegates from other states, Messrs. J. V. Cotta, of Illinois; C. G. Patten and J. Wragg, of Iowa; Chas. W. Garfield and Prof. A. J. Cook, of Michigan; D. R. Maginnis and J. S. Harris, of Minnesota.

The meeting was opened at 2 P. M., on the sixteenth, with an address of welcome by Hon. Alexander Cook, of Waukesha, in which he complimented the society upon its high and ennobling aims, and the zeal with which it had fostered the highest and most ennobling sentiments and inculcated them among the people of Wisconsin, the love of the useful and beautiful in nature, and especially the love for fruits and flowers. He alluded to the wonderful impetus that had been given to horticultural development and progress in the Northwest in the last score of years, through the earnest efforts of this society and kindred organizations in other states, and thought that we were now but standing on the threshold of an era of expansion of horticultural knowledge such as the world had never before conceived of.

Mr. B. F. Adams, of Madison, delivered an appropriate response to the address of welcome, reviewing the work of the society in the past and expressing the opinion that the present outlook was very encouraging, and closed his remarks by saying that the "thoroughbred Wisconsin horticulturist possesses an enthusiasm that the coldest winds of winter or the strongest heats of summer could not overcome."

The remainder of the afternoon session was taken up with the reports of the secretary and other officers, committees, delegates to other state meetings and the election of officers.

The secretary in his report made an urgent plea for an increased membership. Thought the free distribution of reports tended to discourage membership and that the summer meetings held at different places in the State had added greatly to the strength and usefulness of the society. He gave irresponsible tree tramps some hard raps, but did not favor legislation on the subject. Thought the education to be gained through more meetings and farmers' institutes was the only available remedy. They would flourish in spite of all laws as long as there was ignorance of horticulture among the farmers.

Mr. G. J. Kellogg's report as delegate to the Illinois meeting showed that the apple question was but little nearer solved in that state than in Wisconsin and Minnesota. He said: "Half of the orchards in Northern Illinois are on the wood pile and the other half are leaning strongly that way." Nursery men and tree peddlers are not helping the matter, although they are profiting by the misfortunes of the planters.

Mr. A. G. Tuttle was the delegate to the Iowa meeting. He thought Iowa was on the right track and making rapid advances in testing the adaptability of Russian varieties. He said: "At least twenty-six varieties of Russians will compare favorably with the Duchess for hardiness and are as good in quality as an equal number of American varieties." Numerous varieties were being propagated at the agricultural experiment station at Ames, and Prof. Budd had distributed trees to over six hundred parties in Iowa, Minnesota and Dakota, to be tested and reported upon.

The evening session was opened with a paper on "Ornamental Trees," by A. L. Hatch, of Ithaca. He is a vigorous writer and a very earnest horticulturist. He cautioned against overplanting. Too close planting is a very general fault. Single specimens with ample room for development give the best effect. Harmony in form and color ought to be considered in all planting. Many planters crowd their grounds with such varieties as a traveling agent recommends at exorbitant prices and overlook the sugar maple, native white birch, American linden, hackberry and other beautiful natives that can frequently be had for the digging.

Mrs. Huntley followed with a paper on "Plants and Flowers for the Home." She said: "Our homes are what we make them. The young farmer can plant a few trees and shrubs when he sows his first crop. He can devote a little time to the garden from the very start. The woman can give a little time to the growing of flowers from the first. Their culture tends to elevate and purify the mind, and gives the dusty walks of life many a charm that can not be found where they are wanting, and they will afford relaxation from indoor labor." No other class of workers have so good an opportunity for ornamenting their homes as the farmer. The little beginnings made at the start will grow and expand into beautiful surroundings of a happy home. It is a misfortune for children to be reared in a home where there is no adornment. It is criminal in the parents to

neglect to beautify the surroundings of the home, and it tends to poverty. The lawn should always be as fresh and green as grass can make it. The vegetable garden will yield its fruits in a few short months. The strawberry bed will give its ripe fruit in fourteen months from planting, and the raspberry only a month later. She knew one farmer who plants a few trees upon the birth of each child, and they are that child's trees. Why should not all do likewise? And then our children would be a generation of horticulturists. Horticulture has always made the world more beautiful, home happier and human life better.

An interesting discussion followed the reading of the paper. The points brought out were heartily approved, with the suggestion that the house plants should be our plants instead of "my wife's plants."

At this point Chas. W. Garfield, secretary of the Michigan Horticultural Society, and of the American Pomological Society, was introduced, and spoke at length of the workings of the Michigan Society, and advocated the encouragement of local and county societies and the establishment of experimental stations.

The next paper read was on the "Slaughter of the Birds," by Mrs. Ida E. Tillson, of West Salem, in which was shown in a happy manner the blessing of birds to the agriculturist and horticulturist, as their food consisted principally of injurious insects. She alluded to the principal causes that tended to diminish the number of birds and threatened the extermination of some of the most useful species. It was not enough that the electric lights killed them by thousands, and the town boys — "embryo hunters," armed with deadly shot guns — roamed far and wide and from pure wantonness slay all they can find and rob the nests of such as escape, so that in the neighborhood of our villages the quails, larks, blue jays, orioles and other summer songsters can not find a place to rest their weary wing, but the women have added another incentive for their destruction, by adopting a fashion that would shame the barbarians, giving birds a commercial value; and so great is their demand for them for making their "head gear" hideous that the most secluded resorts no longer afford protection for such as are clothed with bright plumage. Unless this slaughter is stopped disaster is sure to follow. Insects will increase to an alarming extent and destroy our crops and our land will become a dreary waste.

SECOND DAY.

This forenoon President Smith read his annual address, in which he reviewed the workings of the society, and the lessons of the season. In alluding to the great drought of last summer he said that experience had demonstrated that good cultivation was the best preventive to injuries to crops in times of drought. He alluded to the L. L. May Nursery Company of St. Paul, and said they had operated extensively in Brown County, through an agent, and sold large quantities of trees and plants at prices little less than robbery, and he could not see wherein their operations differed very much from obtaining money under false pretenses. The operations of such agents are very detrimental to horticulture in the Northwest. Was much pleased with the course taken by the Minnesota Society in the matter, and did not think they scored any points by appearing before our Society. He urged the dissemination of such information through the working of the society as shall educate the farmers to be on their guard against all suspicious tree men, and that the society exercise great care in recommending varieties for general cultivation. A more thorough organization of local societies would prove a partial remedy, as this class of men were disposed to shun those who were well posted on trees and plants.

The remainder of the forenoon was occupied by Prof. Cook, of Michigan, in delivering an illustrated lecture on "Insects Injurious to Plant Life, and Means of Destroying Them." In speaking of the codling moth he says it can not be caught with sweetened water, is not attracted into the house by lights, that they are great respecters of prior rights, and never deposit but one egg in an apple, and no matter how numerous they are, have an instinct to pass by every fruit in which an egg has been deposited by another insect. In speaking of remedies he condemned the old bunch remedy as a failure. The hog remedy is better, as much of the affected fruit falls to the ground before the worms escape, and if at once eaten by hogs will prevent propagation. He told of an orchardist who had about exterminated them on his place by employing boys to pick all infected fruit, and it paid him well to do it. He considered the best remedy to be Paris Green or London Purple, applied when the fruit is about the size of a pea, and said there would not be a trace of the poison remaining two months afterward. To be effective one pound of the poison is put into one hundred gallons of

water and applied with a Holman pump or garden syringe. For large orchards he would use the Field pump with the Dixon spray nozzle. Cattle and other stock must be kept out of the orchard until after two or three heavy rains have fallen.

The "borer" is easily destroyed by using an emulsion of one pint of crude carbolic acid and one quart of soft soap, put into two gallons of water. This emulsion should be applied to the body of the tree with a brush, about the first of June. It also kills the scale or bark louse and fungus growths and helps the tree to endure the following winter.

In this manner he went through the various tribes of the most injurious insects, illustrating them with large drawings and pointing out the best known remedies for each and advised all fruit growers to interest their children in the study of insects and train them to become familiar with their habits and transformations.

In our opinion this lecture, and a paper upon the same subject read the next day by J. S. Stickney, were the crowning features of the meeting and worth many times more to the state than the small sum annually appropriated to aid the society. Here we would suggest that an effort be made to arrange with Mr. Cook to repeat the lecture before our Society at our next annual meeting.

Chas. W. Garfield occupied one hour of the afternoon session and made a good talk on the subject, "How, When and Where to Teach Horticulture." He is an enthusiast, and gained the attention and admiration of the audience.

The remainder of the program was fully carried out and there was an increasing interest from the opening to the close of the meeting and at the final adjournment everyone present pronounced it the best meeting yet held by the society.

I should like to give a further notice of the remaining papers but the length of my report will not permit me to dwell longer in this field, where I have been so well entertained. I must, however, allude to Mrs. Hollister's paper upon "Life of Women on the Farm, as it is and as it should be;" "The Ethics of Horticulture," by Mrs. Campbell. I heartily wish every farmer and his wife in the Northwest could have heard them. I feel like congratulating the Wisconsin society on their having enlisted the co-operation of so many of their talented women in their work.

THE EXHIBITS.

The fruit exhibit was an attractive feature of the meeting. There were nearly five hundred plates heaped with the best specimens of apples grown in the state, also a dozen or so varieties of grapes, a few pears and an elegant display of winter-blooming plants. Our old friend Peffer, of Pewaukee, exhibited 102 varieties, 31 of them being some of his newer varieties of seedlings and some others, varieties he has originated within the last 30 years.

Mr. Jeffrey showed 67 varieties, Mr. Hirschinger, of Baraboo, 60 and Kellogg, Pilgrim and others made fine exhibits, while Mr. Springer was on hand with 35 varieties of the Waupaca County seedlings. Some of the collections must have been kept in cold storage as we saw Duchess, St. Lawrence and other autumn varieties as fair and fresh as if they were picked from the trees but yesterday.

The bulk of the fruit on exhibition was grown in what is known as the Lake Belt, and in Central Wisconsin. The seedlings exhibited were remarkable for beauty of appearance and in quality would compare favorably with an equal number of the older varieties in cultivation; most of them are proving hardier where they originated than most of the old varieties. Some of them are long keepers. Perhaps few, if any, of them will prove adapted to the more unfavored parts of Minnesota and Dakota, but they afford us a valuable lesson and encourage us to work on in the production of seedlings.

A few varieties of Russians were on exhibition. I must confess that I am disappointed in not seeing more of them. There were but four varieties that I should judge to be good keepers. The Repka Malenka is of fair size, of very good quality and may keep until April. Samples of the wood indicate extreme hardiness of tree. Red Queen is a good keeper but not as hardy. Longfield is in season now, quality good, fruit hardly large enough for market. One other (name lost) has indications of being a good keeper and will be valuable for cooking. Other varieties were not in condition to judge of their merits, they having been kept over from exhibition at the fall fairs.

JESSIE STRAWBERRY.

This is a variety of Wisconsin origin and is just now enjoying a "boom." The originator, F. W. Loudon, of Janesville, is a

man of undoubted integrity and he has made the cultivation and propagation of strawberries a study for years. The members of the Wisconsin State Horticultural Society who met at Janesville June 16 and 17, 1886, are too intelligent a set of men to be humbugged. They beheld the berries growing upon the originator's grounds and were astonished. It is undoubtedly a wonderful berry where it originated, but will it prove the berry for the million? Will it supersede all other varieties in cultivation? Probably not. From some things I have heard I conclude there are two sides to the question. Some people are not as skillful growers of the new varieties as others; some have not the same kind of soil as that upon which it originated, and others may not manipulate the fertilizers just right. I fear it is being too highly praised. In favored situations, with good cultivation, it will probably prove all that is claimed for it, but away from home and with the cultivation ordinarily bestowed upon strawberries, I doubt if it will prove superior to many other varieties we now have. The Sharpless, Bidwell, Vick and many others had their "boom." How many here in the Northwest who tried them have realized their high expectations? It is hard to get the whole truth about new sorts. Do not understand me as opposing the introduction of this or any other new variety. I am not, but like to have it thoroughly tested in a wide range of localities, and it ought to have been done before the "boom" was started. The most unfortunate thing I see in this is that the originator has given up the entire control of its introduction to a New York nurseryman, reliable, it is true, but many of us know by sad experience the disadvantage of purchasing plants that have been reshipped and repacked over getting them direct from the grower. It is a critical time in the life of a strawberry plant while it is out of the ground. It is liable all the time to be taking injury from drying, heating, or from making a blanched growth at the expense of its own vitality, and I would rather risk one plant direct from the grower than five through second hands.

Those who desire to try the variety should by all means order direct from headquarters. Doubtless every agent that travels the country the coming year will solicit your order for a dozen or more of this variety. If you consult your own interest you will permit them to pass on with their stock undiminished and get your plants direct from the man who raised them or who controls the stock.

Permit me, in conclusion, to tender my thanks to the members of the Wisconsin Society for the many courtesies extended to your delegates, and for the deep interest they manifest in the welfare of our Society, and also to the members of the Minnesota Society for the high privilege they conferred upon me in making me their delegate upon this and other occasions. Respectfully submitted.

J. S. HARRIS.

OLMSTED COUNTY HORTICULTURAL SOCIETY.

In addition to the report of the secretary of the Olmsted County Horticultural Society, Mr. M. J. Hoag, at the annual meeting of this Society, the following is presented from the Rochester *Record and Union*, from its report of the proceedings of that society:

The annual meeting of the Olmsted County Horticulturists was held in the city hall Saturday afternoon, January 8th.

Mr. A. W. Sias, President of the society, read the following paper:

OBJECT LESSONS IN HORTICULTURE.

Gentlemen of the Olmsted County Horticultural Society:

There is no way by which the student can gain a knowledge of the art of horticulture so rapidly as by object lessons. And this calls up the question of where can we obtain the most complete objects from which to *take* our lessons? Nature's most sublime botanical specimens are to be found in the forests; go there. The Menonite Christians at Mt. Lebanon hold annually a celebration of the Transfiguration under the existing trees, known as the "Feast of Cedars." And we should have not only our "Feast of Cedars," but our feast of pines, spruces, firs, hemlocks, poplars, elms, lindens, hackberries and perhaps the sweetest of all should be the feast of the maple, on which occasion some zealous brother should treat all hands to an old-fashioned "sugaring off."

Gentlemen, I believe it possible for the members of this little obscure horticultural society to inaugurate a new departure in horticultural work that shall be followed and imitated by coming generations through all future time. The plan hurriedly and roughly marked out is for the society to meet every sum-

mer and have their feasts as indicated above. Always under the shade of the most gigantic tree of a certain variety (to be selected by a committee of three), to be found, say within a limit of twenty miles of this city. The next season select another variety and proceed as before, and so on until every variety shall have been visited and passed upon. Make it the duty of the society to make and keep a neat and permanent record of each one of these trees. When the tables are set and loaded with the choicest fruits of the season and surrounded by the friends and members of the society, have some good artist handy to photograph the scene, the secretary to be instructed to place this photograph in the society's book, under which to make a careful record of the aforesaid tree, giving name, height, circumference, where located, exposure to sun and wind, nearness to living water, chemical analysis of the soil, a microscopical report of the style and condition of the leaves, etc. A thick pubescent leaf, like the Aloe, or Century plant, that is obliged to store up moisture enough to take it through a protracted drought of five months, will do for Minnesota. When you come to hold your feast of the apple under some giant wild crab tree, you will doubtless ascertain just about what sort of a leaf we must have in our apple orchards. The great benefit to be derived from this new mode of conducting our summer meetings must, I think, be clearly apparent to all.

While doing committee work for the State Horticultural Society last fall, it was my good fortune to be able to visit "the little babbling brook," Kedron, in Fillmore County, where, in company with G. W. Fuller, of Litchfield, we feasted our eyes on what is thought to be the tallest specimen of the *Abies Alba* on record. Also White Pines, Fir Balsams, Red Cedars and Yew. We would suggest this as a proper place for you to celebrate the feast of the Spruces. Mt. Horeb and Resurrection Spring are not far away. If you can explain why the above named White Spruce made such wonderful growth, it will be information of great value to everyone who plants a tree of this desirable variety. Someone gave as reason for the Green Mountain boys growing so tall, was, "because they were in the habit of going out every morning before daylight to stretch their necks up over the mountain to see the sun rise." In a like manner it occurred to me that this spruce was making a desperate effort to get a peep at the sun. The soil about the roots of these spruces is rich in alluvial and leaf mould. These object lessons are worthy

of the closest scrutiny by the oldest minds. We have a Cottonwood some two miles down the Zumbro that measures nineteen and three-fourths feet in circumference. We must have our feast of the Poplars under the generous shade of this mammoth tree some time in the near future. While I should not care to see you travel all the way to these monarchs of the forest on your knees, like some of the religious devotees of the East, yet I would like to see you pay them more respect than you have heretofore been in the habit of doing.

Our late Consul to Calcutta, J. A. Leonard, of this city, has perhaps the largest flowering maple to be found within the city limits. Mr. Leonard kindly called our attention to this fine botanical specimen as an object lesson, showing the utility of heavy mulching in a dry climate, where rapid growth is required. This tree was planted twenty years ago near the doctor's residence, and for many years stove wood was sawed and piled around the trunk, some five or six feet high, resulting in a most rapid growth, more than double, in fact, that of other trees of the same variety, and planted at the same time, and not heavily mulched. Downing said "among all the species, both native and foreign, we consider the scarlet flowering maple as decidedly the most ornamental species." I wish to call your attention to the maple, as an object lesson on mulching, worthy of the most careful study. Dr. Leonard's grounds on the Zumbro remind me of the beautiful residence of N. P. Willis, on the Hudson, "Idlewild," of which Downing said, "It is a piece of Nature's landscape gardening which the hand of man should, and, from the good taste of the owner, has not been allowed to appear, except in the necessary buildings * * and we refer to it simply to show how delicate and refined that taste must be which, appreciating all that Nature has done with so much prodigality of beauty, as at 'Idlewild,' has the courage to let her alone." I am inclined to the opinion that the doctor would have "let her alone" severely had it not been for the fact that we made a small importation of trees through him, and his characteristic liberality, while consul at Edinburgh, direct from the old home of Robert Burns. The love of the immortal poet was too much for him, and the sanctity of "Idlewild" was invaded and a group of beautiful dwarf evergreens and a Roman tree now holding a conspicuous place at "Idlewild," on the banks of the beautiful Zumbro.

The valley of Jehoshaphat, through which flows Kedron, is very deep and is the native home of the Cedar of Lebanon, some of

which are said to measure thirty-six feet in circumference, of which some writer has said: "For glory of beauty, unequaled among all the objects of the vegetable kingdom." Downing says: "Washingtonia gigantea the mammoth tree." This truly most magnificent of trees—deciduous or evergreen—was discovered in a valley of the source of one of the tributaries at the Calaveras, California. Within an area of fifty acres only, ninety-two of the species were found standing, without doubt the most stupendous vegetable product on earth; discovered in 1850. Some forty years ago I saw in the valley of the St. Johns River, Canada, one of the most graceful and majestic botanical specimens that it has ever been my good fortune to behold. A white elm, perhaps seventy-five feet to the first limbs, and the branches drooping so gracefully down, rendered an object lesson of rare majestic beauty. I was younger than I am now, but I never could forget that tree. The most conspicuous object lessons among apple trees, as far as my observations have extended, were found in the valley of the Genesee River, a Northern Spy tree that measured twelve feet in circumference.

The horticulturist, like the politician and artist, is satisfied with nothing but the best models. The politician's objective points are the county seats, state capitols and the capitol at Washington. Nearly all our ex-presidents have held seats in Congress, the others being military heroes. They study the lives of the greatest statesmen, while we study the lives of the greatest botanical specimens. And in all the departments of human knowledge that man is the most successful who keeps the nearest to, and draws inspiration from, the very best models. The states west of the Mississippi have never produced a president, while Virginia, lying in plain sight of the great object lesson—the dome of the capitol—has given us five; no other state but two.

Excuse me, gentlemen, when I began this paper I did not mean to touch on politics or religion, and for fear I may be led still further astray, I will sum up and see if there is anything of importance to the horticulturist to be gleaned from our random observations upon object lessons:

First—Our most magnificent models are in the rich valleys.

Second—Near living water.

Third—In alluvial soil.

Fourth—Whether wind is broken by mountains and high hills.

Fifth—Where the sun strikes but a small part of the day.

Sixth—In case of transplanted trees where the mulching has been heavy.

Finally, gentlemen, keep your eye on Nature's grandest works! Hide not your light selfishly "under a bushel." Be not discouraged in well doing, for even if our membership is small, remember that "he that is faithful in few things shall be made ruler over many." That man that acted *faithfully* as our secretary for seven years, when the Society was no more prosperous than now, is at present the secretary of one of the most prosperous and honored state societies in the Union, with a membership of one hundred and eighty of the most intelligent men in the State. The man who was acting as private secretary to the governor a short time ago is now governor himself.

Some of you have attempted to change the plan of Nature, who gives to nearly all our Minnesota wild trees a thick, pubescent leaf, by ordering a large share of your trees from the South, where they deal largely in *thin-leaved plants*, and are constantly sending the same to you. They are capable of storing up moisture enough to take them about half way through our summer months — hence they die. To be consistent, order a pump that will furnish you water for only half your stock. The leaves pump water for all our plants and here in this arid clime they *must be large and thick*.

A paper from Mr. Harris, who was appointed entomologist for the society last year, was read, it being a most instructive and pleasing one. He took for his subject the "Codling Moth," giving various methods for exterminating it.

THE CODLING MOTH.

By J. S. Harris, La Crescent.

Mr. President and Members of the Olmsted County Horticultural Society:

I noticed in the report of your last annual meeting that your man — Sias — had attempted to perpetrate a practical joke on you by having me elected as entomologist for your society. If my life should be spared, I hope at some future time to get even with him. He knows that I am not a professor of entomology, and perhaps do not understand the nature and habits of the majority of the bug world any better than most of you. It is true that I have put in a little time studying that chief of bugs, the "humbug," and have always found that his feet were hot and

left an unpleasant sensation wherever he has alighted, and have frequently sent forth notes of warning to my suffering fellow horticulturists. I have also taken a few observations of a few smaller insects that frequently do us considerable harm, but I have not got far enough along to have become case-hardened, and announce myself a full fledged professor, who desires to entertain (bore is perhaps the more appropriate term) you with a long drawn out treatise on the fascination and delight of a study that captivates the imagination and renders the enthusiast liable to construct and spin out descriptions and theories so long that there is no room left for discussion.

Insects are abundant in this country, and rapidly on the increase, and how to head them off is a problem yet unsolved, and in Minnesota but little effort has been made to bring about its solution. We last year gave you a brief and imperfect description of the "Apple Curculio," the insect which is the prime cause of so many of the knotty specimens of apples in some of our orchards.

We have with us another insect that was introduced into this country from Europe, commonly called the "Codling Moth," (*Carpocapsa pomonella* Linn), that is fully as injurious to the apple, but I think if fully understood, might be much more easily exterminated, especially by a concerted effort of the orchardists of a neighborhood. The habits of this pest are not generally well known, and but few persons have ever seen and recognized it in its moth or perfect state. It is one of the most beautiful of the moth tribe, but that is a poor consolation to the man who has none but wormy apples to eat. These moths measure about three-fourths of an inch across the wings when expanded, and are of a brownish gray color, crossed by numerous darker and lighter colored wavy lines. There is a dark brown spot of an oval shape near the margin of each upper wing. The under wings are brownish gray, much lighter than the upper and not shaded similarly, but shaded darker near the margin. They remain quiet during the day, and, owing to their color, are not easily detected, but they come forth and fly about at evening, and numbers of them may be seen in the month of June and later flitting about the apple trees.

By the most careful observations made by Fitch, Harris, Riley, Le Baron and others and corroborated by my own, it is generally conceded that they are two-brooded, or that two generations are produced each year. The parents of the first brood

have hibernated during the winter in the larva state, in cocoons which are concealed under the permanent scales or in the deep fissures of the bark of the tree, on the fruit of which they have been reared. They are also often taken into the cellar or fruit rooms before they leave the apples, and after they crawl out conceal themselves under the hoops of barrels or in the cracks of bins, where the careful observer frequently finds and may destroy them.

As the spring opens, the worms, which are hidden in crevices, change to chrysalis and from that immerse perfect moths, ready for the work of destruction. They first appear soon after the trees blossom, and proceed at once to deposit their eggs, one at a time, in the calix end of the newly formed apple. In about one week there hatches from the egg thus deposited a small, white worm, with shiny black head and neck. As they become larger the body is a flesh color with the head and neck tawny, and when fully grown they are nearly half an inch in length. As soon as hatched the little worms immediately begin to burrow in the apple, eating their way from the eye to the core and through the apple in various directions. To get rid of the refuse fragments of the food it enlarges the hole of the entrance, or gnaws one through the side of the apple, and thrusts them out of the opening. The growth is completed in three or four weeks, when the insect allows the apple to complete its transformation; this is usually when the apples are less than half grown, at which time most of the infested fruit falls to the ground. Now the worms leave the apple whether fallen or not and creep into the chinks of the trees, or other sheltered places, which they hollow out with their teeth to suit their shape. Here each one spins for itself a cocoon or silken case, and unlike the other brood, change into chrysalis immediately after their cocoons are made and turn into moths. In about two weeks they come out and lay their eggs for a second generation and it is this generation that causes so much worm eaten fruit in the autumn. This is the brood that hibernates through the winter in the larva state and comes forth moths in early summer to deposit the eggs for the first brood. We have necessarily been brief in our history and description in order to sooner get to the practical remedies, all of which are simple and easily applied.

REMEDIES.

The first is destroying the insects in their winter quarters. Second, picking the wormy apples from the trees and destroying them. Third, gathering the wormy apples from the ground or letting hogs and sheep have the range of the orchard. Fourth, entrapping the worms in bands or other contrivances.

When we consider that every female moth is capable of laying fifty or more eggs and that every worm of the first brood totally destroys an apple, we will readily see the importance of destroying the insects before they leave their winter quarters. For this purpose the careful orchardist will carefully search every place where their instinct would lead them to conceal themselves during the winter. We will hunt for their cocoons under the bark and in the crevices of trees and also in the hoops of barrels and in the cracks of bins in which fall and winter apples have been kept. I have seen the pieces of barrel heads and the boards of bins that were laid on top of each other, so completely plastered together by the worms between them that a number could be raised together by taking hold of the top one.

As the young worms, soon after the apple begins to grow, throw out castings through the hole they made in entering, or the one made in the side of the apple for the purpose, and a portion adheres to the rough shriveled calyx, their presence is readily detected. All of those within reach may be plucked by hand and the remainder by means of a wire hook attached to a pole, or the tree may first be jarred when many of them will fall and may be caught on sheets spread beneath, and then go over the tree and remove the remainder. The fruit thus removed should of course be fed to swine or burned, and if the work is thoroughly done there will be but few left to propagate the second brood. Third, gathering the windfalls from the ground or letting the swine and sheep have the range of the orchard. By the latter the fruit will be utilized, but it is not as effectual as the other because many of the worms escape before the apple falls. Fourth, entrapping the worms under bands and other contrivances. The well-known habit of the Codling Worms to seek shelter, when about to transform into perfect insects under the scales or bark upon the trees where they have been raised, has suggested the idea of entrapping them under some artificial covers, and experience has proven that by following this method, in connection with the others, they can be nearly

exterminated. Paper bands are probably the cheapest in large orchards, although bands of hay, rags or other substances may answer. The paper bands are made and applied as follows: Sheets of straw wrapping paper, say 18x30 inches, each sheet folded twice, giving eight layers between two and three inches wide. One of these are folded about every tree between the ground and the lower limbs, and fastened in place by a carpet tack. The band should completely encircle the tree, the lower edge being loose enough to permit the worms to crawl under. The object is to furnish the worms a hiding place which they will accept to undergo their transformation. The bands should be put on about the first of June, or before any worms escape from the fruit, and kept on until October. But to be effectual they will require taking off and destroying such insects as have taken refuge under them every few days. The better way is to burn the bands and replace them with new ones, but if they are made of manilla paper, such as is used for flour sacks, they may be run through a clothes wringer, and replaced, and will ordinarily last one season. Where but a few trees are to be protected it might be economy to use cloth bands and at each examination to dip them into boiling water to kill the worms taken off, and lay away when the season is over and they would last many years. Another safeguard against them is to remove all worthless varieties of fruit trees from the orchard.

Many of our farmers have planted largely of Siberians and hybrids that no longer pay for gathering and marketing. The fruit is allowed to remain where it falls upon the ground to decay and form a hot bed for the propagation of various insects and the breeding place of blight and fungus. While such remain, not much headway can be made in fighting the insects upon the trees producing valuable fruit. Lastly, protect and encourage the presence of insectivorous birds. The keen eye of the downy woodpecker will detect the larvæ in its most secret hiding places and the sharp bill is prompt to bring forth the dainty morsel. The blue jay, blue bird, wren, and many others, are always ready to lend the fruit grower a helping hand.

FROM SECRETARY HILLMAN.

The following letter from S. D. Hillman, Secretary of the State Horticultural Society, was read by President Sias:

A. W. Sias, President Olmsted County Horticultural Society:

DEAR SIR:— Your favor of recent date inviting me to be present at your annual meeting is received. I hasten to reply, and regret that a press of other duties will preclude the possibility of meeting with you on the occasion mentioned.

I trust you will call attention to the near approach of our annual meeting, and will extend to the members of your local society a cordial invitation to attend the same and participate in the discussions and deliberations. I have no doubt that some matters of more than usual interest to horticulturists will be presented.

One of the most timely subjects to be discussed and properly considered at this time, is the method to be employed to secure hardy varieties of fruit trees for Minnesota and the Northwest. Our severe winters have had the effect of thinning out our orchards and nurseries, till there are very few varieties left that can be relied upon with any satisfaction or degree of certainty to produce a crop of fruit.

It is undoubtedly true that too little care has been exercised with regard to the selection of hardy, vigorous stock and the kinds that mature and ripen their wood early in the season, and of late the question of how to obtain some of the better Russian varieties of apples has been a prominent subject at our meetings. Experience has demonstrated the great value of many of these sorts which have been propagated to some extent in this State and in states adjoining. The experiments being made will surely result in the bringing out of a few varieties, sooner or later, of equal value with the well-known Duchess, so universally popular with the farmers of the Northwest. By means of judicious crossing with our native seedlings there will be an improvement in the quality of the varieties to be produced.

Of late a method of crossing has been introduced with success by using the pollen on such hardy winter trees as may be found among our native sorts and fertilizing, or crossing, with such Russian varieties as the Hybernal, Lieby, Ostrekoff Glass, or other true ironclads. It is found that the pollen may be even sent in a letter, and after being kept for several days will germinate. By using such means to obtain a stock of required hardiness the crossed seedling will generally be found to follow the characteristics of the parent tree. The method is receiving attention from the fact that it is desirable to obtain choice winter apples of proper hardiness for this climate, and as being consid-

ered a shorter road to success than experimenting with our seedlings and them alone.

The matter of growing grapes successfully here in Minnesota is attracting some attention of late, and should receive greater consideration at the hands of farmers generally. There has heretofore been too little interest manifested in this direction. I have on my table a letter from T. T. Lyon, president of the Michigan State Horticultural Society, in which he says: "I was greatly interested, not to say surprised, in looking over the exhibits of fruit from your State at the New Orleans exposition, and especially to see among them well-ripened Catawbas—a variety whose home proper is in the Ohio Valley, and which we in Southern Michigan only ripen with certainty in our more favorable localities."

I may say here that in visiting the celebrated vineyards near Cleveland, last fall, on the shores of Lake Erie, that the Catawba, which is quite a favorite with many, was not very much advanced in its stage of ripening to that to be observed on the shores of our own Minnetonka lake. It was evident that we could produce the Concord, Moore's Early and Delaware even with equal certainty in our favorable localities.

Your experience in Olmsted county will bear me out in the assertion that there is hardly a better county in the State for fruit culture, and I am glad to know that your society there is still interested in advancing the horticultural interests of the county as well as the State at large.

Please send us a good delegation to our annual meeting. With sincere wishes for your prosperity and begging to be excused for this hasty note, I remain, very respectfully,

S. D. HILLMAN, *Sec'y.*

DISCUSSION.

Mr. Wayland Stedman inquired concerning the paper of Mr. Harris, if the larvæ of the moth when concealed under the bark of the tree, could not be killed by the application of some wash.

Mr. Sias said he thought spraying the tree with Paris green was the quickest way of exterminating the pests, and agreed with Mr. Harris in the statement that insectivorous birds should be encouraged to remain around the orchard as they are of great aid to the fruit grower. He thought the best time to spray with Paris green was just after the blossom had fallen.

Mr. M. J. Hoag, who has been for the past three or four weeks in the South, gave a short description of the country. He said he found good soil for fruit growing, it being a sort of clay loam. It was much firmer than ours, the native soil being very hard. They could not raise grapes there to compete with those of California growing, but they were about the same quality as ours. He never saw fruit trees grow so rapidly. He measured a pear tree that had grown nine feet three inches in three years. About fifty per cent grow from cuttings. Their water was not considered safe for drinking purposes unless boiled, and the majority drink cistern water.

He also gave a short description of the people and their appearance with regard to health, and also the cattle and the effect of water and climate on them.

Mr. Hoag said, in regard to his experience in fruit growing, that he started a few raspberry vines last year. He had covered about half of them this fall. He said that he believed vines should be covered in such a severe climate as ours. He didn't believe in clipping them if they were to be covered, as it stiffened them and they were liable to break when bent. He never saw any blackberry vines that would live here unless covered.

Mr. I. D. Swain said that he didn't think it was a good plan to bend the vines. He lost more vines that way than he gained berries.

Mr. Sias said he used a potato fork in covering and finds it the best, as one man can handle the vines. He thought the vines of most varieties needed shelter.

Mr. Swain said there was little difference between thorough cultivation and mulching, mulching keeping the land cool, which is what the vines want.

Mr. Sias said that on some soils it was unnecessary to manure heavily.

Mr. Stedman said blueberries grew here wild about thirty years ago, and he thought they could be grown here now.

Mr. Sias said he saw some bushes at the head of Bear creek and he had planted a few in his garden and they bore well. He believed they could be cultivated.

We insert here the address of President Cutler, at the annual meeting of the McLeod County society.

PRESIDENT'S ANNUAL ADDRESS.

By M. Cutler, Sumter.

Members of the McLeod County Horticultural Society:

It gives me pleasure to meet with you again, and my greatest desire is that this may prove a profitable and interesting meeting to all present, and that something may be done here today that will cause others to take an interest in our society as well as horticultural work for the health and happiness of their families.

While we have not as many members as we should like to have, we must remember that small beginnings often produce great results. We have as many members as the State Society had during the first year of its existence. Still it is a great success, and each year, through its members and instructive reports, exerts an influence for good that cannot be counted in dollars and cents. A large part of our people have migrated from lands that produce apples and other fruits in abundance and there is a longing desire to gather fruit from their own vine and tree. How intense that desire is, is best shown by the readiness with which they have parted with their hard-earned dollars when the tree agent has appeared with his beautiful pictures and nice stories of hardy fruits adapted to our climate, thereby inspiring hopes to be blighted with the first blasts of winter.

The history of fruit growing in McLeod county presents a dark and dismal record. Enough money has been worse than wasted to make several fair fortunes, but we hope a better day is coming. The perseverance of such men as Gideon, Tuttle and a score of others will, in a few years, solve the apple problem, and our list of small fruits is being rapidly extended so that we see no reason to doubt the realization of the hopes of these old pioneers who have predicted that Minnesota would become as famous for her fine fruits as for fine wheat. Let it be the object of our society to inform the people of the merits of these new fruits and warn them of the danger and risk in giving their money to oily tongued strangers. With your permission I will offer a few suggestions.

I think a committee should be appointed to attend the annual meeting of the County Agricultural Society and if said society will agree to banish fakirs, fortune wheels and all similar

schemes that rob and demoralize the people, make arrangements with them to have liberal premiums offered for horticultural products and make a joint exhibition. Such an arrangement has met with success in some places, and I think would in this county. Some plan should be devised for getting more members and getting the reports of the State Society now on hand among the people. I therefore suggest that the next meeting be held at Hutchinson some time during the winter. If we wish to have a live society we must be full of enthusiasm. One or two can not make of this a successful society, but each must do well his allotted task. I believe that when the people know what to plant and how to care for them, the finest of small fruits will be found in nearly every garden in the county. If one man can grow one hundred and twenty-five bushels of strawberries per acre, as was done by a farmer near Winsted the past season, certainly others should be able to grow enough for their own use. A few years since a cultivated berry was seldom seen in our home markets. Now, as soon as spring opens, they begin to arrive from the south and continue to come until about the middle of June when our own producers furnish an ample supply. Tastes are rapidly changing and the old time pork diet is giving way to the beautiful and delicious fruits. We have the soil and climate for the production of the most highly colored and best flavored fruits grown, as soon as we solve the question what to grow. Then, fellow members, let us hope that this meeting is only a forerunner of many more to follow and that from our deliberations great good may come to the people of this county.

FRUIT REPORT FROM WISCONSIN.

MENOMONIE, DUNN COUNTY, WIS., MAR. 22, 1887.

S. D. Hillman, Secretary, etc.:

Dear Sir: Thinking that a report of trees, etc., from this section might be of interest, I will state the following:

We did not have a very trying winter this year, although the thermometer sank down to 40° and under and remained there for about a week, but that is less than usual for three years. I have just come in from examining the trees and I find the following, which I have growing in the nursery row, to be entirely hardy: Lou, Florence, October, Martha (received from Peter M. Gideon, Minnesota,) Whitney, Hibernial, Ostrokoff's Glass and

Hyslop, Transcendent and Moringe Crabs. Then follow Duchess, Tetofsky, Pringle, Gilman, Dean, Yellow Anis, Charlamoff and Repka Malenka, with the terminal bud and an inch of wood slightly discolored. Next come Isham, Peach, Charlottenthaler, Yellow Transparent, Prolific Sweet, McMahon White, Scott's Red and Iowa Russet, with a trifling more discoloring. Then come Iowa Blush, Wealthy, Alexander, Longfield, Child's and Switzer, with yet more discoloring. Last come Borsdorf, Wolf River, Walbridge, Fameuse, Plumb's Cider, St. Lawrence and Fall Orange — all of which I think are no good here.

I have also Clapp's Favorite, Flemish Beauty and Keifer Hybrid pears growing in nursery row, all of which are frozen to the line where covered by snow last winter. One Keifer Hybrid pear, three years old (from Chas. A. Green, Rochester, N. Y.) that has been drifted up with snow every winter, made a splendid growth last summer and set fruit buds to every inch of wood. Last fall I took two big barrels, with ends knocked out, and placed them around it — one barrel on top of the other — filled in and covered with sawdust. That tree has come out sound, and I expect to have some pears from it next summer.

The native plums received from Mr. Gideon made a very fine growth and are entirely hardy. Moore's Arctic plums, from Phœnix Nursery, Delavan, Wis., seem to have stood the winter fairly well.

Strawberries and currants grow finely here. Raspberries and blackberries must be covered every winter, then they fruit well and pay well.

Very little fruit is grown here, but the market, in season, is well supplied with wild fruit. Besides some strawberries and currants, a few Duchess apples, Hyslop and Transcendent crabs are seen. But as the country becomes settled, the wild fruit will go, the demand for cultivated will increase year by year and by that time, I think, we will have solved the problem of successful fruit growing in the far Northwest.

Yours for further trial to grow fruit,

S. RUNNING.

FRUIT GROWING IN THE NORTHWEST.

[A paper read at the meeting of the American Horticultural Society, at Cleveland, Ohio, September 7th to 11th, inclusive, prepared by J. S. Harris, of La Crescent, Minnesota.]

Mr. President and Gentlemen of the American Horticultural Society:

The duties devolving upon me as a member of the State Board of Agriculture of Minnesota, and the fatigue I feel from the laborious work attendant upon our fair just closed, lead me to regret that I have promised a paper for this occasion, and will deprive me of the pleasure of meeting with you.

I can not give you a carefully prepared paper upon the subject your secretary has assigned to me. The Northwest has gradually receded before the march of civilization until it is now known as the region embraced in the states of Wisconsin, Minnesota, Northern Iowa, Dakota, and Montana; but it is still an empire in extent, the fairest land the sun shines upon, and there is no other section of this great country that to-day offers such unsurpassed inducements to the farmer, mechanic, merchant, professional man, and all others seeking new homes, to come and settle within her borders. The climate is stimulating, and well calculated to bring men and animals to their greatest state of perfection; the waters are as pure and as abundant as in any inhabited country upon the globe; the soil is unequalled in variety, fertility and natural adaptation to the growing, in its greatest perfection, almost every fruit, vegetable and cereal required for the sustenance of civilized man, and it possesses a purity of atmosphere that promotes health and vigor to man and the products of the soil. Within its borders are found forests of valuable timber, vast prairies ready for the plow of the husbandman, and deposits of the richest minerals. These peculiar advantages have brought within its borders a pioneer people composed of the most intelligent and progressive from every land, and the development of its resources is marvelous. A history of its horticulture, which is trying to keep pace with other industries, would read like a romance; would tell of struggles and trials, failures and triumphs, of men who had nerve and hope enough to enable them to plant trees in opposition to public opinion and in the face of the difficulties attendant upon the settlement of a new country, and in the face of almost certain disaster. Fortunately a few of these early pioneers, scattered here and there, were of a class who persisted in planting trees,

making experiments and hanging on to a forlorn hope, until they have gained the confidence of the multitudes and are now regarded as heroes in horticulture.

THE PAST OF HORTICULTURE.

The first planting of trees and fruits by the early settlers of this country was of such varieties as were favorites in their former homes. The planters had but an imperfect knowledge of the soil and climate of the country, and the hardiness and adaptability of varieties; for a few years a great number of varieties succeeded so well as to raise fond hopes that this was destined to be a country well adapted to the production of apples, pears, and all hardy fruits, and orchards were being extensively planted with the most tender varieties. Right upon this hopeful period occurred a fearful disaster; the winter of 1872-3 destroyed trees by thousands, and totally annihilated hundreds of orchards of the old favorite varieties. Investigation proved the cause to be root-killing, resulting from a severe and protracted drought which had prevailed in the fall. The ground froze up dry, and the absence of snow caused it to freeze to a great depth, consequently all moisture was drawn from the roots. A few varieties survived this test (one not likely to come again in an ordinary lifetime), and they were considered to be "ironclads" and formed the basis of replanting and starting new orchards.

Ten or twelve years of remarkable success followed this great disaster, and a new impetus was given to the planting of such varieties as had survived the severe test, and in looking about for others of equal hardiness, and to the originating of new varieties from seed, when in the winter of 1884-5 a disaster as great as the first overtook us. The conditions of the latter were in many respects directly opposite from the first. A summer drought and early frost had matured the growth of the trees. September, October and half of November were wet and very warm, starting a new growth. Winter shut down suddenly, was long and severe, and the deep snows prevented freezing of the ground. The opening of spring found the tops and trunks of many varieties killed to the ground.

THE PRESENT.

Not yet discouraged our people are turning past failures to profit. Improved varieties of the Siberians, several varieties of

home seedlings, and many varieties of Russian origin stood this severe test with little or no injury, and there has been no time in the past when more interest has been manifested in fruit growing. Our horticultural societies are gaining in strength and usefulness; our orchards are being reset and extended; but only such varieties are being used as have proven to be early and abundant bearers and reasonably hardy, while extensive experiments are being made with newer varieties imported from Russia, and in originating varieties.

At the Minnesota state fair just held the horticultural display was one of the best ever made in the Northwest. It included nearly one hundred varieties of large and fine apples, several improved Siberians, some thirty varieties of the best American grapes, and several of native plums.

THE FUTURE.

The future is hopeful. There is not a reasonable doubt but that some of the varieties recently introduced from Russia, by Messrs. Budd, of Iowa, and Gibb, of Canada, will prove adapted to all parts of this great country, and it is believed that seedlings from them, developed in our soil and climate, will be adapted to our wants and produce fruits of great excellence, which, together with the improvement being made in the Siberian species by Peter M. Gideon (the originator of the Wealthy apple), by crossing and hybridizing with the larger apples, will soon give us an enviable reputation for the abundance of its strawberries, raspberries and grapes. The strawberry is at home here, and is largely grown for home use and for market. The most popular varieties are Wilson, Crescent, Downer and Glendale. These are usually grown in matted rows and the beds continued from two to three years. Marketing is cheaply done in quart boxes shipped in sixteen and twenty-four-quart crates. Prices range from from five to fifteen cents per quart, according to season and quality.

The varieties of raspberries most extensively cultivated are Doolittle and Seneca, for blackcaps; and Turner, Philadelphia and Cuthbert for red. Some winter protection is usually given. The yield is generally abundant and the crop sure.

When winter protection is given, blackberries are found to do well and are a very profitable crop. The varieties are Snyder and Ancient Briton. Currants and gooseberries are at home

here. The cultivation of native grapes is now attracting considerable attention, and all varieties that will ripen early enough to escape the autumn frosts produce the most perfect fruit that can be found in the Union. The varieties most extensively grown are Concord, Delaware and Worden. Many others are doing equally well and the future of grape culture is very promising.

Among the fruits indigenous to this region there are none giving a promise of greater possibilities than the Canada plum (*Prunus Americana*). Several varieties, as the DeSoto, Rollingstone, Cheney, Forest Garden, and Weaver, have taken their places among our popular fruits, and steps are being taken to ameliorate and improve them by cultivation and selection of seedlings.

Floriculture is receiving its share of attention, and the displays of flowers and plants at our state and other fairs could hardly be excelled by those of the older states. No country in the world of like extent surpasses this in the quality and quantity of its vegetables with which all our markets are abundantly supplied.

From Farm, Stock and Home.

HORTICULTURE AT THE SOUTHERN MINNESOTA FAIR.

Rochester will always hold a prominent place in the history of horticulture in Minnesota. It was here, at the state fair in the fall of 1866, that the first exhibit of the larger apples was ever made at any state fair in the State. The principal exhibitors on that occasion were J. W. Rollins, of Elgin, and J. S. Harris, of La Crescent; Rollins showing 6 or 8 varieties and Harris 18, all of their own growing in the State. At that memorable fair the State Horticultural Society was first organized, with but twelve members, and has not only continued its existence down to the present time but has increased in numbers, strength and usefulness until it now has over two hundred earnest, working members, and ranks as one of the first and best societies in the Northwest. But three of the original members were present this year, A. W. Sias, J. W. Rollins and J. S. Harris. Mr. Cotterell would have been present but for sickness. The wonderful growth of the Society and the advance in horticulture, as shown by the exhibits, was very gratifying to these old pioneers, and

repays them well for the twenty years spent in working for the advancement of the Society.

This fair has a magnitude second only to the state fair. In most departments the exhibits were full and good. The fruit department was attractive, instructive, and only lacked the Minnetonka grapes to make it excel that of the late state fair. The leading exhibitor was A. W. Sias, who made an entry for a general display and showed a great variety of American, Russian and hybrids, securing the first prize as a professional. William Somerville, of Viola, had a general display of winter and autumn varieties and a large collection of Siberians and hybrids. He took the first prize on general collection as an amateur. His collection had in it several fine varieties of Russians and a few of the Rollins seedlings. His orchard has fruited abundantly this year and we are informed that he has already marketed four hundred bushels. Next came Sidney Corp, of Hammond, and every entry he made took a prize, every ribbon blue but one, and it only lacked three varieties in the collection to decorate that with the same popular color. He showed the largest and best Wealthies ever grown in this or any other state; had several plates of McMahan's White, a seedling from Richmond County, Wisconsin. This fruit is very large, perfect in form, of pleasing appearance, season said to be December or January. This apple stood the winter of 1884-5 about as well as the Duchess, and promises to be well adapted to Southeastern Minnesota. Mr. C. also showed some varieties of the Rollins seedlings and a few of the Russians, one of which, the Autumn Streaked, promises to be a valuable variety, its season closely following the Duchess. Twenty years ago Mr. Corp could show nothing better than Siberian crabs. R. L. Cotterell, of Dover Centre, showed a great variety of apples and grapes. J. W. Hart, of the same place, had a collection of seedlings, two of which are remarkably fine. Wm. McHenry, of St. Charles, had a general exhibit of apples and plums; of the latter there were seven or eight varieties, most conspicuous among them a variety named the Weaver, a free-stone of excellent quality. W. O. Crittendon, of Dover Centre, had a large display, mostly hybrids; and a farmer from Viola made a splendid showing of Wealthy, Duchess and Hybrids. O. M. Lord, of Minnesota City, showed ten varieties of cultivated native plums in glass jars; conspicuous among them was the Rollingstone. There were four or five exhibitors of grapes, and several of single plates of fruit, whose names we did not learn.

The show of flowers and ornamental plants was fine and chiefly made by Mrs. Nesbet, of Rochester, John Wonder, and Smith & Darling, of Winona. The display of vegetables was much better than at the state fair, and the first prizes were sharply contested for. The great variety and superior quality of the corn exhibit would convince the most skeptical that this has been a remarkable corn year, and that this country is peculiarly adapted to perfecting this valuable grain.

J. S. H.

LA-CRESCENT, MINN.

RUSSIAN APPLES.

Wm. Toole, one of the substantial farmers of Sauk county, Wis., writing to *The Farmer*, St. Paul, on the subject of "Russian Apples," says:

In the Russian orchard of A. G. Tuttle, Baraboo, Wisconsin, there are more than eighty varieties set apart by themselves, and the greater part are now bearing. We have dropped the term "Ironclad" in this part of the world, and hardy as the Duchess is now our degree of comparison, though hardy as the Wealthy, if proved, is enough to make a variety acceptable here on the scale of hardiness. That Mr. Tuttle has dozens of varieties here as hardy as the Duchess, no one can doubt after seeing the healthy foliage, smooth, glossy trunks, and making comparison on the same grounds with all of the leading ironclads in various stages of age and growth. Mr. Tuttle said that he would have been well satisfied to have found amongst them a dozen varieties worthy of keeping, but there are so many good ones that it would be difficult to cut down the list of best to less than twice that number. While we were passing through the orchard, some notes of varieties were jotted down at random as follows:

Lord's Apple or Arabsko, a great bearer, fine showy apple, good quality, will keep till May. Glass Green, a late Duchess, very handsome tree, heavy bearer, but not as soon as Duchess to ripen. Lone Turnip, a sweet apple, ripe early in August. Lowland Raspberry, a medium sized, very handsome apple, the best of quality, ripens middle of August. Tetofsky, a very large showy apple ripening in autumn. Barloff, a sweet variety of good quality; early winter. Juicy White, not quite as early as Transparent, very juicy. Golden White, medium, large and hand-

some, good bearer, sub acid, keeps well into winter. Enormous, ripens middle of August, very large and showy and of fair quality. Omensk, first year bearing; evidently a good keeper and promises to be a heavy bearer. Vargle, quite large, green, pronounced by Gibb one of the best of winter Russians. Blue Anis; also four others of the Anis class, all early winter. Antonovka, a heavy bearing, long-keeping variety, of good quality. Early Champaign, a heavy bearer, red streaked, tart, juicy, mellow and sprightly, and is three weeks earlier than Red Astrachan. Hibernial, a heavy bearer, hardy and healthy; season from November to February; kept at New Orleans until spring. Switzer, juicy, fine grain, sub acid; it ripens in September and holds in season twice as long as Duchess. Zolatoref, very large and showy, sub acid, ripens in October. Zuzoff's Winter, an early winter variety of medium size and fit for use early in winter; it is very fine flavored. Longfield, one of the best; fair size, very hardy; it keeps longer and is better than Fameuse. Arabian, a late Duchess. Transparent, a clear, waxy, white-skinned apple, of good quality, juicy and very early. It is hardy, a constant and enormous bearer.

PRUNING AND PROTECTING GRAPE VINES.

The season for doing this work is in the fall. When the vines have shed their leaves, which happens after a few severe frosts about the first of November, a great amount of rough growth must be removed, to make thorough winter protection possible. This question about the manner of pruning is one embracing a great variety of notions, though none of serious dispute. The age and character of the vine has much to decide in the matter, also the location or section of country where grown. As a general thing, however, the purposes for which pruning is done are the same, the question being how it shall be done. Throughout the Northwest it is found necessary to protect grape vines in winter. The wood is light and porous, and through extreme changes in the weather it becomes dried out, and the vitality of the plant very much injured, when not entirely destroyed. Bending close to the ground has some effect of saving evaporation, but a slight covering of earth furnishes ample protection to all varieties found adapted to this climate. The plan of bending down makes it desirable to grow as little old wood as possible, hence the necessity of close pruning, which causes the fruit to grow on the line of one or two canes.



PRUNED READY TO COVER.

A vine that has been set only one season will consist of one cane from two to four feet in length, which should be cut back in the fall to about one foot, leaving about three joints above the surface of the ground. The second year but two canes should be allowed to grow from these buds, and again in autumn these should be shortened each about to eighteen inches, if they are vigorous, but if not they should be cut back close to the old wood and more new canes started the third year. Even the third year it is best to cut back well and allow little or no fruit to be grown until the fourth season, when a good foundation of roots has been secured. The productiveness of a vineyard depends more upon the amount of vigorous roots to the vines than anything else. When the vines have become well established, the pruning thereafter is done in a manner to secure the most fruit at the least expense of vigor to the growing plant. Taking it year after year close pruning will secure the largest quantity of fruit, and at the same time the highest quality. Old vines should be left to grow from four to six feet of old wood, and the laterals on this stem should be trimmed leaving only one or two vigorous buds on each one to produce the bearing shoots for the next year.

The training should be done on horizontal poles or wires, and the main stalks given an incline of about 45° so that bending down will be made easy when the time comes for covering. In a vineyard of considerable size the work of covering is made very much easier by first laying the vines down and throwing just enough earth over them to keep them in place, then take an ordinary stirring plow and throw a furrow on each side toward the row. In doing this it is necessary to use care not to plow too deeply or stir the ground very near the roots. The rest of the covering is done with a shovel, using the already loosened soil.—*The Farmer*, St. Paul.

STRAWBERRIES IN ILLINOIS.

Mr. Parker Earle, of Cobden, Ill., the strawberry king of that State, in writing to the secretary of the Michigan Horticultural Society, gives his method of culture in the following terse manner:

“Here is how we do it. We plant in the spring, and largely of Crescents, getting three rows of them to one of some fertilizing variety, as Sharpless or Sucker State. We cultivate clean all summer, in matted rows, keeping the rows entirely distinct. We mulch in the late autumn with wheat straw, covering the middles heavily and the rows lightly. Never take it off. Next: The tarnished plant bug ruins nearly ninety per cent of all varieties except Crescent, and sometimes half of them. We pick every day — seven days in the week. It is wicked to work so hard, but we can not harvest strawberries for shipment long distances without doing just this thing. We use quart boxes five inches square by two and a half inches deep, and twenty-four-quart crates. We don't use the Michigan box, which is nearly as deep as it is wide, and looks small and carries badly, and would not use them if furnished free. We don't use sixteen-quart cases, which are as high as wide, and which no fellow ever knows or cares how to set down, bottom, side, or top up. We don't use this package, and I wish you Michigan people would abandon such an ill-looking, bad package. Your berries would bring more money in our style of package and it costs no more. Finally, we ship in refrigerator cars, the berries being first carefully cooled off, and we use Tiffany cars, because they carry the ice overhead, where it ought to be. We scatter widely, and we don't make as much money as we want to, for there are too many strawberries for profit to the grower.”

HOW TO EAT STRAWBERRIES.

By Chas. A. Greene, Rochester, N. Y.

The following directions on this topic are given by Mr. Greene, who handles the “Jessie,” and who doubtless knows a good thing when he sees it:

First catch your strawberry. Don't catch her in your neighbor's garden while he is off fishing; don't catch her from

the strawberry man's wagon, when it happens to pass your way at long intervals; don't catch her at the grocery, soft, sticky and slippery. No! Catch the strawberry as it blushes in your own garden or field, fresh with the morning dew, fragrant and beautiful as the rose. Thus captured, you catch ruddy cheeks, a good appetite, love of home, fun for the children and long life. Don't catch her among weeds and grass, nor under the shade of trees, but in the open sunshine, whither she holds a picnic, and where she has a chance for life. While you are catching, catch a plenty. Catch enough for the young folks, the old folks, the servants, the sick neighbors.

Having caught the strawberry do not be rash. Most people are led by instinct to devour ravenously as soon as caught, but I advise you to be deliberate and thoughtful. Look the berries over. Note the form, color, texture, aroma. Take your brushes and paint a strawberry on canvas, then compare it with the original. The garden berry has beaten you, I daresay. Your painted berry has no soul, no heart. It does not look jolly or lead you off into reminiscences of early days; the sunshine does not adhere to it; it does not smell good; even the pigs would turn up their noses at it, and yet, you pride yourself upon being an artist.

Think for a moment of a plant that produced these berries. Its ancestors blossomed and made love on this continent before Columbus landed; Noah plucked a few on his way to the ark before the flood, sorrowing over the hour of parting; Moses fed upon them in the mountain of Palestine, after he last turned his face from the people he had led from bondage; Adam and Eve gathered them when they first awoke in the Garden of Eden.

While thinking, continue to inhale the perfume, and ere you stop, dash on a little sugar, and, as by accident, partially tip the cream pitcher over the berries. (It would be heartless to intentionally besmear creations so beautiful.)

I have now reached the end of my task and the beginning of yours. If from this point you do not know how to proceed, you are not a son of Adam, but a stranger from some far-off planet where it is too hot, frosty or weedy to produce strawberries."

ENTOMOLOGY IN ILLINOIS.

By C. M. Weed, Champaign, Ill.

I may be permitted to mention one or two of the practical results of investigations concerning economic entomology in Illinois. The farmers of the state had for some years been troubled by a worm that ate the roots of young corn, annually destroying great quantities and entailing a serious loss of time and labor. No successful remedy was known. The life history of the pest was studied by several of the leading entomologists of the state and it was discovered that the insect was the young or larvæ of a common green beetle (*Diabrotica longicornis*, Say). It was also found that these beetles deposited their eggs in the soil of corn-fields in autumn, so that the following spring when the young larvæ hatch they are ready to attack the growing corn. From this it was an easy step to the suggestion that by an intelligent system of crop rotation, such as that of following corn with oats, the young worms would not have suitable food at hand, and being unable to escape from the environments of their birth must of necessity perish. Thus there was provided a simple, practical and inexpensive means of escaping from the ravages of a pest that had threatened to put a stop to the production of the chief cereal grown here; and to-day this idea has entered into the scheme of agricultural practice in the most successful farming communities of the state.

Another instance is also in point here. As doubtless all who listen to this paper are aware, the production of strawberries is one of the chief pursuits of the horticulturists of Southern Illinois. The business had been so long continued that a few years ago insects of various kinds had increased to such an extent as to seriously interfere with the successful production of fruit. The state entomologist was appealed to, and the whole subject was exhaustively studied a few years ago by Prof. Forbes and his assistants, the result being an elaborate paper upon the insects affecting the strawberry, which was read at the meeting of the Mississippi Valley Horticultural Society in 1883, being published in the transactions of the society for that year and also appearing in the thirteenth report of the state entomologist of Illinois. It was there recommended that to prevent the undue increase of injurious insects the old strawberry plantations be plowed up at such times as would kill the young of the worst of the pests by starvation, and that the plantations be frequently

renewed, rotating with other crops as much as possible. This, too, is now the ordinary horticultural practice in Southern Illinois.

RESOLUTIONS ON FORESTRY.

The American Forestry Congress, in the meeting held at Denver, Colorado, September, 1886, in behalf of the forestry interests of the country, adopted the following resolutions:

1. That the rapid destruction of the timber lands of this country is an evil which will result in incalculable damage to the present and future generations; that the denudation of mountain slopes and hillsides, by fire and axe, without proper regard for renewal, has already begun to injure agricultural interests by disturbing favorable distribution of water supply, intensifying droughts and floods, causing springs to become dry and streams to diminish their flow.

2. That the importance of maintaining a proper amount of land in forests can not be overestimated, and it is also apparent that only the government, state, or nation can have an interest in such maintenance for the benefit of future generations.

3. That the public lands, at the sources of streams, necessary for the preservation of the water supply, should be granted by the general government to the several states, to be held and kept by such states in perpetuity, for the public use, with a view to maintain a full supply of water in all rivers and streams.

4. That we recommend to the general government the creating of the office of commissioner of forestry, which office shall be filled by a man conversant with the interests of practical forestry, whose duty it shall be to see that the laws upon that subject are carried into effect.

5. That fire is the most destructive enemy of the forest, and that the most stringent regulations should be adopted by the national, state and territorial governments to prevent its outbreak and spread in timber lands.

6. That the general government be recommended to assist the agricultural colleges of the various states in the formation of tree planting and culture, and that all work and experiments in that direction should be under the general supervision of the commissioner of forestry, in case such an office should be created; otherwise to be under the supervision of the commissioner of agriculture.

7. That the principles of forestry and practice of tree planting should be taught in the public schools of this country.

8. That, in our opinion, the agricultural colleges of the various states should give special attention to propagation and cultivation of forest trees, and especially to the purpose of determining the most useful and robust varieties of timber for their respective states, and for the various portions thereof, and for the proper dissemination of the knowledge so obtained.

9. That to encourage the planting and propagation of forest trees, states and counties should provide for and allow an abatement of taxes proportioned to the extent and success of such planting.

10. That we most earnestly recommend to the governors of the various states that they urge upon the legislatures of their respective states the importance of the preservation of the forests where they already exist, and to urge and encourage such legislation as will promote the more general planting and cultivating of trees and forests.

11. That there should be no rigid ruling as to the varieties of timber to be planted or cultivated upon a "timber-culture" claim.

12. That the commissioner of agriculture be authorized by Congress to apply, in his discretion, such sum or sums as he may see fit, from the appropriation for the forestry division of his department for the encouragement of national and local forestry associations.

13. That it is the sense of this forestry congress that the legislatures of the states should provide for the establishment and maintenance of experimental timber-culture stations, to the end that there may be secured a knowledge of the highest adaptability of different varieties of timber to the different soils, and that the taxable wealth of the state may be increased to the material lessening of the rate of taxation.

EXPERIMENT STATION AT OWATONNA.

AN ACT TO ESTABLISH AN EXPERIMENTAL FRUIT, FOREST AND ORNAMENTAL TREE STATION.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. That an experimental station be and is hereby established on the State School Farm at Owatonna, in this State, for the purpose of producing new and valuable varieties of fruit trees, thoroughly testing promising varieties we now have, and securing reliable reports in regard to fruit, forest and ornamental trees best adapted to the State.

SEC. 2. That said station shall be under the general supervision of the board of regents of the State University, who shall, with the advice of the president and secretary of the State Horticultural Society, appoint a superintendent, who shall report to the board of regents as they may direct, and who shall report to the State Horticultural Society in person at each annual winter meeting thereof.

SEC. 3. That all products of said station shall be the exclusive property of the State, and all surplus shall be disposed of as the board of regents may direct.

SEC. 4. That said board of regents is hereby authorized to set apart and appropriate from any fund at their disposal for such

purposes, such sum as they may deem advisable, not exceeding one thousand (1,000) dollars per annum, for the total expenses of said station.

SEC. 5. That this act shall take effect and be in force from and after its passage.

THE LAW OF MINNESOTA ON FRUIT STEALING.

Chapter 35, General Laws 1867.

AN ACT FOR THE PROTECTION OF FRUIT AND ORNAMENTAL TREES, SHRUBS, VINES, AND VEGETABLE PRODUCTIONS.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. That if any person or persons in this State shall hereafter enter the inclosure of any person, without the leave or license of such owner, and pick, destroy, or carry away the fruit, or any portion thereof, of any apple, pear, peach, plum, grape, or other fruit tree, bush, or vine, or any vegetable products, such person shall be deemed guilty of a misdemeanor, and upon conviction thereof may be fined any sum not less than ten nor more than fifty dollars, and imprisoned in the county jail for any period not exceeding thirty days.

SEC. 2. That if any person or persons in this State shall willfully and maliciously, and without lawful authority, cut down, root up, sever, injure, peel, destroy or carry away, any fruit or ornamental tree, or shrub, cultivated root, plant or vine, of whatever kind, or any fruit or other vegetable production, standing, or growing on, or being attached to the land of another, or shall willfully, and without lawful authority, cut down, root up, destroy, or injure in any manner, or carry away any fruit or ornamental tree, plant, shrub, or vine, upon any street, lane, alley, public highway, or public grounds, in any city, town, or village in this State, such person or persons so offending shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not more than five hundred dollars, or by imprisonment in the county jail not exceeding three months, or both fine and imprisonment, at the discretion of the court having jurisdiction of the case, and shall, moreover, be liable in double the amount of damages to the party injured.

SEC. 3. The penalties incurred by violation of this act may

be enforced by indictment in any court having jurisdiction of misdemeanors in the county where the offense is committed, or the fine may be recovered in an action for debt before any justice of the peace of such county.

SEC. 4. This act shall take effect and be in force from and after its passage.

Approved March 9, 1867.

SELLING NURSERY STOCK.

AN ACT TO PREVENT THE PRACTICE OF FRAUD BY TREE PEDDLERS AND COMMISSION MEN IN THE SALE OF NURSERY STOCK.

Be it enacted by the Legislature of the State of Minnesota :

SECTION 1. It shall be unlawful for any person, corporation or association, to sell or offer for sale any tree, plant, shrub or vine not grown in the State of Minnesota without first filing with the secretary of state an affidavit setting forth his name, age, occupation and residence, and, if an agent, the name, occupation and residence of his principal, and a statement as to where the nursery stock aforesaid to be sold is to be grown, together with a bond to the State of Minnesota in the penal sum of two thousand (2,000) dollars conditional to save harmless any citizen of this State who shall be defrauded by any false or fraudulent representation as to place where such stock sold him by such person, corporation or association was grown, or as to its hardiness for this climate; provided, that the bond aforesaid shall, where the principal is a resident of this State, be given by such principal and not by the agent.

SEC. 2. The secretary of state shall, on the full compliance with the foregoing provisions, give to the applicant aforesaid a certificate under his official seal, setting forth in detail the facts showing a full compliance by said applicant with the provisions of this act, and said applicant shall exhibit the same or a certified copy thereof to any person to whom stock is offered for sale.

SEC. 3. Any person, whether in the capacity of principal or agent, who shall sell or offer for sale any foreign grown nursery stock within this State, shall furnish to the purchaser of such stock a duplicate order, with a contract specifying that such stock is true to name and as represented.

SEC. 4. Any person, whether in the capacity of principal or agent, who shall sell or offer for sale any foreign grown nursery stock within this State, without complying with the requirements of this act, or shall refuse to exhibit the certificate mentioned in section two (2) of this act, whenever demanded, or shall by means of any advertisement, circular, notice or statement, printed or written, published or posted, or circulated by the agency of an officer, agent or other person, or by any other means shall falsely represent to any person, or to the public, that said nursery stock is grown in this State, and is hardy and adapted to this climate, shall be deemed guilty of a misdemeanor, and upon conviction thereof by any court of competent jurisdiction, shall be punished by fine of not less than twenty-five (25) nor exceeding one hundred (100) dollars, or by imprisonment in the county jail for a term not less than ten (10) nor more than sixty (60) days, in the discretion of the court, and shall be liable to the party injured in a civil action for treble the amount of damages sustained, and such party in such civil action may sue in his own name on said bond for the amount of such damages.

SEC. 5. This act shall take effect and be in force from and after its passage.

Approved March 8, 1887.

CONSTRUCTION OF THE ACT.

The following opinion of Attorney General, Clapp will be of interest:

ST. PAUL, MAR. 31, 1887.

Hon. H. Mattson, Secretary of State.

DEAR SIR: In regard to the bond to be given under the act commonly known as the Tree Peddler's Act, I am of the opinion that where the principal is a resident of this State he can give one bond on behalf of his agents. The bond should specify the agent in whose behalf it is given. I think it would be an unnecessary hardship to require an additional bond, or a separate bond, for each agent which the principal may employ; and a bond of \$2,000, in connection with the penal clause of this law, would doubtless be ample protection.

In regard to the surety upon the bond, there should in all cases be at least one surety, and whether you will require more than one will depend upon whether, in your judgment, the principal and one surety offered render the bond perfectly good.

I have the honor to be

Very respectfully yours,

MOSES E. CLAPP,

Attorney General.

H. A. Johns, of the Sioux City Nursery and Seed Co., writing from Sioux City, Iowa, under date of Mar. 30, 1887, to the Secretary of State in reference to the requirements of the act, says: "I desire you to call the attention of the Attorney General to the fact that we sell direct to the farmers in the nursery business the same as we do the Minnesota merchants in the seed business, and all parties who sell are simply working for us direct, and I feel confident that with as liberal a ruling as he can make will conduce to all conforming to the requirements of the law. As we, and not our hired men, are the responsible parties, I think if we give bond and furnish to each man a copy, it will be right and save us a great inconvenience."

This letter being referred to Attorney General Clapp, elicits the following reply:

ATTORNEY GENERAL'S OFFICE. }
St. Paul, Minn., April 1, 1887. }

Hon. H. Mattson, Secretary of State.

DEAR SIR: The communication of H. A. Johns, treasurer of Sioux City Nursery Co., received. I do not see how I can give the construction asked for. While the law may be oppressive, and I would be inclined to mitigate its severity by liberal construction, still I can not ignore the plain language of the law.

If the company employs persons in this State to sell their stock, such persons are the agents of the company and must each give the bond required.

It is true that the company is the responsible party, and had the law-making power been content to take that view, it would have been sufficient. Officers whose duty it is to administer the law cannot assume to say what would have been sufficient as a law, but must take the law as the law-making power has left it.

I would be glad to give it the construction asked for, but the terms of the act are too plain to warrant my doing so. I have the honor to be

Very respectfully,
MOSES E. CLAPP,
Attorney General.

Secretary Mattson, states there has been a good deal of inquiry with regard to this law, and there seems to be a disposition manifested to comply with its provisions. He states that he has sent out a large number of blanks and has written a great many letters to nurserymen residing outside the State. Some of them claim the law will prove a hardship if they are required to give bonds for all their agents selling foreign stock in this State. This seems to be the principal objection, as under the rulings of the Attorney General they will be required to furnish such bonds. He believes the law will be complied with, however, and will certainly accomplish much good in such event. He states further that some of the foreign nurserymen write him that they are much pleased with the passage of this law and will do all in their power to see that its provisions are carried into effect. Where parties manifest a desire to comply with the act, he states, in such cases, unintentional violations, or mistakes, will be overlooked, where parties appear to be acting in good faith; while endeavoring to enforce the law there is no disposition to do so in an oppressive and arbitrary manner, the object being to protect the people from misrepresentation and fraud, on the part of dealers in foreign-grown nursery stock.

He cites an instance in Otter Tail county of a party there who was selling stock raised in Canada, who writes that he disliked to give bonds as to the reliability of such stock. He had written him in reply, advising him to obtain stock from parties whom he knew to be responsible.

Under this act, the Secretary of the State has issued the following blank forms :

STATE OF MINNESOTA, }
County of..... } ss.

....., being by me first duly sworn, deposes and says that he.....is about to engage in the business of selling nursery stock in the state of Minnesota, which said stock was not grown in said State.

That his name is.....

That his age is.....years.

That his occupation is.....

That his residence is.....

That the nursery stock which he designs to sell in the State of Minnesota is grown in the.....

Further affiant says not, except that this affidavit is made for the purpose of enabling affiant to sell nursery stock in this State which was not grown therein, under and pursuant to the provisions of An Act, approved March 8th, 1887, entitled, "An act to prevent the practice of fraud by tree peddlers and commission men in the sale of nursery stock."

Subscribed and sworn to before me this.....

day ofA. D. 188.....

Know all Men by these Presents, That we,

of....., as Principal, and.....

of....., as Sureties, are held and firmly bound unto the State of Minnesota in the sum of Two Thousand Dollars (\$2,000), lawful money of the United States, to the payment of which, well and truly to be made, we bind ourselves, and each of us, and each of our heirs, executors, administrators and assigns, jointly and severally, firmly by these presents.

Sealed with our seals, and dated this.....day ofA. D. 18.....

The condition of the above obligation is such, that whereas the above bounden.....

is about to engage, pursuant to the provisions of Chapter.....of the General Laws of A. D. one thousand eight hundred and eighty seven,.....

in the business of selling and offering to sell nursery stock in the State of Minnesota, which said stock was not grown therein;

Now Therefore, if the above bounden

shall keep and preserve all the provisions of said chapter.....in the prosecution of his said business within this State, and shall not defraud any citizen

of this State by any false or fraudulent representations made by.....oragents to such citizen, as to place where any such stock sold by..... to said citizen, was grown, as to its hardiness for culture, then the above obligation to be void, otherwise to remain in full force and effect.

Signed, Sealed and Delivered in the Presence of }(SEAL.)
..... }(SEAL.)
..... }(SEAL.)
(PRINCIPAL.)

To all to whom these Presents shall come, Greeting:

I,.....Secretary of State of the State of Minnesota, hereby certify, that in accordance with the provisions of Chapter..... of the General Laws A. D. 1887, of said State, one..... did, on the.....day of.....18....., file with me an an affidavit, made in due form, wherein it is set forth, among other things, that affiant's true name is.....; that his age is.....years; that by occupation he is a; that his place of residence is..... and that the nursery stock to be sold by him in this State is grown at..... in the state of.....

I further certify that said.....did, at the time of filing said affidavit with me, also file, in the same manner, a good and sufficient bond, conforming in all respects to the requirements of the said Chapter....., herein before referred to.

Given under my hand and official seal, this.....day of.....A. D. 18.....

.....
Secretary of State.

[L. S.]

(AGENT.)

To all to whom these Presents shall come, Greeting:

I,.....Secretary of State of the State of Minnesota, hereby certify, that in accordance with the provisions of Chapter.....of the General Laws A. D. 1887, of said State, one.....did, on the.....day of18....., file with me an affidavit, made in due form, wherein it is set forth, among other things, that the affiant is the agent of one; that said principal's age is.....years; that his place of residence.....;

that by occupation he is a.....; and that the nursery stock to be sold by said.....as the agent of said..... in this State, is grown atin the state of.....

I further certify, that said.....did, at the time of filing said affidavit with me, also file, in the same manner, a good and sufficient bond, conforming in all respects to the requirements of the said Chapter., hereinbefore referred to.

Given under my hand and seal, this.....day of.....A. D. 18.....

.....
Secretary of State.

[L. S.]

WEEDS OF SOUTHWESTERN WISCONSIN AND SOUTHEASTERN MINNESOTA.

A CONTRIBUTION TO THE LOCAL FLORA OF LA CROSSE AND VICINITY.

By L. H. Pammel, St. Louis, Mo.

The term "weed" is used somewhat loosely, and often plants which are not troublesome are called weeds, and on the other hand certain plants which are showy are not (among the laity, at least), considered weeds, such as the common Corn Poppy, of Europe, *Papaver rhæas*. But any plant growing persistently where it is not wanted may be looked upon as a weed. One of the best definitions, and the one now generally accepted, is a "plant out of place." This definition includes everything which can possibly be called a weed, whether showy or not. The greater number of weeds do not have showy flowers, a few exceptions are the mustard, thistles, etc.

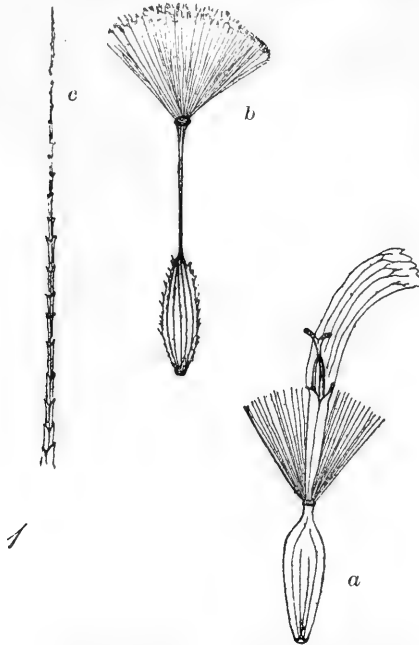
PROLIFICACY OF WEEDS.

The following figures are from Prof. W. R. Lazenby. (1) In Wild Parsnips the number of seeds per plant were from 4,834 to 19,000. A rather large plant of Curled Dock (*Rumex crispus*), 36,000. Shepherd's Purse (*Capsella bursa pastoris*), 62,500 to 77,500. The Burdock (*Arctium lappa*), had, the second year of its existence, 400,328. A single plant of Foxtail Grass (*Setaria*

glauca) had 19,499 seeds (fruits.) Green Foxtail Grass, 46,041; Hedge Mustard (*Sisymbrium officinale*), 36,685; Wild Mustard (*Sinapsis nigra*, *L.*), 131,574. Common Plantain, 43,569.

VITALITY OF THE SEEDS OF WEEDS.

Seeds may retain their vitality for years, if not exposed to the air, and properly matured. Girardin sprouted beans that



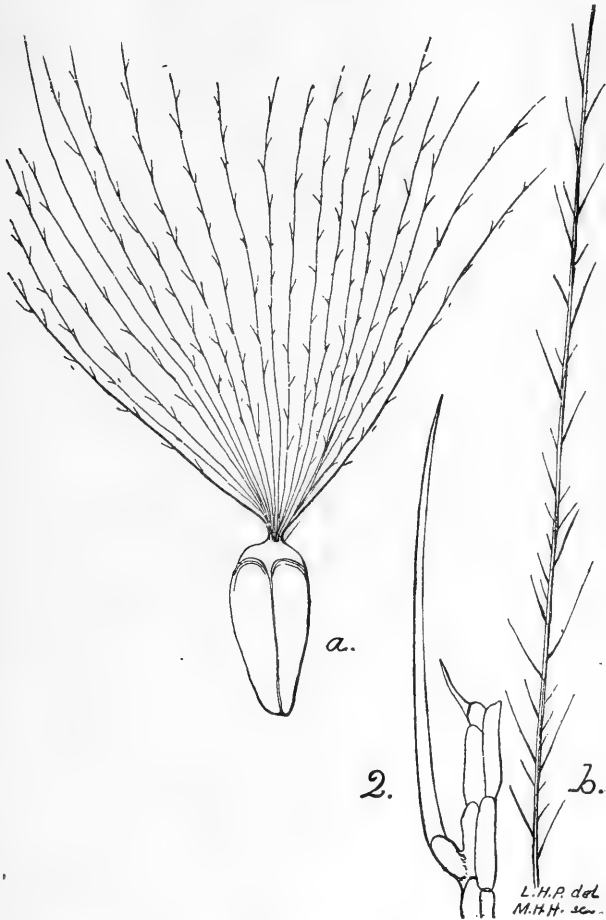
Lactuca scariola. *a.* Single floret in the pappus and corolla, the Stamens united about the Style and the Stigmas protruding. Acheneum with long beak and pappus *b.* attached to its end. *c.* A single thread of the pappus.

were over a century old. Some experiments made by Haberlandt in 1861, the percentage of wheat which germinated was as follows: Those of 1850 and '51, none germinated; 1854, 8; 1855, 4; 1857, 73; 1858, 60; 1859, 84; 1860, 96.

Oxygen and moisture are the agencies which put a speedy limit to the duration of the germinative power of seeds.

Some of the rich bottom lands of this region, when in meadows for a few years, show no traces of the Great Ragweed, but when again cultivated, there springs up an abundance of this

and other weeds. It is probable, in preparing the land for meadow, some of the seeds and fruits were deeply covered, and thus in a measure retained their vitality. Through cultivation the seeds and fruits have been turned up. The seeds of some



(*Cnicus pumilus*) a. Achenium with pappus. b. Single plumose thread. c. A part of b. more highly magnified.

orders differ greatly in their power of germination. The Leguminosæ are capable of retaining their vitality for a long time, as the seeds are often provided with hard protective coverings (seed coats), which prevent decomposition.

DISSEMINATION OF WEEDS.

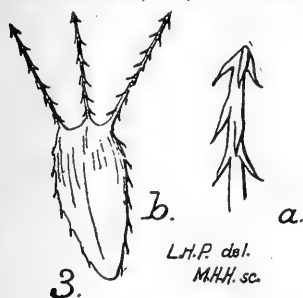
We can conveniently make two modes:

1. Natural agencies—Wind, animals, water, snow, explosive properties of the fruit.

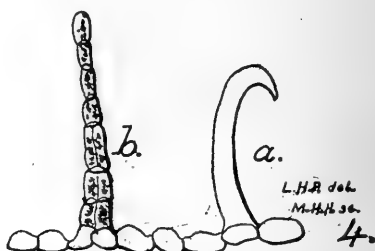
2. Where man is chiefly concerned—Impure seeds, railroads and other carriers, planting for ornamental purposes.

In most cases the fruits and seeds of our first division have certain structures in form of burs, hairs, etc., which enable them to be disseminated,

In many of the compositæ, the calyx, the outer set of the floral envelopes, is made up of a collection of fine, thread-like bodies, collectively called the pappus. In Prickly Lettuce (*Lactuca scariola*, L.) The achenium (a one-seeded seed like fruit),



3. (*Bidens Connata*) b. Achenium with its awns barded downwardly. a. One of the awns more highly magnified.



Trichomes of (*Desmodium canescens*) a. Hooked trichome. b. Ordinary trichome. c. Epidermal cells magnified 122 times.

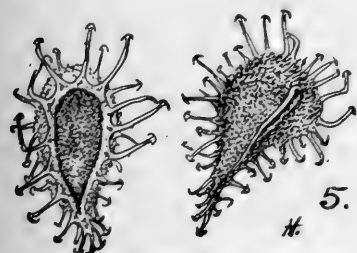
is carried out into a long beak bearing the pappus at its end. See Fig. 1. In another composite, The Pasture Thistle (*Cnicus pumilum*, Spreng.) The pappus is made up of numerous fine and long threads which are plumose. See fig. 2. Such fruits are easily carried about by the wind, the akenes being in most cases light. The seeds or fruits disseminated by animals, at least among most of our weeds, are hooked and barbed. In *Bidens connata* the achenium bears three awns which are barbed downwardly. See Fig. 3. In *Echinosperrnum lappula* the small nutlets (forming burs which are not seeds but quarter portions of seed-like fruits—6 b), are covered with a double row of grappling organs. See Fig. 5. These burs easily fasten themselves to any passing object.

In Tick Trefoil (*Desmodium canescens*, D C.), a troublesome roadside weed in the South, the pod breaks up into several transverse joints, and by means of the small trichomes (plant

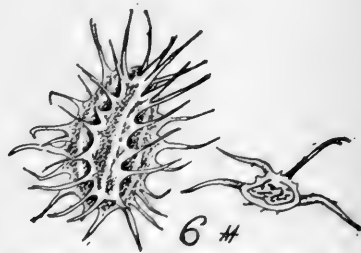
hairs), which are hooked, as shown in Fig. 4, is enabled to cling to the fleece of animals and clothes of persons, and thus it is often carried great distances. Birds aid also in disseminating of weeds, by the mud containing seeds which clings to their feet, and by eating of seeds, which pass through the digestive apparatus and are still capable of germinating. The water acts principally in a mechanical way by carrying the seeds of weeds.

The writer has often seen Tumble-weeds, Pig-weeds, Thistle akenes on the surface of the snow which were drifting before the wind, and when the snow melts in the spring these seeds and fruits are often carried still further by the water.

Certain fruits, Touch-me-nots (*Impatiens*), Wood Sorrels (*Oxalis*), etc., burst when the pod is touched, thus scattering the seeds for several feet.



Small nutlet of (*Echinospennum lappula*), after Sudworth in Beal's Grasses of N. A.



(*Daucus carota*) a. Whole fruit with prickles. b. Cross section, after Sudworth in Beal's Grasses of N. A.

IMPURITIES IN SEEDS.

Prof. Lazenby found in Michigan Amber wheat sent out by the department of agriculture for 1884, the following impurities: Chess (*Bromus secalinus*), 9,248 seeds per bushel, an estimate made upon the amount found in one quart; Corn Cockle (*Lycnis githago*), 1,888; Oat (*Avena sativa*), 160; Barley (*Hordeum jubatum*), 32; Snow Thistle (*Sonchus*), 32.

Many of our most troublesome weeds are introduced in this way, such as the Corn Cockle, Wild Oat (*Avena fatua*) etc.

It is well known that railroads are a great factor in the distribution of pernicious weeds. One or two cases will suffice. Squirrel-tail grass (*Hordeum jubatum*) was not known to occur in this region until last summer when it was found for the first time along the C., M. & St. P. railroad. Common Flax (*Linum usitatissimum*, L) is commonly found along railroads where the

seeds must have fallen from passing freight cars, and hosts of others might be mentioned.

Years ago it was a matter of common observation when farmers hauled their grain long distances to some market that along the road could be found Chess, Corn, Cockle, etc. It can still be seen but in a less marked degree.

MIGRATION OF WEEDS.

Many of our most troublesome weeds are foreigners, as is made apparent from the table at the end of this list. Many have become so thoroughly naturalized that it is difficult to make a line of separation of the truly indigenous (native) and those naturalized. While we have added a large number of European plants, Europe has received from us, such as the common Horseweed *Erigeron canadense*, the common Evening Primrose *Oenothera biennis*, and *Anacharis canadensis* a harmless North America water plant, said to be so abundant in England as to clog up canals. Some of our weeds which were at first ballast plants along the seaports, have moved westward. Prickly Lettuce *Lactuca Scariola*, which was for many years an adventive in eastern New England, has since 1874 spread with remarkable rapidity, and is now found in many of the states east of the Mississippi river. Some western native plants have moved eastward and have become pernicious weeds. *Solanum rostratum*, a native of Kansas and Southwest, has traveled eastward and has been reported from New York. Of the less troublesome weeds Worm Wood *Artemisia biennis*, Cone Flower *Rudbeckia hirta* are reported as common in the East and inclined to be weedy.

In the arrangement of the orders and genera I have followed Bentham & Hooker's Genera Plantarum. The nomenclature is that given in Dr. Gray's Synoptical Flora of North America (Gamopetalae), Watson's Bibliographical Index to North American Botany (Pt. 1 Polypetalae) and Botanical contributions by Sereno Watson and Dr. Gray.

The introduced weeds are printed in italics.

CRUCIFIRAE.

Sisymbrium officinale, Scop. Hedge Mustard. Abundant in waste places and has become naturalized from Europe.

Brassica sinapistrum, Boissier. Yellow Mustard. Frequently found in grain fields where it may become a great nuisance, as it is in Eastern United States and in Europe.

Nasturtium armoracia Fries. Horse Radish. This perennial plant, first cultivated for its roots, which are well known as a condiment, has become thoroughly naturalized and is difficult to exterminate, though it spreads only by non-sexual means. It grows so profusely that all other plants are suffocated. It is European.

Capsella bursa-pastoris, Mœnch. Shepherd's Purse. A common dooryard weed, abundant in waste places, roadsides, etc. flowering very early. It is a native of Europe, and has long been naturalized in this country and many other parts of the world.

Lipidium virginicum, L. This, unlike the foregoing crucifers, is a native of Southern United States. It is found along roadsides, in fields, in waste places, and seems to adapt itself to various kinds of soil.

CARYOPHYLLEAE.

Lychnis githago, Lam. Corn Cockle. A very common weed in grain fields. The large black seeds are very conspicuous in grain. The seeds are roughened and very often if the farmer is not careful the larger seeds pass over with seed wheat. Cockle commonly matures earlier than wheat and oats, so that the seeds are liable to remain in the field.

The "screenings" of wheat, oats, etc., are largely used for feeding cattle, and as they are likely, and do, in a great many cases, contain the seeds of cockle and common Vetch or Tare, the farmer ought to be somewhat cautious in feeding his cattle. In some cases it is customary to boil or grind the "screenings;" in other cases it is fed raw, the seeds thus entering into compost, some passing the digestive apparatus without materially affecting the germinative powers of the seeds.

If it be preferable to feed "screenings" raw, the compost ought to remain till thoroughly rotted.

This weed is also very troublesome in Europe. (Thaer, 1.)

The following two ought to be included, but neither of them is troublesome: *Cerastium viscosum*, L. Mouse Ear Chickweed. *Stellaria media*, Smith. Common Chickweed. Troublesome in Europe (Thaer, 2.)

Saponaria vaccaria, L. Cow Herb. Becoming abundant in grain fields in Houston County, Minn. The larger seeds are often found in seed wheat after cleaning. The smaller enter into "screenings."

PORTULACEAE.

Portulaca oleracea, L. Common Purslane.

This common garden weed with succulent stems and leaves is well known by almost everyone who has had any experience in gardening. This plant ought not to be left in the field or garden when pulled up, as severed parts readily develop into new plants by the formation of roots. It is also a well known weed in Europe. Fendler found it wild in Texas and Nuttall on the Missouri. (Dr. Gray, 2.) Something very near to the common purslane was found by Lind Heimer (Englemann). It has the appearance, however, of being naturalized.

MALVACEAE.

Malva rotundifolia, L. Common Mallow.

Common around old dwellings, along roadsides, etc. Found in similar places in Europe.

Abutilon avicennae, Gertn. Indian Mallow.

It has spread quite rapidly. A few years ago, 1882-83, some straggling specimens were found along roadsides; now it is abundant in gardens and fields, especially where the soil is loose and of a loamy nature, or in loamy drifts. Last summer I found a field in the northern part of La Crosse Co., Wis., where it had completely taken possession. The plant is a native of Asia, and has probably moved northward along the Mississippi River. Baron von Mueller reports it as occurring in Australia.

GERANIACEAE.

Oxalis stricta, L. Yellow Wood-sorrel.

Common in grain fields, not particularly troublesome.

LEGUMINOSAE.

Vicia Sativa, L. Common Vetch or Tare.

It is about the only really troublesome Leguminous plant we have, and, like Corn Cockle, is abundant in grain fields. The seed are somewhat larger than Corn Cockle and smooth. In Europe it is largely used as a forage plant and greatly prized. (Kraft, 1).

ROSACEAE.

Geum, Album, Gmelin. White Avens.

Becoming abundant along roadsides and borders of woods.

Potentilla norvegica, L.

Common in waste places, fields and gardens.

Agrimonia eupatoria, L. Agrimony.

Common along roadsides, abundant in Europe, and troublesome in Southern Russia (Koppen), and especially as the fruits fasten themselves to the fleece of sheep. Baron von Mueller reports it as common in Australia.

Rosa blanda, Ait. Early Wild Rose.

Sometimes common in grain fields, where it causes annoyance in harvesting.

ONAGRARIEAE.

Oenothera biennis, L. Common Evening Primrose.

In fields and waste places with a rather loamy soil. It is well known in Europe, where it has become naturalized.

Oenothera rhombipetala, Nutt. Evening Primrose.

Especially common on sandy prairies.

CUCURBITACEAE.

Sicyos angulatus, L. One Seeded Star Cucumber.

Along borders of streams and in moist places.

FICOIDEAE.

Mollugo verticillata, L. Carpet Weed.

Common in dry fields, an immigrant from the South.

UMBELLIFERAE.

Conium maculatum, L. Poison Hemlock.

Not particularly troublesome as a weed, but from the fact that it and the following are very poisonous, they ought to be mentioned:

Cicuta maculata, L. Water Hemlock.

Grows in marshes and swamps.

Peucedanum sativum, Benth. & Hooker. Wild Parsnip.

Common in and about gardens, especially where Parsnip culture has been carried on, rapidly spreading.

Daucus Carota, L. Wild Carrot.

In dooryards, and very abundant in dry fields. A weed in Europe.

COMPOSITAE.

Erigeron annuus, Pers. Tall Daisy.

Common in waste places, and in moist soil.

Erigeron Canadensis, L. Horseweed.

In fields and waste places. Very abundant, especially in loose soil. The Tall Daisy and Horseweed are extensively naturalized in Europe. (Ratzeburg, etc.)

Erigeron Strigosum, Muhl. Daisy Fleabane.

The plant is frequent in dry clay soil, but not as "weedy" as either of the above.

Gnaphalium decurrens, Ives. Common Everlasting.

In old dry fields.

Inula helenium, L. Elecampane.

Thoroughly established in the northern part of Vernon Co., Wis., along roadsides.

Ambrosia artemisiæfolia, L. Common Ragweed.

Abundant along roadsides and fields, especially where the soil has been loosened.

Ambrosia trifida, L. Great Ragweed.

More troublesome than the preceding, especially common in rich bottom land. It is a coarse plant from eight to ten feet high, and when numerous growing, crops have little chance to develop.

Xanthium Canadense, Mill. Cockle-bur.

Along roadsides in loose sandy and gravelly soil. Becoming more numerous. A very troublesome weed in Russia. (Kopen, 2.)

Bidens frondosa, L. Common Beggar Ticks.

Along roadsides and in waste places.

Anthemis Cotula, L. Mayweed.

Common in dooryards, along roadsides, and in waste places on rather hard soil, preferably clay or loam. Also troublesome in Europe. (Thaer, 3 and Ratzeburgf, 1.)

Achillæa millefolium, L. Yarrow.

In poor and dry pastures, and along roadsides. Its presence is an indication that the soil is rather poor. The plant is widely distributed across the continent of America, and also in Europe.

Chrysanthemum leucanthemum, L. Daisy.

Not common. In this region only a few localities are known; in La Crosse, which is now obliterated, and in several other places a few straggling specimens. In eastern United State this weed is especially troublesome, but in Wisconsin and Minnesota it is rare and somewhat local.

Tanacetum vulgare, L. Common Tansy.

At one time largely cultivated as a garden plant, and now thoroughly naturalized. Along borders of fences and roadsides. This perennial is somewhat difficult to exterminate.

Artemisia biennis, Willd. Biennial Wormwood.

Common in waste places, dooryards and roadsides. Rapidly spreading eastward.

Arctium lappa, L. Burdock.

Along fences, in waste places in rich soil. The plant persists where once established, but does not spread as rapidly as many of our other weeds, as most farmers cut the plant off, not allowing it to mature its fruit.

Cnicus arvensis, Hoffm. Canada Thistle.

Fortunately this plant is not as common here as it is in the eastern states. Mr. J. S. Harris reports it from Trempeleau Co., Wis., and in Upham's catalogue of The Flora of Minnesota, it is reported from Fillmore Co. In July, 1886, I found it in the southern part of La Crosse Co., Wis., where it is said to have established itself some fifteen to twenty years ago. Prof. Beal says: "Its course westward is likely to be checked by the fact that it has usually failed to produce seeds on the prairies." But it spreads freely below ground. It is a common weed of fields in Europe. Linnaeus in his *Flora Lapponica*, considered it one of the greatest pests of the fields. (George Thurber, 3.)

Thaer recommends deep plowing, several times in a season, and and after each plowing, to pull up the root stocks. Also that a good field of Lucerne *Medicago* or *Onobrychis Sativa*, will destroy it. Prof. Beal, (1) finds Red Clover a good weed exterminator.

Canada Thistle seems to be most abundant on loamy soil.

Cnicus lanceolatus Hoffm. Common Thistle.

This is likewise a common weedy plant of Europe, and in this region very troublesome, at times especially, in loose and rich soil. It is a biennial and hence is much easier to deal with.

Cnicus pumilum, Spring, Pasture Thistles.

Sometimes troublesome in dry rocky pastures.

Cichorium intybus, L. Succory or Cichory.

Has become established along roadsides, and proves a most persistent weed where introduced.

Taraxacum officinale Web. Dandelion.

Common everywhere, along roadsides, in pastures, etc.

Sonchus oleraceus, L. Common Sow Thistle.

Common in gardens and about dwellings.

ASCLEPIADEAE.

Asclepias cornuti, Decaisne, Common Milkweed or Silkweed.

Common in this section and often troublesome. A most pernicious weed in The Traverse Bay region, Michigan, and according to Prof. Beal (3) in many other portions of Michigan, especially in light soil. It is more commonly found in rich, rather loose, black sandy soil. It strikes root very deeply, and is difficult to exterminate on that account.

Asclepias tuberosa, L. Butterfly-weed.

Common on sandy soil and occasionally "weedy."

BORAGINEAE.

Cynoglossum officinale, L. Hound's Tongue.

Common along roadsides, La Crescent, Minn., and in dry pastures.

Echniosperinum lappula, Lehm. Stickseed.

In gravelly soil, along roadsides, common. A troublesome weed in Southern Russia (Koppen), the burs fastening themselves to the fleece of sheep.

Echinosperrmium virginianum, DC. Beggar's Lice.

In woods, and borders of woods and along fences.

CONVOLVULACEAE.

Convolvulus sepium, L. Common Morning-glory.

The weed is troublesome in grain and corn fields, using the growing grain as a support, often pulling it to the ground. The weed is one of the most difficult to exterminate.

SOLANACEAE.

Solanum nigrum, L. Common Nightshade.

In shady and waste ground, common.

Datura stramonium, L. Jamestown Weed. Locally it is known as Jimson weed, a corruption of Jamestown.

It is becoming more plentiful. It is especially common in the streets of Brownsville, Minn., and also found in a few places on the Wisconsin side of the Mississippi river. The plant is a native of Asia, but with us it has probably made its way northward along the Mississippi.

SCROPHULARINEAE.

Verbascum thapsus, L. Common Mullein.

Abundant in dry and old pastures, on rocky hillsides. Not difficult to exterminate as it is a biennial; removing the young plants with a hoe will easily destroy it. Is occasionally "weedy" in Europe.

Linaria vulgaris, Mill. Toad Flax.

Not troublesome, now and then found in neglected gardens, and here and there in the streets of cities. Said to have been widely distributed as a garden flower by the Department of Agriculture.

Scrophularia nodosa, L. Figwort; Simpson's Bee Plant.

Somewhat weedy in rich soil and in damp places.

LABIATEAE.

Teucrium canadense, L. Germander.

Along fences, hedges, etc., but is frequently found in fields so abundant as to do a great deal of injury to growing crops. As early as 1846 Darlington, (3b.) found it to be somewhat of a troublesome weed in Pennsylvania.

Nepeta cataria, L. Catnip.

Common along roadsides and fences, and occasionally in pastures in loamy soil.

PLANTAGINEAE.

Plantago major, L. Common Dooryard Plantain.

This and the following are common dooryard weeds.

Plantago Rugelii, Decasine.

Ocurring with the other. (*Plantago lanceolata*, L.), has not been found in this region. In the South and East it is a troublesome weed. It has established itself at Madison, Wis.

AMARANTACEAE.

Amarantus retroflexus, L. Pigweed.

Common in manured soil, in fields, etc. Is a native of tropical America. (?)

Amarantus albus, L.

Common in black sandy soil. In autumn it breaks off at the root and is driven before the wind. Naturalized from tropical America. (?)

CHENOPODIACEAE.

Chenopodium album, L. Pigweed.

Common in rich and loose soil.

Chenopodium botrys, L. Jerusalem Oak.

Dry soil in streets of cities.

POLYGONACEAE.

Rumex acetosella, L. Sheep's Sorrel.

In gravelly soil and in old fields. It is said that where this plant occurs, the soil is sour (Thaer, 15), and that an addition of lime or manure will drive it away. It is certain that the soil of Western Wisconsin and Southeastern Minnesota contains a great deal of lime. The absence of lime can therefore hardly account for its abundance.

Rumex crispus, L. Curled Dock.

More common on high land, pastures, etc. The following, *Rumex obtusifolius*, L. Bitter Dock, is largely found in low meadows and pastures and is exceedingly troublesome in preventing the growth of useful forage plants. Cattle will avoid it in all conditions. It is difficult to exterminate, as it has a very long tap root and is a perennial.

Polygonum aviculare, L. Knotgrass.

A common dooryard weed.

Polygonum convolvulus, L.

Common in cultivated grounds and grain fields in loamy soil.

Polygonum erectum, L.

Common in dooryards, etc.

Polygonum persicaria, L. Smartweed.

In waste places, and low grounds, rich soil.

Polygonum hydropiper, L. Common Smartweed.

Common in moist and wet grounds.

EUPHORBIACEAE.

Euphorbia Cyparissias, L. Cypress Spurge.

Escaping from several cemeteries, La Crosse and North Bend, Wis., and La Crescent, Minn.

Euphorbia maculata, L. Creeping Spurge.

Common along roadsides, in dooryards, and on sandy soil.

URTICACEAE.

Urtica gracilis, Ait. Nettle.

Common along fences, hedges, etc.

Cannabis sativa, L. Hemp.

This weed is common along roadsides, especially in light loamy soil.

GRAMINEAE.

Panicum capillare, L. Old Witch Grass.

Common in sandy soil and cultivated fields.

Panicum crusgalli, L. Barnyard Grass.

In rich and wet soil, common.

Panicum Sanguinale, L. Common Crab or Finger Grass.

Becoming numerous along roadsides.

Muhlenbergia mexicana, Trin.

Common along the borders of woods, fences, in damp clay and loamy soils.

Setaria glauca, Beauv. Fox-tail Grass.

A common weed in stubble, poor meadows, etc.

Setaria viridis, Beauv. Green Fox-tail Grass.

More troublesome than the last in corn fields and cultivated fields generally.

Cenchrus tribuloides, L. Hedgehog or Bur-Grass; but better known as Sandburs.

On poor sandy soil along rivers, etc.

Avena fatua, L. Wild Oats.

In grainfields. Introduced a few years ago and somewhat troublesome. This species is widely diffused, in Australia, South America, etc. Employed for fodder in California and said to be very good.

Bromus secalinus, L. Chess or Cheat.

In grainfields especially noticeable in winter wheat or rye. Sometimes in meadows, but is not invaluable as a forage plant.

Agropyrum repens, Beauv. Couch Grass.

In grainfields, where it is a nuisance, but as a forage plant it is valuable.

Hordum jubatum, L.

It is probably only a waif. It is not a native here. In July, 1886, I found a small patch on the C., M. & St. Paul R. R. near La Crescent, Minn.

Table showing origin of weeds.

ORDERS.	Eu.	U.S.	Eu.&U.S.	Trop. Am.	Asia	Total.
Cruciferae.....	4					5
Caryophylleae.....	3	1	1			4
Portulacaeae.....	1					1
Malvaceae.....	1				1	2
Geraniaceae.....		1				1
Leguminosae.....	1					1
Rosaceae.....		3				3
Onagrareae.....		2				2
Cucurbitaceae.....		1				1
Ficoideneae.....		1				1
Umbelliferae.....	3	1				4
Compositae.....	10	10	1			21
Asclepiadeae.....		2				2
Boraginiae.....	2	1				3
Convolvulaceae.....						1
Solanaceae.....	1				1	2
Scrophularineae.....	2	1				3
Labiatae.....	1	1				2
Plantagineae.....	1	1				2
Amarantaceae.....				2		2
Chenopodiaceae.....	2					2
Polygonaceae.....	5		3			8
Euphorbiaceae.....	1	1				2
Urticaceae.....	1	1				2
Gramineae.....	5	4	2			11
Totals.....	44	32	8	2	2	88

Of the 88 weeds represented in this list, 44 are European, 32 of American origin, and nearly one-third of these come from the compositae, the most troublesome of our weeds and almost one-fourth of the entire list are members of the compositae.

The following are some of the important papers and works on the subjects which have been consulted:

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4th and 5th Annual report of the N. Y. agricultural experiment station, pages 262 and 298.

BEAL, PROF. W. J.

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DARLINGTON, WM.

American Weeds and Useful Plants. Revised by George Thurber, (1) p. 199, (2) p. 241.

DIMITRIEVICZ, NICOL.

Wie lange bewahren die Samen unserer Culturpflanzen ihre Keimfähigkeit. In Haberlundt's Wissenschaftliche Untersuchungen, etc.

ENGLEMANN, DR. GEORGE.

In *Plantæ Lindheimerianæ*, p. 154.

GRAY, DR. ASA.

Darwiniana.

(1) *Am. Naturalist*, Burs in the Boarage family. Vol. X, 1876, p. 1.

(2) *Am. Jour. of Sc.* Vol. XXV, p. 253, and Vol. XXVI, p. 138.

HABERLUNDT, DR. G.

(1) *Wissenschaftlich-practische Untersuchungen auf dem Gebiete des Pflanzenbaues.*

(2) *Wiener Landw. Zeitung*, 1873, p. 126.

IHNE, DR. EGON.

Studien zur Pflanzengeographie; Verbreitung von *Xanthium strumarium* und Geschichte der Einwanderung von *Xanthium spinosum*.

KABSCH, DR. WILHELM.

Das Pflanzenleben der Erde.

KOPPEN, FR. TH.

Zur verbreitung des *Xanthium spinosum* L., besonders in Russland, nebst kurzen notizen über einige andere Unkräuter Süd Russlands, p. 36, (2) p. 35.

KRAFT, DR. GUIDO.

Pflanzen Baulehre. (1) p. 76 and 189.

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Weedy plants of Ohio.

Proceedings of the 7th annual meeting of the Society for the Promotion of Agr. Science, 1886.

MARTINS, CH.

Experience sur la Persistance de la vitalité des Graines flottant a la surface de la Mer.

MUEHLER, BARON VON.

Systematic Census of Australian Plants.

NOBBE.

Handbuch der Samenkunde.

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Die Standortsgewächse und Unkräuter Deutschlands und Schweiz: Berlin, 1859. (1) p. 59.

SCRIBNER, Prof. F. L.

Weeds of Maine, in Agriculture of Maine, 1869, p. 239.

SEYMOUR, Prof. A. B.

Weeds mentioned in weed law of 1884-85, Wis., and several other weeds. Report of Wis. Agricultural Experiment Station for 1885.

STURTEVANT, Dr. F. L.

First annual report of N. Y. Agricultural Experiment Station, p. 86.

THAER.

Die Landwirthschafterchen Unkräuter; 24 chromo-lithographic plates. (1) p. 9, Taf. IV. (2) p. 10, Taf. V. (3) p. 14. (4) p. 8, Taf. IV. (5) p. 11, Taf. VI.

UPHAM, WARREN.

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ANNUAL REPORT

OF THE

MINNESOTA STATE

HORTICULTURAL SOCIETY,

FOR THE YEAR 1888.

EMBRACING THE

TRANSACTIONS OF THE SOCIETY FROM MARCH 31, 1887, TO MARCH 31, 1888;
ALSO PROCEEDINGS OF THE ANNUAL MEETING OF THE
MINNESOTA AMBER CANE ASSOCIATION,
ESSAYS, REPORTS, ETC.

VOL. XVI.



LIBRARY,
NEW YORK
BOTANICAL
GARDEN.

Prepared by the Secretary, S. D. HILLMAN, Minneapolis, Minn.

ST. PAUL:

J. W. CUNNINGHAM & Co., STATE PRINTERS,
1388.

LETTER OF TRANSMITTAL TO THE GOVERNOR.

OFFICE OF THE SECRETARY,
MINNEAPOLIS, March 31, 1888. }

To Hon. A. R. McGill, Governor of Minnesota :

SIR: I have the honor to submit herewith, in compliance with legal requisition, the accompanying report for 1888, with supplementary papers.

Respectfully yours,

S. D. HILLMAN,

Secretary Minnesota State Horticultural Society.

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OFFICERS AND MEMBERS FOR 1888.

PRESIDENT.

WYMAN ELLIOT.....Minneapolis.

VICE PRESIDENTS.

A. W. SIAS.....Rochester.

E. H. S. DARTT.....Owatonna.

M. CUTLER.....Sumter.

N. J. STUBBS.....Long Lake.

G. W. FULLER.....Litchfield.

SECRETARY.

S. D. HILLMAN.....Minneapolis.

TREASURER.

DITUS DAY.....Farmington.

EXECUTIVE COMMITTEE.

The President, Secretary and Treasurer *ex-officio* and

J. S. HARRIS, Chairman.....La Crescent.

J. M. UNDERWOOD.....Lake City.

F. G. GOULD.....Excelsior.

O. F. BRAND.....Faribault.

ISAAC GILPATRICK.....Minneapolis.

ENTOMOLOGIST.

PROF. O. W. OESTLUND.....Minneapolis.

LIBRARIAN.

E. A. CUZNER.....College of Agriculture, Minneapolis.

SUPERINTENDENTS OF EXPERIMENTAL STATIONS.

PROF. EDWARD D. PORTER.....	University Farm, St. Anthony Park.
E. H. S. DART.....	Owatonna.
PETER M. GIDEON.....	Excelsior.
J. S. HARRIS.....	La Crescent.
O. M. LORD.....	Minnesota City.
UNDERWOOD & EMERY.....	Lake City.
A. W. SIAS.....	Rochester.
O. F. BRAND.....	Faribault.
M. PEARCE.....	Minneapolis.
G. W. FULLER.....	Litchfield.
R. M. PROBSTFIELD.....	Moorhead.
ANDREW PETERSON ..	Waconia.
CHARLES LUEDLOFF.....	Carver.
B. TAYLOR.....	Forestville.
FRED VON BAUMBACH.....	Alexandria.
L. E. DAY.....	Farmington.

GENERAL FRUIT COMMITTEE.

SIDNEY CORP.....	Hammond.
D. K. MICHENOR.....	Etna.
J. C. KRAMER.....	La Crescent.
O. E. SAUNDERS.....	Granite Falls.
O. F. NORWOOD.....	Balaton, Murray county.
M. C. BUNNELL.....	Newport.
N. J. STUBBS.....	Long Lake.
WILLIAM McHENRY ..	St. Charles.
O. M. LORD.....	Minnesota City.
CLARENCE WEDGE.....	Albert Lea.
GEORGE E. CASE.....	St. Peter.
M. CUTLER.....	Sumter.
G. W. FULLER.....	Litchfield.
L. E. DAY.....	Farmington.
CHARLES LUEDLOFF.....	Carver.
W. H. BRIMHALL.....	St. Paul.
J. H. LUDLOW.....	Worthington.

The members of the General Fruit Committee are expected to report separately on all matters of interest in horticulture, but more especially to bring to the notice of the Society new and improved fruits.

COMMITTEE ON LEGISLATION.

WYMAN ELLIOT.....	Minneapolis.
PROF. E. D. PORTER.....	St. Anthony Park.
J. T. GRIMES.....	Minneapolis.

COMMITTEE ON SEEDLING FRUITS.

J. S. HARRIS.....	La Crescent.
A. W. SIAS.....	Rochester.
G. W. FULLER.....	Litchfield.

COMMITTEE ON APPLES, PEARS AND PLUMS.

J. S. HARRIS.....	La Crescent.
CHAS. A. KEFFER.....	Brookings, Dak.
ISAAC GILPATRICK.....	Minneapolis.

COMMITTEE ON NATIVE FRUITS.

O. M. LORD.....	Minnesota City.
OLIVER GIBBS, JR.....	Ramsey, Dak.
J. O. BARRETT.....	Browns Valley.

COMMITTEE ON RUSSIAN APPLES.

CHARLES LUEDLOFF.....	Carver.
A. W. SIAS.....	Rochester.
A. PETERSON.....	Waconia.

COMMITTEE ON GRAPES AND SEEDLINGS.

R. KNAPHEIDE.....	St. Paul.
A. W. LATHAM.....	Excelsior.
M. PEARCE.....	Minneapolis.

COMMITTEE ON GRAPE DISEASES.

J. S. HARRIS.....	La Crescent.
A. W. LATHAM.....	Excelsior.
CHARLES LUEDLOFF.....	Carver.

COMMITTEE ON EXPLORATION FRUITS AND FLOWERS.

PROF. E. D. PORTER.....	St. Anthony Park.
S. D. HILLMAN.....	Minneapolis.
A. W. SIAS.....	Rochester.

COMMITTEE ON FORESTRY.

PROF. P. P. SCHOTZKA.....	Minneapolis.
C. L. SMITH.....	Minneapolis.
J. W. BOXELL.....	St. Paul.

COMMITTEE ON EVERGREENS.

J. T. GRIMES.....	Minneapolis.
O. F. BRAND.....	Faribault.
H. R. HUNTER.....	Sioux Falls, Dak.

COMMITTEE ON DECIDUOUS TREES AND SHRUBS.

H. W. S. CLEVELAND.....	Minneapolis.
S. M. EMERY.....	Lake City.
M. J. HOAG.....	Minneapolis.

COMMITTEE ON FRUIT BLOSSOMS.

PROF. E. D. PORTER.....	St. Anthony Park.
GEO. P. PEFFER.....	Pewaukee, Wis.
J. S. HARRIS.....	La Crescent.

COMMITTEE ON GREENHOUSES AND HOTBEDS.

R. J. MENDENHALL.....	Minneapolis.
E. A. CUZNER.....	Agricultural College, Minneapolis.
SMITH & DARLING.....	Winona.

COMMITTEE ON FLORICULTURE.

MRS. C. O. VAN CLEVE.....	Minneapolis.
MRS. M. S. GOULD.....	Excelsior.
MRS. ANNA B. UNDERWOOD.....	Lake City.

COMMITTEE ON NOMENCLATURE.

A. W. STAS.....	Rochester.
J. S. HARRIS.....	La Crescent.
L. H. WILCOX.....	Hastings.

COMMITTEE ON SMALL FRUITS.

E. DE BELL.....	Sioux Falls, Dak.
PROF. L. ASIRE.....	Minneapolis.
F. G. GOULD.....	Excelsior.

COMMITTEE ON VEGETABLE GARDENING.

WILLIAM LYONS.....	Minneapolis.
JOSHUA ALLYN.....	Red Wing.
FRED BUSCH.....	Richfield.

COMMITTEE ON MARKETING AND NEW HORTICULTURAL APPLIANCES.

F. G. GOULD.....	Excelsior.
M. PEARCE.....	Minneapolis.
WILLIAM H. BRIMHALL.....	St. Paul.

COMMITTEE ON HONEY AND SYRUP.

WILLIAM URIE.....	Minneapolis.
WILLIAM DANFORTH.....	Red Wing.
SETH H. KENNEY.....	Morristown.

COMMITTEE ON BREAD AND CAKE.

MRS. WILLIAM H. BRIMHALL.....	St. Paul.
MISS M. ESTELLE PORTER.....	St. Anthony Park.
MISS MARY GRIMES.....	Minneapolis.

COMMITTEE ON PICKELS, PRESERVES AND CANNED
GOODS.

MRS. E. J. STAGER.....	Sauk Rapids.
MRS. O. C. GREGG.....	Minneapolis.
MRS. WILLIAM LYONS.....	Minneapolis.

COMMITTEE ON ENTOMOLOGY.

PROF. O. W. OESTLUND.....	Minneapolis.
R. J. MENDENHALL.....	Minneapolis.
J. S. HARRIS.....	La Crescent.

ANNUAL MEMBERS.

ALLYN, JOSHUA.....	Red Wing.
ANDREWS, J. P.....	Faribault.
AUSTIN, L. E.....	Leola, Dak.
BARRETT, J. O.....	Browns Valley.
BERG, C. L.....	Wegdahl.
BOXELL, J. W.....	St. Paul.
BRAND, NORTON F.....	Faribault.
BRAND, O. F.....	Faribault.
BRIMHALL, WILLIAM H.....	St Paul.
BROWN, C. F.....	St. Peter.
BUNNELL, M. C.....	Newport.
BUSSE, H. F.....	Minneapolis.
COOK, DEWAIN.....	Windom.
CORP, SIDNEY.....	Hammond.
CROSS, MRS. E.....	Sauk Rapids.
CUTLER, MILON.....	Sumter.
CUZNER, E. A.....	Minneapolis.
DANFORTH, WILLIAM.....	Red Wing.
DARTT, E. H. S.....	Owatonna.
DAY, DITUS.....	Farmington.
DEVOL, W. S.....	Columbus, Ohio.
DOUGHTY, J. COLE.....	Lake City.

FLANDERS, G. H.	Chowen.
FOGG, F. A.	Sauk Rapids.
FRANKLAND, THOMAS.	Stonewall, Man.
FULLER, G. W.	Litchfield.
GILBERT, FRED A.	Beardsley.
GILMORE, H.	Georgetown, Wis.
GILPATRICK, ISAAC.	Minneapolis.
GOULD, G. B.	Minneapolis.
GOULD, F. G.	Excelsior.
GOULD, MRS. M. S.	Excelsior.
GRAY, J. S.	Minneapolis.
GUSTAFSON, CHARLES.	Worthington.
HALE, ROBERT.	Minneapolis.
HALL, PROF. C. W.	Minneapolis.
HARRINGTON, G. W.	Plainview.
HAUGAN, A. C.	Minneapolis.
HERZOG, PHILIP.	Minneapolis.
HILLMAN BROS.	Minneapolis.
HILLMAN, S. D.	Minneapolis.
HARRIS, EUGENE E.	La Crescent.
HARRIS, FRANK I.	La Crescent.
JACKSON, E. D.	Minneapolis.
JACKSON, GEORGE R.	Manchester, N. H.
KENNEY, SETH H.	Morristown.
KRAMER, J. C.	La Crescent.
LATHAM, A. W.	Excelsior.
LATHAM, R. A.	Excelsior.
LABBETT, GEORGE.	Lake City.
LEUDELOFF, CHARLES.	Carver.
LORY, H. A.	Maple Ridge.
LYONS, MISS JULIA.	Minneapolis.
LYONS, WILLIAM.	Minneapolis.
McHENRY, S. A.	St. Charles.
MACINTOSH, WILLIAM.	Langdon.
MAGWOOD, ARMOUR.	Stonewall, Man.
MARTIN, WILLIAM L.	Smith's Mill.
MILLS, L. D.	Garden City.
MITCHELL, G. A.	Minneapolis.
NOBLE, J.	Sumter.
NORBY, A.	Madison, Dak.
NORQUIST, JOHN.	Red Wing.

OWEN, S. M.	Minneapolis.
PARKER, W. L.	Farmington.
PARTRIDGE, SAM.	Moorhead.
PETERSON, ANDREW.	Waconia.
POND, C. H.	Kasson.
POOR, HAMLIN V.	Bird Island.
PORTER, PROF. EDWARD D.	St. Anthony Park.
PORTER, J. F.	Red Wing.
PUFFER, DR. F. L.	Bird Island.
ROGERS, G. A.	Red Wing.
SCHOTZKA, PROF. P. P.	Minneapolis.
SHIRK, DR. J. K.	Lancaster, Pa.
SMITH, CYRUS L.	Minneapolis.
SMITH, FLORENCE	Cresbard, Dak.
SMITH, MISS GRACE L.	Minneapolis.
SMITH, JAMES	Cresbard, Dak.
SMITH, S. B.	Morris.
SOMERVILLE, WILLIAM	Viola.
STEINERSON, H.	Madison.
STAGER, MRS. E. J.	Sauk Rapids.
STRANDWOLD, O.	Trysil, Dak.
STUBBS, N. J.	Long Lake.
TERRY, ALFRED	Slayton.
UNDERWOOD, MRS. ANNA B.	Lake City.
UNDERWOOD, J. M.	Lake City.
URIE, WILLIAM	Minneapolis.
VARLEY, C.	Big Lake.
WENTWORTH, DR. F. H.	Cresbard, Dak.
WHITE, J. H.	Crystal.
WILCOX, ARCHIE N.	Hastings.
WILCOX, BURTON T.	Hastings.
WILCOX, L. H.	Hastings.
YOUNG, H. H.	St. Paul.

HONORARY MEMBERS FOR FIVE YEARS.

EDSON GAYLORD, from 1886.	Nora Springs, Iowa.
J. E. CORLETT, from 1887.	Farmersburg, Iowa.
B. S. HOXIE	Evansville, Wis.
H. R. HUNTER	Sioux Falls, Dak.
C. H. BRETT	Henry, Dak.
J. S. B. THOMPSON, from 1888.	Grundy Center, Iowa.
MISS EDITH A. KELLOGG	Janesville, Wis.

HONORARY LIFE MEMBERS

HON. MARSHALL P. WILDER (deceased)	Boston, Mass.
DR. JOHN P. WARDER (deceased)	North Bend, Ohio.
DR. P. A. JEWELL (deceased)	Lake City.
HON. L. B. HODGES (deceased)	St. Paul.
D. W. HUMPHREY (deceased)	Faribault.
CHARLES HOAG (deceased)	Minneapolis.
HON. N. J. COLMAN	St. Louis, Mo.
GEORGE P. PEFFER	Pewaukee, Wis.
J. C. PLUMB	Milton, Wis.
J. M. SMITH	Green Bay, Wis.
E. WILCOX	La Crosse, Wis.
PROF. J. L. BUDD	Ames, Iowa.
CHARLES GIBB	Abbotsford, Quebec.
A. G. TUTTLE	Baraboo, Wis.
F. K. PHOENIX	Delavan, Wis.
J. W. MANNING	Boston, Mass.
MRS. J. W. MANNING	Boston, Mass.
MRS. WM. PAIST	Hersey
CHARLES Y. LACEY	Fort Benton, M. T.
COL. J. H. STEVENS	Minneapolis.
J. S. HARRIS	La Crescent.
R. J. MENDENHALL	Minneapolis.
H. W. S. CLEVELAND	Minneapolis.
TRUMAN M. SMITH	San Diego, Cal.
L. M. FORD	San Diego, Cal.
WYMAN ELLIOT	Minneapolis.
J. T. GRIMES	Minneapolis.
A. W. SIAS	Rochester.
PETER M. GIDEON	Excelsior.
MRS. WEALTHY GIDEON	Excelsior.
M. PEARCE	Minneapolis.
COL. D. A. ROBERTSON	St. Paul.
R. L. COTTERELL	Dover.
CHARLES LEUDLOFF	Carver.
OLIVER GIBBS, JR.	Ramsey, Dak.
ANDREW PETERSON	Waconia.
MRS. C. O. VAN CLEVE	Minneapolis.
MRS. JAMES BOWEN	Minneapolis.
MRS. IDA E. TILSON	West Salem, Wis.
MRS. H. B. SARGEANT	Lake City.
MISS SARAH MANNING	Lake City.

OFFICERS
OF THE
Minnesota State Agricultural Society
FOR THE YEAR 1888.

PRESIDENT.

WM. R. MERRIAM.....St. Paul.

VICE PRESIDENTS.

F. C. PILLSBURY, FirstMinneapolis.

JAMES MCHENCH, Second.....Fairmont.

SECRETARY.

H. R. DENNYHamline.

TREASURER.

F. J. WILCOX.....Northfield.

BOARD OF MANAGERS.

JOHN F. NORRISH.....Hastings.

CLARKE CHAMBERSOwatonna.

JOHN COOPER.....St. Cloud.

A. N. JOHNSONBenson.

L. H. PROSSER.....Wykoff.

C. N. COSGROVE.....Le Sueur.

The next annual fair will be held on the State Fair grounds between Minneapolis and St. Paul, (Sept. 10 to 15, 1888. No effort will be spared to make it the best agricultural and horticultural exposition of the year.

Much more liberal premiums offered in every department than ever before. For further information address the secretary, as above.

CONSTITUTION
OF THE
MINNESOTA HORTICULTURAL SOCIETY

ARTICLE I.

NAME.

This Society shall be known as the Minnesota State Horticultural Society.

ARTICLE II.

OBJECT OF THE SOCIETY.

The object of this Society shall be to improve the condition of pomology, horticulture and arboriculture, by collecting and disseminating correct information concerning the culture of such fruits, flowers, trees, and other productions in horticulture as are adapted to the soil and climate of Minnesota.

ARTICLE III.

MEMBERSHIP.

Any person may become a member by paying to the secretary or treasurer an annual fee of one dollar, or a life member by the payment of ten dollars. Honorary members, for a time stated or for life, may be elected at any annual meeting by a two-thirds vote of the Society, and shall be entitled to all the rights and privileges of membership; provided, that honorary life members may pay a fee of ten dollars, in two equal annual payments of five dollars.

ARTICLE IV.

OFFICERS.

Its officers shall consist of a president and one vice president from each congressional district, a secretary, treasurer, and an executive committee of five, and librarian.

ARTICLE V.

DUTIES OF PRESIDENT AND VICE PRESIDENTS.

The president shall preside at and conduct all meetings of the Society, and deliver an annual address, and in his absence the vice presidents, in their order, shall perform the same duties. They shall also have a general supervision of the horticultural interests in their respective districts, and make a written report to the Society at its annual winter meeting; in consideration of which the Society shall pay their traveling expenses to the same.

ARTICLE VI.

THE SECRETARY.

The secretary shall record all the doings of the Society, collate and prepare all communications, etc., for the public press, and pay over all moneys received from members or otherwise to the treasurer on his receipt; receive and answer all communications addressed to the secretary, establish and maintain correspondence with all local, county, district and state horticultural societies, and secure by exchange their transactions, as far as possible; to aid the president as an executive officer in the dispatch of business relating to the meetings of the Society, notices of horticultural and similar meetings of general interest, and report to the annual meeting of the Society an abstract of the matter that has come into his possession, which, with its approval, shall become part of its transactions of the current year.

ARTICLE VII.

THE TREASURER.

The treasurer shall collect and hold all funds of the Society, and pay out the same only on the order of the president, countersigned by the secretary. He shall make up a report of all the receipts and disburse-

ments of the Society, and present the same at the annual winter meeting, or any other time when called upon to do so by the executive committee. He shall give bonds in such sum as the Society may direct, to be approved by the president and secretary, and the bond when so approved shall be filed with the state auditor.

ARTICLE VIII.

ELECTION OF OFFICERS.

The officers shall be elected separately and annually by ballot, and hold their office until their successors are elected.

ARTICLE IX.

MEETINGS OF THE SOCIETY.

The Society shall hold annual sessions on the third Tuesday of January, and other meetings at such time and place as the Society may direct.

ARTICLE X.

THE LIBRARIAN.

The librarian shall have charge of the library and report its condition at each annual meeting.

ARTICLE XI.

AMENDMENTS.

By-laws and alterations of the constitution for the purpose of meeting the further wants of the Society, may be enacted by a vote of two-thirds of the members present at any regular annual meeting, and on one day's notice of the same being given.

BY-LAWS.

1. The president, at each annual meeting of the Society shall appoint a general fruit committee, consisting of two members from each congressional district in the State, and it shall be the duty of each member to make a written report annually upon the fruit crop, and a limited list of fruits best adapted for general cultivation in their respective districts.

2. The president, secretary and treasurer shall be members *ex-officio* of the executive committee, who shall have charge of all matters pertaining to the interests of the Society.

3. The executive committee may call a meeting of the Society at any time they may deem advisable, giving at least thirty days' notice through the public press.

4. The executive committee shall appoint a committee on seedlings, on nomenclature, on forestry, on fruit blossoms, on Russian apples, on gardening, on small fruits, and on floriculture.

5. The five members of the executive committee, not including the president, secretary or treasurer, shall be a committee on finance, and it shall be their duty to audit all bills before they shall be ordered paid by the president and secretary.

6. The executive committee shall see that a program is issued for each meeting of the Society, at least one month before the winter meeting and ten days before the summer meeting.

7. Every member shall be entitled to one copy of the transactions as often as published, on which postage shall be paid; but in the distribution of all other copies the party receiving the same shall pay the postage. Where several copies are sent to auxiliary societies it shall be discretionary with the secretary to pay the freight.

8. *Quorum*.—A quorum shall consist of nine members of the Society, or a majority of the executive committee.

MINNESOTA STATE HORTICULTURAL SOCIETY.

TRANSACTIONS 1887-8.

TWENTY-FIRST ANNUAL MEETING.

AT MARKET HALL, MINNEAPOLIS, TUESDAY, WEDNESDAY, THURSDAY
AND FRIDAY, JANUARY 17, 18, 19 AND 20, 1888, IN JOINT
SESSION WITH STATE AMBER CANE ASSOCIATION.

[NOTE.—This Society will not be held responsible for individual opinions which are found in this report.—Secretary.]

Following is the circular sent out announcing the annual winter meeting of the Society :

The Twenty-first Annual Winter Meeting of the State Horticultural Society will be held at Minneapolis, on January 17th to 20th, inclusive, 1888, the State Amber Cane Association occupying the time for its Eleventh Annual Session on the afternoon of Wednesday, January 18th.

A cordial invitation is extended to kindred organizations in other States, as well as to those of Local Societies, to send delegates to the meetings, which are *free to all*. Ladies are especially invited to attend and take part in the exercises.

All members are especially urged to be present and to render such assistance as may be necessary to make the session one of interest and profit. If you have succeeded in growing fruit come and tell us about it, or if you wish to know more about it come and ask questions. We want a lively and wide awake session.

Members of special and standing committees are expected to report in person or by manuscript; let the same be brief and to the point. This is important as indicating what progress is being made in fruit and vegetable culture throughout the State.

Liberal premiums will be given for exhibits of fruits, flowers and vegetables, etc., but not on inferior or unworthy articles, even if there is no competition. It is hoped that a large exhibit may be made.

SPECIAL PREMIUMS FOR ESSAYS.

The Society offers the following special prizes for essays from young men and women under twenty-five years of age:

Best essay on "Orcharding for Minnesota,"	.....\$25 00
Best essay on "Grape Growing in Minnesota,"	..... 25 00
Best essay on "Strawberries and Raspberries in Minnesota,"	..... 25 00
Best essay on "Blackberries and Dewberries in Minnesota,"	..... 25 00
Best essay on "Currants and Gooseberries in Minnesota,"	..... 25 00

The following lines of railway will return delegates at reduced rates of fare, to wit: St. Paul & Duluth Railway, one-third fare; the Northern Pacific Railroad and the Minneapolis & Pacific Railways, at one-fifth fare, provided receipts are obtained from station agents at starting points, showing full fare has been paid one way.

The following lines of railway will return delegates upon the certificate plan, to points within the State, at one-third fare, to wit: Chicago, Milwaukee & St. Paul Railway, Chicago & Northwestern Railway, Chicago, St. Paul, Minneapolis & Omaha Railway, St. Paul & Kansas City Railway, Minneapolis & St. Louis Railway and the Burlington and Northern Railroad.

Delegates on purchasing a full fare ticket going, will secure at the same time from the station agent a Delegate's Convention Receipt or Certificate specifying that such ticket has been purchased, which receipt, on being properly filled out and signed by the secretary of the Society, and presented to the local railway agent at Minneapolis, will authorize the return of the delegate at the reduced rates, provided such certificate is presented on or before Jan. 23, 1888.

Where delegates pass over two or more railways en route to the meeting and do not obtain through tickets, they should procure receipts for the full fare paid each line, for each ticket purchased, as separate return tickets will be issued by each company. Such tickets are provided by the Chicago & Northwestern Railway at Winona, Dodge Center, Owatonna, Waseca and Kasota.

Members in attendance from a distance will be provided with entertainment by the local committee on arrangements.

For further particulars address

S. D. HILLMAN, *Secretary,*

MINNEAPOLIS.

State Horticultural Society.

WYMAN ELLIOT, *President,*

MINNEAPOLIS.

PROF. E. D. PORTER, *Secretary,*

ST. ANTHONY PARK

State Amber Cane Association

RUSSELL BLAKELEY, *President,*

St. PAUL.

PROGRAM.

The following order will be adhered to as near as circumstances will permit, but may be varied from time to time as the Society may deem best.

FIRST DAY—TUESDAY, JANUARY 17, AT 10 A. M.

Opening Exercises. Arrangements of Exhibits and Reception of Members.

Appointment of Committees. Committees on Fruit List; on Award of Premiums; on Publication; on Final Resolutions; on Obituary.

AFTERNOON SESSION—AT 2 P. M.

Address of Welcome. Isaac Atwater, President Board of Trade.

Response to Address of Welcome. E. H. S. Dartt, Owatonna.

Reports from Local Societies. Hennepin County Horticultural Society, Prof. L. Asire, Secretary, Minneapolis; Olmsted County Horticultural Society, M. J. Hoag, Rochester; Minnesota Valley Horticultural Society, A. B. Regester, Granite Falls; Lake Side Horticultural Society, A. S. Crossfield, Browns Valley; McLeod County Horticultural Society, H. I. Corson, Glencoe; Ramsey County Agricultural and Horticultural Society, Adam Bobland, St. Paul.

Correspondence, etc.

Horticultural Experiment Stations and how to conduct them. E. H. S. Dartt, Owatonna.

Discussion on same.

Question Box.

EVENING SESSION—AT 7 P. M.

President's Annual Address. Wyman Elliot, Minneapolis.

Grape Culture. N. J. Stubbs, Long Lake.

The Tree Peddler. A. W. Sias, Rochester.

SECOND DAY—WEDNESDAY, JANUARY 18, AT 9 A. M.

Report of Seedling Commission. John S. Harris, La Crescent; G. W. Fuller, Litchfield; A. W. Sias, Rochester.

Report of Committee on Native Fruits. O. M. Lord, Minnesota City.

Report of Committee on Russian Apples. Chas. Luedloff, Carver.

Discussion on same.

Forcing Houses for Vegetable Culture in Winter. J. S. Gray, Minneapolis.

AFTERNOON SESSION—AT 2 P. M.

Eleventh Annual Meeting of the State Amber Cane Association.

Minutes of Last Meeting Read.

Reception of Members.

Report of Secretary and Treasurer.

Election of Officers.

Appointment of Committees.

President's Address. Russell Blakeley, St. Paul.

Improvements in Machinery and Process of Manufacture. B. Densmore, Red Wing.

Present Condition of the Amber Cane Industry. Seth H. Kenney, Morristown.

Reports from Growers and Manufacturing of Amber Cane.

Report from Station at Fort Scott, Kas. M. Swenson, Director.

Discussion.

EVENING SESSION—AT 7 P. M.

Music.

Street and Lawn Planting with Trees and Ornamental Shrubs. H. W. S. Cleveland, Minneapolis.

Sanitary Management of Cities as Related to Horticulture, or, the Disposal of City Cleanings. Lecture by Prof. Wm. W. Folwell, of State University.

Governor McGill has promised to be present and to address the Society briefly.

THIRD DAY—THURSDAY, JANUARY 19, AT 9 A. M.

Annual Report of Secretary

Annual Report of Treasurer.

The Culture of Small Fruits. Wm. Danforth, Red Wing.

Report of Committee on Small Fruits.

Discussion on Same.

Culture of the Dewberry. De Wain Cook, Windom.

Five Minute Papers on Vegetables. By Practical Gardeners.

Early Beets and Tomatoes. Joshua Allen, Red Wing.

Report of Finance Committee.

AFTERNOON SESSION—AT 2 P. M.

Principles of Drainage as Related to Horticulture. Rufus Cook, Minneapolis.

Ad Interim or District Reports, by Vice-Presidents of the Society. A. W. Sias, Rochester, E. H. S. Dartt, Owatonna; M. Cutler, Sumter; N. J. Stubbs, Long Lake; G. W. Fuller, Litchfield.

Annual Election of Officers. By Ballot.

Value of Evergreens. O. F. Brand, Faribault.

Report of Committee on Evergreens.

Report of Committee on Forestry.

Scaler's Experience in Northern Pineries. J. W. Eastman, Minneapolis.

Report of Work of State Forestry Association. C. L. Smith, Minneapolis.

Discussion on Sawe.

EVENING SESSION—AT 7 P. M.

Music.

Report of Committee on Floriculture. Mrs. C. O. Van Cleve, Minneapolis; Mrs. Anna B. Underwood, Lake City; Mrs. M. S. Gould, Excelsior.

Amateur Flower Garden. Frank H. Carleton, Minneapolis.

Entomologist's Report. Prof. O. W. Oestlund, Minneapolis.

Early Experience in Orchardng in Minnesota. Prof. W. W. Pendergast, St. Paul.

FOURTH DAY—FRIDAY, JANUARY, 21ST, AT 9 A. M.

The Apple; What may we reasonably expect of it in Minnesota. O. F. Brand, Faribault.
Reports from Experimental Stations:

FROF. E. D. PORTER, St. Anth'y P'k. CHARLES LUEDLOFF, Carver.

PETER M. GIDEON, Excelsior.

M. PEARCE, Minneapolis.

G. W. FULLER, Litchfield.

A. W. SIAS, Rochester,

R. M. PROBSTFIELD, Moorhead.

F. J. SCHREIBER, Moorhead.

ANDREW PETERSON, Waconia.

UNDERWOOD & EMERY, Lake City.

B. TAYLOR, Forestville.

FRED VON BAUMBACH, Alexandria.

E. H. S. DARTT, Owatonna.

L. E. DAY, Farmington.

J. S. HARRIS, La Crescent.

O. M. LORD, Minnesota City.

Report of General Fruit Committee :

SIDNEY CORP, Hammond.	CLARENCE WEDGE, Albert Lea.
D. K. MICHENOR, Etna.	GEORGE E. CASE, St. Peter.
J. C. KRAMER, La Crescent.	M. CUTLER, Sumter.
O. E. SAUNDERS, Granite Falls.	G. W. FULLER, Litchfield.
O. F. NORWOOD, Balaton.	L. E. DAY, Farmington.
M. C. BUNNELL, Newport.	CHARLES LUEDLOEF, Carver.
N. J. STUBBS, Long Lake.	W. E. BRIMHALL, St. Paul.
WILLIAM MCHENRY, St. Charles.	M. T. DUNCAN, Fergus Falls.
O. M. LORD, Minnesota City.	H. J. LUDLOW, Worthington.

*Discussion on Same.**Native Plums.* D. B. Wier, Lacon, Ill.*Reports of Special Fruit Committees on Fruit Lists.**Report of Committee on Award of Premiums.**Report of Committee on Nomenclature.*

AFTERNOON SESSION—AT 2 P. M.

Gardening and Moral Influence of Flowers. Robert Hale, Minneapolis.*Benefits of Forests.* J. O. Barrett, Browns Valley.*Reports of Special Committees.**Report of Committee on Legislation.* Prof. E. D. Porter, St. Anthony Park.*Report of Committee on Final Resolutions.**Place of Next Meeting.**Miscellaneous Business.**Final Adjournment.*

PREMIUM LIST.

 WM. H. BRIMHALL, ST. PAUL, SUPERINTENDENT OF EXHIBITS.

APPLES.

(All Plates to consist of five specimens.)

Best collection of Minnesota apples, including hybrids, first premium, \$5; second, \$3; third, \$2.

Best display of Wealthy, first premium, \$3; second, \$2; third, \$1.

Best plate of winter apples, any variety, first premium, \$2; second, \$1.

Best plate of winter varieties Russian apples, first premium, \$2; second, \$1.

Best plate of hybrids, first premium, \$2; second, \$1.

GRAPES.

Best display of native grapes, in good condition, first premium, \$5; second, \$3; third, \$2.

Best plate, any variety, first, \$3; second, \$2.

Best display of fruit in glass jars, first premium, \$5; second, \$3.

PLANTS AND FLOWERS.

	1st Prem.	2d Prem.
Best display ornamental and flowering plants.....	\$5 00	\$3 00
Best display of roses in pots.....	2 00	1 00
Best display of geraniums.....	2 00	1 00
Best single plant in bloom.....	2 00	1 00
Best display begonias.....	2 00	1 00
Best display carnations.....	2 00	1 00

CUT FLOWERS.

- Best and most artistically arranged design, first premium, \$5; second, \$3.
 Best collection of roses, first premium, \$3; second, \$2.
 Best hand bouquet, first premium, \$3; second, \$2.
 Best cultivated cranberries, provided a history of their cultivation be furnished, first premium, \$5; second, \$3; third, \$2.

VEGETABLES.

	1st Prem.	2d Prem.
Best display.....	\$5 00	\$3 00
Best half peck early potatoes.....	2 00	1 00
Best half peck potatoes for winter and spring.....	2 00	1 00
Best half peck onions.....	2 00	1 00
Best half peck turnips.....	2 00	1 00
Best half peck beets.....	1 00	50
Best half peck parsnips.....	1 00	50
Best half peck carrots.....	1 00	50
Best Hubbard squash.....	1 00	50
Best six bunches celery.....	1 00	50
Best winter cabbage.....	1 00	50

SEEDS.

- Best display of Minnesota garden seeds, first premium, \$5; second, \$3.

PANTRY STORES.

- Best display canned fruits, \$3; second best, \$2.
 Best display of jellies, \$2; second best, \$1.
 Best jar mixed pickles, \$1; second best, 50 cents.
 Best sample home-made vinegar, \$1; second best, 50 cents.
 Best sample comb honey, \$1; second best, 50 cents.
 Best sample strained honey, \$1; second best, 50 cents.

WORKS OF ART.

- Collection of paintings, fruits and flowers, first premium, \$5; second, \$3.
 Best single fruit painting, \$3; second best, \$2.
 Display garden tools and horticultural implements. Certificate of honorable mention.

Exhibitors are expected to make their entries the first day. All exhibits must be in place by 10 o'clock, A. M., the second day.

Competition shall be open to all, but it is expected that the annual membership fee (\$1) will be contributed unless exhibitors are members of the Society. All members are entitled to bound copies of the Transactions.

MINNESOTA STATE HORTICULTURAL SOCIETY.

ANNUAL WINTER MEETING.

AT MARKET HALL, MINNEAPOLIS, TUESDAY, WEDNESDAY, THURSDAY
AND FRIDAY, JANUARY 17, 18, 19, AND 20, 1888, IN JOINT
SESSION WITH STATE AMBER CANE ASSOCIATION.

The twenty-first annual winter meeting of the State Horticultural Society, held at Market Hall, Minneapolis, convened on Tuesday morning, Jan. 17, 1888. The meeting was called to order shortly before 11 o'clock, by the President, Wyman Elliot, of Minneapolis.

Prayer was offered by Prof. G. E. McLean, of the State University, Minneapolis.

President Elliot announced the following committees:

Committee on Award of Premiums: M. C. Bunnell, Newport; J. S. Harris, La Crescent; Mrs. M. S. Gould, Excelsior.

Committee on Fruit Lists: A. W. Sias, Rochester; J. S. Harris, La Crescent; M. Pearce, Minneapolis.

Committee on Final Resolutions: Col. J. H. Stevens, Minneapolis, A. W. Sias, Rochester; G. W. Fuller, Litchfield.

Committee on Obituary: J. S. Harris, La Crescent; C. L. Smith, Minneapolis; S. D. Hillman, Minneapolis.

Committee on Publication: Col. J. H. Stevens, of Minneapolis; with the President and Secretary.

President Elliot stated it would perhaps be proper to name committees on Award of Premiums on Essays.

Mr. Pearce. So far as the essays are concerned I think it is better to have them read and awards made by the Society as a whole.

Mr. Harris If there is time to have them read carefully that would

answer; but I think a committee can arrive at a decision by taking time better than the Society could do from simply hearing them read.

President Elliot. I am aware that there was delay in awarding the prize on essays at a former meeting; but I think committees can be secured that will act promptly and perform the work with acceptance. The appointment of those committees will be deferred for the present.

Prof. McLean stated that owing to engagements at the university he would be obliged to retire. He hoped the members of the Society would find time to visit the State University for the purpose of observing the methods pursued in the different departments of that institution, where they would be welcome at any time.

The resignation of Treasurer Grimes was announced, and, on motion, William H. Brimhall, of Hamline, was appointed Treasurer, *pro tempore*. The balance of the forenoon was devoted to the arrangement of exhibits, etc.

The meeting adjourned until 2 o'clock P. M.

AFTERNOON SESSION.

TUESDAY, JAN. 17, 1888.

The meeting was called to order by President Elliot at 2 o'clock, P. M.

The attendance of delegates was much larger than expected, considering the severity of the weather of the preceding week, and the blockaded condition of the railroads and the public highways in the country. The temperature ranged some twenty-five or thirty degrees higher than for several days preceding the meeting. The number of members present at the opening session gave evidence of awakened interest and a successful meeting.

A large and very fine display of flowers and exotic plants was made by the Mendenhall Greenhouse. But few other entries were made during the first day's session.

ADDRESS OF WELCOME.

Hon. Isaac Atwater, president of the Minneapolis Board of Trade was introduced and delivered the following Address of Welcome:

Mr. President and Gentlemen of the State Horticultural and Amber Cane Associations:

I feel especial pleasure in that I have the honor, on behalf of the citizens of Minneapolis, to welcome you to our city to hold your de-

liberations. I hope you will not take this as a mere formal expression of courtesy, usual on such occasions, for I know of no association of men or women whose aims and occupations are more nearly related to the highest interests of our city—and when I say city I include the State—than those which you represent.

As you are aware, our beautiful city, thus early in her history, has already become somewhat famous for her conventions. The disciples of all professions—theology, medicine, law, agriculture, the arts and sciences—all here find their favorite place of rendezvous; nay, indeed, so ambitious have our people become in this direction, that lately, as you are aware, they even attempted to capture one of the largest political parties of the country, to hold its convention in this city. The attempt, however, was unsuccessful. But had it been otherwise, I doubt if the expenditure of time and money, and I may add spiritual condiments, would have inured an hundred-fold more to the interests of the city and State, had it been devoted to the development of the industries you represent.

Gentlemen, the city of Minneapolis has cause to feel proud that you honor her to-day with your presence. Your discussions it may be tend to some extent to your personal interest, but this city and this State will gain an hundred-fold more than you yourselves.

You are the men who, by patience, intelligence, skill and energy, have placed on our tables as appetizing fruits as any reasonable man can desire—as beautiful flowers as Paradise can offer—and delicious sweets, scarcely inferior to those of Cuba.

This we already know. We know that even the simple parlor of the laboring man may be adorned all the dreary winter long with flowers which make his home a lovely summer. We know that the growers of Amber Cane have placed the sweets of the tropics in many a humble home which could not otherwise have been enjoyed. Your victories thus far should satisfy you, and yet with the true old Anglo-Saxon spirit, you thirst for more.

What a mighty revolution has your skill, intelligence, untiring industry and patience wrought in this great Northwest within the last twenty-five years! When, in 1850, I came to this State from New York, no one there believed that anything except the most hardy vegetables, such as cabbage, potatoes and turnips, could here be raised. One or two of the small grains, as oats and buckwheat, might sometimes be relied on to get through. For the rest, lumber and furs were supposed to be the only sources of industry. No fruits and flowers were ever to be seen. It was a veritable Botany Bay, to which we, who

had committed no crime, were sentenced for life. We accepted our sentence. We entered upon our several occupations. We lawyers engaged in our profession. We waited long weary days for clients. The flies did not walk into our chamber. But you, more fortunate, sought nature in her still retreats. She was coy, and long withheld her gracious gifts. But by your perseverance, by your skill and patience, you have demonstrated that Nature is no less kind in the forty-fifth parallel of latitude than in the thirtieth.

But, gentlemen, in welcoming you to this city, what have we to give in return, in comparison with what you give us? I may say almost absolutely nothing. True, we can show you half a dozen theatres running day and night—especially at night. We have churches on almost every street, with every phase of theology, and some with no theology at all [laughter]; half a dozen courts constantly running to dispense justice. Lectures on every science and subject under the sun; and musical concerts by artists who think themselves the equals of those of European fame. But all this is that for which you do not seek. And had we known in time you were to honor us with your presence here to-day we would have erected an ice palace for your delectation, the magnificence of which, as compared with that in our sister city, should have been as the splendor of the sun to the feeble light of the moon. [Laughter.]

Gentlemen, I am detaining you, you are men of business, we of theory. Indeed, it does not seem quite appropriate that a professional man should welcome those so entirely practical as yourselves to our city. But I beg you to believe that I am such, is rather my misfortune than my fault. If you will pardon me a word I will tell you how it happened. I was brought up on a farm, and was blessed, as I suppose all of us were, with poor but honest parents, My earliest infantile aspirations were to become a practical bonanza farmer, like our friend, J. J. Hill, of St. Paul, or a famous horticulturist or Amber cane grower. In pursuit of this ever present idea, at the age of ten or eleven, I discovered a scythe hanging in my father's barn, and was ambitious to demonstrate my ability as a mower. The grass was tempting in the door-yard, and I proceeded to lay it low, together with quite a number of choice shrubs and flowers which had recently been set near the grass plat. At this juncture my paternal ancestor appeared on the scene. His look was ominous, and he said, "Isaac, did you do that?" Like the immortal Washington, I could not tell a lie, especially as I had been caught in the very act. [Laughter.] I was told to go and put up the scythe. Then did the old Adam rise in my

innocent young bosom, and hurling the instrument upon an adjoining flower bed, I said: "If I cannot mow when I am a boy I wont when I am a man." It was an unfortunate remark, taken in connection with my previous work. The aforesaid paternal straightway marched me to the barn, and with the aid of a rawhide caused the chilling "snows of winter" to descend on my nether extremities, which caused them to bud and blossom as the rose [laughter], while the neighbors thought from the sound that a menagerie had broken loose. It is thus that a^s a child I was trained up the wrong way, which, when I become old, I did straightway "depart from it."

Gentlemen, I will detain you no longer. I trust that your stay in our city may be pleasant, your deliberations harmonious and profitable. Bidding you, on behalf of our citizens, thrice welcome, I leave you to your further duties. [Applause.]

RESPONSE TO THE ADDRESS OF WELCOME.

E. H. S. Dartt, of Owatonna, responded on behalf of the Society. He said:

Mr. President, Ladies and Gentlemen:

I can say in behalf of our Society that we are not surprised at this cordial greeting. When we have watched a man or a city and have found them pursuing a straightforward, undeviating course for a long period of time, we come to know about what to expect of them.

Minneapolis has always treated us with that kindness and consideration which we think our cause merits. In the days of our infancy, when we were struggling for existence, when we required that material aid without which great enterprises often fail, two righteous men were found in Minneapolis who rendered that aid and we lived.

Now, sir, it may not be quite right for us to claim that the finding of those two righteous men saved your city, but we know she has been saved to a period of growth and prosperity that is the marvel of all beholders, and we believe this wonderful prosperity is largely due to that spirit of liberality among her citizens that "cropped out" so conspicuously in our Horticultural fathers, Wyman Elliot and R. J. Mendenhall.

Certainly, sir, as has been intimated, we have met with great discouragements. At a very early day L. M. Ford told us we could not successfully grow the common varieties of the standard apples in Minnesota. As a Society we were then in that hopeful period of youth and our trees were in the same period, and we *sat down* on Ford, A

succession of mild winters brought such encouragement that we were able to place every croaker on the list with Ford. Thrifty young orchards sprang up, and our exhibition tables groaned under their load of luscious apples; and, though the frost king whispered "beware," and croakers thought our trees were struck with death, yet we heeded them not; a shout of victory went up and our fame as an apple-growing State extended as far as Philadelphia and New Orleans.

Alas! in the height of our glory Old Boreas assumed a more savage attitude. He breathed on us with a breath so fierce that it blighted most of our standards and sent the chills to the marrow bones of our faith. He tantalized us with the stigma of being false prophets, and all the Fords seemed to say "Amen! we told you so."

Thus humiliated, what could we do. Should we surrender? *Never.* If we seemed to falter, it was but the feint of the expert wrestler to feel our adversary and concentrate our powers for greater efforts. We will build again on a more substantial foundation, and though the completion of our structure may require a new list of varieties and a new list of laborers, yet the ultimatum of the apple question in Minnesota will be a grand success. And whilst we would profit by our adversities, we may still remember

" And though our toils are hard to bear,
We have of joys an equal share,
And less of envious strife and care, whilst here below."

To-day, a great city comes to do us honor and to strew roses in our pathway. And a generous public says, "with all thy faults we love thee still."

Now, sir, I wish I had a better tongue that I might adequately express our gratitude on this occasion. But the best that I can do is to promise that our Society shall go forward in her efforts to ameliorate the condition of mankind, not only as regards the present generation, but as regards the countless millions that are to come after us; and I promise that she will pursue these labors with a sincerity and an energy that shall do honor to her parentage and merit the continued approval of one of the best, one of the most enlightened and one of the most progressive cities on earth. [Applause.]

REPORTS FROM LOCAL SOCIETIES.

The Secretary then read the following report :

REPORT OF THE SOUTHERN MINNESOTA HORTICULTURAL SOCIETY.

To the Secretary of the Minnesota State Horticultural Society:

Before reporting the status of our present society at this place, it may be well to speak briefly of its predecessor.

The Olmsted County Horticultural Society held its last semi-annual meeting June 11, 1887, under a giant cottonwood tree, known as the "Zumbro Chief," standing on the banks of the Zumbro river, about one mile north of the city of Rochester. The tree is said to be the largest in the county, Thirty or forty people were present.

The exhibit of strawberries was probably the finest ever shown in Southern Minnesota. A. W. Sias, of this city was the largest exhibitor, showing eight varieties. F. W. Loudon, of Janesville, Wis., furnished some fine specimens of the "Jessie," one berry measuring nine inches in circumference. Several members took specimens of the "Jessie" to their homes to plant the seeds; and we may expect that Olmsted county will in the near future produce a new strawberry worthy, at least, of notice. †

A fine photograph of the berry exhibit and of the people present, with the giant tree in the background, was furnished at a moderate figure to all who desired it. The purpose of the society is hereafter to hold its summer meetings in the vicinity of some noteworthy horticultural object lesson.

The fifteenth annual session of the society was held at the City Hall in this city, Jan. 7, 1888. Before this meeting it became impressed upon the minds of some of the members that a change was needed. For, although the society had been in existence for fifteen years, the result of its labors had been anything but satisfactory, and this seemed largely due to the fact that so few workers could be found in the county with interest enough in horticultural matters to share the burdens of carrying on the work of the society that they might enjoy the benefits of its existence.

J. S. Harris, of La Crescent, an honorary life member of the society, in a letter to President Sias, strongly urged the organization of a society with a wider field of action, and thus enlist the interest and

labors of many horticulturalists in other sections of Southern Minnesota.

Opinions concerning the new organization were also elicited from a number of other horticulturalists, including Wyman Elliot, president of the State Society, E. H. S. Dartt, of Owatonna, and J. H. Vandervort, of Mankato. Some of those opinions were adverse and some favorable. Mr. Elliot seemed to think we had better begin by building up township societies subsidiary to the county organization, and they to the State Society. Mr. Dartt was not enthusiastic but said we could count on him for membership fees, etc. Mr. Vandervort, though his letter reached us after the meeting, strongly favored the move, and said, "I am sorry I cannot attend your meeting and help organize that Southern Minnesota Horticultural Society." C. H. Pond sent us encouraging words from Kasson.

But to return to our annual meeting. Two sessions were held which occupied nearly the entire day. The attendance was not large, but those present were there for business.

After calling the meeting to order, President Sias read a letter from Jos. Klinkhammer, of Le Sueur county, on the subject of tree frauds in his county.

The subject of reorganization was then brought up, and letters from President Elliot, of Minneapolis, and J. S. Harris, of La Crescent, were read, followed by a paper from President Sias on the same subject. After some discussion by the members, the following resolution was read and unanimously adopted:

"WHEREAS, The Olmsted County Horticultural Society desires to enlarge and broaden its field of labor and to increase its usefulness by improving the condition of horticulture and kindred topics, and to collect and disseminate correct information concerning the same throughout the southern portion of our State; therefore be it

Resolved, 1. That the Olmsted County Horticultural Society take on the name and be merged in the Southern Minnesota Horticultural Society.

2. That all the property, rights, franchises, assets and liabilities of the Olmsted County Horticultural Society be, and the same hereby are, vested in and assumed by the said Southern Minnesota Horticultural Society.

3. That it shall be the purpose of the Southern Minnesota Horticultural Society to extend its labors to and secure co-operation from all the southern portion of the State of Minnesota."

A new constitution and a new set of by-laws, adapted to the use of

the society in its new field of labor, were offered, and, after some discussion, adopted by the society.

J. S. Harris, of La Crescent, though not present at the meeting, manifested his good will by contributing a paper on the subject of "Entomology." The paper was mainly devoted to a study of the Round Headed Apple Tree Borer.

A paper on "Onion Culture" was then read by Wayland Stedman, of this city, which was quite a thorough discussion of the different varieties, the best methods of cultivation, and the profits of the business.

This was followed by a paper on "Orcharding," by Edwin Deacon, also of this city; it was mainly devoted to furnishing practical suggestions to the planter, for buying, transplanting, protecting and cultivating his apple trees.

President Sias then read a letter from C. H. Pond, of Kasson, in which he related his experience in fruit growing. He has several Duchess trees, twenty-five years old, that are still healthy and bearing well. He also has some success with the Wealthy, and is quite extensively engaged in small fruit growing. He has now two acres of blackberries, mainly the Ancient Briton.

The following officers were then elected for the ensuing year:

President—A. W. Sias, Rochester.

First Vice-President—J. S. Harris, La Crescent.

Second Vice-President—C. H. Pond, Kasson.

Secretary—Edwin Deacon, Rochester.

Treasurer—Wayland Stedman, Rochester.

Librarian—Mrs. Stansbury, Rochester.

Executive Committee—William Somerville, Viola; E. G. Ballard and John Bamber, both of Rochester.

The annual fee for membership in the new society was fixed by the constitution at fifty cents, and as in the county society heretofore, each member is entitled to a copy of the State Horticultural Report, free of additional charge.

Articles of Incorporation were then adopted by the society and placed in the hands of the Executive Committee, with instructions to perfect the incorporation.

Adjourned to meet at the call of the Executive Committee. Dated, Rochester, Minn., Jan. 18, 1888.

EDWIN DEACON, *Secretary*.

The following report was prepared by President Cutler:

MCLEOD COUNTY HORTICULTURAL SOCIETY.

The second annual meeting of the McLeod County Horticultural Society was called to order by the president, Mr. Cutler, at 2 o'clock P. M., at the Methodist church.

Mr. Pearce, of Minneapolis, told how to raise strawberries. His remarks were very interesting and called out many questions from those present.

The secretary being absent, M. W. Clay was elected secretary pro tem. The reports of the secretary and treasurer were read, showing a considerable sum of money on hand, and quite a number of reports of the State Society. Reports accepted.

The election of officers resulted in most of the old officers being retained, as follows:

President—M. Cutler, Sumter.

Vice-President—J. Benjamin, Hutchinson.

Secretary and Treasurer—H. I. Corson, Glencoe.

The date of holding the annual meeting was changed to the first Tuesday in December.

A resolution was passed requesting our representative in Congress to work for a bill reducing postage on books, seeds and plants

Very interesting papers were read on "Grape Growing," by J. S. Harris, of La Crescent, and on "Fruits and Evergreens for the Prairie," by G. W. Fuller, of Litchfield

EVENING SESSION.

In the evening an address was made by M. Pearce, of Minneapolis, subject: "How to grow Raspberries, Blackberries and Grapes without fail," followed by questions and discussions on the same. This was followed by the president's annual address. It called attention to the increased interest which is manifested in horticulture and the promising outlook for the future.

M. T. Ridout, one of the most successful gardeners west of the Big Woods, read a very interesting paper on "Vegetable Growing."

Owing to the extreme cold weather, there was not a very large attendance at the meeting. We have obtained several new members the last season and still hope to have a live and useful society.

HUTCHINSON, MINN., Jan. 11, 1888.

We are indebted to the editor of the Hutchinson *Leader* for a copy of the very interesting address of President Cutler, which is herewith presented.—*Secretary.*

ADDRESS DELIVERED AT THE ANNUAL MEETING OF THE
MCLEOD COUNTY HORTICULTURAL SOCIETY.

[From the Hutchinson Leader.]

Fellow Members of the McLeod County Horticultural Society, Ladies and Gentlemen:

It gives me pleasure on this second anniversary of our organization to note the increased interest that is being taken by our people in horticulture, forest planting and floriculture. From the woods of Winsted, from the prairies of Sumter and Lynn, and from the beautiful lakes north of this town—we hear of success in fruit culture. Since I commenced the cultivation of fruit for market, about seven years since, a great change has taken place. Then few berries were in our markets and it was hard work to sell the sixteen dollars' worth I had to spare. While the past season the hundred bushels I had for sale did not begin to fill the demand, and hundreds of cases were shipped from the twin cities to towns west of us. As soon as the frosts of winter are gone and our merry songsters return from the sunny South, the queen of berries, the strawberries, makes its appearance in our markets and holds the fort until about the fourth of July. It has been reported that two million boxes were received in St. Paul and Minneapolis in one season, besides the hundreds of bushels of home grown berries. Notwithstanding the great increase in production, prices were good and demand better the past season than for the two previous years. The demand for and production of other small fruits has increased in the same ratio. Mr. Latham, of Excelsior, found a ready market for his eighteen tons of grapes at fair prices. Raspberries and blackberries are being grown by the acre almost at your very doors, with as much or more certainty and a little more labor than corn. Yet how few of our people have a supply.

It is the mission of horticultural societies to show the people how to raise these most delicious of fruits, as well as to warn them of humbug and swindling tree-peddlers. Methinks if three-fourths of the money spent in this country for dead apple trees had been spent for small fruit plants and the other fourth for good horticultural books and papers, every family owning land could have plenty of fruit from its own vine and plant. The appetite for fruit is natural, and should be supplied.

Your little two-year old child is sitting at the table; on one side of his plate is a nice dish of berries and a rosy cheeked apple, on the other side a plug of tobacco. I need not tell you which it would seize and

devour with eagerness. A great change is taking place in the habits of our people. As the mobbing of Lovejoy and the hanging of John Brown presaged the downfall of slavery, so sure does the murder of Rev. Mr. Haddock presage the downfall of the liquor traffic. Already the foes of good society and happy homes are on the run and getting hard knocks from every quarter. With the decrease of the consumption of intoxicating drink, the demand for the finest of fruits is increasing. Though I am not much of a prophet, I predict that in less than two years Minnesota will have a prohibition liquor law, and that double the amount of fruit will be consumed that there is at present. What a pleasing contrast this will be to the present condition of things. To-day the father toils for a dollar and at night goes to a saloon and spends it for liquor, which places him in a condition lower than that of the lowest brute, while his wife and children are covered with rags and are suffering from hunger and cold. In the good time coming part of his hard earned dollars will be spent for fruit, another part of them for a nice lot of vegetables, his family will be well clothed and fed and his evenings spent at home and all will be happy.

This beautiful valley and the surrounding country is the natural home of several kinds of delicious fruits. Strawberries, raspberries grapes and plums are found growing wild, and we see no reason why strawberries and raspberries of largest size and finest quality and grapes equal to those of Minnetonka, which took the highest premiums at the American Pomological Society, Philadelphia, and later at the World's Fair at New Orleans, cannot be grown in abundance.

Well, there, the good wife says, it is the indifference of the men, not of the ladies, that causes such a scarcity of these luxuries. That if the women could have their way every garden and farm would have a good sized berry patch. My experience has shown me that the good wife is right. Not only your wives but your children crave these greatest of nature's blessings. I have had the old widow, bowed down with age and crippled with rheumatism so that she could scarcely walk, come many miles to see the big berries and ask for the privilege of picking a few, they looked so nice. And then when I have taken them to town to see the youngsters flock around the crates and look with longing eyes at the scarlet fruit.

I feel to-night like appealing to every man in our county who owns any land to set apart some of it for a berry patch, buy a few dozen plants of the best kinds and then care for them.

Perhaps you may say you do not know what to buy, or how to care for them. To this I will say that it is the mission of our society to

collect and disseminate this kind of knowledge, and that if you will join it and pay the nominal sum of fifty cents we will furnish you books giving instructions, showing how and what to plant and how to care for the same when planted. They give the experience of such men as Mr. Smith, of Wisconsin, who grew two hundred and seventy-three bushels of strawberries per acre last year, of Mr. Latham who had eighteen tons of grapes, of Mr. Lyon and Mr. Pearce with their acres of raspberries and strawberries, and of many other famous horticulturists.

But methinks I hear some hard-fisted old farmer, whose chief diet has been pork and beans, tobacco and hoe cake or corn dodgers, say that this berry growing is too small business for him to attend to. To such I would say that your appetite and taste is so blunted and demoralized that it might be dangerous for you to change your mode of living and occupation to that of a horticulturalist.

As we roll back the curtain of time 6,000 years or more we behold our first parents in the garden of Eden and their occupation that of caring for their vines and trees thereof. They were the first horticulturalists. I know it has been the custom for the sons of our farmers to go back on the occupation of their fathers and become doctors, lawyers, etc. But I believe the tide is turning, and we predict that the good time is soon coming when the high places now filled with lawyers and millionaires will be filled with farmers and mechanics, whose qualifications will not be measured by the size of their bank account. When the one who is following the occupation of old Adam will be the most honored in the land.

But the mission of the horticultural society is not only to encourage the growing of fine fruits, but to encourage the raising of vegetables for home and market, the planting of trees both for useful and ornamental purposes, the cultivation of flowers and ornamental shrubs, and the proper management of lawns, so as to make of our homes pleasant places in which to dwell. Surely, these are subjects worthy of the attention and support of every intelligent citizen.

But I am sorry to say that such is not the case. Horticultural enlightenment is done by a few sacrificing individuals. Our State meeting was held in St. Paul last winter, with perhaps a hundred members present. A prize fight was held in Minneapolis at the same time and it was said 8,000 men (but no ladies) gave one dollar each to see the brutal display.

At our fairs five or ten dollars is offered for the best display of fruits or vegetables (and often not paid), while some professional

horse jockey or trickster takes away two or three hundred dollars of hard cash. I can hardly believe that this condition of things is a fair indication of the taste and wishes of a majority of our citizens, and I hope we shall soon see a change for the better.

To the people of Hutchinson I wish to say, encourage the growing of fruits and vegetables in every possible way until your home wants are supplied and until a large cannery will be required to consume the surplus, and then there will be healthy and profitable employment for every man, woman and child in your village. Mankato has had a cannery for several years and you have had just as good facilities as that town.

To our farmers I wish to say, do not let our villiage friends enjoy all the good things of this world. Do a little more thinking and a little less muscle work. You are buyers and sellers, why not be business men in every sense of the word.

Following is the report of the local society in Big Stone County :

LAKESIDE HORTICULTURAL SOCIETY.

To the Secretary of the State Horticultural Society:

No specially marked progress in fruit raising in this part of the State can be reported; though our people keep trying with persistent perseverance. The great drawback is a general deficiency of forest trees to protect such plants. A goodly number of our farmers are appreciating this necessity.

The tree peddler's enactment has operated favorably here—keeping out a set of cormorants.

The members of our society are considerably scattered, rendering it quite difficult to keep up regular meetings; but it is a live working institution. Under its direct auspices a very successful Farmers' Institute was held here last November, during which sessions the claims of forestry were urged upon the people, whereby to lay the foundation of successful fruit raising.

S. Y. GORDON, JR.

Secretary Lakeside Horticultural Society.

BROWNS VALLEY, Jan. 17, 1888.

Following is the report of the secretary of the Hennepin County Horticultural Society and Market Gardeners Association :

HENNEPIN COUNTY HORTICULTURAL SOCIETY AND MARKET GARDENERS ASSOCIATION.

S. D. Hillman, Secretary, etc.

We have about twenty active members who take some interest, although our books show a membership of fifty or more. We expect some new blood will be injected into the organization and give it more life; I hope so, at least.

At the annual meeting in December the following officers were elected:

President—M. Pearce.

Vice-President—G. H. Roberts.

Secretary and Treasurer—Prof. L. Asire.

Executive Committee—Wyman Elliot, J. S. Gray, Wm. Lyons.

Yours truly,

L. ASIRE,

Secretary.

DISCUSSION.

Col. Stevens. I want to inquire of Mr. Sias as to his success in raising the Jessie strawberry.

Mr. Sias. We have only a few plants but they made a vigorous growth. A gentleman in the adjoining county to the west of us [Dodge] has fruited it and is very successful; he has been growing it for the past three years.

Col. Stevens. If the extravagant stories told with regard to this variety are true it seems to me its merits ought to be investigated.

Mr. Sias. The Jessie is said to be a seedling of the Sharpless; its fruit is considerably larger.

Mr. Harris. I have quite a number of the plants that were set last spring and it proves to be a vigorous grower. That is the most I can say for it, so far as my experience with it is concerned as yet. I was present at the summer meeting of the Wisconsin Horticultural Society at Baraboo, and it received much praise from many of the horticulturalists of that state, the almost universal opinion being that it was a good thing and the best that they have. But this is not universal, however; there are instances where it has proved a grand failure, the same as has been the case with other new varieties that have been sent out.

Mr. Pearce. What was the opinion of Mr. Smith, the president of that society?

Mr. Harris. He says with him it has been about as great a failure any variety he ever undertook to grow. I think there were some others who pronounced upon it in the same way.

Mr. Pearce. What is Mr. Smith's location?

Mr. Harris. He has a peculiar soil, with a sort of clay sub-soil, that seems to be just moist enough for a dry season. He succeeds with strawberries better than any other man I know; in fact, I think he stands ahead of all other western men as a strawberry grower. He does not succeed well with the Jessie, on his soil. Mathew Crawford, of Ohio, speaks highly of the variety, and sees no reason why it will not maintain the reputation it has thus far attained. I do not think we ought to recommend it for setting largely nor any more than for trial, until we know more about it; that is my candid opinion.

Mr. Dartt. You think we should not take the word of those interested in their sale, as regards their value?

Mr. Harris. Some times they see things through different kinds of glasses.

Mr. Sias. I will take mine off. I find the Jessie strawberry leaves withstood the effects of the drouth splendidly, and the plants have made a fine growth. The leaves seem to be of the right color and are very thrifty; that is one reason I have great confidence in the Jessie—its capacity for withstanding drouth.

Mr. C. L. Smith. When I heard of the Jessie strawberry and the great recommendations it received from the Wisconsin Horticultural Society, I concluded to plant some of them. I got two hundred plants; they grew nicely, made as fine a growth, I think, as any other strawberry plant I ever saw. But I am not surprised that they failed with Mr. Smith, of Wisconsin. He has not succeeded with any of the rank growers and never can with his soil. He has a deep, loose, sandy soil, with an abundance of moisture, which he manures very highly; and he succeeds well with the Wilson strawberry. I am satisfied from the crops I have seen raised of the Jessie, that when planted on that kind of soil it will prove a strong grower but that it will yield little fruit. I think that is his experience. Mr. Loudon, who originated the variety, has a soil that is not as strong, that is underlaid with clay; it succeeds well there. I would not advise any man to buy strawberry plants that are scarce enough to compel one to pay the prices that are charged for this variety. I don't think any of us Minnesota growers know enough about it to recommend it. As far as my experience goes I would consider it a fair variety to try for a few years; next year we may know more about it. I presume there are hundreds of growers

in the State who will fruit it this year. We must consider the conditions under which it is grown. There are very few who have such soil as that of Mr. J. M. Smith.

Mr. Harris. Mr. President, perhaps I ought to state my position with regard to the organization of the Southern Minnesota Horticultural Society. I have traveled around some in the State and find there is an increasing interest manifested to know more of the subject of horticulture. I have asked men to join our Society and they have said they did not join because they were unable to attend our meetings. They do not realize that they could get five times the cost of becoming a member from reading our reports, and still remain at home. They do not realize the benefit of having a large membership in all sections of the State. After thinking the matter over, knowing that Olmsted county was the birthplace of the State Society, I did not see any good reason why it might not be a proper thing to have an organization for the southern or southeastern portion of the State. In my letter to the president of the society, I urged them to maintain their county organization and tried to tell them how they could help to build up this Society. I told them that we ought to have five thousand members. We might be able to get that number of names enrolled if we had more sub organizations in the State that would work to this end. I hope and trust that their new organization may prove to be a success.

I further stated in my letter to Mr. Sias that I thought the State Society ought to have a Board of Horticulture; I believe the same now. I believe we ought to have horticultural experiment stations all over the State, and that these stations should be under the charge of district and county societies. Some might argue that this plan would weaken the State Society. Gentlemen, horticulture is like a great many other things, it is "catching." If some of our country friends will turn out to the meetings of the Southern Minnesota Horticultural Society. they will become interested, and they will certainly want to attend the meetings of the State Society. I hope in the near future we may be able to hit upon some feasible plan for all the local organizations to claim a membership in this Society.

CORRESPONDENCE.

The following letter was read from President Lyon of the Michigan State Horticultural Society:

FROM MICHIGAN.

SOUTH HAVEN, MICH., Dec. 28, 1887.

S. D. Hillman, Secretary Minnesota Horticultural Society:

MY DEAR SIR: I am just in receipt of the program of your annual meeting to occur on Jan. 17-20, prox.

During my hasty visit to your city and State in August last, I saw very much to surprise me in the way of horticultural advancement; and I would gladly have extended the calls I was able to make upon yourself, President Elliot and the various objects of interest about your wonderful and thriving city. I was also very much interested in looking over the various horticultural plantations which I was able to visit; among which were the State farm near your city, the plantation of Mr. Gideon, at Excelsior; that of Mr. Luedloff, of Carver; Mr. Sias, of Rochester, and Mr. Harris, of La Crescent.

I also observed with not a little surprise the wonderful energy and courage displayed by your fruit growers in the face of the climatic calamities by which your State has been visited.

If we, in Michigan, had more of the enthusiasm which you people manifest in the face of your peculiar afflictions, we might hope to accomplish far more than has yet fallen to our lot.

The little which I have been able to see of the men and the horticulture of your State adds greatly to my interest in your doings as well as to my desire to know you and your people more intimately.

Very truly yours, T. T. LYON.

FROM CHAS. W. GARFIELD.

SECRETARY'S OFFICE, GRAND RAPIDS, MICH.

Dec. 21, 1887.

Dear Secretary Hillman:

Your favor received, and I hasten to say that it will be impossible

for me to make any further engagements than those in Wisconsin. I would like so very much to meet you and your Society, but time and strength are limited; and I, in a moment of rashness, agreed to spend ten days in Wisconsin, following January 10th.

Sincerely yours, GARFIELD.

FROM WISCONSIN.

JANESVILLE, Wis., Jan. 14, 1888.

Friends of Minnesota Horticultural Society:

I should have been glad to have met with you this winter. Our committee appointed our corresponding secretary, A. S. Hatch, delegate, who will extend to you our society's greeting for this "open winter."

Hoping your horticultural work will keep step to the music of 40° below zero, and yet prove the varieties that will pay you abundantly.

I remain truly yours,

GEO. J. KELLOGG.

P. S. Enclosed find my youngest daughter's first horticultural essay—competing for one of your prizes. G. J. K.

FROM NEW YORK.

ROCHESTER, N. Y., Dec. 30, 1887.

S. D. Hillman, Secretary, etc.:

The announcement of the meeting of the Minnesota State Horticultural Society, Jan. 17, 18, 19 and 20, with program, is at hand.

It will be a pleasure if you will forward such accounts of the meeting as may be published at the time in the daily Minneapolis papers, with any additional notes you may think best. From these I can make a fair account for publication. It is always interesting to hear from your wide awake Society.

Yours very respectfully,

C. W. SELLYE,

Editor Vick's Magazine.

FROM TEXAS.

DALLAS, TEXAS, Dec. 30, 1887.

S. D. Hillman, Secretary, etc.:

DEAR SIR: Your kind invitation and letter received.

Thanks for the former, and in reply to the latter, beg to say our State report is not out yet. When out will comply with your request. I am doing all I can to get same out. Will you send a delegation to California to the national convention of the American Horticultural Society? We send you programs of our last state and local meetings.

Yours truly, MRS. J. R. JOHNSON,
Secretary Texas State Horticultural Society.

FROM WASHINGTON.

U. S. DEPARTMENT OF AGRICULTURE, }
 WASHINGTON, D. C., Nov. 29, 1887. }

S. D. Hillman, Secretary, etc.:

DEAR SIR: This year I again submit for your consideration another schedule, which is but slightly changed from that of last year. You will see that according to it, it is desirable that your Society hold its annual meetings on the first Tuesday after the fourth Monday in January of each year. The only reason for this, is the fact of the collision in the meetings of your State and Iowa, unless some such arrangement is made permanently. There are special reasons, as we all well know, why this should not occur—because of the intimate relations of their respective members, and because of climatic conditions of similar character. Please present this matter at your next annual meeting.

Yours fraternally,

H. E. VAN DEMAN.

I recommend the adoption of the following:

SCHEDULE FOR ANNUAL MEETINGS OF STATE HORTICULTURAL SOCIETIES.

First Wednesday in December (annual meetings), Michigan, Dakota, Missouri; second Wednesday in December, Ohio; second Tuesday in December, Illinois; third Tuesday in December, Kansas and Kentucky; first Tuesday after first Monday in January, Indiana and Colorado; first Tuesday after second Monday in January, Nebraska; first Tuesday after third Monday in January, Iowa and Pennsylvania;

first Tuesday after fourth Monday in January, Minnesota and Western New York; first Tuesday after first Monday in February, Wisconsin; first Tuesday after second Monday in February, Michigan.

The following from Com. Van Deman was also read:

GENEVA, KAS., Dec. 23, 1887.

S. D. Hillman, Secretary, etc.:

MY DEAR SIR; Your letter of December 5th, has followed me here, where I am spending a few days with my family after a visit to some of the western states on official matters.

I will write to the secretary of the Iowa Horticultural Society asking if they can take the date proposed for your State. But they have so long held that position that it may be hard to get them to do so. In the mean time will you not endeavor to have your Society leave the matter in such shape that you can change if Iowa does not?

I would gladly send you something to present at your next meeting if it were possible, but owing to extreme pressure on my time, getting out special reports or bulletins in addition to other regular work, that it will be almost out of the question. However, I will *try*, but hardly expect to reach it in time for your meeting. I will soon return to Washington where you can always address me.

One of the bulletins I mention will be of interest to you in the Northwest, and will be sent to all your members without further notice, as I have their names upon my list.

Yours, fraternally, H. E. VAN DEMAN,
Pomologist to U. S. Department of Agriculture.

FROM R. L. COTTERELL.

DOVER, OLMSTED CO., Dec 29, 1887.

S. D. Hillman, Secretary, etc.:

I thank you for this notice. I should feel a great pleasure in attending your meetings, as I feel as much interest as usual, but remember I am getting old, and it is rather severe weather, or I would like to meet old familiar friends.

I should be very much obliged should you furnish me with any of the proceedings of the Society; it will be esteemed a great favor by

Yours very truly,

R. L. COTTERELL.

President Elliot here stated that Mr. Cotterell was an honorary

member of the Society and one of the original twelve who assisted in its organization.

FROM PROF. OESTLUND, OF THE STATE UNIVERSITY.

MINNEAPOLIS, MINN., Jan. 3, 1888.

S. D. Hillman, Secretary, etc. :

DEAR SIR: Yours of December 28th, at hand. I will be pleased to make use of the time you have given me to address the Horticultural Society on the subject of Entomology. I will not have any special reports this year that will require cuts.

In my last report I asked members of the Society to send me specimens of any insect that was found to be injurious or on which any information would be wanted, and I would then look up the subject and report at the annual meeting. But during the year I have not heard a word from any of the members, and have not had time to undertake any special work on insects injurious to the horticulturist.

The subject of entomology is not recognized as it ought to be in our State, and we all need to be a little wakened up if we could get the right man to present the subject before us. I am glad to do what I can, but this is not much.

During the summer I have used most of my time in collecting our insects along the western border of the State and in finishing my report on the plant lice of Minnesota; a copy of which I take pleasure to mail you.

Yours truly,

O. W. OESTLUND.

FROM DAKOTA.

RAMSEY, McCOOK Co., DAKOTA, July 2, 1887.

S. D. Hillman, Secretary, etc. :

MY DEAR SIR: The Report for 1887 has come to hand, and the reading of it has been the comfort of many a leisure hour. I think of the old Society every time I go into my garden. There I am reminded of its influence, and for what little I have there that is better than the average farmer's garden contains, and for all the benefit and pleasure I derive from the garden in any respect, I feel an obligation to the Society for giving me the horticultural bent of mind and holding me to it till it became second nature.

Say to Mr. Harris, when you meet him, that I appreciate and thank him for the motion to make me an honorary life member.

You asked me once to furnish my photograph for the picture gallery. I have no spare copy suitable, and it is uncertain when, if ever, I may get out where a new one could be taken. Meantime, I wish you would look into the State Fair buildings for a large photograph I left there in September, 1885, in frame, showing a group of the State and Territorial commissioners at the World's Exposition in New Orleans. If it is still there, ask Secretary Hoard to let you have it. In the group my friends will recognize what was left of me after my Washington illness. It is the best I can do for you at present. Let me know if you find it. I left it hanging on a panel of the fish exhibit, It was designed as a present to Gov. Hubbard, and I asked him to send for it, after the fair of that year was over, but I presume he never thought of it afterwards.

Why is Andrew Peterson left out of the list of life members? He was elected on my motion at the same time with Charles Luedloff. It is one of my pleasant memories that I discovered these two grand old men out there in Carver county and brought them and their works before the Society, and enlisted them for life as active members. It strengthens my courage in apple growing to know that Mr. Peterson's surviving Russian trees—strays from the East plain, sifted out of the Washington importation, as Prof. Budd called them—have continued ever since, the same hardy look as when they greeted my prophetic soul in August, 1883, when I found them, searching as I was, not alone for apples to get the medal with at Philadelphia, but for things new and improving, for the Horticultural Society. It was the first time I had ever seen a fair test of the Russian trees—all else had been top-worked on crabs; and the first time, also, that I had seen an apple tree in Minnesota that said plainly in every expression of leaf and wood that it had come to stay. These trees must now be from twelve to fourteen years old—no test for a single seedling, having its own top root under it, but for a group of root grafted trees, a pretty good one. If, as Prof. Budd avers, others of the East plain Russians, having equal adaptation to our Northwestern climate, are in addition good in quality for eating out of hand, we are nearer success in orcharding than by the seedling route; though to one traveling either from the Russian starting point or any other starting point, "happy may be his dole," I say.

As to my own Russian trees—apple, pear, cherry and plum—planted last year, about one hundred and twenty-five in number as before re-

ported, the most of them wintered well. They made a good deal better showing when new growth commenced this spring than my Duchess and Wealthy, most of which I had to cut back; more, I think, on account of insufficient growth in our dry season of '86, than from any other fault. I have added about fifty more Russians to my orchard, all from Prof. Budd and, in the fall, will try to give you a statement of their appearance then. They are all making a thrifty growth this year.

We have had a poor season here to test new varieties of strawberries—too dry till picking season was over. None of mine have proven satisfactory. Their growth for next year is now well started by heavy rains, and I will give them another trial before reporting on them by name.

A garden item: Early last fall I emptied my whole barn yard upon the garden, covering the ground out of sight and pretty deep. This spring as soon as dry enough, I burned the manure all off—at least the strawy, fibrous part, before ploughing. Have scarcely seen a cut worm. Things are growing like Jack's bean, and the vegetables are of a tender, succulent quality, quite unusual. Peas and potatoes planted April 15th—the William Hurst pea was ready for the table June 10th; the Champion of England, June 30th, and Early Rose potatoes, June 22d.

Wild fruits abundant with us this season, especially gooseberries, grapes, plums and choke-cherries.

With best wishes for your continued prosperity,

I am, yours truly, OLIVER GIBBS, JR.

SUPPLEMENTARY.

Dec. 3, 1887.

Continuing the garden report and completing the season, I find of the four varieties of watermelons planted—Excelsior, Iron Clad, Mountain Sweet and Stokes—the latter, although very sweet as reported last year, inclining to toughness, and shall reject it. The Iron Clad I would only plant for variety to exhibit at fairs. It furnishes the largest specimens, and is very showy, but its quality is inferior. The Mountain Sweet is always good and averages large. But I would always plant the Excelsior, and if but one sort, it would be this. It is the earliest of the lot with me; yields abundantly—no small ones and many that weigh thirty to forty pounds, and is of luscious quality and always tender. Rind thin, flesh of a deep, rich pink. I showed ten of the Excelsior at our county fair, September 22d,

weighing three hundred and fifty pounds. Largest Iron Clad in that collection weighed thirty-seven pounds; but one stolen from same vine that would have gone to fifty pounds. A new variety appeared among my vines which had the shape of the Mountain Sweet, color a mixture between that of the Excelsior and Stokes; size, a medium, between Mountain Sweet and Stokes, and quality, texture and color of flesh a combination of all three at their very best, with smallish seeds, like the Stokes, but larger. If I can fix the type by replanting it will be a lovely melon for home use.

I planted the same muskmelons as reported on last year—Miller's Cream Nutmeg and Bird Cantaloupe. The Miller is perfection for home use, but cracks at the stem as soon as fit to use, and will not answer for market. The Bird cantaloupe shows this year a cross with the Miller, bringing up its quality to a high grade, retaining its firmness and soundness for handling, and losing about one-third in size. This type I hope to fix by replanting.

The market for melons was always ready at Madison at about a cent a pound by the wagon load for well-grown lots. I sent in several loads, all I could get in without neglecting the farm harvest; but the best pay I got for the labor in raising my melons was by calling in the neighbors for six miles around one pleasant day in September and having a melon pic-nic. Half a ton of melons disappeared in the afternoon, and just before sundown our guests opened their lunch baskets and spread an excellent pic-nic suppe. for us on tables laid on the blue grass lawn in front of the house. I reckon some missionary work was done in the melon cause by the distribution of the pic-nic seeds; and I presume some of my guests will beat me out of my premiums at the county fair next year.

In tomatoes this year I had the Beauty in addition to Livingston's older sorts, the Perfection and the Favorite—all first class every way, but the Beauty averaged larger than the others, and I prefer its color—that of the Acme. The whole crop was late in ripening, and after marketing about twenty bushels of ripe tomatoes, I tried the experiment of using the green ones for cow feed. I found the cows would eat them with good relish, taking half a bushel at a ration; and offering them to my horses, they, too, pronounced them good and wholesome. I fed them for a month from the garden, the frost holding off till the latter part of October, and then putting about fifty bushels in the basement of my barn, used them up before decay set in. To gather them cheaply I pulled up the vines by the roots, let them wilt two days, and then shook the tomatoes off and picked them up as we would potatoes.

Recurring to small fruits, I expect to be able to make a good report next year on strawberries, as my Crescents, which I neglected to mention in last report, and my Glendales, Sharpless, Warrens, Parry's, Black Defiance and Triumphe De Glondes have all made a luxuriant growth, and the Jewell a few strong plants.

In the orchard, everthing that got a fair start in last year's dry season, has done well this summer, and the rest that were cut back last spring have made good new stems, the ground froze up dry about a week ago, but not deep, till we got two snow falls, each of about four inches, in quick succession—the last very damp, so as to prevent drifting, and both will probably melt and go into the ground before we have any hard freezes. The additional Russians sent me by Prof. Budd last spring, apple, pear, cherry and plum, together with some trees of the Wolf native plum of Iowa, said to be a freestone similar to the Weaver, but darker in color, and larger, have all made a vigorous growth.

Speaking of native plums, I have a lot of letters of inquiry and asking for seeds and cions, as a result of my report on my plum grower at your last annual meeting. It is annoying, for only now and then a correspondent sends stamps for a reply, and I am too busy with my own affairs to attend to their requests, and not being in the trade have no facilities to pack for mail or shipment. If your experimental stations want to try them, I shall be happy to furnish small lots to each, if your Society will let me refer to them and will undertake redistribution when enough cions are grown. The crop this year was very abundant on nearly all the trees outside of the cattle pasture, and the surplus sold at sight by the load at Madison at two dollars per bushel. As a hint to others, I will mention here, that the market at the same time was overstocked with half ripened, poorly handled plums from the Big Sioux and the gulches in this vicinity at one dollar per bushel; but mine were left on the trees till ripe and in full color, handled carefully, crated in Beecher baskets—a lot that I have had on hand for fifteen years in continuous use—and carried to town in a spring wagon. We shook them off upon a soft carpet of grass without injury, as the space under the trees was kept mown like a lawn and all rough or sharp things kept grubbed out or picked up for this purpose. I would never cultivate the native plum, but keep the ground in grass and fertilize by top dressing when necessary. This to prevent suckers from severed roots. No new sorts worthy of mention found this season, although previous favorable impressions are sustained and increased by second testing of many sorts. We find

several sorts that have so little acidity as to make a very palatable plum butter with but a moderate amount of sugar, and these are nearly all freestones; but the best plum yet tested for canning is the large wild Damson spoken of in last report. I found this year scores of young trees of this variety scattered all about my woods, in bearing, identical in every way with the parent tree, showing that it reproduces itself exactly from seed, although surrounded everywhere with bloom of other sorts. The best plum to eat out of hand is a small, cherry-red freestone, bearing enormously and medium late, and holding on well against the wind. This is a cross from older trees standing near—one sort a big, dark red, perfectly sweet and solid-meated cling, and the other a large, light red cling, of good sub acid quality. This tree has borne heavily for two years in succession. The best plum for all purposes is the one I mentioned last winter for its remarkable beauty of color and finish. I speak of this now in order to mention a singular fact. It is the only plum on my grounds that is seriously interfered with by the birds, although my woods are full of all the birds of the North. They puncture every plum of this variety as soon as it is ripe. Is it because of its striking beauty? Certainly there are other plums in the vicinity at the same season of ripening good enough in quality. Next year I must cover at least one tree of this sort or lay and watch to discover what bird does the mischief. I shall not pass sentence of death in advance, like Jephthah of old, for it may be some favorite songster. I suspect the turtle-dove, and might find it the sly brown thrush, a bird I love and for which I would plant a plum orchard if he could not live with me without, in memory of one little pet of this species that summered and wintered with me at Lake City with the freedom of the premises, coming to the window to be fed and to his perch in the house at nightfall—bathing in the snow winters, and in the chicken drinking-pan summers—boss of the poultry yard, keeping the fowls off the house porch, and companion of my garden work in quest of all worms turned up—victim at last to the marauding cat of a neighbor.

If I am too prolix, cut me down; but I am reminded here of many little things of interest to me—possibly to others. My best bird fruit is the choke cherry. They take every one—bushels and bushels in all, but what a scattering they make of the pits, and what myriads of young trees coming up everywhere outside the cultivated fields. I am obliged to make war on the choke cherry trees in some of my gulches to keep down the black knot and prevent its spreading to the plum trees; but for all that, it is a lovely tree, either in blossom or fruit,

and a good companion for the wild tree rose which seems to seek out this tree, pushing its stalks up among the cherry branches on the shady banks, and hanging out its bright red blooms resting on the cherry leaves, six to eight feet from the ground, in pleasing contrast to the dark green of the cherry and offering the illusion of rose blooms growing from the cherry.

The next best bird fruit is the wild gooseberry, which is as abundant here as the hazel in Minnesota, and yielding in great abundance a large smooth fruit, in good demand in the market either green or ripe. A drove of a hundred turkeys subsisted almost entirely upon them while green, and when ripe the little wild birds leisurely harvested what there was left. None of my birds interfered with the garden strawberries last summer.

I think Mr. Brand was too severe on the sand cherry in his remarks last winter. I have seen it in full bearing this year. It occupies no more space than a currant bush, and bears an enormous crop of black, glossy cherries about the size of the Janesville grapes. It is not a fruit to eat out of hand, having a little of the acid flavor of the choke cherry, but this disappears in cooking; and it is so hardy and so prolific, and so handsome, and so useful for pies, cherry butter, canned fruit and jelly, as reported by my neighbors who grow it, that I would certainly recommend it for trial. If "so disposed," as Mrs. Gamp would say, I would undertake to educate the fruit market of any town near me to take the sand cherries in large quantities.

I have not yet seen a Dakota-grown apple in this county, and only a few crabs; and none of the nurserymen's native plums, except a single plate of De Sotas shown at our county fair. But I hear that in Turner and Clay, the two next counties south, there were a good many fine apples raised. I did not attend the Territorial fair at Mitchell, being laid up at home with sundry ills the flesh is heir to. But I am going up to Huron the thirteenth to meet with the Horticultural Society, and may then inflict on you another supplement.

A word about the roses and other flowers and I am done. We brought with us from Lake City and planted out in the spring of '86, of the roses, our favorite damask--name unknown--the Plantier, the white Scotch, the yellow Harrison, the old-fashioned Blush; the Boursault climber and three kinds of moss roses, whose names are not known. All these gave us handsome blooms last summer--the Boursault having two hundred and eighty-five from one root. How is this for only one year's growth after transplanting; and so much better is our soil than where we used to grow the roses, that there is a marked

increase of size and brilliancy of the blooms. We planted last spring a double set of Salzers "Diamond Four," the Jacquiminot, the La France, the Coquette des Alps and the Capt. Christy—the latter the favorite rose of Mr. Bancroft, the historian, out of five hundred sorts, as his gardener at Washington once told me. All have made a good growth, and the La France and the Coquette put out a few nice blooms the latter part of the summer. We lay down and cover all our roses with sod spaded from the grass near by; and shall uncover the Diamond Four in the spring with some anxiety for their life; but Salzer says they will stand out doors. I cannot report in detail on the annual flowers except that there was an abundance of the common favorites and some of the new sorts, and that they looked pretty and smelt nice, and were in much request among our guests and picnic parties, and somehow one carries nothing more agreeable to a friend in town than a nice bouquet. Their names, at least the newer sorts, are not known only to the superintendent of that department, who uses my envelope too freely to save the seeds and write their stuck-up names on, and crams the drawers and pigeon holes of my desk with the packages. But I get acquainted with the perennials. The one year's growth that rewarded us with rose blooms on the roots we brought from the old garden, also brought out the flowering of the lilacs, the grandiflora, the spireas, the nigalias, the clematis, the nisterias and the peonas, and here also reminding us of the kindness of our soil. The buffalo berry, *Argentea Sheperdu*, I found growing in my pasture and transplanted half a dozen small trees to the garden last year. It is a dainty little ornamental tree, in all respects—form of tree, leaves, blossoms and fruits. It holds its leaves undimmed by frost till the last hard freeze-up just as winter sets in.

But this report is too lengthy. Slash it till it fits into the program and the time allotted to other things.

Would be glad to attend your annual meeting; but although I amuse myself a little in horticulture, the farm business is my employment, even in winter, and obliges me to keep closely at home, at least not to go far away. Have not set foot in a railroad car since November, '85, when we came here. But don't weep for me on that account. It had come to be a relief not to be obliged to ride on them or go anywhere away from home, for that matter--and is so still. G.

The next on the program was a paper by Mr. Dartt.

Mr. Dartt. Mr. President, I was invited to prepare a paper upon experimental stations, their scope and usefulness, as I understood it; I think those were the words of the Secretary; and I wrote in reply that I would try and do so, but when I came to get the program I found it was a different thing. I found he had made the task a great deal harder there than at the first. As you all know, it is an easy matter for one to talk at random about a thing, but when you are pinned right down to the thing itself, it is a great deal more difficult. I am trying to run an experimental station at Owatonna and I look to this Society for instruction. It would be presumption on my part to expect to be able, or to undertake to educate the Society; it would be entirely wrong. So I have written according to the first heading, which gives me a chance to talk at random. I do this knowing that fools can ask questions that wise men are puzzled to answer. And I know, too, that the principle comes in that it is easy to prate at the Bunker Hill monument but not easy to build one. I would a great deal rather prate at experimental stations than come down here and try to instruct you how to run a horticultural experiment station. With this explanation I will read my random remarks:

EXPERIMENT STATIONS: THEIR SCOPE AND USEFULNESS.

By E. H. S. Dartt, Owatonna.

Mr. President, Ladies and Gentlemen:

In considering this subject, our main object should be to determine in what way, we can secure the greatest permanent benefits, in the shortest time and at the least expense. And the first question may be in what line of experiment may we reasonably expect to secure these permanent public benefits? Not in the line of small fruits for our experimenter would hardly have time to explode one boom before another would be on and he would have to settle down to the business of chasing humbugs which would be comparatively useless on account of their rapid flight and transitory nature. In regard to flowers and vegetables they seem to be on a paying basis, and need few baits from the public crib. In farm products we favor experiments, but to do most good they should be so simplified that the average farmer can comprehend and comply with the conditions.

It is quite important to know what breeds of farm stock are best, but the difference is not so great as our fancy stock breeders would have us believe, or as to require extensive experiment. We know that the "swill pail hog" and the "meal and bran cows" are excellent

breeds, and the best seed corn we ever tried was the Richfield. We grew about one hundred and sixty bushels of ears of dent corn to the acre.

For our greatest benefits from experiment we must look in those lines where it can change partial or total failure to success. If certain breeds of cattle were exempt from cattle diseases, and certain breeds of hogs were exempt from hog cholera, then the question of breeds would become of vast importance, but such does not seem to be the case. Then where shall we look for such conditions. This points directly to our glorious hobby, fruit, forest and ornamental trees. Here in our different varieties and climatic influences we have all the gradations from total failure to eminent success, and I firmly believe that no line of experiment can be followed with such assurance of beneficial results to the present and future generations. For, what would the world be without trees? And what must the condition of our part of it soon become unless tree planting shall receive a greater impetus? Now, whilst we seem to have found tricks in all trades but ours, some of the other fellows say our hobby is the biggest humbug out, and that experimenting at public expense is useless for the reason that it absorbs vast sums of money without adequate returns. Their error seems to arise from the fact that the money goes out in round sums, so many thousands of dollars which anybody can comprehend, whilst the beneficial results are so scattered and far-reaching that it requires a penetrating mind to see and comprehend their vast importance. And even then, great benefits may result without becoming perceptible at all.

Suppose the wheat experiments at our central station should enable our farmers to increase their yield only one per cent or four quarts to the acre. If they realized this, they might say it is a small matter and it don't pay to run these high-toned institutions. Still these benefits might be continuous and cumulative, and if figured for one year would amount to over \$200,000, enough to establish and run an experiment station for many years. Again, suppose a man, by improved methods should increase the profits of his farm ten or twenty per cent he would not know where to place the credit. Evidently most of it would be due to his own good sense and energy, but without agricultural papers, farmers' institutes and experiment stations, he would still be plodding on in his old ways.

Many farmers believe that the interest taken in their welfare is prompted by purely selfish motives—that they are favored like fattening animals that they may afford better pickings for those who prey

upon the industries of the world. And that our country is largely controlled by rings and combinations whose policy it is to tax every industry just as much as its degree of prosperity will warrant, and that if their prosperity as a class should be increased it would be followed by increased exactions.

In this view of the case it does not seem strange that they do not take kindly to the teachings of men brought in from the trades or professions to teach them how to manage the farm.

Experiments, to satisfy this class, must be managed in each leading department by a man of practical experience and in whom the people have confidence, and they must be on a scale of sufficient magnitude and surrounded by such circumstances as will make them fair and practicable tests. Too much science is not admissible in the common walks of life.

If these conditions are not secured as approximated, it will not be strange if some of our farmers should shout humbug! and if some of the more modest professors should think about the pearls and the swine.

There is probably no branch of business where the old theory of every man to his trade comes in with more force than in conducting experiments of whatever nature. An obscure poet has said:

“Take the wisest man that ever drew the pen,
Or raised his voice to be heard by men,
He'll tell of things taught in his school,
But if y^e go beyond, he too's a fool.”

Now, sir, we think we discover a great deal of the far beyond in conducting varied experiments, for if precedents are found they can seldom be applied on account of a change of surroundings. The word experiment implies the exploration of new fields, and these fields when entered will be found so expansive as to afford ample room for the best efforts of your best man, though he be philosopher and sage. If he jumps at conclusions, he will frequently stumble, and if he carefully feels his way, his progress will be so slow as to require from a reasonable public the exercise of those commendable virtues, patience and charity.

DISCUSSION.

Mr. Pearce. Mr. President, I am not in favor so much of what are called experiment stations as fruit and tree stations. There are stations where men will experiment as a business, and after their experiments have been made the results have been established beyond a

shadow of doubt. My view is this, that we as a Society should not put out anything at a station but what we have tested ourselves. We should be able to describe the variety of tree and to give the number that failed to grow. Each man in charge of a station should have a duty to perform and he should be governed by that duty. Our experiments ought to be such as would warrant success. Now, I take it that after I have experimented on certain things I ought to be able to say, do thus and so and you will get a crop. I am in favor of fruit and forestry stations where we can put our trees and say that we know they will grow. That is the general view I take of it. An experimenter is an expert and he has got to use his experience. His experience is used, it becomes developed and established with regard to any variety, and then anybody can grow it. When Columbus broke the egg and made it stand alone, anybody could do it.

Mr. Sias. I consider this paper of Mr. Dartt's a very valuable one and I would like to hear it fully discussed. I believe that there are several other papers to be read upon this subject and I suggest whether it would not be better to hear those and have them all discussed at one time; certainly there should be a full discussion on the matter of experiment stations.

Mr. Dartt. Mr. President, I agree with Mr. Sias in regard to the propriety of delaying discussion until the other reports are in.

Mr. Harris. The reports from experiment stations come in the last day. I am very much in favor of experiment stations. Experience is a dear school, but it is one in which we can learn something. I believe we ought to have an experiment station in every county in the State of Minnesota, and that those stations in a certain measure ought to be under the control of the State Horticultural Society. I am speaking of horticultural experiment stations. We ought to have men in charge of these stations who have the capacity to manage them. For instance, we might have one man to conduct experiments upon one line, and another in another department. One man may succeed in growing seedling apples, another in small fruit; while here and there we may find a man who has the ability to conduct experiments successfully along the whole line.

The field for experiment in this State is a very broad one. It is well known that we have met with a series of reverses in our endeavors to grow the apple; to-day we dare not stand out and say to the world that we can grow the apple successfully here. But by testing Russian varieties and new seedlings, and planting the seeds of these Russian varieties and of the best seedlings and crossing them, we may hope in

time to secure varieties that will be adapted to our wants in every portion of our State. We want to conduct our experiments with a view to get apples that will last us the year round, as we must recognize that fruit has become an absolute necessity. It is necessary to have fruit upon our tables, and if there is a lack in this direction we are living very poorly.

We have the native plum growing in our State and in Dakota, and as far north as the Red River of the North, and some varieties of the plum are very choice fruit. It seems to me that our experimenters ought to collect together the best varieties that can be found in these northern regions and raise seedlings from them to get the best and distribute the products so that every farmer throughout the State and in Dakota may know that they can grow the native plum in great abundance and varieties that are choice in quality. If we follow up the improvement of any one kind of fruit properly it can be so improved as to be fit for use in our kitchens and upon our tables.

One of the most important things for experimenting upon is forestry. We want to test the question whether our native trees that are growing in our forests in Minnesota, are better adapted for use than trees that are brought here from Europe; to find out the best methods of culture and planting; to determine which will furnish the cheapest and best fuel, and afford material for lumber and shelter-belts, in the very shortest space of time. These and other questions could be brought out by experiments at these stations. I hope this Society will encourage the work to be done at such stations and that we can have them located where such experiments may be carried on, and if they are properly conducted I will guarantee that they will not only be of service but that we shall receive much benefit from them.

President Elliot. I do not think we had better continue this discussion at this time, but take up some of the unfinished correspondence. We have a question box and anyone that desires can prepare a question to be brought before the meeting at the close of every session, when if there is time a few minutes can be given to discussion of whatever the subject may be

FROM COMMISSIONER COLMAN.

S. D. Hillman, Secretary, etc. :

DEAR SIR: This section is collecting material for a report on apple

scab, and it is desirable that information concerning the extent of the injuries occasioned by the disease be obtained from your State.

You will greatly aid this section in this work by answering, as far as you are able, the following questions:

I. What is a fair estimate of the annual loss occasioned by the disease in your State?

II. What varieties are subject to the attacks of the disease?

III. What varieties are comparatively free from the attacks of the scab?

IV. Does the character of the soil or atmospheric conditions in any way influence the spread of the disease?

V. Do you know of any remedies that have been used with success?

Hoping that you will favor the section with the desired information,

I remain, respectfully,

NORMAN J. COLMAN,
Commissioner.

DISCUSSION.

Mr. Brand. Mr. President, I will say that while I was in the South I met the Rebel General French, and in conversation with him he stated that when he was a boy they were troubled with the scab in the State of Virginia; that in his father's orchard they tried the experiment of boring a hole in the body of the apple tree, put in a quantity of sulphur and then plugged up the hole; that for years afterwards the tree was never troubled with scab.

Mr. Harris. If he had put the sulphur under the tree it would have been still more beneficial.

Mr. Dartt. I would like to know, Mr. President, if there has been any instance of apple scab known in this State?

Mr. Harris. I have seen it on one or two seedlings and observed it in my orchard the summer before last on my Strawberry crab.

Mr. Dartt. I think I have seen it on apples that were brought in from other states.

President Elliot. For the information of some of the members it might be well for you to explain what it is.

Mr. Dartt. I don't think I can.

Mr. Harris. It forms upon the fruit and takes a growth which spreads if it is very bad until the apple will get as much out of shape as those that are effected by the curculio. It has a vigorous growth, but I have not seen it in this State far enough developed to cause cracking

of the fruit, but enough to effect the shape of the apple. In conditions where the trees are very much confined for want of circulation of the air there is more of the disease manifest.

Mr. Brand. I would like to add a word to this talk in regard to experimental stations, and I would like to say now that it is the duty of this Society to instruct Commissioner Colman (if he does not know his duty,) that is just what he is there for, to try and explain different things that prove destructive to various crops and to find out remedies for the same.

Mr. Pearce. That is just what he is doing.

Mr. Brand. The benefit is for the whole people and the government should pay the expense of ascertaining these facts.

Mr. Dartt. Mr. President, I would say that I received a circular from Mr. Colman asking the number of fruit trees and the number of acres I had in cultivation, stating that the information was wanted with a view of putting himself in communication with the fruit growers of the country, for the purpose of getting information from them.

President Elliot here introduced Mr. J. S. B. Thompson, of Grundy Center, Iowa, as a delegate from the Iowa Horticultural Society.

On motion of Mr. Stevens Mr. Thompson was made an honorary member of the Society.

REMARKS OF MR. THOMPSON.

Mr. Thompson. Mr. President, and fellow horticulturists: I return to you my sincere thanks for the honor you have conferred upon me, in permitting me, as a representative of the State of Iowa, to mingle with you in your discussions at this meeting. I hope and trust that the knowledge we gain in this manner may be of mutual benefit.

There seems to be a little question in dispute here in regard to the blight of the apple. In Missouri it has effected the fruit very much; it is caused by the buffalo midge stinging the fruit. In this State and in Iowa, it is injured by the stinging ant; perhaps some of you have run into a covey of them; I don't know whether they bite or sting, but they hurt most awfully when they get after a person. I noticed a swarm of these ants in a young orchard and they almost ruined one-third of the fruit on one tree. I was working around there and made up my mind to have a row with them. I went to the house and got some torches and soon drove them out. I noticed that the fruit they stung would wither and the apple would grow out of shape. When first stung it expands in growth and afterwards there is a dark,

brown speck, forming into a knot, as the fruit grows; when you come to remove it by peeling the apple you will have to cut a quarter of an inch deep in taking it out.

In Missouri they have the midge and the scale louse; the same thing is noticed in California. The disease is described at length in a work which I have here. I hold in my hand a report from the Department of Agriculture, by Mr. Colman and also by Mr. Van Deman. It contains the report of the agricultural department, that of the chemist, the statician, entomologist, etc. It appears from the report there have been at least one hundred and fifty different experiments made on the California fruits, and some are recorded here as to fruit in Missouri. They have tried experiments with soap and kerosene, soap and whale oil, etc.

Mr. Harris. Carbolic acid is also used.

Mr. Thompson. I think it is, but there are more than one hundred and fifty experiments mentioned. I received this book about three weeks ago, and it is worth a twenty-dollar gold piece to any man who is growing fruit, I don't care who he is, if he will read it and practice by it. This information is gathered up from different localities and is printed here.

In regard to these experimental stations I think that every man ought to make himself an independent experimenter. What will grow on that brother's farm there might not grow on mine, or on this other brother's. The soil has a great deal to do with the growth of trees as well as climate, but both have their effect. I presume there is not a gentleman in the room that would read the chemist's report in this book that would believe that the life propensities or the sources of life of the different trees, derive their sustenance and nourishment for the growth and life of the tree, from chemical action. If you were to see the chemical analyzation of even the Ben Davis apple you would hardly believe it; I didn't believe it myself. I read it over twice and finally made up my mind that it was like the Bible, meant to be believed and I would believe it.

I am trying experiments all the while. I find it helps me, and these experiments have proved a benefit to several of my neighbors, also. The experiments I have made in a seedling orchard have been worth hundreds of dollars in our State. The experiments you have been making in this State have also been of great value.

This report here states that already the Wealthy apple, which was originated by Mr. Gideon, of this county, is becoming a leading apple for export, from Canada and Vermont; and this is a credit to your

State, as well as to the originator of the apple, Mr. Gideon. The Peter and the Gideon are also valuable varieties. What we need is a few more such apples as the Wealthy, that are long keepers; and we hope that Mr. Gideon, or some other Northwestern man, will give us the desired fruit.

There is a lesson here that we all can profit by. My advice is, for every man to plant all the good seeds from all the good apples that come in your way. It is an old saying and a true one, that one seed of an apple will give a corresponding apple of the parent; the others may be better or they may be inferior. I know the kind of seeds that I have planted in my orchard, in Grundy county, and I know I had one hundred and seventeen different varieties at the Storey County fair one year—distinct varieties. Many of them were very choice apples; some were very poor. I have some kinds on which I have taken five or six state premiums, in Iowa. By my experimenting in this way it has been the means of enlisting several of my neighbor farmers in the growing of seedlings down there. I have been growing them for the last ten years. I believe if those present would plant seeds of our native seedling trees, crossed and fertilized with our best Russian varieties that we would succeed in a few years in producing the very best apple which can be grown anywhere, and that we would soon place apples within the reach of every farmer of this Northwestern country.

In this book there are over fifty varieties of apples mentioned. While I am talking, there is one new fruit mentioned of a seedling of an unknown parentage, originating, I think, in South Carolina, which is said to be devoid of either blossom, seed or core; it is said to be a very good apple, keeping till April and May, in its own climate. It is something I never read of before, but it is in print here and I suppose it must be true. It is a sweet apple, of deep, orange yellow, and the season is claimed to be from April to May; an unknown seedling. How true it is, I would rather say after seeing the apple.

This seems to be an instance where a new variety of apple has been originated by the planting of seeds, originating a variety destitute of seeds, and nature having done the balance.

If this Society will adopt the plan of establishing experimental stations and will take some of its best men, who will give their time, or who will work at their leisure at experimenting in a practical way, you will find it of advantage and you will be improved by it—the whole of you.

Mr. Harris. These reports of the Department of Agriculture are

very valuable, and I think the majority of the people who receive them from their members of Congress do not appreciate them properly; but every horticulturist ought to have the last one and just as many of other numbers as he can get. Probably Commissioner Colman would send a copy to anyone who would write for them. Members of Congress can mail them to people who would appreciate them and to whom they would be useful. I would recommend that members of our Society write to their members of Congress and request that a copy of the last report be sent to them and as many as can be had of the back numbers, and they will be sent to them free of charge.

Mr. Thompson. I think there were seven or eight thousand copies printed for general distribution.

President Elliot here announced that anyone on payment of a dollar became a member of the Society and entitled to copies of our report, bound in cloth.

On motion of Col. Stevens the meeting was adjourned till 7 o'clock P. M.

EVENING SESSION.

TUESDAY, JANUARY 17, 1888.

The meeting was called to order at 7 o'clock, P. M., by Vice-President Sias, who stated the first thing in order upon the program for the evening, was the delivery of the President's Annual Address.

PRESIDENT'S ANNUAL ADDRESS.

Members of the Minnesota State Horticultural Society, Ladies and Gentlemen:

We have come together once more to take up the horticultural resume of the year's work, and draw from it some conclusions worthy of consideration for our instruction. The vicissitudes of the year have been manifold and exhibited in various ways. With all of us the year has not been full of unbounding contentment, joy and happiness. Dame Nature has at times seen fit to cast many a threatening frown upon our thoughts, deeds and actions. Some have been blessed with prosperity, happiness and good fortune, while others have been overwhelmed with affliction and reverses. Sometimes we have been on the mountain top in our aspirations for worldly gain and horticultural fame, at others deep down in the valley of gloomy discouragement and depression. The experiences of the past where they have been profitable and instructive should be treasured in our minds and

reviewed as we meet to greet each other in friendly discussion for improvement; for here it is we brush away the cobwebs from our minds, obtained by recluseness from the world, and receive new impulses, thoughts and conceptions of the possibilities and impossibilities of this labor of love to which so many of us have devoted our time, money and attention in trying to develop something that will be of use to future generations.

We come here this evening to take a retrospective view of the work of the past year and try to discern wherein it has been successful, and, if possible, the cause of our failures. Here we should be willing to discuss freely what have been our plans of operation, that we may develop or impart information concerning the progress attained, or describe new methods adopted in conducting our particular industry. If we have made failures, it is here we should be willing to discuss them, and, if possible, discover their causes. If we have been successful in producing something better than our neighbors, it is here we should try to impart that knowledge for the improvement of the whole; unless we believe in that trite but true saying, "It is always safe to learn, even from our enemies—seldom safe to instruct even our friends." As a rule our greatest ambition should be to place the knowledge we possess in the cultivation and management of our different crops at the disposal of all, then we shall be giving and receiving; this will be improvement in the right direction. Our new theories, new methods, new experiments are of little value to the world at large unless we are willing to have broad gauge ideas and spread them far and wide, imparting freely to each other what we have discovered that will be of value to mankind.

It is a true saying that those can direct best who can do best; and those can do best in any department of work who begin early in life, and learn by first impressions and experience much that can be learned in no other way. If this be true, we should endeavor to awaken an enthusiasm for the performance of horticultural duties at a very early age in the minds of the rising generation. This, it seems to me, is an important move towards solving this problem of profitable fruit raising.

The thought forcibly impresses us of the amount of time and energy that have been wasted by not understanding fully the relation or dependence of one part of the work upon another. Correct principles and ideas should be instilled into our minds at the beginning of our education, or we shall sooner or later be on the wrong road to success. A very dull scholar is he who cannot learn some new truth

from experience. Benjamin Franklin said: "Experience keeps a dear school, but fools will learn in no other." The school of experience to many of us has been a very dear one, and want of system has been to many nearly as expensive. There is nothing that I regret more than the habit I have fallen into of doing my work in an unsystematic way; the older I grow, the more I see the necessity of having some fixed purpose in all classes of work, and systematic rules to follow.

Every young person should be taught that there should be a place for everything and everything in its place; also that there should be a rule established for doing all classes of work, and it should be done according to the rule as near as possible. It is the unsystematic way we have of going through life that causes us so much waste of time and so many of our failures.

This is not all; many of us have acquired the habit of using up a great amount of time unprofitably. There is a quotation like this: "As every thread of gold is valuable, so is every minute of time." Idleness is the thief of time, and if we should make use of each moment with the mind directed to some particular object, how much more would we accomplish. Show me a man that has methodical, systematic ways of doing everything with which he is connected, and he is invariably a successful business man in whatever industry he may be engaged.

RETROSPECTIVE.

Twenty-one years ago the thirtieth of the present month this Society held its first annual winter meeting at Faribault; a little band in numbers, but devoted in purpose; and the few remaining that came to the front on that occasion and enlisted for the war, have never since let their interest in the good cause diminish, but have ever been persistent, faithful workers, untiring in their devotion, standing shoulder to shoulder, battling against the elements to make successful an industry capable of giving us employment, sustenance and gratification to the better impulses of our minds and added refinement to our homes. This band of persistent workers little thought of the reverses they would be called upon to meet or the discouragements to endure, and if they have had doubts and fears to overcome they have never showed signs of being disheartened, but have ever kept their faces to the front; if their labors were arduous they redoubled their efforts to make a success out of defeat. If their doubts developed into fear they have never murmured. If they have

increased in the minds of the people a desire or ambition to press forward this work of horticulture they so nobly begun, they feel well repaid for the toil of mind and body they have endured. As the saying now is, we are of age, and like the young men of our country we are now able to take on new responsibilities, new ambitions, new hopes, new desires. In looking back over the records of our past history we find, as in all other classes of business, many becoming discouraged have dropped out, but those remaining are devoted workers, wishing to perpetuate the same unselfish desire in those coming after; and it is to be hoped that whoever take upon themselves the burdens and responsibilities of aiding and sustaining the correct principles of horticulture in coming years, will bring more intelligent minds, as devoted hearts and as willing hands to help develop an industry that had its beginning in the Garden of Eden, and will ever continue to fascinate and attract the attention of mankind as long as the dews of Heaven fall, causing the earth to produce trees and plants to bud and bloom.

FAILURES.

Failure is an ever present factor that attends nearly every industry of any magnitude. The failures in trade in the United States in 1887 have averaged one to every one hundred and eleven persons in business; while the failures with those in horticultural pursuits I think have been less, yet there are more than there should be.

The reasons for our failures are not at first apparent, but on seeking after the known or unknown facts the true causes are developed; but then, as the saying is, "It is too late to lock the door after the horse is stolen." To obviate the possibilities of failure each enterprise should be scrutinized with care, caution and sagacity. Many times it is the want of a true system arranged in regular subordination to a well developed plan to be guided by a mind stored with knowledge based on practical and scientific principles for governing all our actions.

Our experiences in producing apples, pears and cherries have to a large extent been discouraging; now is there not a good reason for so many partial and total failures? When we consider the methods used in handling, planting, care and cultivation of fruit trees, I sometimes wonder that we have shown any good results. Still there are many places in the State where apple trees are yielding a proper remuneration or return for time and money expended. Many of our failures have come through lack of thoroughness in all our experi-

ments, in developing this class of fruits in a climate like ours. If our standard of success with the apple has not been high, we have great reason for encouragement in the successful cultivation of all kinds of small fruits where we have planted them judiciously with proper surrounding elements.

There is hardly any place so bleak but where some varieties of the small fruits will thrive and produce profitable crops when planted and cared for with intelligence, unless in some few exceptional cases under peculiar circumstances.

MARKET SUPPLY AND DEMAND.

Within the last decade great alterations have been produced for improving the business methods relative to increasing the facilities for handling and distributing large quantities of horticultural products expeditiously. Now, one of the first things to be considered is how a market can be obtained for produce, and how production can be limited to the capacities of the market.

A few years ago our market gardeners held back in extending improvements, for fear of overstocking the market. Sales were slow, prices low, much that they raised was necessarily disposed of at a great sacrifice. New manure and machinery, together with greater intelligence in the use of fertilizers and management of sowing, cultivating, harvesting and marketing their products has served to revolutionize the whole system of market gardening, and create new relations with producer and consumer regarding supply and demand, that are alike beneficial to both. In this business as in every other, the more system introduced in the carrying of it on the better the chances will be of success; and if all used the same enterprise and judgment in their operations their expenses would be reduced, their profits increased, and a general prosperity prevail.

It always has been and always will be these enterprising, persistent men, who never fail in producing first-class products, and obtaining good, remunerative prices, that come to the front, prosper and are happy; and it remains for the shilly-shally laggard who always has poor, unshapen vegetables and fruits to sell to do the grumbling about poor markets and low prices. I have heard it said by gardeners: "If it were not for these commission men that are shipping in such large quantities of fruit and vegetables, we could dispose of more produce at better prices." Now those men do not stop to think what an important factor the commission or middle man is, or to consider if it were not for their tact, push and energy our markets would be much more

irregular in supply and prices; short at one time and overstocked at another. They are the great distributors and equalizers or balancing power that governs supply and demand, the market gardener's best support.

FORESTRY.

I do not wish to forestall the Forestry Committee's reports, only to add emphasis to what they may say with regard to the adopting of some definite plans for accomplishing what seems to be of necessity for the well-being of those interested in horticultural and agricultural pursuits. The subject of forestry is becoming of so much importance to the people of every State and Territory that it is attracting a portion of their attention which it so justly deserves. There should be some scheme devised for the reservation and protection of large areas of timber to the west and northwest of this point, to serve for the specific purpose of protection from storms of wind which sweep over this portion of the country with so much fury and cause such great loss of life and property. The ameliorating influences of this large belt of timber on our climate at this point is known to be very great; the thermometer here ranging several degrees higher in winter and lower in summer than west of the big woods. If such are the facts, that alone would be a good argument in favor of this scheme. Unless some measure is taken soon to preserve it for wind breaks and other uses, we shall have the dreaded cyclone sweeping through our streets and beautiful parks, laying waste our shade trees and dwellings. The acquiring now of large tracts of these fine timber lands, if protected and cared for properly, would have a tendency to increase in value the adjoining portions of the State; also it would be a good financial scheme as rendering future aid and assistance to many other kinds of industry. Many are urging reasons for experimental stations to be instituted to aid in growing tree seedlings for distribution to those desiring to grow timber. This is well enough, but better than this is to enact laws for the preservation and protection of the forests we now have, that have been planted by an indulgent Creator and so beautifully cared for by an all-wise Protector, until wasteful man took possession. I would therefore recommend that the committee investigate and suitably consider this great question of so vital importance to the prosperity and happiness of the future generations, and draft resolutions to be presented to the Society expressive of our desires and wishes on this question of forest preservation and protection, before adjournment

It is said: "The fool and squanderer march along, heedless of the coming disaster; the wise man acts in time to prevent it."

NEW VARIETIES.

Those seeking to introduce new varieties of fruits or vegetables should exercise great care and judgment that none are sent out except those of fixed character and value. Too many of us are solicitous for our new varieties, when it would be much better for us to cling to the old, tried sorts; and we often do not stop to consider when we have produced a new seedling tree, fruit or vegetable, whether it possesses fine qualities of acknowledged superiority, better than some kinds now in cultivation, but send it forth for public favor regardless of its hardiness, productiveness, quality, size, shape, color or texture, thinking it will come into prominence if we boom it with glaring advertisements. Until a variety has been thoroughly tested and found possessing many good qualities, equal to or better than those already in the market, it should be considered with temerity. We, as horticulturalists, should adopt a conservative policy in regard to buying high-priced varieties. Many of us have bought our experience, sometimes dearly, and we should hoist the red flag of warning to caution new members and amateurs in the business. Until new varieties have been tested at a number of our experiment stations, we, as members of the Minnesota State Horticultural Society, should be cautious in recommending their sale or distribution.

HORTICULTURAL INSTITUTE WORK.

The special act of the legislature that created the Farmers' Institute also gave the president of your Society a voice and vote in its organization, electing of superintendent and supervision of his work; and as your servant, entrusted with this responsibility, I have tried to exercise my best judgment, and act for the best interests of the Horticultural Society. If I have erred in the performance of these duties it has been the fault of the head, and not of the heart, for I have always felt that what was for your interest should take precedent in each and every action that demanded special, intelligent, thoughtful consideration in a broad-gauged, unbiased policy.

I have taken some pains to keep posted in regard to the class of instruction that was being given at the various institutes in the interest of horticulture and the manner of its presentation, and I have to report that we have not as yet been able to place such teachers in the

field at all times as the exigencies of the situation demanded, and the instruction in our particular interests; has come far short of meeting the expectations of many of our members, and those most deeply interested in the success of this class of work. The Farmers' Institute I consider one of the best mediums, when rightly conducted, for the dissemination of practical horticultural information among our farming population. In selecting and sending out those who are successful experts in their particular class of industry, it should be our highest aim to send out such instructors as are not bigoted and have no scheme to push for their own selfish ends outside of giving horticultural instruction, and unless we can find such instructors I think we should hesitate before recommending any one for this position. I do not wish to be understood as casting any reflections, but simply to guard against any contingency of this kind in the future. We must carefully consider the qualifications of our horticultural lecturers and feel sure they are worthy of the places they hold; if not our claim to the position of an intelligent, progressive horticultural society may be justly criticised.

OWATONNA EXPERIMENT STATION.

The Owatonna Experiment Station, created by special act at the last session of the legislature, has been started on the State School Farm under the care of E. H. S. Dartt, superintendent. Our Society has been honored in the selecting as superintendent of this station one of our members who has been long identified with the horticultural interests of the State, and whose experience in the past will help him very materially in deciding what to plant, as well as what not to plant. The task, allotted to him, to develop a practical, profitable, instructive example of object teaching to those children that will come in daily contact with his work, I hope will impress him with the great responsibility that rests upon him; and ample means should be provided for carrying on the experiments in such a way as will tend to store these young minds with knowledge that in after years will help them and us to solve the great problem of successful fruit culture in this State

I regret to report to you its beginning under adverse circumstances. The policy pursued by our legislature in not making available an appropriation to carry on an enterprise that is fraught with so much of benefit to the minds of those children dependent upon the State for support and education seems narrow. The supporters of this measure

have done everything possible to advance the work and put it in shape to forward the purpose for which the station was created.

EXCELSIOR STATION.

Now that the experiment station at Excelsior is about to be abandoned, would it not be best to transfer such stock as Supt. Dartt may think best to his station? I would also suggest that a committee be appointed to confer with Prof. Porter, and through him with the Board of Regents, as to whether the one thousand dollars designed for the Excelsior station could not be transferred to pay expenses at the Owatonna station. If such an arrangement could be effected it would place that station in a position to go on and undertake valuable experiments at once.

TREE PEDDLERS.

The law that was passed at the last session of the legislature to prevent the practice of fraud by tree-peddlers and commission men in the sale of nursery stock was watched very close by those anxious to hinder or prevent its passage if possible; and from the amount of letters of inquiry received, and the criticism this new departure has occasioned from very many of the nurserymen south and east of us, privately and in their Nurserymen's Association meeting held last June, we are led to believe that some of their agents have given warning to their principals that the people of this State are taking means for the protection of those horticulturally inclined, who are annually being defrauded by deceitful impositions in the sale of nursery stock. This may be a new revelation to the principals, and I wish I could honestly believe that such was the case. The law considers employer and employed alike responsible, and a business that has to constantly employ fraudulent means in the sales and distribution of its products to make a success is in a pitiful condition, and should be looked upon with disgust and aversion.

The inquiry into the means established to throw some restraining influence upon the methods pursued in the sale and distribution of nursery stock should very properly come before this meeting for a fair and impartial consideration. That the law has its defects and is not perfect is apparent, but complaints of swindling and fraud, by tree agents, have been less the past season than at any previous time for several years, which proves it beneficial and a decided progress in the right direction. We hope the experience of the past year may teach

us a better method to be used in the future to prevent our people being defrauded and help elevate the nurseryman's standard of honesty.

REFRIGERATION.

There is a new process of refrigeration about to be introduced into this State that has many valuable points of excellence. It possesses all the qualities for preserving meats, vegetables, fruits, flowers, food and drinks of all kinds in great perfection, in a very simple and effective manner. Its intensity of cold can be regulated from 40° above to 80° below as easily as you can turn on your city water or gas, simply by turning a stop-cock to regulate the amount of flow of material used for freezing from the reservoir through a coil of pipes within the refrigerator, where it condenses and collects in a similar tank or receiver placed at the other side, which material can be redistilled without loss and sent out again on its round of duty. It is said to be much cheaper than ice, and to give a much better atmosphere for preserving perishable goods from decay. This process will be invaluable to the market gardeners, fruit producers and dealers, on account of the possibility of lengthening the season. By it we can have apples that are now late fall, in perfect condition in April and May, and those we consider as winter apples the next midsummer and fall. By this process we may have the choicest varieties of fruits much beyond their usual season.

AMERICAN POMOLOGICAL SOCIETY.

The twenty-first session of the American Pomological Society was held in Boston, Mass., commencing Wednesday, September 19th, and continuing three days. Our Society was not represented by a delegate as we were needed at home to assist at our State Fair then in session. This has been a very unfruitful year in nearly every section of our State, and with the exception of grapes all the show fruits were unproductive, and it would have been impossible to make a creditable exhibition. The society made a wise choice in selecting as president Mr. P. J. Berkmans, a man of liberal views and with experience in horticulture. It may justly be said that the society honored itself, pomology, and the man, when they elected him to succeed the lamented Marshall Pinkey Wilder, who served that organization so long and faithfully.

ORNITHOLOGY.

I wish to call your attention to that friendless bird the English

sparrow, *Passes Domesticas*. Scientific research into the character and disposition of this untamed annihilator of horticulture and agriculture has developed some very startling facts that call for your immediate attention. If the following synopsis of the report, which was prepared by C. Hart Merriam, of the United States Department of Agriculture, be true, the friends should become alarmed at the sad havoc this foreign importation is causing among our friends, the native birds of America. The report says:

“The English sparrow is a hardy, prolific and aggressive bird, possessed of much intelligence and more than ordinary cunning. It was first brought into this country in the fall of 1850. It is domestic and gregarious in habit, and takes advantage of the protection afforded by proximity to man, thus escaping nearly all the enemies which check the abundance of our native birds. Its fecundity is amazing. In the latitude of New York and southward it hatches, as a rule, five or six broods in a season, with from four to six in a brood. Assuming the average annual product of a single pair to be twenty-four young, of which half are females and half males, and assuming further that all live, together with their off-spring, it will be seen that in ten years the progeny of a single pair would be 275,716,983,698. In the year 1886 the English sparrow was found to have established itself in thirty-five states and five territories. In the United States the total area occupied at the close of the year 1886 is 885,000 square miles; in Canada it is not quite 148,000 square miles; in all 1,033,000 square miles. In the United States alone it has spread during the past fifteen years at the average rate of 59,000 square miles per year, and in the United States and Canada together at the rate of 69,000 square miles per year. Of all the native birds which habitually make their homes near the abodes of man, the martin is the only species which is liable to hold its own against the sparrows, and numerous instances are on record where even the martin has been beaten and forced to abandon its former nesting place by these beligerent aliens. The birds which have suffered most from the English sparrow are the robin, catbird, wren, song-sparrow, chipping-sparrow, yellow-bird, oriole, vireo, and phoebe. Not only does the sparrow drive away and sometimes kill the adult birds, but when it finds their nests it throws out their eggs and young, and not infrequently feasts upon them.”

WHAT THE SPARROWS DESTROY.

The sparrows cause a positive and direct loss to our agricultural

industries, amounting in the aggregate to not less than several millions of dollars per annum. Indeed, it is safe to say that it now exerts a more marked effect upon the agricultural interests of this country than any other species of bird; and its unprecedented increase and spread, taken in connection with the extent of its ravages in certain districts, may be regarded with grave apprehension. In the early spring it prevents the growth of a vast quantity of fruit by eating the germs from the fruit buds of the trees, bushes and vines, of which the peach, pear, plum, cherry, apple, apricot, currant and grape suffer most. Lettuce, peas, beets, cabbages, radishes and cauliflowers are attacked in turn, and devoured as soon as they show their heads above the ground, and in many cases the seed is taken out of the earth before it has germinated. The grape industry is also a heavy sufferer from the ravages of these pests. At the end of the season of 1886 bitter complaints of damages done the grape crop by sparrows had reached the department from twenty-five States and the District of Columbia, as follows: Alabama, Arkansas, California, Connecticut, District of Columbia, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Mississippi, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Vermont, Virginia and West Virginia. Its consumption and waste of corn, wheat, rye, oats, barley and buckwheat, in many parts of the country is enormous. It feeds upon the kernel when it is in the soft, milky state, as well as when it has matured and hardened, and in fields of ripe grain it scatters upon the ground even more than it consumes.

In addition to the disfigurement of buildings by the nests and excrement of the sparrows, and the injury to ornamental trees and shrubs resulting from the same cause, it should be mentioned that they frequently damage and sometimes destroy the ivy and woodbine covering the walls of churches and other edifices. The destructive habits of the English sparrow in Bermuda, Cuba, Germany, Austria, Russia, India, Egypt and Australia are too well known to require more than a passing observation. In England alone the damage it causes has been estimated at not less than \$3,850,000 per annum, and in Australia the loss is much greater. It threatens to become a more baneful pest to the American farmer and the horticulturist than the grasshopper, caterpillar and Colorado beetle.

The report further suggests that legislative action be taken to stop any protection at present afforded the English sparrow; to authorize killing it; the destruction of its nests and young; and to protect the

outcher, sparrow hawk, screech owl, the birds which feed largely upon the sparrows, and the appointment of one or more persons in every town to officially take measures for their destruction.

The report also suggests several means by which they can be exterminated, among them being by firearms, tearing down their nests by an iron rod or hook, and driving them from their roosts by turning a stream of water upon them. In this connection it should not be forgotten that the English sparrow is an excellent article of food, equalling many of the smaller game birds.

IN CONCLUSION.

Every member of our Society, for the attachment they entertain for it, should feel a personal desire to promote its welfare at all times and places. They should employ their best ability, ideas, desires and ambitions to contribute to its advancement, and help adjust the many perplexing difficulties to be overcome. Every opportunity should be improved for establishing in the mind of some man, woman or child the love or desire of becoming proficient in the art of cultivating beautiful flowers that shall please with their perfume the delicate sense of smell, or delicious fruits exciting enjoyment to their cultivated palates, or splendid trees that shall impart a pleasant shade from the noonday sun and give shelter to their declining years. With each, neglect of this should leave a feeling of duty unperformed. Sometimes a look or word of inquiry may be the means of exciting interest or creating desires for developing some beautiful feature for pleasure or use that will unfold and illustrate some fundamental truth over which we have spent much time.

The æsthetic studies in horticulture are each day disclosing to the inquiring mind some very valuable examples worthy of our closest attention, and as we seek to solve its many vexatious problems we begin to comprehend how intricate are her processes and little our knowledge of the governing laws of nature. "Tall oaks from little acorns grow," so we must develop step by step, year by year more practical methods of obtaining information from each and every source attainable to make more perfect a system of rules serving to assist us in performing with greater dexterity the duties devolving upon us as men and women who have assumed the pleasing responsibilities of solving a few of the concealed mysteries that excite our curiosity when we try to develop fruits, flowers and vegetables in their greatest perfection, adapted to a climate as variable as ours.

1. Grub up all your extravagant customs and revolutionize your habits, that the law of your being, a kind of second nature which grows within you, may be radically changed.

2. Break up the soil that covers your dormant brain, and eradicate all the old weeds of dissatisfaction, and begin anew a more advanced class of cultivation.

3. Fertilize your minds with ambition, greater aspirations, and desire for larger usefulness.

4. Sow the seeds of prosperity, success and good fortune by adopting the truism of one of America's most noted men: "He that by the plough would thrive, himself must either hold or drive."

5. Cultivate special attention and study of the three virtues, Faith, Hope and Charity, with a view to valuable returns as payment for your industry.

6. Prune off the unnecessary sap suckers of wastefulness and prodigality that rob your business, steal your resources and bring want and failure in place of success and prosperity.

7. Cut away your needless indulgences, vices and faults, things not needed in the every-day life of sensible fruit, flower and vegetable raisers.

8. Reap a harvest of happiness in the felicity of elevated perceptions and blessedness from the pursuit of social and benevolent affection, and the promised bliss of the great hereafter when remembrance of failures, discouragements and losses will cease.

9. Market unbounded charity and good will towards those who cheat and defraud the innocent, inexperienced, upright amateurs in horticultural pursuits.

And finally, brother co-workers, when we go hence to our homes and occupations, do not hide the zeal and enthusiasm here acquired, but go forth with fixed purposes of faithfulness, persistency and devotion to the cause we maintain and the principles we espouse.

The reading of the address of President Elliot was received with applause and marked approval.

On motion of Mr. Gould, a committee of three was appointed upon the recommendations of the President, as follows: G. W. Fuller, J. S. Harris and A. W. Latham.

President Elliot stated that, owing to the illness of Mr. Stubbs, who was to prepare a paper on grape growing, he was not able to be present to read the paper, but it would appear at the proper place in the report.

GRAPE GROWING.

By N. J. Stubbs, Long Lake.

I do not consider there is any great secret or mystery about growing grapes, and it seems to me it is fully time that everyone who owns a portion of "God's acre" should realize this, and not longer neglect the planting and rearing of this luscious fruit.

Grapes have ever been the constant companion of man from the earliest dawn of civilization to the present time.

The vine is likewise the emblem of peace and prosperity, always adding much to the comforts of home life.

Stamped on the memory of childhood are recollections of pleasures that in our declining years we love to recall with joy and delight.

If you have concluded to plant one vine, or a thousand, in either case select the warmest spot you can find, for heat is pre-eminently essential to make success of this fruit. This is generally to be found in this country on somewhat elevated land, near a body of water, the land inclining to the south or southeast, with a goodly share of sand mixed with top soil to attract and hold the heat of the sun. Such a location, with a clay subsoil mixed with limestone, will prove very satisfactory for growing grapes.

Select good, strong, two-year-old vines, grown from cuttings, six or eight inches long, so you can be able to plant at least one foot deep, to avoid winter freezing and summer drouth, for undoubtedly many failures here in the Northwest can be traced to roots grown from single eyes and shallow planting.

Clean your ground thoroughly of all impediments that would in any way retard the cultivation of the soil among the vines. Work the ground well to the depth of one foot or eighteen inches. Harrow and mark off the rows eight feet apart each way. Some varieties of grapes that are slow growers would do closer than this, but this distance is best for most varieties. The best plan is to use a trellis and cultivate crosswise of the hill, or rolling ground, to prevent washing of the soil by rains. The first year after planting keep the ground well cultivated, leaving the vines to grow unchecked in the fall; cut back to two buds. The second summer we select the strongest and best buds and train to a stake, set well in the ground, unchecked as before, except to pinch all laterals off above the first leaf. If our work has been well done thus far, we have laid the foundation of our vineyard. In relation to the manner or system of training and pruning the vine, it would be folly, perhaps, for us to designate any particular one as

being the best, as circumstances and conditions may exist when any particular system would be "more honored in the breach than in the observance." But whatever system is adopted, the third season brings around the time when it is necessary to erect the trellis, which we make by setting posts of tamarac or oak, six feet two inches long, sixteen feet apart in the row, and two feet deep, leaving them about fifty inches high. To these posts attach four strands of galvanized No. 12 wire, one foot between each strand; fasten the wire to post with small staples, bracing the end posts well to keep the wires taut. Having the trellis completed, it would be well to consider a few important principles before we can proceed intelligently to train and prune the vine:

First—As a general rule, the fruit-bearing canes at this stage are grown from buds on the previous year's canes, or in other words, the wood of this year contains the buds which produce fruitful canes of next year.

Second—That *fruit* buds differ from *wood* buds only because of better development.

Third—That a cluster is a fruitful tendril, and that the ordinary capacity of a fruitful bud is to develop on an average three of these fruitful tendrils; although I have seen on the Eumelan and Elvira as many as five of these fruit bunches, or clusters.

Fourth—That it is an easy matter to overtax a young vine by leaving more fruit on it than it is capable of ripening without damage. A young vine cannot yield the crop that an old one may, any more than a young person can perform the labor of an adult.

Fifth—It is of the utmost importance, if we wish to insure health and long life to the vine, to keep the foliage, fruit and roots well balanced, for the relations of all parts are closely related and are constantly acting and reacting on each other, quite as readily as do the mind, body and brain of a living organism.

In fall pruning, cut the fruit-bearing canes so they will not reach more than half way to the top of the trellis. As the vines awaken from their winter's sleep in the spring, and the buds begin to swell and burst forth, it will be observed that two buds often appear from what seemed but one in the dormant state. The first and simplest operation, in summer pruning, is to rub off one of these buds, and all superfluous ones wherever and whenever they appear; a simple touch of the finger is sufficient. The weakest and lowest ones must go. If these shoots have grown a foot or more the necessity of removal is greater, and this must not be neglected.

At times it may require a good deal of courage to destroy so many prospective clusters of fruit, therefore it is better to do it early.

The remaining shoots are pinched off at one or two leaves beyond the last cluster of fruit, and all laterals are stopped in the same way as fast as they appear. These bearing canes and laterals, after recovering from the check thus given, will soon recover and make a fresh start in wood making, when the pinching process is repeated as before, leaving an additional leaf each time. The effect of this treatment is to retard the sap and retain it where it is most needed for the full development of buds, leaves and fruit. The leaves remaining are thus increased in size much beyond their natural proportions, which undoubtedly adds to the vitality of the vine, its power to resist disease, also at the same time increasing the size of the fruit and giving it a finer flavor. This close pinching process also results in full, well-developed fruit buds on the canes to be left for next year's fruiting.

Some advocates of long pruning claim that the third and fourth buds on a cane produce the best clusters, while others contend that the axillary buds, those that emerge at the junction of the young and old canes, will never produce fruit. But it will be observed that very much depends on the treatment the vines have received. If they have been allowed to grow at random and to take care of themselves, we will admit the vines will seldom fruit, purely from lack of development, the sap being allowed to pursue its natural course unmolested; it has no time to stop to develop buds. With judicious summer pruning these base buds are equal to the emergency. In fact, the short spur-system depends absolutely for success on this summer pruning.

For our climate, where it is absolutely necessary to protect vines during winter by laying down and covering with earth, in order to secure a crop, the spur-system is probably the most successful, all things considered.

The following paper was then read by Mr. Sias:

THE TREE PEDDLER.

By A. W. Sias, Rochester.

Mr. President and Gentlemen of the State Horticultural Society:

“When you see him coming, call back your dogs; don't slam the door in his face, for you *may* entertain an angel unawares.” These

true words were spoken many years ago before this Society by the late Dr. P. A. Jewell, whose eloquent words always carried weight, and commanded marked respect and close attention. Mr. Jewell was a "gentleman and a scholar." He had no haughty words of contempt for any poor mortal who peddled for a livelihood, whether on foot, or with a cart, providing he carried on an honest business. What we understand to be a "Tree Peddler" in Minnesota is a man who takes a load of trees on a wagon, or some other conveyance, most invariably from some home nursery, of hardy, well grown plants, and he carries these trees among farmers, who dare not order, owing to having been swindled so often, shows them just what he has got, and usually sells as low as the same stock could be purchased at the nursery. Now I am not aware that I ever peddled a tree in my life—but think I have known men in the business, as stated above, that were as honest and reliable as any man I ever dealt with. But is it not just *larely possible* that I was expected to speak of a very *distant* related animal species, known as the "Tree Dealer?" Please to excuse me for introducing an entirely new subject under the head of the "Tree Peddler." Now this animal usually known as the "Southern Tree Dealer," is in such marked contrast with the tree peddler that there is no danger of mistaking one for the other, no more than there is of mistaking a clod-hopper for a dude. You may also entertain a regiment of Southern Tree Dealers without the slightest danger of entertaining an angel unawares. And as President Elliot said in his annual address a year ago, "many of them have more cheek than a government mule." A friend living less than a mile from my place kindly handed me the following bill of plants last week that he purchased of one of the aforesaid tree dealers last spring, more than half of which are now dead:

4 Russian Mulberry	\$4 00
2 Rhododendrons	4 00
2 Paul's New Flowering Thorn	2 00
2 Camperdown Elm	4 00
2 Unknown shrubs	2 00
2 Cut Leaved Birch	4 00
	<hr/>
	\$20 00

There are two Scotch varieties of weeping elms, the Camperdown and Scampston. But what a scamp a man must be to charge two dollars for a small elm tree. Such a man should be made to scamper down and out, in a hurry.

Our new law to protect planters against fraud by tree peddlers and dealers is in no sense a nurseryman's invention. While a very limited number spoke against the gross frauds that were continually being practised upon the farmers, I am not aware that a single nurseryman helped to put the law into its present shape. I think they would prefer free trade with Canada and all other countries, and very much regret that the robbery of the "tree dealer" should have been the cause of such a partial and restrictive law.

I wrote President Patten, of Iowa, if this law would work any injury to horticultural pursuits in Iowa, and he replied: "Yes, it cripples small nursery establishments all over the northern half of Iowa, and lets in the big bugs who can put up the bonds, and drives honest competition out of your State, and allows those who can sell at home an excuse, and a reasonable one, too, for asking bigger prices for their stock. The law was thoroughly canvassed at the last National Nurserymen's Convention, at Chicago, and thought by a large majority of the most intelligent men there to be a clear infringement of the inter-state commerce law; and there is no doubt but that if a suit was brought under your law, that an association of nurserymen would conduct it, and they believe it would be declared unconstitutional. They regard it as substantially so decided in a decision by the United States supreme court, made in Tennessee last fall. Such legislation will never be tolerated in this country."

E. De Bell, president Dakota Horticultural Society, writes under date of December 29th: "In regard to the Minnesota tree law, the only objection that might be urged against it is its discrimination against nurserymen outside the State of Minnesota. Yet if each State had a similar law it might be called an offset. Nursery firms with large capital are able to give bonds for a large number of agents, while the poor (because honest) nurseryman is excluded. I do not know of any way by which this can be avoided. On the whole I think the law a most excellent one for Minnesota, but hard on Dakota, until we get a similar one, which we shall endeavor to do." Whether the law is constitutional or not I am unable to say. There is a question whether or not any State has the right to discriminate in any legitimate business in favor of residents of its own state as against those of other states. A nurseryman in Wisconsin mentions as one of the good results of our law restricting "tree dealers," that the better class of agents formerly working for "hefty" firms further East and South, whose nurseries were as extensive as the poor man's pasture (viz., the whole length of the highway), and existed only on paper—he says

they are leaving these thin concerns and seeking nurseries further West. Men who want or are compelled to do an honest business, and submit to your law. "I wish to know the meaning and intent of the law. Are you obliged, in case you want to buy a currant or strawberry plant outside of your State, to take out the \$2,000 bonds? If so, it will seriously interfere with the local trade, and throw it into the hands of the large firms at such prices as they may see fit to ask, shutting out competition from other States."

Another letter from one of the foremost horticulturists of Wisconsin, or the Northwest, either, writes: "I do wish I was lawyer enough to tell you about that law against tree peddlers, but I am no lawyer. You must have had it long enough to tell how it works with you—whether its prohibitions prohibit or not? The proof of the pudding is in the eating. Does it so far work well? Does it protect the people? You and I would prefer a more educational preventive course—but alas! alas! this is "a free country!" Evil free; good enslaved. * * * Hope you will give full reports of its working as far as tested in this winter meeting."

Chas. Gibb writes under date of January 3d: "I have read in your Minnesota State Horticultural Society Report your recent law regarding tree peddlers. The law is a hard one, but I must say I like it, though you may find it well to amend it in some way. In former years our trouble was the sales of the cull trees at Rochester, N. Y., which were bought by agents and sold in the remote parts of the Province. They were often labeled according to orders, and gave people the impression that they could not grow apple trees. As a protection against this, we, together with those of Ontario, asked the government to put on more duty. The duty adopted was apple trees, 29; pear and cherry, 49; and plum 54 each. You ask if your new law is likely to work any injury to the provinces. If Ohio, New York and Michigan trees are doing harm, surely Ontario trees are also likely to do so. You must look to the interests of your State, and you have given us some ideas which it might be well for us to consider and act upon. I am glad the Dakota Horticultural Society had a good meeting. Sorry I cannot be with you on the seventeenth."

The Provinces have no grounds for complaint. While the duty on trees, as shown by Mr. Gibb, amounts to almost a total prohibition on their part, we allow them to ship us plants, trees, shrubs, and vines of all kinds, except medicinal seeds not especially enumerated or provided in the act last passed. Roots, seed cane and seeds imported by the Department of Agriculture or the U. S. Botanical Garden, fruit

plants, tropical and semi-tropical, for the purpose of propagation or cultivation. Fruits, green, ripe, or dried. all duty free with us.

The Province of Ontario extends down between lakes Huron, Ontario and Erie to about latitude 42, which gives them a most genial climate from which to furnish Minnesota with all the Russian apricot trees she may need at the low figure of 75 cents each—low considering their great bearing qualities in this climate—as we have it from a *re-lie-able* Tree Dealer that some one produced 300 bushels of them from a small orchard last year at Brainerd, Minn. There they can furnish us with all the following popular plants in our State, viz: Paw paw, egg plums, peach, pear, nectarine, Baldwin, Mann apple, strawberry tree, blue rose, and blue blazes! all free of duty! Who says it is not our duty to avail ourselves of the rare privilege to stock up on Ironclads at low figures. Go in grangers, farmers' alliances, and monopolists!

We happened to have a friend at the nurserymen's convention in Chicago last June, through which we glean the following items:

Nurserymen here from all parts of the country, and nearly all disgusted with the Minnesota tree law. Some twenty or more of them have pledged themselves in the sum of \$75 each (which amounts to \$1,500 or more) to test the constitutionality of this law, and to secure to all the right of equal business privileges. Now, Mr. President, I am no lawyer, neither do I wish to assume the place of both judge and jury in regard to this law. I am well aware that all you expected of me was to open up the subject for discussion. This I have done as fairly as possible, showing the dissatisfaction on the one side and merely touching the gross frauds on the other. That we have a legal right to assist the tree planter to defend himself against foreign tree impositions no sensible person for a moment doubts. On the other hand, if this law allows and encourages every farmer in leaving his regular business and becoming a Tree Dealer because they can club together and send out of the State for what they want without giving bonds, while the nurseryman near by has been waiting upon them, and experimenting for their good and profit, till he is so poor that no one will sign his bonds, "must take a back seat."

Gentlemen, I am inclined to think with Mr. Chas. Gibb, that you may find it well to amend it in some way. It does look the least bit oppressive to say to a nurseryman that is too poor—as Prest. De Bell says "because honest"—to procure the bonds, in case, for instance the poor man thought he must have a dozen Jessie strawberry plants from Wisconsin—to put him under \$2,000 bonds "to keep the

peace," for this small offense does seem rather hard. In conclusion (as last years' wheat crop was a light one) I will suggest to the farmers who have been so grossly defrauded by Tree Dealers (mind you I do not say Tree Peddlers, as they are a far more respectable class) to come out as did the patriot of old and say: "Let the wheat lay and rot on the field where it grows, and the reaping of wheat for the reaping of foes."

DISCUSSION.

Mr. Pearce moved that the paper be filed for publication, which motion was carried.

Mr. Gould. Mr. President, I am one of the number that opposed the enactment of a bill of this character a year ago, and I have not changed my mind in that respect as yet; and with all due respect for all that was said upon this subject at that time, I must say in all candor and sincerity that the whole thing in my opinion is a mistake. Without passing any reflections upon the integrity and good intentions of those who took action in the matter, I would say now, after having had some experience in the nursery and tree business—I am out of that business at present—that I think there ought to be an amendment to that bill. Every tree peddler, every man who offers a fruit tree for sale, in connection with the offer should say to the person to whom he offers the tree that he don't have any faith in it that it will ever bear fruit, as for thirty years the effort to grow fruit has proved a failure. I think that is a fact; the trees that survive are very few. Of course we don't expect to raise cherries and peaches, nothing of that kind; but apples—I am speaking of the hardiest kind of fruit trees—apple trees. And I believe that after this winter of 1887-8, the trees that will be alive that bear apples will be very few and far between.

Mr. Pearce. They will be good ones, though. Mr. President, when this proposed enactment of a law in regard to the sale of nursery stock was under consideration, as you remember, I was opposed to it all the way through. It is well known that I don't believe in peddling fruit trees of any description in Minnesota. I think that after the millions of dollars of money that have been wasted in Minnesota, it is almost equal to robbery for a man to go out and sell fruit trees in the way that they are generally sold, as has been the custom here for at least thirty years, to my own personal knowledge. I am perfectly willing that everybody who desires should set out fruit trees; that they should be grown everywhere in the State; and if anybody wants

to set out fruit trees, let him go to the nurseries and get the trees at a reasonable price; that is where I stand. I am opposed to the tree peddlers in any shape or form in Minnesota. When it comes to plants, it is a different thing. If fruit trees are going to be sold by agents, I am in favor of asking the legislature to repeal that law.

Mr. Harris. Mr. President, I did not oppose the enactment of that law, and I do not oppose it now. Mr. Pearce has not made his point, or I have not understood him. The law does not prohibit the selling of trees. To compel us to send to the nurseries and get them would be pretty rough. In regard to this law, we did not expect a perfect law. We knew it was very imperfect, but we had to take what we could get. I think there can and should be some amendments made to it. I think the legitimate nurserymen, who have a few acres planted to a nursery, who are doing an honest business in the State, ought to have the right, if they want to obtain a dozen grape vines outside the State, to do so.

Mr. Pearce. In that respect it does not affect the nurserymen in this State.

Mr. Gould. That is the trouble, it does. I claim an honest man can't do business in Minnesota and sell nursery stock, if I understand the bill.

Mr. Harris. I think after the law has been in operation a short time we can see where it comes short, and can have it amended. The law has worked well in our part of the State. In one instance a party took a few orders on Saturday. On Sunday a member of this Society happened to be near there, and on Monday morning he went with the man who had given the order to see the agent and called for his papers, wanted him to show that he had given the bonds up here at the capitol. He was selling stock for a firm in St. Paul that don't own any nursery. He could not produce the necessary papers, and they gave him just so long a time to get out of town, and he got. There was another similar instance in another portion of the county. The party was operating who could not show any authority to sell, and he was informed that if he took an order in the place he would be prosecuted, and he left. So there has been very little of that kind of work done in that part of the State.

I think we should keep the law we have until we have tried it a little more thoroughly. It doesn't prohibit any man sending where he wants to for stock. I think anybody can order stock. The legislature has a constitutional right to levy a tax upon every citizen of the State to help support the government. It seems to me that it is con-

stitutional to put some check upon these scamps who are traveling through the country selling worthless nursery stock, for they are nothing more nor less than that. They should be made to take out a license. Pack peddlers are required to pay a license, and why should not the tree peddler?

Mr. Dartt. I don't see as it can make any material difference just now whether we are in favor of this law, or opposed to it; it cannot be changed before another winter, and I don't know as there is any use of our taking action in regard to it. We will have plenty of time another winter, if we want it changed, to make an effort to get the change made. I don't think I opposed the passage of the resolution very much, or said very much in favor of it; but I think I did warn our friends to be cautious, and not ask the legislature to pass a law they did not want. First, to be sure that they wanted it before they asked the legislature to pass it. I did so on the ground that this Society ought to know better what the interests of the State required in this regard than the legislature. I still think so, but it seems to me as good a thing as we can do now is to lay the matter on the table.

Mr. Thompson. I met one of these tree peddlers in Fayette county, Iowa, yesterday, on the train. He had one of your Minnesota licenses in Iowa, in our prohibition state. [Laughter.] I thought it was queer. He directed me to call on L. L. May when I came to St. Paul. I informed him that we Grundy county farmers were acquainted with that name, but I did not know whether his license was good or not; we had a "prohibition law" in force, and I thought he would have a fine time selling his trees. By the way, this same firm was operating in our part of the country quite extensively a year ago last spring, and if there was ever a set of farmers defrauded and robbed, it was our Grundy county farmers. A year ago this fall there was one set of agents of L. L. May, and another set of commission men that represented the Chase Nursery, of Rochester, N. Y., that were operating there to some extent. They bought their trees of Mr. Speer, of Cedar Falls. They got two loads of trees that had been condemned by him, and brought them to Grundy county. Some of the trees still had tags on them. On inquiring of the man who drew them down, he said he got them where Mr. Speer had piled them up intending to burn them, and that they gave him \$5 to draw the load of trees to Grundy Center, which he did, thinking there was no harm in it; but when he returned Mr. Speer discharged him. They had all manner of names for the trees which they peddled out to our Grundy county men, but as good luck would have it, not more than one in a hundred lived, so they

simply lost their time and the money advanced. These are what we call "pocketbook emptiers" and "scalpers" in our part of the country, instead of honest nurserymen. We want no tree that has been grown east of the Mississippi river for Iowa planting. When farmers will quit patronizing these traveling agents, take only home-grown stock, receive it when it is alive, and take judicious care of it, then there will be less complaint than there is now-a-days from worthless trees.

I had a little bit of experience this summer. One of your residents of this State came down our way, and he was introduced to some of my friends. He was no more fit to handle an apple tree than a boy to handle a steamboat. Some of our men in our county bought trees of him at big prices; they threw them into the cellar, never covered them up, never went to the railroad depot to get them until fifteen days after they were brought there. Of course the trees did not start the next season. One neighbor who set out the trees used his lot for a hog pasture, and because the trees would not stand against the hogs and the dry weather, he complained that the trees "went dead," and turned around to the agent and wanted to know if he would refill the order. The agent told him he would, and asked him what he wanted; opening his canvass he asked him to take his choice; he replaced them with Hyslop crabs. Whether he will be able to make a good stock-yard with those or not I don't know, but he is going to try the experiment. When we have such men as those to handle fruit trees it is no wonder we have failures. Until I saw these methods pursued I was a little down on the scalpers.

Mr. Pearce. I would like the Society to take some action, and place us before the State in a proper light. This whole thing is a slander on this Society. I took advice upon that law from a good lawyer, and paid him for it. He told me the law wasn't worth as much as the paper it was written on. It is a mere scarecrow, and I would like to have an expression from this Society in regard to its amendment or repeal.

Mr. Gould. Mr. President, I supposed this paper was read with the intention of having a general discussion of the subject here. I have not pointed out my objections, and will not do so if there is no opportunity given for discussion.

Mr. Underwood. I was about to ask, what are the objections to the law? I have failed so far to catch any particular point, or objection. I never took any part in framing, or assisting to enact the law; I don't quite see the necessity of it, because I have always been considerable of a "free trader," although I have always trained

in the Republican ranks. I don't know that I heard what the objections were. Of course, if it is not really lawful, or is unconstitutional, why that is a matter which would bear investigating, and it ought to be, perhaps, if it is so considered by those who have given it attention; because we do not want, as a Society, to be placed on record as assisting to enact a law, or being responsible for a law, that really don't amount to anything. We want to be dignified, and to be careful of what we do; but I am perfectly in sympathy with the idea that we only want to do what is endorsed by the State Horticultural Society. Having asked the legislature to pass such a law, I don't see how anyone is to know whether it is of any account or not without making some inquiry; and if there are any of the gentlemen present who have been taking notes of the operation of the law, I should think for the matter of discussion, inasmuch as that is what we are here for, now that the paper has been read that we ought to know what the objections are, so I shall be able to vote and act understandingly in the matter.

Mr. Dartt. Mr. President, I feel opposed to taking any action on this at the present time for the reason that the action will do no good; we cannot annul that law; it will stand whatever action we may take, and inasmuch as we cannot change it I think it is better for us to say nothing about it at present. One gentleman says we want to maintain the dignity of the Society. The question is whether we want to maintain its dignity as much by keeping still as we will by showing that we have changed our opinion since last winter, unless we have changed it for some good reason. If there is any benefit in it as a scarecrow let us have the benefit. But if there is not any benefit in it and those who oppose it want to contest it, why they can do so just as well as if we passed resolutions in regard to it; our action won't make any difference. Let us leave the subject without any expression on our part, merely on the ground that the time has not arrived for us to give such expression of our views. If we take an expression against the law, and say it isn't good for anything and we don't want it, why then we would want to use all the moral power we have against it; but I doubt whether that would not be like boys' play. Now, I think the law has done some good probably, and that it has proved not to be a serious hardship to the nurserymen of the State. Of course they can't buy stock to sell again out of the State. So far as these apple trees are concerned that my friend wants prohibited entirely, I don't believe we want any law for that; I believe that the people have made up their minds that there is not much use to

plant apple trees. I don't believe a canvasser could go through the country and sell a very great many apple trees at best. I hope there won't be any action taken on this matter only to lay it on the table.

Mr. Gould. Mr. President, and gentlemen of the Horticultural Society: There are two objections, to my mind, that are serious ones, that are worth considering at any rate; and the very thing that my friend Mr. Dartt referred to last was of the number I had in mind. It is not supposed that a dealer in this State raises everything he sells; as a general thing that is an impossibility. The truth is it is better for the nurseryman to buy some of his stock; he knows where to buy it and have it pure and sufficient in every respect for his customer. I have been in that position fifteen years or more and have always bought more or less stock outside of the State. While I have made some mistakes and delivered some things that were not true to name, and perhaps things that people had better not bought, still I think I have done about as well as most men engaged in the business in Minnesota. I know it has been very convenient for me to have an opportunity to buy outside, and it is the same with others. It is just as well for the customer also. The most serious objection, perhaps, is that if this thing was carried out fully it would make a monopoly of the business; the customer and the farmer would suffer, because there would be no competition in the field worthy of the name. Of course I care nothing about that personally as I am not now interested in the business; but these are points I wish to make as I see the matter in that light. These facts will be conceded by my friend Dartt that we can get good stock in Wisconsin, Illinois, and even Ohio and New York. I would just as soon have a grape vine grown in Texas as in Minnesota, and it will ripen just as early. I think the same would hold good with raspberries and strawberries. I believe this law is unconstitutional. I think there was a decision in Texas, on a similar law, within a few months past, but this has nothing to do with that. We are not supposed as a society to pronounce upon the legality of the act, but I would like to see an expression taken upon it. We ought not to be so modest that we cannot acknowledge a mistake we have made. I don't hold myself responsible one way or the other for its passage, and I would like to see some action taken upon it.

Mr. Sias. This is what some claim to be class legislation. It seems that there should be some way to protect ourselves against these gross frauds without casting odium or contempt upon other honest nurserymen here in the Northwest. It seems as if this thing was gotten up entirely to protect such men as these consummate fools that don't

know any better (up here along the line of the Northern Pacific road) than to buy apricots, which Prof. Budd says may do well south of parallel 41, and in tropical latitudes. Now, in order to protect such men, we put every nurseryman in the Northwest under two thousand dollars bonds to keep the "peace," as someone has it. It seems to me we ought to have some way to protect ourselves from these frauds, but most of the nurserymen seem to think we have not hit the right thing; they do not doubt the honesty and good intentions of the parties who got up this thing. I haven't a particle of feeling against them; I believe they did it for the best. They supposed they were working for the good of the greatest number. But I think with Mr. Gibb, of Canada, that the law needs to be amended.

President Elliot. I have listened with a good deal of interest to what has been said. I suppose if there is any one man in this organization that is responsible for the passage of this law, that I have done my share. I know I put in considerable work to secure its passage, and I know how it was fought in the legislature by the tree men. I know from the time we started with it until its final passage, it met with determined opposition. The law has some features we did not attempt to put in it, and they were perhaps put there by the tree men themselves.

Mr. Dartt. To make it odious?

President Elliot. To make it odious. We were obliged to take such a law as we could get. We wanted some barrier put up against these wholesale frauds. When a man comes into our country and attempts to peddle stock grown in the South and East, and says it is just as good as Minnesota grown stock, he is stating that which he knows to be untrue. Experience here has taught us all that we have got to come down to our own home-grown stock if we ever expect to raise any fruit. Now, we may have put our foot into it in passing a law of this kind, but where there is so much squirming among these Eastern nurserymen and tree dealers, it shows that it must have hit somewhere; it hit a tender spot.

President Colman, in his address before the Nurseryman's Association, in 1886, called the attention of nurserymen to the methods practiced for the distribution and sale of nursery stock, as not being what it ought to be, when the business is conducted upon right and business principles. And every time a man that is not interested in some way, either in the sale of stock, or a member of a nurserymen's association, or something of that kind, if honest to himself and he tells his honest convictions, he will tell you that it was for the public

good that we had this bill passed. It isn't to protect the nurserymen, or the tree dealer, but to protect the people, who are being swindled.

Now, if there is any possible way to protect the innocent, we ought to do it. I have looked upon the methods practiced by some of these tree agents with a good deal of disgust. I started in the nursery business at one time, feeling that I could carry on the business honestly and in a legitimate way, and feel that between my own conscience and my customers that I was doing an honest, upright business. But I soon found that if I put an agent in the field I had to throw principle away. There is no man that sends out a tree agent that can govern his agents, as a general thing. Where he is selling on commission he will sell that which he can sell to the best advantage, it makes no difference whether it is a crab apple or a Rhododendron.

It seems to me it is all boys' play for us to pass any resolution saying that we will take back all that has been done in regard to this tree bill. As Bro. Dartt says, it will amount to nothing to take any action at present.

Secretary of State Mattson is probably as well posted as any one as to the working of the law. He has had considerable correspondence with parties in regard to it, and it has added to his official duties in having the oversight of this law. He says the workings of it are all right.

So far as the objection as to its constitutionality is concerned, we had that passed upon by the attorney general, who gave us his opinion that it was all right—that it was constitutional. What the judges may decide when they get it into the courts is another question. But until it is carried there I shall consider that it is just as constitutional as any law we have. Furthermore, if we have no right to prevent these men from coming in here to defraud and cheat and lie to us innocent grangers, why is it we had an insurance law passed? Outside companies sent their agents here to do a dishonest business. Our insurance law has been upheld by the courts, I believe, and these foreign agents have been withdrawn from the State, and now insurance men are doing a legitimate business. An insurance commissioner is appointed to look after all the insurance business. Why should there not be the same propriety in having a wholesome law to prevent nurserymen from defrauding the people? I think if we discuss the thing in all its bearing we will find that we want to protect the innocent, poor people, and that the men who are making their hundreds of thousands of dollars here, selling their nursery stock, are the ones we want to guard against. [Applause.]

Mr. Thompson. While listening to the remarks, it occurred to me that it would be a good way to test the law by each one seeing that it is rigidly enforced. You will soon find out whether it is constitutional or not. Our friend over here says one lawyer told him it wasn't. Lawyers sometimes tell the truth, but to my sad experience I know they won't all the time, so it won't always do to believe what they tell you.

Mr. Pearce. I suppose you consulted one, probably?

Mr. Thompson. Yes, and I paid him well for it.

Mr. Dartt. I call for the question and think we had better dispense with further discussion

Mr. Underwood. I don't think we want to choke off discussion. That is what we are here for; it is one of the things that concerns us, and I say let the discussion go on. I have come here to learn something about this matter as well as the rest of you. I don't know whether the law has proven to be any damage or detriment to anyone or not. I have not thought much about that, as I have been steadily pegging away. Of course I wouldn't like to say that I would continue to support a law that ought to be amended; and when the proper time comes, to amend it would be all right. Now, we had our committee of this Society get up this law and frame the bill, and I have no doubt it was done under the best of counsel and advice; and we don't want to be like children about this thing. It is all right to discuss it and to be sure that we are right. I don't care anything about these eastern nurserymen if they do squeal about it in their conventions. They may think they have the right to come in here and repudiate it if they want to, as being unconstitutional; but they will never do any such thing, because they have plenty of men and can put their agents in the field, and will do so if they want to. Personally I don't think I would have had any such law—just personally—just consulting my own personal relations. I know this: that there is that cousin of mine who knows we are in the nursery business, and that all he has to do is to let us know what selection of stock is wanted, that when an agent comes along he will pay \$3 for a worthless plant that would never grow anyway if set out. But what is the use, you might legislate till doomsday and you never would break that cousin of mine; he would still continue to pay the \$3 for nothing. You must educate the people if you want to get them to avoid these frauds; but if you can protect them by law of course it is all right.

Mr. Dartt. If there are any real objections to the law it will be time enough to have them presented another winter, and then to have the law amended.

President Elliot. You are connected with the Lake City Nurseries, Mr. Underwood. In the working of the law has it been any detriment to your business?

Mr. Underwood. I can't say that it has. Of course I haven't so much charge of the sales department, I am interested in the production; but I have not heard that it caused any detriment at all. In fact I would not have known there was any law of the kind so far as it has affected our business; we can't see that it makes any difference. Those gentlemen that talk against the law must do the talking. Still they will abide by the law I think. I could not say it has been any detriment to us, no, sir.

President Elliot. In my relation to this Society, as president, I have heard of no complaints further than one or two inquiries in regard to certain concerns in this city, as to whether they were doing a legitimate business. I looked the matter up and decided that they were so reported; further than that I have heard no complaints at all. Last year there were many complaints. A notice was published in the *Farm, Stock and Home* last spring, requesting parties having complaints to make them known and they would be properly looked into; but we haven't heard of one complaint outside of those that come from nurserymen and agents outside, that wished to come in and dispose of their stock.

Mr. Underwood. Don't you understand that they can come if they want to?

Mr. Gould. Can't a nurseryman in this State send outside and get any Jessie strawberry plants and sell them here without laying himself liable to prosecution?

Mr. Dartt. He can if he will set them out and grow them an hour—he can take them up and sell them. [Laughter.]

Mr. Latham. Is that the way you do?

Mr. Gould. That is the difficulty. I am afraid it will make some of our people dishonest.

President Elliot. I pity the dishonesty with that class of people!

Mr. Latham. Mr. President, I understand the matter is still under discussion. There are a class of laws in force in Canada and Manitoba that are sometimes called paternal laws. It is taken for granted that the citizen is entitled to protection from the government. It is the same with the law we are talking about. There are quite a number of laws on our statute book of this nature, as for instance the law with regard to manufactured butter and the adulteration of milk, which are just getting into force, the insurance law, etc. The tend-

ency is to increase the number of these laws, and to throw protection around the general public. I think that is legislation in the right direction. I know many think that every individual ought to go it alone, but if our law could be amended somewhat it might be better; of course it is impossible to do that before next winter. It seems to me we cannot change the law now. We don't know now how it is going to work, and if all we want to do is to amend it to make it better, we had better take no action at this meeting.

Mr. Pearce. I think there are a good many improvements we can make. I didn't know but we might get ourselves into trouble. I went over to St. Paul. I have a brother there that has been in the law business for a good many years, and he looked this matter up carefully, and told me that any nurseryman could buy and sell and use, so far as the law was concerned; if anybody was a mind to contest it, which they would, it would be set aside. Now, on the strength of that, I bought rose bushes.

Mr. Latham. Let's send him up. [Laughter.]

President Elliot. This law was not intended to prevent a man from selling stock and conducting a legitimate and honest business. I know the law has met with opposition; it has, certainly. So it was in regard to our insurance commissioner. Men that were doing an honest business were protected as well after the passage of the law. It was only those that were committing fraud that needed to be suppressed. You will find by reading this law carefully that the object is simply to prevent fraud; it is right there in a nut shell.

Mr. Gould. It seems to me there is great danger of innocent dealers being prosecuted for damages; there certainly is.

President Elliot. Not if they are honest.

Mr. Gould. I claim to be just as honest as other persons, yet I had a claim brought against me of \$10,000, and if I had not defended myself I would have lost it, and I was not to blame at all; it was clear malice. Here is a case: Friend Pearce has admitted that he has transgressed this law. Suppose I get into a quarrel with him, and I take advantage of this. It seems to me there is a weak point in the bill. I wouldn't go into the nursery business with that law standing there, because I know I couldn't go into it and do a decent business and be restrained; and these gentlemen won't be.

Mr. Sias. I haven't a particle of doubt about the good intention of this law, and never had. But it reminds me of a certain party that I knew about in New England, a sort of bully, who lost some property; he traced the matter up and came to the conclusion that

the man who stole the property was one of seven men that he knew, and he said he was going to whip the seven men in order to be sure and find the right one. That is about the way with this law; they calculate to whip every man in the Northwest for the sake of whipping the right man. It seems to me there ought to be some other way to get at it. I am just as much in favor of punishing these fellows as any of the rest of you.

Mr. Dartt. Mr. President, there seems to be no doubt as to the intention of the law. It was intended for the punishment of criminals. The question comes up, what does it do? It is not what is the intention of the law, but what it does itself. I have read it carefully, and I claim that any man that ships in any article of nursery stock and sells it without first growing it himself, or giving his bonds, is liable to pay a fine. That is the straight reading of the law. If this was not so we could bring in foreign stock and sell it, as May & Co. did; but it was to hit just such cases exactly. You may say that if Bro. Pearce wants to import a few plants he can do it. But if he can, why cannot Mr. May? Laws are made that way. I claim the law as it stands hits those it was not intended to, but I don't believe our discussing it to-night will be productive of any good; we might better leave it just as it is.

Secretary Hillman. At the annual meeting of the Society one year ago, the committee of five, which had this matter under consideration, reported recommending unanimously in favor of the enactment of a law to prevent frauds in the sale of nursery stock. The legislative committee was expected to prepare a bill and to obtain its passage in the legislature. The one prepared was introduced in the Senate, and was afterwards very carefully considered by the judiciary committees of both houses, and approved so far as its constitutionality was concerned. The object of the law was simply to prevent the practice of fraud, and in procuring its passage the committee simply followed the instructions of the Society.

President Elliot. I would like some expression as to whether there is any need of the law."

Mr. Latham. I move as the sense of this Society, that some law is needed for the protection of the poor from fraud and misrepresentation in the sale of nursery stock.

Mr. Underwood. I think that hardly covers the ground. We have got the law, and why should we pass such a resolution when we already have it? As long as we have it, I think we want to pass a resolution endorsing the action of the legislative committee in securing the law that we already have.

Mr. Harris. I would like to see that motion of Mr. Underwood's carried. This law was passed in the interest of the agricultural portion of this State, and if we simply turn around and ask to have it repealed without giving it a fair test, it seems to me they will have no further confidence in us.

Mr. Underwood. I make that motion. If we see after studying the workings of the law that it is not what is desired, why then we can recommend that it be amended so and so. But for us to take any other action than that, it seems to me would be out of place, really. And I would like to say, now that we have had a legislative committee appointed, in whom I have confidence to believe that they did the best they could. The judiciary committees in the legislature considered the matter, and a prominent lawyer of St. Paul appeared before one of the committees in opposition to the bill; and since both bodies of the legislature have passed upon it, and it has been only about a year since the measure was passed, I say—while I don't see any need of the law, believing that every tub ought to stand on its own bottom, and that people ought to be intelligent enough when they buy anything to know what they are buying; still I am in favor now of endorsing the action of that committee, and thus showing our confidence in them in what has been done. If it ought to be amended, it should not prevent endorsing the action of the committee.

Mr. Nobles. I second the motion, but I object to the amendment.

President Elliot. I understand the amendment goes further than the motion of Mr. Latham, and endorses the law.

Mr. Gould. I want to offer an amendment to the amendment, in order to protect my friend Pearce and others. I am candid in thinking the nurserymen of the State should be protected; outside of the State I don't see anything wrong.

President Elliot. They are protected in this way, that if they go and file their bond they have a right to buy and ship as much as they have a mind to.

Mr. Harris. I suppose the filing of one bond is all that is necessary in order to conduct the business according to the requirements of the law.

Mr. Underwood. I hope we shall have confidence enough in our committee to endorse their action. Because a few nurserymen down east have made a howl that should make no difference. And because some of our small fruit growers object to it is no good reason for refusal to do this; the simple matter of paying a couple of dollars for filing the bonds required, is a small matter, and it would have fixed

the matter all up and given them the right to ship in all the peach trees and high priced strawberry plants desired, and in the first sale they would have got it all back. It reminds me of the druggist telling what the profits of the drug business are. He said a boy came in and ordered a small prescription and he told him it would be fifteen cents. The boy handed him five cents. Supposing he misunderstood him as he did up the package he said "fifteen cents." "Yes," said the boy, and took the bundle and started off—it was all the boy had. As he closed the door said the drug man "Well, go to thunder, I made three cents off him anyway." [Laughter.] So you see you can get your money back; just file your bond and the first bill of Jessie strawberries you sell you get the money back! The question now is whether we shall endorse the action of this committee. Another year if you wish to get up some amendment to the law it will be all right.

Mr. Pearce. I think friend Underwood is all wrong. That bill was not passed upon by the Society. It was fixed up by the legislature.

President Elliot. The Society took action on the matter and instructed the committee to get such legislation as they thought the Society wanted; they did the best they could.

Mr. Pearce. We admit you did nobly; we didn't have any idea you would get anything at all.

Mr. Latham. But you see they did.

President Elliot. You should not have appointed the committee and given them instructions what to do, if you did not wish any action taken.

Mr. Pearce. The bill that was wanted was not the kind of one that was passed by the legislature.

Mr. Dartt. Mr. President, I have been opposed to any kind of action. Now this resolution contemplates action, and means that we endorse the law. If we are committing ourselves for or against the law, I want to go against any action. I don't think we need to take any action until next year, and then we will decide. If we don't want to approve of it, it seems to me we want to vote in opposition to this resolution.

Mr. Pearce moved to lay the motion on the table. Lost, by a vote of eight to seven, several members not voting. The motion of Mr. Underwood was then carried.

On motion of Mr. Harris, the meeting adjourned till Wednesday morning.

MORNING SESSION.

SECOND DAY, WEDNESDAY, JAN. 18, 1888.

The meeting was called to order at 9 o'clock, by President Elliot.

The first thing on the program was the report of the seedling commission.

REPORT ON SEEDLING FRUITS.

By J. S. Harris, La Crescent.

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

I fully realize the importance of the work of the seedling committee, and only regret that I am not able to make it more effective.

The season was most unfavorable for the prosecution of our work, owing to the shortness of the fruit crop, which was probably caused by the severity of two or three previous winters, unfavorable conditions of the weather in the season of blossoming, and the severity of the drouth that prevailed during much of the summer.

With the exception of one single locality, I found that even the Siberian and Duchess were not carrying the usual quantity of fruit, and numbers of trees that bore well in 1886 had scarcely a specimen in 1887.

IN WISCONSIN.

On the twentieth and twenty-first of July I visited the Russian orchards of A. J. Tuttle, and others, at Baraboo, Wis. There I found the Duchess, Tetofsky, and about twenty of the newer varieties of Russians, fruiting quite liberally. Mr. Tuttle's orchard of new Russians contains over sixty varieties, and about half of them appear to be as hardy as the Duchess, about the same proportion of them are strong, thrifty growers, and comparatively free from blight. Blight was prevailing to an unusual extent in that vicinity, and the Duchess and Tetofsky were suffering about as badly as I had ever seen the Siberians, and Mr. Tuttle's old orchard of the hardiest American variety was about ruined by it. There was, however, but very little

of it in the orchard set exclusively to the new Russians, and that was confined chiefly to varieties of the Alexander type. The following varieties were well loaded with fruit, and impressed me as being the most valuable: Hibernial, Glass Green, Juicy White, Red Wine, Garden Apple, Blue and Yellow Anis, Charlenthaler, Early Champagne, Yellow Transparent, Trees of Lord's Apple, and Repka, Beautiful Arcad, Raspberry, Summer Lowland, and some others, were fine trees, but were bearing poorly.

The Hibernial is perhaps the best tree of all, a free and regular bearer of large, fair fruit. The season is late autumn and early winter use, cooking, and for that purpose it is excellent. The Red Wine is a splendid tree, fruit medium, very beautiful, but quite acid; season rather earlier than Duchess. Glass Green resemble the Duchess in tree, and fruit not quite as acid. The Garden Apple is sweet, or nearly so, and apparently a very hardy tree; season early autumn. The trees of Early Champagne were bearing to their fullest capacity. Mr. Tuttle informs me they are annual bearers. The trees appear hardy on his grounds. If it should prove adapted to Minnesota it will become our most popular summer fruit. In size it is below medium, quality very fair, is as productive as any of the crabs, and it ripens up gradually, so that it is in season from July to September.

In an orchard near by we saw trees of the Antonovka in full bearing, and apparently sound. These trees are among the best growers of the Russians. The fruit was larger than we expected to see it at this season of the year. Prof. Budd speaks of it as the king apple of Central Russia, and a good keeper. We trust that it will be widely tested in this State. The varieties of the Anis family are doubtless hardy, and the fruit of the Yellow Anis, the only variety we have sampled (and which, by the way, was not a yellow apple), is of prime quality. Season same as the Wealthy.

We here saw the Lucretia dewberry in bearing, and we were much pleased with it.

IN NOBLES COUNTY.

On the 27th and 28th of July A. W. Sias and myself made a visit to the orchard and gardens of H. J. Ludlow, at Worthington, and we were agreeably surprised to find there the most fruitful orchard we had seen in the State this season.

We found this thrifty young orchard looking fully as well as when we visited it last year, and fruiting to its fullest capacity, and never in any locality have we seen the Tetofsky doing so well. The bear-

ing varieties are chiefly Duchess, Tetofsky, Wealthy, and some seedling varieties and Siberians and their hybrids. We estimated the crop at two hundred and fifty bushels of the larger apples, and nearly as many Siberians. The orchard is situated about thirty rods south of Lake Okabena, and is protected on the west by a willow windbreak, about two hundred feet distant. A windbreak nearer than that to an orchard would prove disastrous, owing to the tendency of the snows to lodge inside of it in huge drifts.

Our objective point was the Okabena seedling tree, upon which we reported at the last winter's meeting. The tree passed through last winter without any perceptible injury, and was now carrying a fair crop of most beautiful fruit. It has not been tested elsewhere, but if it proves as hardy in other localities as here, and has the constitution to resist blight, it will prove of immense value to the Northwest.

We discovered another seedling in this orchard having the same origin, which seems to be equally as hardy as the Okabena, and is believed to be a longer keeper. The fruit is just the right size for desert and retailing, beautiful as a coy maiden, and of excellent quality, an agreeable sub-acid. These trees are true Minnesota seedlings, and probably seedlings of the Duchess and Wealthy, more beautiful in appearance and better in quality than either; are they not a "rainbow of promise" for the future of apple culture in this State? Will they not encourage us to save the seeds of the hardiest and best fruit raised in our own State, plant and raise trees, saving only the best, continuing to do so until we have reached the climax of our proudest hopes?

These fruits were afterward shown at the Southern Minnesota and State Fairs, and greatly admired by all who saw them; and the latter were awarded the first prize over the Wealthy as being the best seedling apple grown in the State, and very appropriately named "Daisy."

IN COTTONWOOD COUNTY.

We made our next stop at Mountain Lake. The people here are largely Russian Mennonites, and there is an air of neatness and thrift about their homes that we seldom see in a newly settled country. Thrifty groves and rows of forest trees surround their dwellings, and they are given thorough cultivation and kept as neatly as the best public gardens. These people are great lovers of fruit, and several of them brought with them from their native country seeds and trees, of apple, pear, plum and cherry. Thus far they have

not met with much success, and it is not to be wondered at, as many of them came from a portion of Russia where the climate is similar to Southern Iowa and Nebraska.

The cherry trees have fruited, and are said to be hardy and fine; some of the seedling pears and plums look promising. The deep snow of last winter was very disastrous for them. Snow drifts formed inside the shelter belts to a depth of ten to fifteen feet, and as it settled away in the spring crushed the trees to the ground or denuded them of their branches. Otherwise, I think we should have been rewarded with the sight of some fruit.

Important lessons can be learned here in regard to windbreaks and shelter belts. Evidently the outer rows should be placed two hundred feet or more from the orchard, and if more shelter is needed a low belt of mulberry, or some other shrub, might be set say sixty feet outside the fruit trees.

Some attention is being given to the cultivation of grapes, and two hundred bearing vines seen on the place of Peter Goertz convince us that they may be successfully grown here when properly managed.

Our next stop was at the place of Dewain Cook, about fourteen miles northwest of Windom, the object being to examine his hardy dewberry. It is evidently a variety of *Rubus Canadensis*, and appears to be more shrubby and less trailing than the varieties found native in the eastern part of the State, or the Lucretia or the Bartlett. It may be identical with a variety that in former years was found growing at St. Anthony.

With Mr. Cook this plant is enormously productive, and a large portion of the berries are perfectly filled, which would indicate that it is a strong staminate; it may prove valuable for fertilizing the Bartlett and other shy fruited. We found the fruit about the size of Stone's hardy blackberry, but Mr. Cook is growing them without any thinning or pruning, and the fruit would probably be much larger if greater pains were taken with the pruning and cultivation. The quality of the fruit is very good. They are growing upon a deep, rich, prairie soil, and if they succeed as well in other localities and soils will prove a most valuable addition to our list of small fruits for farmers. We have taken steps to have them tested in other localities, and expect that another season we shall know more about them.

Mr. Cook has a great variety of trees and plants on trial, and we shall watch the result of his experiments with great interest. With a few such men in every county in the State our perplexing fruit question would soon be settled.

On returning to Windom we stopped for an hour at the place of Joe Wood, distant about four or five miles from the above named place. He is quite enthusiastic on the fruit question, and showed us some promising seedling varieties of raspberries, gooseberries and grapes of his own raising; also a tree of the Russian mulberry bearing fruit as large as the Ancient Briton blackberry.

We noticed that forestry plantations and windbreaks are receiving considerable attention among the Mennonites in this county, as well as other parties who design to make this their permanent home, that they are doing fairly well, making a good season's growth, except in some instances where they have received serious damage from insects.

The willow worm and cottonwood tree beetle are increasing at an alarming extent, and it does seem that if our legislature felt any interest in the future welfare of the people of this State they would take some steps towards making investigations in this matter. Your committee suggest that our Society petition the Department of Agriculture at Washington to give this matter their early attention.

IN RICE COUNTY.

On the fourteenth of October Mr. Sias and myself paid a visit to the Peerless apple tree, standing on the farm of J. G. Miller, of Rice county, about eleven miles southeast of Faribault. We learn that the tree is seventeen years old, and was raised from seed of the Duchess of Oldenburgh, saved from fruit raised upon a farm about one mile west of where the tree now stands. In the orchard from which the seed was taken there was growing in proximity to the Duchess, bearing trees of the Golden Russet and Talman Sweet. The Peerless proved to be the hardiest and best of a batch of seedlings raised by Mr. Miller, eight of which fruited and specimens of the fruit were exhibited at the State Fair about ten years since. I remember at that time I was favorably impressed with the appearance of these seedlings, and pronounced most of them of a quality superior to the Duchess, and thought some of them would prove better keepers. There are now but three of these seedling trees left. Two of them do not appear to be as hardy as the Peerless, and are but little if any better in quality, or later in season, than the Duchess.

The Peerless has successfully endured three of the most trying winters known in Minnesota, and is still in very good condition, but perhaps not quite up to the Duchess of the same age, although it is a larger tree. It has lived to see two generations of what are termed "Iron Clads," including the Wealthy, totally annihilated, and Mr.

Fuller says has been the most profitable tree in his orchard. It is a vigorous, medium, upright grower; the trunk is about ten inches in diameter; it is about four feet from the ground to the first branches. It is growing upon the north side of a belt of willows, but much too close to them for the best results.

Mr. Fuller has had about one hundred and fifty trees of different varieties in his orchard, all of which have killed out except the Duchess, a few varieties of Siberians and these seedlings. This tree was not fruiting this year. In size it is about like the Duchess, and the season is said to be from December to March. He has quite a number of young trees raised from seed of the Peerless, several of which look very promising. He also has several trees from seed of Transcendent Crab that are free from blight, and one of them is the most beautiful and hardy looking tree we ever saw. The fruit is larger than the Transcendent, keeps a month later, and is said to be of better quality.

We left his place chanting to ourselves the old song so often sung by the late and venerable Marshall P. Wilder—

“ Plant the best seeds of all your best fruit,
 Good fruits to raise that some lands may suit ;
 Fruits which shall live, their blessings to shed
 On millions of souls when you are dead.
 Plant, plant your best seeds, no longer doubt
 The beautiful fruits you may create ;
 Fruit which, perhaps, your name may enshrine
 In emblems of beauty and life to shine.”

We have learned of some other seedlings of promise, but the information came too late to pay them a visit. One is at or near Kasson, Dodge county. It is reported to be a seedling from the Duchess, from twelve to fifteen years old, having thus far withstood the winters better than the Duchess. The fruit is about the size of an orange, of good color and flavor; season about January. We understand it was on exhibition at the Southern Minnesota Fair, and trust that Mr. Sias will give us a further report on its merits.

The seedling of Jacob Kline, of Houston county, is reported as still healthy, and having produced a liberal crop of fruit during the past season.

It is reported that R. D. Frost, of Madison, Wis., has a seedling tree that bore twenty-five bushels of apples in 1886, and that scions could be procured of him for testing at our experimental stations.

The Cheney plum, a native variety found in Vernon county, Wis.,

is gaining in favor. It is early, productive, and larger than the De Soto. I have the promise of scions for the use of our experimental stations.

So far as the behavior of the newer Russians is concerned in this State, we have been able to add but little to our previous knowledge.

We had hoped to get some valuable points from the Russian trees in the orchard and nursery upon the State Experimental Farm. We did go there to see them dug, and to give each number a careful and thorough examination, and to take copious notes of their behavior as nursery trees, the character of the foliage, etc., but were unfortunate in finding Prof. Porter absent from home. All of which is respectfully submitted.

REPORT ON SEEDLING FRUITS.

By A. W. Sias, Rochester.

Your committee are not content, in the second year of their service, to add nothing interesting or valuable to their report. Our first year was of necessity spent in reconnoitering the extensive field before us, and all that we had time and means to do was to report on a few what we considered to be the most worthy trees and fruits. That we have failed to find all the best varieties in the great field before us, is more than likely. We advertised through the press for all those having choice new fruits to inform us that we might examine and report upon them. But very little attention has been given to this call, and that accounts in a measure for the brevity and lack of information of the present report.

The first thing, perhaps, worthy of note for our report was during the summer meeting of the Olmsted County Horticultural Society; held June 11th, where the first exhibit of the famous Jessie strawberry was made to a Minnesota audience. These berries were so large that they were eaten as you eat large apples, by biting off the sides first. Some of the far-seeing ones present said they would take some home and plant the seeds from them. Your committee saw at a glance that that was the most sensible speech made during the session. And after they had all finished their bountiful feast and taken what they pleased to plant, your reporter carefully gathered up the fragments, and the result was in the fall he was able to show, and did exhibit to T. T. Lyon, of Michigan, and other noted horticulturists, some five hundred plants of little baby Jessies as fine as F.W. Loudon

or any other expert would care to look upon. We mention this not in a braggadocio spirit, but rather as an example of what others should do for the improvement of our best fruits. I say best because Mr. Loudon has fairly demonstrated the truth of what A. J. Downing uttered over forty years ago, viz: "Once in the possession of a variety which has moved out of the natural into a more domesticated form, we have in our hands the best material for the improving process, The fixed original habit of the species is broken in upon, and this variety which we have created, has always afterward some tendencies to make further departure from the original form."

Mr. Loudon took the Sharpless, and some others of the largest and finest known varieties and crossed them. The result has been the largest and finest berries known to civilized man.

IN BLUE EARTH COUNTY.

July 26th, in company with Mr. Harris, we left Rochester for various points in the southwestern part of the State. Our first regular visit was Mankato, a flourishing town on the Minnesota river. We have been wondering for years why Mankato made so little noise in the horticultural world, and we are reminded again that "still waters run deep" Nature has done her part, in my humble opinion, to make Mankato the garden of the State for all horticultural products at all adapted to any part of her large domain. My acquaintance with Mankato's horticulturists is extremely limited, but that there is leaven there that will soon ferment the whole mass, I am quite hopeful.

J. H. Vandervort writes Jan. 9, 1888: "Horticulturists of Minnesota, who have so many difficulties to overcome, will find that there is strength both in union and communion." The Mankato people will yet discover the wisdom in this remark from one of her leading horticulturists, and organize a local society there that will cause other parts of the State to look well to their laurels.

IN NOBLES COUNTY.

Mr. Harris will no doubt tell you of the many good things we saw at Mankato, so I will pass on to Worthington, a beautiful prairie town near Lake Okabena. Our principal object here was to inspect the choice seedlings of J. H. Ludlow. He has here one of the best bearing orchards in the State. We found Mr. Ludlow hauling off apples to market by the wagon load, and we estimated that there was still over two hundred bushels on the trees. I was astonished, and

immediately donned my thinking cap and inquired if we had been traveling east for the last day or two? When answered in the negative, I exclaimed: "But I was told that apple trees would not *produce apples* as far to the westward as this: how is it?" I refer you to Mr. Ludlow.

Will leave the particulars of this pleasant visit with Mr. Harris, who gave you such an accurate account of the situation in our last annual report. Will say, however, that Mr Ludlow's seedlings, viz: The Okabena, Daisy and Wax, surpassed my anticipations. They were all exhibited at our fair at Rochester last September, and took the first prize as the best collection of seedlings. How these varieties will behave when removed north from the south border of the State, and from Lake Okabena, this deponent saith not, but they are well worthy of trial.

It is not improbable, we think, that the Daisy should prove the most valuable; it is the best keeper, and carried the most fruit the present season.

IN COTTONWOOD COUNTY.

Windom was our next objective point. Here Mr. Dewain Cook met us and piloted us out some fourteen miles across the prairies to his well cultivated little farm, where flourishes in lavish abundance the Cook's Hardy Dewberry, which, I think, he prefers to designate the "Windom Dewberry." How this plant will succeed on heavy clay soil, or timber land, we cannot say; but for the prairies, similar to that of Mr. Cook's, I very much doubt if it has an equal as to quality. I must say that it fitted my mouth so nicely that I soon became too full for criticism. At the time Mr. Cook brought this dewberry into notice, many planters had become discouraged in regard to blackberry culture, but it does appear as though this enormously productive variety must go a long way towards restoring confidence again.

Mr. Cook introduced us to some of the leading gardeners among the Mennonites and we endeavored to glean something new and valuable, if possible, in regard to the much talked of mulberry, and other plants peculiar to the Mennonites. We came to the conclusion that to buy Russian mulberry plants there, even at the low price of \$4 per one hundred (as we had done several years ago), would be a losing game, as it would be like a man's buying common seedling apple stocks for an orchard, as he would not stand a ghost of a chance to get a single tree of good repute. We found one man there who said

he had a mulberry among his seedlings that was of good size and quality. The tree looked hardy, and he had it layered, and promised us a sprout from it, which we expect to receive next spring. In this way, by careful selections from thousands of bearing trees, and then planting seeds from these again, in time we shall no doubt produce a large, fine mulberry, like the Downing Ever-bearing.

We found some of the Mennonites well up in grape culture, small fruits and vegetables.

IN DODGE COUNTY.

Next visited C. H. Pond and Alexander Houston, of Kasson, Dodge county. Mr. Houston has a seedling of the Duchess some fourteen years old. The seed was planted by Charles Gove, a former owner of the farm. The fruit is thought to be superior to the Duchess in quality, and a better keeper; cannot say just how long it will keep. Mr. C. H. Pond, if not the principal fruit grower in Dodge county, is fast tending that way. He has a native plum grove that produces a large amount of very fine fruit, perhaps fully up to the De Soto, Rolling Stone, and other cultivated varieties.

IN RICE COUNTY.

October 14th we visit the Peerless apple tree in Rice county. We first called on O. F. Brand, to have him show us the way, but he was out of town, and we had to find our way the best we could. J. G. Miller, the owner of the tree, gave us the following history of the Peerless: "Seedling of the Duchess; age, seventeen or eighteen years; has been transplanted once; stands on a common clay soil, with a row of willows on each side; its season is from about the first of November to the first of January." Mr. Brand has got all the sions so far. It has borne eight or ten bushels in one season, and the average about four to six bushels a year. We found other promising seedlings in this orchard, and Mr. Miller is to be congratulated for his success in growing seedlings. But I will not weary you further, as our chairman will doubtless give you a detailed report of the many good things found at J. G. Miller's.

REPORT ON SEEDLING FRUITS.

By G. W. Fuller, Litchfield.

I have visited the two seedlings referred to in my report last year, that of Mr. Mills in Greenleaf, and of Mr. Baldwin in Cedar Mills. The trees bore but little fruit. Two apples from the Mills seedling kept in my cellar until a few days since. The Mills seedling usually keep but a short time.

I put in grafts from both these trees last spring, and, after a few years, shall be able to say more certainly what they will do.

I am inclined to think we cannot decide on the real value of a seedling, until we have tried it by growing grafts.

I have had no opportunity to act with the other members of the committee.

G. W. FULLER.

LITCHFIELD, Jan. 17, 1888.

DISCUSSION.

Mr. Dartt. I would like to inquire of Mr. Sias on which side he found the windbreak, when visiting the Peerless?

Mr. Sias. I noticed when visiting the tree that the orchard was protected from all sides.

Mr. Brand. Mr. President, I want to correct one or two errors in the description of the Peerless apple. In reference to the age of the tree, your committee took some facts from Mr. Miller's memory; I have something more substantial than that. In 1875 I made a plat of the orchard and a record of it, and numbered every tree. At that time, as he told me, the trees were six years old past, and I was of the opinion they were a year older still; he stated that they were grown from seeds of apples raised in 1867, as that was the year he had a large crop of apples, in another orchard, which I found confirmed by reference to the files of the *Faribault Republican*. He got his seeds from that orchard.

With reference to the condition of the tree as compared with the Duchess, I would state that in the year 1868 I sold Mr. Miller thirty Duchess trees, nearly all of which came into bearing, but they have all killed out except four or five which still remain of the original thirty set in the spring of 1869. He has planted a good many since, but the Peerless has produced twice as much fruit as any

Duchess of the same age, and its last crops have been its largest ones. The last crop it bore was between ten and eleven bushels, and the crop in 1884 was nine bushels. The Wealthys in the orchard have all killed out. I simply made these remarks because I made a statement last winter which did not appear in the record.

Col. D. A. Robertson, of St. Paul, was here introduced as the first president of the Society, he was asked to come forward, at the same time being greeted with applause.

Mr. Sias. Just a word in regard to the age of the Peerless apple I have no doubt Mr. Brand is correct about its age. I have Duchess trees on my place that are twenty-three years old, and this Peerless tree is still larger than any of mine. In regard to the discrepancy in the amount of fruit produced, I don't pretend to know about that.

Col. Stevens. Mr. President, I would like to know if this tree is propagated generally, and has there been any fruit raised from it by propagation?

Mr. Brand. No, sir; I don't think there was any scions taken from the tree until a year ago last fall; there will be no chance for its being fruited for a couple of years yet. Another point I wished to mention: Mr. Harris states in his report that there are only three of the seedlings left in the orchard; there are six left. I got fruit from all of them a year ago last fall.

Col. Robertson here took the floor and stated that one of the most interesting topics to him was that of the feasibility of growing apples and forestry trees, their effect upon the amelioration of the climate, exposure, etc. When the Duchess was mentioned he was interested to know where it was grown and where it was grafted. He knew nothing of the Peerless. It was only by accident he had learned of this meeting, as he had supposed from a notice in the paper that the meeting had been postponed.

President Elliot said the notice had reference to the meeting of the local society here.

Continuing, Col. Robertson said that as soon as he discovered his error he hastened to come to this meeting, as he had certainly intended to be present; there was no organization in the State of Minnesota nearer to his brain and heart than that of the State Horticultural Society, on account of the good it could accomplish for the State and the Northwest. He had always attended its meetings when possible to do so. He inquired as to the origin of the Peerless, as he knew nothing of the variety.

President Elliot. That is a new seedling just being brought out.

Mr. Brand. It is a seedling of the Duchess, and is supposed to be a cross from the Talman Sweet.

Col. Robertson inquired as to the exposure of those trees that had been destroyed.

Mr. Brand said he would make a plat of the orchard, if desired. On the north side of the orchard was a row of willows and some cotton-wood trees, not more than two or three rows on the north.

Col. Robertson said that would be insufficient for protection. He had tried experiments with seedlings for many years; a great many years ago he had his experimental grounds near the city, where he had expended much money uselessly, perhaps, but he hoped not. He had thought he had a sheltered spot, but a severe winter killed all of the seedling trees; others had tried to raise seedlings with the same experience.

He said that a Mr. Stewart, of Le Sueur county, had saved a few trees, perhaps, but not of great value. He had investigated where seeds came from, and in most instances learned that they were from cider apples. He had been informed by an eastern seedsman that his stock came from apples grown in New Jersey, Pennsylvania and Virginia; and when he saw the result the statement was confirmed. In those states the best apples were sold and the worthless ones used for cider, hence the worthless quality of the seeds. The old varieties of apples grown in New England were mostly seedlings. The Newtown Pippin originated at Flushing, Long Island. He had often visited the celebrated gardens and orchards in that vicinity, when a boy; he came to Ohio in 1838. He found the country there full of worthless seedlings, but a lot of grafters went through the state with their bundles of scions and soon transformed the orchards. In this way the Ohio farmers got their fine varieties. He knew of one man who went through the country claiming he could grow a dozen varieties from one tree, and it was no humbug, for it could easily be done.

Many men who could afford the expense had imported trees from England, and some from Germany, and by making judicious selections varieties of fine quality and flavor had been introduced.

Apple seeds obtained from the cider press were unfit to be used for planting. He had heard nurserymen say that the root did not affect the stock, but he could prove to the contrary. The Duchess would die when exposed, as also would most other varieties. He had been in Europe for some time recently, and had been studying this subject, as to the causes for the losses of trees, etc., with much interest. It

would be observed that any tree that was exposed to these northern winds would die the same as persons would perish when exposed to these cold blasts. The winds that prevail in the winter throughout Dakota, and south as far as Kansas, were too rigorous to be endured without some protection against them. He knew something about it, as he had slept out of doors on the prairie when the thermometer was 25° below zero; it was pretty hard to keep warm, even with fires. There was a great difference to be observed in the atmosphere where there was protection from forests. He had talked with ex-Gov. Marshall, for one, who was surveying for the Government some forty years ago, and who with others camped out in tents in winter in the woods, in Wisconsin and Northern Minnesota, while surveying. They managed to live without freezing; out on the prairies they would have frozen to death. This came in as sort of an episode.

Where the barriers to orchards are removed there is a decrease in the amount of fruit produced. He had noticed this fact at Vladimir, Russia, and the same thing is referred to in the reports of Prof. Budd and Mr. Gibb, who had visited that country. What was needed for the orchard was protection. The best protection, in his judgment, was that of evergreen trees and hedges.

Col. Robertson said he feared he was taking up the time of others, but felt great interest in these matters, as he had studied them very thoroughly. He had noticed that the Duchess was inclined to split from the graft, and recommended planting a large stone under the roots, which would cause the tree to throw out roots of its own. The same rule would hold good with other trees too tender for the climate.

He said there was no reason why people should become discouraged as to raising fruit. They were raising apples in abundance in Russia, and had the very finest kinds of winter varieties there, and he had taken pains to obtain some of the seeds which he had brought home with him. There were finer varieties to be had than we had yet tested here.

The Duchess, according to his investigations, was a Swedish variety. It had been taken thence to Germany and England. He had traced up its origin with a good deal of interest and patient research.

He had found this to be true, that in every country on the face of the earth there were seeds to be found which would produce the variety of plants that were best adapted to the particular region of country, such as would prove of the highest degree of excellence, and adapted to the climate of the particular country where the seeds originated.

From seedlings, and nothing else, good fruits were to be produced. The same law held good with the ancients, but the Greeks understood the process better than the Romans, as he could show by reference to books in his possession.

At a convention held in England some two years ago an effort was made to obtain information with regard to the adaptation of various varieties of apples to the different parts of the British Isles. It was there demonstrated that every locality had a different climate, and that different varieties were adapted to particular regions of country. He believed that animals were climatic, and plants as well; everything that grew on God's earth was climatic, and it was wonderful that it should be so, although we could not tell the reason.

He had heard of a delegate to a certain political convention who asked the question, "What are we here for?" That might be applied to us individually. We are here to take care of ourselves; we are here to subdue, replenish and beautify the earth.

Mr. Thompson. We have been talking about the Duchess of Oldenburg. I do not know of any such apple; we are misnaming it; there is no such variety in the catalogue. The name Oldenburg is given, but the other is a mongrel. The true Oldenburg is a Russian variety, and a general favorite throughout the district where it originated, as well as throughout the Western States, as shown by this report to which I have referred. I have here the historical accounts of some of our best varieties, and the Duchess of Oldenburg is not mentioned in the list, while the Oldenburg is. It is described as of medium size, round, oblique, yellowish red in color, quality good, season September, a Russian variety. It is a good apple. The tree "scalpers" have added to the name. I have on my grounds the Oldenburg proper.

I have heard of agents who have been around in Grundy county selling what is called the Winter Duchess. There is no such thing. It is what is known as the St. Lawrence, a very valuable apple. Why, one of your agents here representing L. L. May & Co., was down there and tried to humbug me into buying some of their trees, and I suppose would have agreed to sell me anything under the heavens, and would have given me some hazel brush claimed to bear peaches if I would have given him the order.

We, as horticulturists, should exchange ideas; work in harmony. There is not a man living that is too old to learn something from the interchange of ideas. The great trouble is we are apt to be selfish;

we want to act as a family of brothers. We are all working to one end, and should remember that in unity there is strength.

My name is Thompson. I have the champion seedling orchard of Grundy county. I believe that every man can raise fruit on their own farms if they will make the effort to do so, in a greater portion of Minnesota and most of Iowa. They can do this with proper protection by using our native seedlings and crossing them with the choicest Russian varieties.

I agree with Col. Robertson that the root does affect the scion; it will affect the flavor of the fruit if allowed to remain. It is best to get a tree on its own roots if possible. I never sold a tree in my life. I don't want to interfere with the business of those who sell trees. They should sell trees true to name, and then, I say, let the purchaser use a good deal of common sense, and investigate as to the kind of soil he has, the best locations, study the reports, and plant the varieties adapted to the soil and location, and they will succeed, and not till then. Above all things there is no use for people of Northern Iowa and of Minnesota going to the east of the Mississippi river, taking soft, woody trees, gathered up promiscuously, to be planted out here. My theory is to plant seeds of the best varieties of seedling trees, and throw away the worthless kinds. I have experimented with seedlings until I have more than a hundred distinct varieties in bearing in a single season, in a seedling orchard of a little over three hundred trees.

Col. Robertson stated that he had found from observation, where fruits were improved either in Europe or in this country, it had been by the cultivation of the best varieties and by the propagation of seedlings. The experiments that are made should be conducted by our agricultural institutions. The work was too expensive to be conducted by individuals. The results accomplished by our experimental stations would be more satisfactory than could be obtained in any other way.

REPORT OF COMMITTEE ON NATIVE FRUITS.

By O. M. Lord, Minnesota City.

In the production of native fruits, Southern Minnesota bears no comparison with that part of Wisconsin lying east of it, especially such fruits as have a wide commercial value, like cranberries, the va-

rious kinds of huckleberries and blackberries; and it is doubtful if we have a great amount of soil adapted to the culture of the two first named. The only places where our native fruits are indigenous is among the timber, on lands lying contiguous to the streams, and in the groves which are scattered here and there on the prairies. These lands are of limited extent compared with the area, but we can probably find upon them all the varieties common to Wisconsin, though the quantity is too small to be of great significance. Strawberries were found growing wild when the country was first settled, and where fields were left uncultivated for a year or two they were sometimes very abundant, and in some places still continue to be so; but the cultivated kinds have entirely superseded them for market, and also largely for home use.

One or two varieties of huckleberries are sometimes found upon the sandy table lands along the streams, especially if the soil be formed of disintegrated sand rock. But they do not appear as luxuriant and as productive in fruit as in a more congenial soil. The climatic conditions can not be materially different from those in Wisconsin near by, where they grow in immense quantities. The habit of the plant under cultivation, if it has ever been carefully observed, is not generally known, and as long as the fruit continues to be furnished to the markets in such quantities and at such low prices, no elaborate experiments in their cultivation will be made.

The cranberry, as a commercial fruit, occupies a very important place. There are a few marshes along the south side of the Minnesota river, but no great attempts have been made to improve them. Experience has shown that under good cultivation they vary somewhat in size and shape, but in quality and in habit of growth their character has not been changed from those found growing wild.

The subject of cranberry culture has occupied so prominent a place in horticultural works that it will not be here further discussed.

Blackberries are indigenous along the Mississippi bluffs, and in the groves of brush and timber throughout this part of the State. There are few localities, however, where they have grown in quantities sufficient for market, or where they can be relied upon to produce fruit annually; and, indeed, it has been rare in many places where the bushes grow, to find any fruit for several years past. These remarks may also be applied to the dewberry, though the dewberry is adapted to a greater variety of soil. It is found equally thriving on the light sandy soil, or heavy clay.

It is well known that these fruits have long been profitably grown

for market, and their cultivation is said to have improved them. Though the varieties in cultivation have been selected from superior wild ones, or from chance seedlings of marked character, so far as I know no choice variety has originated through cultivation alone.

Although they have been successfully cultivated in this vicinity for a series of years, without winter protection, the last few winters have shown that they are not entirely hardy here, which also probably accounts for the disappearance of the fruit of the wild ones.

Black raspberries were not found here till about the year 1864, or twelve years after settlement. They made their first appearance in the alluvial deposits along the streams, but have now found a home along the roadside, and even in the crevices of the rocky bluffs, and upon the uplands. They have repeatedly been transplanted to the gardens for cultivation, but the results do not seem to justify the labor. It is found that the improved kinds are hardier, more productive, and better in quality than any that have been brought to notice selected indiscriminately from wild ones.

Red raspberry bushes are often found in the hazelnut brush, and sometimes in other localities; but they rarely fruit here in a wild state, as the tendency of all of them is to swamp themselves with suckers.

In very moist land they have a little fruit, but it does not compare in size and quality to the varieties commonly cultivated.

Gooseberries, both rough and smooth, and black currants are quite common in the moist sandy soils near the streams, and here also is found the wild grape, often in great abundance. These are gathered in considerable quantities nearly every season and used in domestic wine making.

Highbush cranberries, the black haw, the thorn apple and wild crab apple are also found in similar locations. The fruits of all these are sometimes utilized, but no attempts have been made to improve them. The trees or bushes have been transplanted for ornament, or from curiosity, and they often thrive and appear to do well, and may all be made to serve some useful purpose.

We also have the Juneberry, the choke cherry, and a dwarf black cherry, mostly found on the soil of the valleys.

The sand cherry is only found on the gravelly prairies formed by the Mississippi river.

If there should prove to be an important truth in top grafting hardy stocks, to secure the production of fruit in this climate, the sand cherry may yet be found very valuable.

All of these are altogether food for the birds. Though the Juneberry is quite palatable it is rarely tasted, as it ripens at a season when the birds can find little else so desirable. It has been cultivated to some extent further south, and the plants offered for sale, but the birds are too destructive to make the fruit profitable.

Wild plums are quite common in the vicinity of timber, in thickets of brush, and along the margins of the smaller streams, or wherever they are protected from fire. The tree is entirely hardy, naturally and when cultivated, and flourishes in a great variety of soils, and bears fruit more abundantly than any other tree, and at the present state of horticultural work is attracting attention second only to the apple among the larger fruits. In the short time in which it has been brought to notice, it has been demonstrated that it can be hybridized or cross fertilized to an unlimited extent, and we have reason to expect as much advance in its culture as has been made in strawberries.

The following report was presented by Mr. Harris:

REPORT ON FRUIT BLOSSOMS.

By J. S. Harris.

Mr. President I find myself in a novel position as a member of the committee on fruit blossoms. I can see beauty in the flowers and utility in the fruit which follows, but I am not well versed in scientific botany; moreover, I do not know what you are expecting of me.

By referring to notes taken at the time, I find that on April 30th toads were out of their winter quarters, and blossom buds of the cherry and plum were nearly open

May 2. Cherry and plum trees in full bloom, and the buds of the rollingstone quite prominent. The stamens on the cherry appear well developed and filled with pollen. Weather warm and windy.

May 3. Morning almost cold enough for frost. Juneberry trees in full bloom.

May 6. The petals of the flowers of the cherry and plum are about all dropped. The rollingstone is in full bloom. DeSoto and common plums are commencing to open their blossoms. Weather quite warm again.

May 7. Pleasant, dry and very warm. Transcendent crab apples are commencing to open their blossom buds.

May 8. Clear and warm with strong winds. Transcendent crabs are in full bloom. Duchess and Tetofsky are showing considerable color. The blossom or petals have all fallen from the plum trees; also from the Juneberry.

May 10. Ground so dry we can scarcely plow. Duchess, Wealthy, and Tetofsky trees in full bloom and petals falling from the Transcendents.

May 13. Warm to hot. The bloom has entirely disappeared from all our fruit trees. It seems to us that we have never known them to hold their blossoms for so short a time. During the season of blooming the weather has averaged warm, the ground has been

✶ We have had considerable wind and not very much dew.

May 15. Blackberries are commencing to blossom.

May 17. Blackberries in full bloom.

May 19. Black raspberries commencing to bloom.

May 26. Concord grapes in bloom.

RESULTS.

Fruit of all kinds appeared to set as well as usual, at least it commenced to grow and enlarge. In a few days the principal part of the plums had dropped to the ground, and none held on to mature except a few of the DeSoto. The young apples commenced to drop immediately, and continued to do so up to the twentieth of June; by that date the Wealthys were literally all gone; Duchess, with the exception of a single tree, but a few left. A portion of the Transcendents dropped about as bad, while a few trees produced a half crop. Tetofsky, Strawberry crab, Pride of Minneapolis and Montreal Beauty, matured full crops.

The raspberry and blackberry crop would have been good but for the drouth. Grapes were a large and good crop.

Query. Was the loss of the plum crop and the shortness of the apple crop caused by drouth or a failure of the blossoms to fertilize from imperfect reception of pollen on account of strong winds and dry atmosphere? I thing the latter. Why? First, in the town of Greenfield, Wis., two neighbors have a quantity of the cherry plum; in one case they are on sandy ground and exposed to the winds and the crop was a failure; in the other case they are on a moist, loamy soil and sheltered from all but southeast winds, and they matured a large crop of good fruit.

On my place the DeSoto, the only variety that matured fruit, were sheltered by other taller trees. The other varieties were exposed on all

sides. The most apples were produced on trees the best sheltered. I believe there is much truth in the old saying that when the blossoms hold long there will be much fruit.

J. S. HARRIS,
Chairman of Committee.
La Crescent, Minn.

REPORT ON RUSSIAN APPLES.

By A. W. Sias, Rochester.

Mr. President, and Gentlemen :

We are getting more large, fine fruit at the present time in Minnesota from trees of Russian origin than from all others. Then why find fault with the "bridge that takes us safely over the stream?" The silver leaved family that I mentioned in my report a year ago, of which the Autumn Streaked is supposed to be at the head, came through the severe drouth last summer without flinching, or curling a leaf. Mr. Peterson agrees with me that the Red Cheeked is one of the hardiest known sorts, and unsurpassed as to color, but as to its bearing qualities I am not so well advised, as I have but one tree, and that on the Hyslop stock. With me it has never borne well; it stands in grass and cares for itself. The Anis family still bids defiance to drouth or winter's cold. The Russian Green, Hibernial, Lieby, Rosy Little Turnip Apple, White Pigeon, Antonovka, Titovka, Grandmother, Enormous, Green, Yellow and White Transparent, and many others are still with us, and unless we get a temperature lower than 50° below zero, they are likely to be for a long time to come. But about the height of my ambition at present is to obtain a cross between the strong constitution of the Autumn Streaked, with its perfect foliage and fine quality of pulp, and some other Russian of good keeping qualities, red color and large size, like the Red Black. Also a cross with such an almost perfectly hardy variety as the Red Cheeked with the McMahan White, which I believe to be one-half Golden Russet and balance Russian. That there is money in this line of work I steadfastly believe.

REPORT ON RUSSIAN APPLES.

By Andrew Peterson.

I never had so much damage to my apple trees as I had last winter. I think the cause was first that we had no frost in the ground before the snow came, and next that my orchard is sloping to the south, {so that when we had sunny days the sap was up pretty quick, and then in the evening it became very cold with a sharp wind before the sap settled down, causing injury to the trees.

My Wealthy trees, from three to six year old, were killed to the snow line, and in the spring were entirely dead. The same effects were seen with the Duchess, but not so bad.

As to my Russians, I find the Charlamoff was injured by sun-scald just as much as the Duchess, but the Hibernial and Ostrekoff's came out all right, and they are hardy enough for Minnesota always. No. 980, Pelikanoff, is a hardy tree with better fruit than I thought, but a scant bearer. No. 445, Romianka, is the hardiest of all the Russians, or any crab variety, but a poor bearer. I think the reason is that the tree is standing in the nursery now, with a long tap root. The Christmas apple and Winter Livland and Sweet Borovinka are no hardier than the Duchess of Oldenburg.

The Russians that I received from Prof. Budd are No. 10 Riga Stripe, No. 22 M. Blushed Calville, No. 387 Good Peasant, Antonovka, Red Anis, 382 Peter-hoff, No. 169 Green Sweeting, No. 4 M. Ostrokoff's; not the same kind as from the Department. All these varieties did not sustain any damage at all, and they seem to be hardy enough for Minnesota.

The next are those that were sun-scalded more or less, but not damaged in the top: No. 206 Czar's Thorn, 252 Aport, No. 14 M. Anisim, 220 Tilus Risur, No. 200 Rosy Repka, 502 Rambour Remette. No. 3 M. Lead apple, No. 28 M. Kluevskoe, 2 M. Hare Pipka, No. 469 Grandmother, but none of these I think will be hardy enough for Minnesota, anyhow but No. 2 M. and Aport.

And now as to these that are not hardy enough for Minnesota: No. 21 Karbooka, No. 58 Vincent, No. 1277 Voronesh Red, No. 210 Vinegrand, No. 413 Cross apple, No. 20 M. Kursk Reinette, No 5 M. Royal table. These above named I think are all too tender.

Longfield, Suso winter, No. 53 M. No. 9 M. and Zelenka are entirely dead.

The Russian pear trees were killed to the snow line, except one variety is living yet, but richly it promises to blossom next spring. The

Russian plums standing on the south slope were killed entirely, but those protected by the woods are all right.

Four years ago I imported sixty varieties from Sweden and the first and second years some of them came out all right. Last winter most of them were killed down to the snow line, except one variety, and that is just as hardy as any Russian, and as it is a long keeper in Sweden, I think a good deal of this tree.

As to other fruits I would report that last winter was a very hard one, and we did not have much fruit this last summer. The raspberries had a good deal of damage and very little fruit; the Turner came out all right and fruited well.

In Carver county there was no fruit last summer except some crab apples. Grapes bore well last summer at my place.

I have more of the Russian varieties that I have not mentioned here, but they are too young yet so I can't say anything about them.

WACONIA, Minn., Dec. 21, 1887.

FORCING HOUSES.

By J. S. Gray, Minneapolis.

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

I enter upon this essay reluctantly, knowing that there are a number of men in and out of this Society whose experience is much larger than my own; but since those of large experience prefer to keep their knowledge to themselves, I, who claim to know but little, am willing to share that little with those who know still less.

Wishing to grow such vegetables as lettuce and radishes for winter and spring trade, our land being nearly level, we decide upon running our houses north and south, and while we concede that the east and west built house, with a one-slant roof to the south has the advantage of a more direct sunlight in mid-winter, and therefore warmer in daytime, we claim for the north and south house, span roof, a more equable temperature; the early morning sun in early spring and fall months strikes full upon the glass; at noon it strikes upon the ridge and obliquely on the rafters, making a partial shade; this shade decreases as the sun moves westerly, until due west is reached, when it again strikes full upon the glass on the west side of the houses. CONSTRUCTION: Cedar posts squared are set in the ground two feet deep and

four feet apart in line for the side wall; another row ten feet six inches distant for the other wall, and also posts for the end wall; the outside walls are then boarded up with common rough boards; posts sawed off at an angle in line with the ridge; tarred paper is then laid over the walls inside and outside; the walls are then boarded inside and outside with matched boards; a cap is then nailed on top of the walls on which the top or the rafters rest, the upper end of the rafters being nailed to a 2x4 inch ridge pole, the distance apart determined by the width of glass used.

The first two houses we built we used 10x12 single-strength glass, rafters ten inches apart. On the remainder we used double-strength glass, at a cost of about thirty per cent more; rafters one foot apart, and would not use single-strength glass on such buildings at any price.

Now comes a coat of paint over everything, and then the glazing. Lap the glass not more than one-fourth inch; if a large lap is made water will get between the panes, freeze, and burst the glass. We use six-ounce tinned tacks to keep the panes from slipping down, and fasten the lights down with glazier's points, driven in with a point driver, a little machine that will drive points as fast as the hand can move from one position to another.

For filling the crevices between the panes and rafters we use a composition made of one equal part, by measure, of putty, raw linseed oil and white lead, well mixed and strained, and applied with a rubber bulb, made especially for the purpose.

The inside construction consists of a bench four feet wide on each side, with a two foot walk down the center. The benches must not be built tight to the walls, but a space of at least one inch left between the wall and bench for the heat to pass up, this part of these houses being the most vulnerable to cold. Ten foot houses heated by steam for the growing of lettuce, require a coil of these one inch pipes to each four foot bench. Four one inch pipes to each bench will give sufficient heat for cucumbers.

HEATING.

The best position in which to place the pipes is not settled; years ago it was thought that bottom heat was decidedly the best, but time brings new ideas, and one of these new ideas is that natural heat, meaning sun heat, comes from above; also that experience in forcing houses teaches us that our weakest places in these houses is in our roofs just as soon as the sun goes down. For the purpose, then, of

warming the upper air, we run our main heating pipe the whole length of the house, hung to the ridge pole, then back in smaller pipes, either hung to the wall or under the benches.

Those of you who have read Peter Henderson's plan of building these houses with straw roofs, with no space between, if you will take my advice will not follow his example.

We have four houses running north and south, from 10 to 12 feet wide, with a space of 3 feet between the walls, and one 20-foot wide house, with 6-foot space.

After a snow storm we scrape the snow off the roofs into the alleys; in the narrow alleys we remove the snow and ice by hand; the 6-foot alleys we clean out with a horse and scraper.

The cost of such buildings is about \$5 per running foot for the 10-foot houses, and \$8 per foot for the 20-foot wide house, the capacity of the wide house being just double the narrow ones.

MANAGEMENT.

On the benches we place about six inches of soil well manured, finely raked and marked off in rows with a stick, through which we drive nails at the required distance apart, so that the lettuce plants will stand six inches apart from each other; in four or five weeks the crop will be ready for market; the ground is then dug over and two quarts of Minnesota Fertilizer Company blood and bones raked in on two hundred and forty square feet of ground, and another crop planted. Under the benches the ground can be used for growing rhubarb and beets and turnips for greens.

The growing of cucumbers in early spring will require a warmer house than for growing lettuce, and the vines should be hung to the rafters eight or ten inches from the glass, and will require to be kept fertilized by hand.

The modes of heating, viz: by brick flue, hot water, or steam, each have their advocates. A neighbor of mine, Mr. C. A. Smith, extensively engaged in floriculture, has tried all, and is firmly convinced that steam is the most economical.

Peter Henderson has tried all, and says he would not tear out hot water apparatus, but in all new buildings puts in steam. My opinion is that a combination of the two will prove best, using steam for winter, and for spring and fall, hot water.

The fuel needed for heating our six houses ran about two tons per week of coal during December, and as high as three tons per week during the late cold spell, or say an average of two and one-half tons

of coal at \$3.50 per ton, or \$8.75 per week. My advice to any person who wishes to build one or two houses only, would be to heat them with brick or tile flues, and that no man should use steam except in an extensive establishment.

REPORT OF DELEGATE TO WISCONSIN.

By J. S. Harris, La Crescent.

The summer meeting of the Wisconsin State Horticultural Society was held at Baraboo, Wis., July 20 and 21, 1887. The meeting of this society was something of a departure from the usual custom of holding it in the midst of the strawberry season, and it proved a very great success, as it was more favorable for securing a good attendance of the members and a fine exhibition of the midsummer fruits. The papers read before the meeting were ably written and full of life, experience and practical suggestions. The people of Baraboo gave countenance to the meeting by their presence, and every session was marked with a full house.

Liberal premiums were offered for the various varieties of small fruits in season, early and last season's apples, vegetables and flowers; and, although the season was thought to be unfavorable on account of the severe drouth that had prevailed, varieties were well represented, and the quality and appearance of most varieties was fine, demonstrating that some horticulturists had met with something besides "blasted hopes and disappointed expectations."

The varieties of raspberries shown were of blackcaps, the Gregg, Tyler, Souhegan, Nemaha, Ohio and Earhart; of reds, Cuthbert, Turner, Marlboro, Brandywine, Shaffer, Colossal; of yellow varieties, Caroline and Golden Queen. The Gregg and Souhegan were the finest of the black, and Ohio and Earhart the poorest. In reds the Cuthbert stood at the head of the list, although the Shaffer was the largest fruit, and Brandywine the most showy and in best condition; however, it did not seem to be a general favorite.

Blackberries were represented by Ancient Briton, Snyder, Stone's Hardy, Wilson Junior and Agawand. The Ancient Briton was the most extensively shown and generally the best fruit, while one exhibit of Stone's Hardy was very fine, one plate of the Wilson Junior was extra fine, and others were the poorest in the entire collection. I was informed that this variety was not as early as advertised, not

hardy, and very liable to bring imperfect or blighted fruit. Lucretia dewberry were larger and finer than the Bartlett, and promise to be more fruitful and better adapted for general cultivation.

Mr. Peffer made an exhibit of seedling apples that were grown in 1886, of medium size, fair quality and in good preservation. Other parties made exhibits of Duchess, Tetofsky, Yellow Transparent, Early Champagne, and a number of other varieties of Russian apples. The Yellow Transparent and Early Champagne were ripe and in good condition to test their quality, and if sufficiently hardy are of so good a quality as to be worthy of general cultivation throughout the Northwest.

A significant feature in all meetings of the Wisconsin Society is the prominent part taken by the lady members, and the papers read by them are becoming the most valuable horticultural literature of the day. Cannot we profit by the example of our Wisconsin neighbors and enrich the pages of our future reports with thoughts of the ladies of our own Society?

REPORT OF DELEGATE TO DAKOTA.

By A. W. Sias, Rochester.

Mr. President and Members of the State Horticultural Society:

This live and progressive institution for the dissemination of horticultural knowledge, the Dakota Horticultural Society, convened in the court house at Huron, December 13th, and closed its last session on the night of the 15th. The meeting was called to order at the proper time by President E. De Bell, of Sioux Falls, who presided with uniform fairness, and with satisfaction to all. It is fortunate for this society and the good cause it represents that it should be so well officered from the very commencement of its arduous duties. It was a most happy surprise to your delegate, on entering the hall where the horticulturists were assembled, to be brought face to face with four distinguished horticulturists of Minnesota fame, viz: H. H. Young, of St. Paul, a former well known editor of Rochester, and well known to your reporter as an uncompromising friend to horticulture. B. C. Benedict, a former partner in the Rochester nursery of M. W. Cook & Co., now of De Smet, and one of the few nurserymen in our section whom the tree planters felt that they could "tie to" as an honest man. Oliver Gibbs, Jr., who showed all nationalities at New Orleans, in

1885, that Minnesota was in the habit of "taking no back seat" in her exhibits of fruits and other farm products, was at this convention, and read an interesting and instructive paper on the Native Plum of Dakota. And last, but I refuse to say least of this horticultural quartet, was the genial, lively Prof. Chas. A. Keffer, of the Brookings Agricultural College, formerly of the Experimental Farm between St. Paul and Minneapolis. I am well aware that the word quartet is more commonly applied to regular musicians than to horticulturists. But I take nothing back, as these gentlemen were not wholly devoid of good music, although they sang solos, while the Farmers' Alliance in session at the same time in the adjoining room, indulged in vociferous concert or "congregational music." An unknown member just behind your reporter was heard to remark that "still waters run deep," which of course shows too much prejudice against a great people who stated, as they had a legal right to state, in actions which speak with more force than mere words, that they must divide the great Territory of Dakota, and know who was running the government there, before taking up any question of minor import, such as protecting their families from the relentless blizzard and tornado, with rapid-growing deciduous and evergreen shelter belts, etc., etc. Hence where the great majority of the Farmers' Alliance were sheltered on the night of the "joint session," "this deponent saith not."

Your reporter is no prophet, but it would appear to a stranger on first entering the Territory of Dakota, that arboriculture was a subject of second, third or fourth importance to her people when compared to the other well ordered industries of the country. But we need not despair, for there is leaven enough in the Dakota Horticultural Society to leaven the whole mass.

The first meeting of the Dakota Horticultural Society was held at Huron, Dec. 18, 1884, at which time a constitution and by-laws were adopted. The second meeting was also held at Huron, Feb. 4, 1885. The next at Parker in 1886, and the last at Huron.

Mr. Harris, in an able paper read at our county horticultural society's meeting, January 7th, speaks of Rochester as "historic ground," being the birthplace of the State Horticultural Society, its first and second meetings being held here. For precisely the same reason we must be allowed to speak of the beautiful city of Huron as "historic ground."

Mrs. L. A. Alderman, of Hurley, the late efficient secretary of the society, we regret to say, was kept from the meeting by illness.

All that is wanted to transform Huron into almost an earthly para-

dise, and render it the best location in the Territory (when divided) for the seat of government for the new state, is for the city to obtain in some shape two hundred or more acres of land west of the city, cultivate the same well for two years in some crop, then if money is an object, set with cuttings of gray willow, cottonwood, Russian poplar, or anything that will succeed best in that location, four feet apart each way, leaving room between this grove and the city for an arboretum. And when the trees become large enough, lay out drives through the plantation and convert the whole thing into a beautiful driving park. In this way the city can be protected in a few years from blizzards and tornados, and have "a thing of beauty and a joy forever" right in sight.

There is no two ways for the settlers on the "oceanic prairies;" they must protect their buildings on the west by shelter belts, or some one will some day "get hurt." The railroads might profit by this hint, and set trees on the west side of all depot buildings throughout all the prairie country they traverse. We can conceive of no better or more humane use for a small part of the cash received from their "watered stock." If they say, as the man did who failed in his attempt to get on board the ark at the time of the deluge, that they "don't think there is going to be much of a shower," and so take no heed, they will in that case "sow the wind and reap a whirlwind."

The election of officers Wednesday, the 14th, resulted as follows: President, E. De Bell, Sioux Falls; vice president, G. H. Whiting, Esmond; secretary, Prof. Chas. A. Keffer, of the Agricultural College, Brookings; treasurer, Oliver Gibbs, Jr., Ramsey; director at large, A. Wardell, Twin Brooks; for North Dakota, William Clausen, Bismarck; for South Dakota, H. C. Warner, Forestburg.

Where all the papers were especially fine it is not necessary to report on each separately. This was true with the above directors.

Leonard Gee's paper on "Experiments in Forestry" was handled in an able manner, showing conclusively that the writer had "been there" and knew whereof he spoke.

"Shelter Belts" by G. H. Whiting, Esmond. You will notice that this writer takes a subject as broad as our Western Prairies, and that he was master of the situation there was none to dispute. If time and space would admit of it, I should be pleased to speak more at length in regard to the rare merits of all the papers read before this convention—but there is one thing of vital importance to the rising generation that I must not neglect to mention here, and that is a resolution offered by Mr. Bushnell of Huron, proposing the appoint-

ment of a committee to devise measures for the general observance of Arbor Day. His plan was to issue a circular letter impressing upon persons having charge of churches, schools, and other institutions, and upon citizens of towns and villages the necessity of planting shade trees upon the grounds in their charge. Now "The Farmer" of St. Paul deals in good common sense when it says of this resolution: "No doubt a great deal of good might be accomplished by following out this suggestion, and that, too, at a trifling expense to each individual."

Were it not for the friendly and most liberal aid rendered the horticulturists by the agricultural press of the Northwest, our noble vocation would be "up hill" business when compared to its present status. This thought was suggested by noting the lively interest manifested in the Dakota Horticultural Society by the Dakota Farmer, not only at her last convention, but from the day of their organization up to the present time. And when I compare this friendly aid to similar papers in our own State, such as "Farm, Stock and Home" and "The Farmer," I perceive no lack of interest. These being facts that any man of ordinary intelligence can comprehend—then why should not every horticulturist in Minnesota aid the agricultural press of Minnesota with both "pen and purse?"

ANNUAL MEETING OF THE DAKOTA HORTICULTURAL SOCIETY.

By Oliver Gibbs, Jr., Ramsey, Dak.

As you will receive from A. W. Sias, who was present at our meeting at Huron last week, and who, by the way, was made an honorary life member, some account of the proceedings, I will leave to him the most that I had in mind as being likely to interest you.

The meeting convened under depressing circumstances, the bill passed at the last session of the territorial legislature providing an annual appropriation to print the horticultural report and to pay the incidental expenses of the society, having failed to receive the governor's signature; and why his excellency had not signed it none of us knew. However, after being together a little while, it was found that the few present were willing to do the work of the meeting just as thoroughly as if an immediate publication was in prospect, trusting that next winter all would come out right, and the public then

have the benefit of the society's papers, correspondence and discussions, in the shape of a proper report.

On Friday, just after the final adjournment, President DeBell, Vice-President Whiting and myself happened to hear that Gov. Church was in town, and immediately we constituted ourselves a committee to call upon him, and forming in a revolving triangle, give him, one at a time, the three points of it if necessary, in missionary labor. Happily we found that the governor was not one of the unconverted. Our bill had failed for the sole reason that it lay too near the bottom of a big pile of bills that the legislature had sent him at the last minute of the eleventh hour of the session, and it went with a number of other important and meritorious bills that he could not get time to read at all before the adjournment—nobody having called his special attention to it, or taken any pains to acquaint him with the needs and plans of the society. Gov. Church is an ardent for-ester and an awakened horticulturist; and the committee, when they left him, carried his invitation to the society to come to him freely at the next session, or at any other time, and with the assurance of his appreciation and support of any suitable bill.

I mention this as an indication that in another year our society will be on an exchange basis as to an annual report, and to ask that our members may be furnished with the Minnesota Horticultural Report of 1888, to be sent direct by mail to the addresses to be hereafter given. I will remit the necessary amount for postage on the entire list upon notice from your secretary that the books will be sent.

There were two peculiarities of our meeting that I cannot forbear mentioning. One was the reports as to the different behavior of the same varieties of trees and plants as affected apparently by local conditions of soil in the district where planted. This was as marked as the well known varieties, between their growth under the known differences of climate in districts far remote in our great territory, and it shows how truly experimental is all our work over here; how much we have to learn of local conditions and adaptations, and how necessary is the horticultural society's work, to teach the people of Dakota what to plant that will suit the local conditions where they live.

Another peculiarity was the disposition to bring out for trial our wild fruits, shrubs, etc., and get into general cultivation such as are found useful. The Sheperdii, the Wahoo, the wild thorn, the sand cherry, the service berry, and even the wild gooseberry and the wild currant, and some dainty wild roses were mentioned, as well as our wild plums which all our horticulturists are becoming deeply interested in. I

would add to this list our beautiful ornamental plant, "Snow on the Mountain" (don't know its botanical name), which is a common pasture weed in South Dakota. It seems to care nothing for drouth or neglect, and is beautiful in all situations; yet when allowed to stand in rich cultivated ground shows that it can respond as well as any other weed to such treatment.

We had a report from a reputable member who had seen it, of a wild plum on the Missouri that beats any native plum of the Northwest ever yet mentioned for size and quality. But as the wife's apron string, attached to the tree for a mark when it was found, had disappeared when our informant went back at the season for sprouts or scions, the identity of the tree was lost. There is hope that it will reappear again at another fruiting season. Mr. Sias can tell you all about this incident in our proceedings.

The next annual meeting will be held at Mitchell the first Tuesday in December, 1888, but there is a probability of a summer meeting in the time of strawberries and June roses, at Sioux Falls; at either of which we should be happy to meet any of the members of the Minnesota Horticultural Society. We have on trial, as reported by the members, a good large list of strawberries from which to gather an attractive exhibition, and the stand of plants is generally reported as very strong. Of roses, we shall know better what we have got when we come together. President De Bell reports a good rose of damask color that is as hardy as the wild rose, and blooms from June till autumn. Its name is *Rosa Ragusa*. We have never had any roses in our garden that were safe in all winters without covering, except the Scotch white and the old-fashioned blush, and these are the better for covering.

P. S. In a letter just received, January 8th, from President De Bell, I learn that there is a prospect of getting our report printed through the Commissioner of Immigration. The society is indebted for this to a suggestion made by Gov. Church, at the interview above mentioned at Huron.

Coldest temperature here this winter, thirty below zero. Plenty of snow. It fell during the last of November, and covers prairies, fields and orchards like a tight blanket. Ground froze rather dry, but thawed out in December under the snow, and absorbed plenty of moisture. Badgers were busy digging out gophers during the warm week in the middle of December, through a foot of snow.

President Elliot announced the following committees on award of premiums for prize essays, viz:

On orcharding and on grapes—E. H. S. Dartt, J. M. Underwood, and M. Pearce.

On strawberries and raspberries—A. W. Latham, O. F. Brand, and M. Cutler.

On blackberries and dewberries, and on currants and gooseberries—J. S. Harris, A. W. Sias, and Wm. Lyons.

The meeting adjourned until 2 o'clock P. M.



MINNESOTA STATE AMBER CANE ASSOCIATION.

ELEVENTH ANNUAL SESSION,

HELD AT MINNEAPOLIS, WEDNESDAY, JAN. 18, 1888.

The eleventh annual session of the Minnesota State Amber Cane Association was held at Market Hall, Minneapolis, on Wednesday afternoon, Jan. 18, 1888.

The Association met at 2 o'clock p. m., and was called to order by the secretary, Prof. E. D. Porter.

Prof. Porter said a letter had been received from Capt. Blakeley, of St. Paul, the President of the Association, stating it would be impossible for him to be present at the meeting, owing to pressing engagements elsewhere.

Vice President Day was called to the chair.

The minutes of preceding meeting were read and approved.

After a short intermission for reception of members, payment of annual dues, etc., the following paper was read:

IMPROVEMENTS IN MACHINERY AND PROCESSES OF MANUFACTURE.

By B. Densmore, Red Wing.

The first public expenditure of money under the direction of the department of agriculture for experimental work in manufacturing sugar from sorghum was made in the year 1885, at the Ottawa Syrup and Sugar Works, Ottawa, Kansas. The diffusion process was employed, and the results obtained were general in character. An extraction of ninety-eight per cent of the sugars of the cane was claimed, niety-seven one-hundredths of which could be placed on the market either as dry sugar or molasses.

The Ottawa company was, however, a failure financially, and for the following year, 1886, the Parkinson Sugar Company was organized at Fort Scott, Kansas, and a commodious works or factory established as a nucleus in which the department could pursue experiments still further. The buildings, and to a great extent the machinery, for these works was furnished by the company, but the more important aids and fixtures, in the form of a complete diffusion battery, carbonatative apparatus, filter presses and vacuum pans, were furnished by the department of agriculture.

Almost, if not the entire, sorghum crop for 1886 tributary to Fort Scott was consumed at these works in purely theoretical and experimental work, concerning which Dr. Wiley, the United States chemist in charge, states in his official report as follows:

“In a general review of the work the most important point suggested is the failure of the experiments to demonstrate the commercial practicability of manufacturing sugar from sorghum.”

Thus far upwards of \$100,000 of public money had been expended in these experiments, and with failure as the only acknowledged result; but the management of the Fort Scott company, having an abiding faith and being still possessed of undaunted perseverance, “made careful selection of the essential parts of the process already used, omitted the non-essential and cumbrous parts, availed themselves of all the experience of the past, and, in the season of 1887, attained that success which finally placed sorghum sugar making among the profitable industries of the country.”

The experiments of 1886 were substantially an effort to adapt the juice of sorghum cane to the diffusion and carbonatative process, instead of which the process should have been so modified or changed as to meet the requirements of sorghum.

Diffusion and carbonatation are employed in Germany and France, and with great success, in extracting sugar from the beet root, but the process in full and as there employed is not adapted to the manufacture of sugar from sorghum.

This fact was recognized in 1886 by the Fort Scott management, and in 1887 they, having by experience learned what best not to do in order to treat sorghum juice successfully, were in a position of advantage, and prepared to derive all the benefits possible from the work which had been undertaken by the department.

The process of sugar making, as now developed is, briefly, nearly as follows: The seed tops are removed from the cane while yet in the field where grown. The first step at the factory is to separate the

leaves and leaf-sheaths from the cane. To accomplish this the cane is cut into short sections, and then run through a system of fanning mills the blast of air from which blows out all the light material. The cleaned cane is next cut into fine pieces or chips, and is then ready to go into a cell of the diffusion battery, where it is subjected to a leaching or soaking process with hot water. Each cell of chips is held under this treatment for sixty or seventy minutes.

The diffused juice is said to have taken up and to hold in solution ninety-eight per cent of the total sugars of the diffused chips, and to consist of about half a gallon of water to each gallon of juice obtained from the cane. Milk of lime is used in the usual manner for defecation, and the clarified juice is then evaporated in vacuum to a semi-syrup, and lastly boiled to grain in the large vacuum or strike pan. Under the most favorable circumstances the time occupied, from cutting the cane for cleaning, to dumping the strike of sugar or milada from the vacuum pan, is about twelve hours.

The encouraging results had with diffusion have fairly brought before the sugar industries of the United States the question of how best to extract the juices from the cane, whether by rolling or grinding in the mill, and thereby obtaining something over fifty per cent, or by diffusion, and thereby securing nearly all the sugars of the cane. It is already evident to practical manufacturers that the best quality and greatest quantity of product can be obtained from cane which has been thoroughly cleaned, hence the first and great desideration for the successful manufacturer is a machine which will do this work rapidly and efficiently, whether the juice is to be extracted by milling or by diffusion.

The advantages of diffusion consist mainly in the large extraction obtained thereby. Diffusion has, however, its disadvantages—first, the diffused juice consists of one hundred parts of juice from the cane to fifty or more parts of water added in the process of diffusion, and thus the relative cost of evaporation is increased nearly sixty per cent. Second, the exhausted chips or begasse, being surcharged with water, have no immediate value as fuel. Third, the immediate and determined effect of diffusion is to completely destroy the normal character of the juice. At its best, as expressed by the mill, the juice is very unstable in its character and relative bearings. Fourth, diffusion extracts soluble solids and coloring matter to a great extent, and equally as well as sugar, and these, except such a part of them as may be skimmed off or precipitated, finally incorporate with the sugars, giving a heavy precipitate in a heated solution of the crystal-

izable sugar, or rendering the non-crystalizable sugar, glucose or syrup a black opaque molasses of rank flavor. Lastly the great cost of the diffusion plant places it practically beyond the reach of the average sorghum manufacturers.

The report of the Fort Scott works for 1887 shows an average product of 49 pounds of sugar and 10.6 gallons of molasses to the ton of field cane, and an average of $10\frac{2}{3}$ tons per acre, an average product of 523 pounds of sugar and 113 gallons of molasses.

The total products from four hundred and fifty acres are reported at 235,826 pounds of sugar and 51,000 gallons of molasses. The average for the season of the analysis of the diffused juice is two and ninety-five one-hundredths of sugar to one of glucose, while the ratio in product is one of sugar to two and one-half (nearly) of molasses.

In this connection the inquiry may not be impertinent as to the loss of sucrose which may be sustained by reason of inversion—a source of loss ably endorsed by the state of degradation established in the juice by the diffusion process, and which finds ample opportunity for accentuation in the time consumed after diffusion and before the grain is completed in the vacuum pan.

If we allow nine pounds of the above sugar to represent one gallon of molasses, we have on this account 26,203 gallons, or a total of 77,203 gallons of molasses (or syrup).

The fuel account for the amount of cane worked for sugar and syrup averaged, on this basis, thirty-five and one-third pounds slack coal, equivalent to nearly twenty-five pounds soft coal per gallon.

Reports from factories employing the mill and open pan evaporation instead of diffusion and evaporation in vacuum, show an average of thirteen pounds of soft coal used as fuel to the gallon of syrup made—a difference of nearly fifty per cent on account of fuel in favor of the mill and open pan evaporation. The highest coal bill reported from these factories is sixteen pounds of coal to the gallon of syrup made, or a difference of thirty-three and one-third per cent in the same direction.

Again, and from the same reports, the Fort Scott factory averaged sixteen gallons of molasses to the ton of field cane, having a market value of twenty cents per gallon, while the mill factories averaged twelve and one-half gallons of syrup to the ton of field cane, and having a market value of forty cents per gallon.

These figures cannot be taken as conclusive regarding the relative merits of the two methods under consideration,—milling and diffusion,—but they may be taken as an approximate index of what the method to be employed in the future will be.

The juice obtained by diffusion has not yet turned out a product equal in quality to that obtained by milling. Diffusion employs three very active agents or factors—time, heat and pressure, and with these affords a liberal opportunity for the full action of atmospheric influences. Milling employs but one agent—pressure. A careful examination of the statements made shows the relative bearings of these methods.

Briefly, milling with a much higher grade product than diffusion, while the latter furnishes about one-third more in quantity.

Diffusion is a long stride ahead, but it is self-evident that it is yet in a crude form. Whether it will be found practicable to materially reduce the amount of time consumed in the process, as well as the volume of added water and the amount of coloring and other matter extracted with the sugar, and whether the cost of the plant can be reduced to bring it within the ability of the average manufacturer to purchase, remains to be classed with improvements yet to be made.

Prof. Porter said he had hoped Prof. Swenson, the director of the works at Fort Scott, would be present at this meeting, but he had been detained by storms, etc. He had received a letter from him stating he had just returned from Texas, and had not received the letter sent him requesting a report of their operations there till it was too late to comply with the request. Prof. Porter described the process of manufacture of sugar and syrup there and at the works at Rio Grande, New Jersey.

By the process followed at Rio Grande they had secured one hundred and thirty-five pounds of sugar to the ton of cane this past season. With Southern cane the yield is about two hundred and twenty pounds of sugar to the ton. The Southern cane was ahead of the Northern, but when the question of seed and everything was considered, honors were about even.

He thought this whole subject of Amber cane culture had been conducted improperly in this State as an industry, and there was a departure from the objects contemplated when the Association was organized, some twelve years ago. They had heard of the old adage about spoiling a most beautiful horn in order to make a spoon. The object had in view was the manufacture of syrup for home consumption in Minnesota, an enterprise entirely feasible and not requiring much machinery. Too much attention had been given to experiments

in the manufacture of sugar, which required expensive machinery. The only way for the farmer to get pure syrup in Minnesota was to grow it on his own farm, take the cane to his neighbor's mill, and sit on the barrel till it was manufactured into syrup, for if left out of sight a single hour the barrel might be filled with glucose, since that article could be furnished at about one-fourth the cost of pure syrup from the cane. Here was the principal cause for a decline in the Amber cane industry in Minnesota for the past three or four years. Those most deeply interested in the business had been turning their attention to the manufacture of sugar. There was no question about our ability to make sugar, as it had been done by two persons in the room, who had made a success of its manufacture in a commercial way; but it was not worth while for farmers generally to undertake to raise their own sugar till they had succeeded in producing all the syrup that was needed. Half a dozen farmers could club together and grow Amber cane in sufficient quantities to make the manufacture of molasses profitable.

Mr. J. F. Porter of Red Wing was called upon to report as to his success with Amber cane. He said he had but few remarks to make on the subject. He had made about 4,000 gallons of syrup the past season, of which amount about four hundred gallons was of his own raising. He had made no effort to manufacture sugar.

Mr. Kenney was called upon for a report and a paper.

AMBER CANE INDUSTRY.

By Seth H. Kenney of Morristown.

Gentlemen of the Minnesota Amber Cane Association:

I have to state that some little time ago I received from an editor in the East, through Prof. Porter, a request for a statement of this year's work on Amber cane. Although I was a good deal hurried at the time, I sat down and wrote a brief statement. As I had been pressed for time I requested the report to be returned to me, and here it is:

MORRISTOWN, RICE CO., MINN., Dec. 1, 1887.

DEAR SIR:—Prof. E. D. Porter, of the State University, has sent me your letter which is full of practical questions, requiring, to be correct in answers, a first-class chemist, however I will give you some facts, using your questions as a basis for replies.

First—As to sorghum sugar. It has not been produced at a practical profit till the fall of 1885. This has been brought about by the in-

vention of John F. Porter, of Red Wing. A steam evaporator (for information address Densmore Bros., Red Wing.) on the principle that high heat long continued inverts the sugar. The pipes are of copper, and I made on one of them one and one half gallons of syrup per minute on Amber cane juice that tested by SACH ten degrees of density, after defection and juice little below boiling point. Having excellent cooling facilities, this syrup by open evaporation, ran sugar of a good grain right from the coolers into the receiving tank, giving us the finest syrup in the United States, and that is saying a good deal. In proof I shall send a jug by express to you, Here is the secret: good ripe cane, thorough defection, rapid evaporation, rapid cooling. When made I put in 2,600 gallon tanks. The sugar forms in the tanks and settles, and we draw off the syrup; the sugar is at the bottom. We wait till the summer comes when thermometer is 85 degrees. We can drain this sugar 100 pounds to a batch in centrifugal and rewash the drained molasses.

Second—Average production has been so far as my experience goes four pounds per gallon of syrup. The cost has been with me to manufacture about six cents per gallon, not including drawing the sugar. I have not worked with special reference for sugar, but it will come without effort.

The market price the past three years has been 45 cents by the barrel and 50 cents by the keg, price of package added. Price paid for cane with seed cut off leaves just enough wilted so as not to extract green matter from them. The seed we feed to milch cows Boil and feed to hogs, making good pork; boiling to a pulp extracts the astringent properties. The begasse we spread direct from the cane mill and when dry place in a rick or stack for stock of all kinds which do well on it. It must be dried well, and I consider it worth as much as timothy hay; never less than ten tons, average twelve and one-half tons per acre—have grown twenty tons. Never lost but two crops in twenty-seven years, and then not an entire failure. Surer than any crop I know of to give good returns. It cost me to grow forty acres cane to cut, top, and deliver it to mill quarter of a mile, \$1 50 per ton. I began September 1st, ended October 1st, only run day time. Run two mills, used about ten and one-half gallons of juice per minute for one and one-half gallons of syrup. If juice was poorer about seven gallons per minute for one gallon of syrup. To lengthen season plant some later; have to use care about frosts. Three degrees below freezing point cooks it some. The same cane cut up twenty-four hours before frost loosens the juice cells and prevents rupture, so it is safe

if cut soon enough, say by September 18th. In boiling seed, water should be hot, then put seed in; it will not burn on kettle then. I have answered your questions as near as possible. Should you wish to see what can be done I will send five gallons in new keg, on cars here, \$2.90 My crop is now more than half sold.

I have jotted down the following additional notes:

Eleven years ago the present month it was thought by quite a number of persons that the Amber cane industry in Minnesota ought to be encouraged, and to do this successfully required a State organization. The present condition of the industry is such that we can all work with renewed confidence. The reports from Fort Scott, Kansas, from Rio Grande, N. J., and from our own State, enable us to present evidence that this State, for quality of syrup and sugar, will compare favorably with any other state.

To give you anything like a report I shall have to refer to my own work. My former factory was made before we had learned the kind of buildings adapted to the wants of the work; so, early last summer, I planned and built four new buildings, with special reference for having everything in the right place. The results have proved it a paying investment.

The boiler capacity of the works is ninety-six horse power, the engine sixteen horse power. (This might seem to some out of proportion, but it was just right.) I run two cane mills, that furnished about ten gallons of juice per minute. The juice was elevated by pumps to two settling tanks, of three hundred gallons each, filling first one and then the other. As soon as I began to fill a tank I put into the juice about one-half the lime required for a good defecation. The object was to prevent the acids which come from the joints and sheaths from inverting the sugar.

This is in keeping with the work at Fort Scott, except that they placed the lime on the sliced cane. I have practiced this for many years, and think cane juice ought not to stand without being treated with lime. As we fill one of these tanks in thirty minutes we then commence to fill the other, so that when the juice is drawn into the deficators it has not usually stood more than thirty minutes to settle before going into the deficators. It goes from the tanks to the deficators. These are wooden boxes, $2\frac{1}{2}$ feet wide, $2\frac{2}{3}$ feet deep and $6\frac{1}{2}$ feet long, lined with copper. They each have a coil of two-inch pipe, fifty feet in length if straightened, which fill with steam and are provided with tight-fitting steam joints, so that by loosing two set-screws they can be taken out and quickly cleaned; and when kept in

good condition will heat three hundred gallons of juice in fifteen minutes, or about one-half the time it takes to grind the corn for that quantity. In these deficators the rest of the lime is added as soon as they are filled. It is then heated nearly to the boiling point, when the steam is shut off, and the thick blanket of vegetable matter removed. It is then allowed to remain quiet to settle the heavier portions which do not raise to the top. This juice is next run into a six-hundred gallon tank, and stored ready for the evaporators.

This storage tank holds the entire contents of the two deficators, and will last the evaporators one hour. I have mentioned this treatment of the juice before boiling. It comes to the evaporator nearly as clear as spring water, with the fodder taste taken out, which, for making first quality syrup, is absolutely necessary. Now we come to the evaporators, two of Porter's No. 3. They will boil six hundred gallons per hour into heavy syrup. I only use one at a time. Their capacity is from sixty to ninety gallons per hour of syrup, in proportion to the richness of the juice. The advantage of having two evaporators is in cleaning the pipes, which are of copper. We can change from one evaporator to the other without delay, which is all important when we consider ten minutes represents one hundred gallons of juice and the time of seven or eight men. I could say everything for this evaporator, for I owe my success in this business to it, and if I had twenty car loads of syrup I could sell it all at good prices. The business is now reduced to a perfect system, and both sugar and the finest syrup that is made is made with these evaporators.

We have brought samples of 8,000 gallons. I think the entire crop would give four pounds of sugar per gallon, and I feel that I can depend on the results with certainty. The seed almost pays the cost of cultivation. The work by steam requires much less fuel than by the old way of boiling. The demand for the syrup grows better. The past year we dried the crushed stalks, and all kinds of stock do well on them, eating them in preference to wild hay. I learn that most of the syrup, as made by the farmers, was bought up at from 25 to 30 cents per gallon, shipped to Chicago to sweeten glucose, sent back and sold to a wholesale house at about 30 cents, and retailed at from 50 to 60 cents.

There ought to be good cane works in every county to supply the home demand for syrup and sugar. It is a direct home trade. It saves transportation, and barrels of it can be exchanged for any kind of groceries. People will buy the pure article. I do not care for the glucose.

I do not know but I have trespassed on friend Densmore's paper on manufacture, but I could not have shown what a perfect system the industry is now reduced to except I had followed it through.

ELECTION OF OFFICERS.

The Association proceeded to the annual election of officers for the ensuing year.

On motion, the present list of officers was re-elected, viz.:

President—Russell Blakeley, St. Paul.

Vice President—Ditus Day, Farmington.

Secretary and Treasurer—Prof. Edward D. Porter, State University Experimental Farm, St. Anthony Park.

Executive Committee—Russell Blakeley, Ditus Day, Prof. E. D. Porter, Seth H. Kenney, J. F. Porter.

THE HONEY INDUSTRY.

It was suggested that a few moments be given to discussion on the Apiary, and Mr. Wm. Danforth, of Red Wing, was requested to come forward and address the Association upon the subject.

Mr. Danforth exhibited some fine samples of comb and strained honey in frames and glass jars. He said:

MR. CHAIRMAN: I don't claim to be a bee or honey man, nor to understand the business very well. I have been too much occupied with other kinds of business to make the subject a study, but I think the honey industry a very important one. Although we have to search around considerable to find a competent bee man, we have such a person present in the person of Mr. Urie, who can tell you much more than I can on the subject.

The first swarm of bees he had anything to do with was when he was a boy of thirteen years, when he had followed a stray swarm some three-quarters of a mile and succeeded in saving it. They were taken home, and in two years when he left home he had quite an apiary. He soon found that it could be made a remunerative business. Year before last, he said, we had a ton and three-quarters of honey, and about a ton the past season. He had not been at home to give them any attention except about twelve days, the care being bestowed by his wife and hired help. It was a rather poor honey season this year.

His method was to work the bees for honey; to control the bees and

compel them to make honey, and at the same time to increase the stocks. Last year his honey at current prices was worth \$600.

Mr. Wilcox. I would like to ask how many swarms you have?

Mr. Danforth. I put forty-one swarms into my cellar.

Mr. Hillman. How do you manage to keep them from the frost?

Mr. Danforth. I keep them in a cool and dark place. They are kept quiet from the beginning of the winter till the end.

Mr. Dartt. Do you use moveable frames?

Mr. Danforth. Yes, sir; I have but one kind of hive, and that the old-fashioned kind; there are twenty-eight sections in a case for the surplus honey, and when a case is filled we slip another one under until the top case is filled.

Mr. Dartt. How do you manage your queenless colonies?

Mr. Danforth. We get another queen to supply the bees; we use Italians as much as possible. It is impossible to keep them pure. I think the natives perhaps finish up their honey in the best shape, but the Italians make the most honey and are the most profitable if kept pure.

Mr. Mitchell. What do you use for pasture?

Mr. Danforth. Mostly clover, of which there is an abundance on the Mississippi bottoms, as well as other flowers.

Prof. Porter. What kind of honey is the best in quality?

Mr. Danforth. White clover and basswood.

Mr. Mitchell. Which do you prefer, natural or artificial swarming?

Mr. Danforth. I think most of natural swarming. I think they are the most successful. You can keep them back with the extractor.

Mr. Hillman. Do you extract the honey, or remove the cases?

Mr. Danforth. That depends upon circumstances. It pays best to extract the honey. It is estimated that it takes about twenty times as long for the bees to make a pound of comb as to make a pound of honey. We extract the honey by using the moveable frames, and the same frames can be used three or four years. But I will give way to Mr. Urie, who knows more about this subject than I do.

Mr. William Urie, of Minneapolis, was then called upon to address the Association, and came forward and said:

REMARKS OF MR. URIE.

Mr. President and Gentlemen of the Amber Cane and Horticultural Societies :

I have made apiculture a study for the last forty years, at least a good deal of the time, and yet with all this experience I have not fully mastered it. There is a good deal to be learned, and it is one of the greatest studies we have. I claim that it is one of the greatest insects that has ever been given to man,—the honey bee,—and perhaps the least understood. The reason why so few are engaged in the industry I do not know, unless, as the Irishman says, “The bee has a warm foot.” [Laughter.]

There was no trouble in getting along with bees with proper treatment. The first swarm he ever owned was down in Vermont, and he traded a tub of maple sugar for the swarm and hive, with a corncob stuck in the the top of the hive. In those days honey was obtained by the use of brimstone, but those days had passed away.

The proper way to handle bees was to strengthen the weaker swarms from the stronger colonies, which should be done from the first to the tenth of May.

He described the method of dividing the swarms. He had kept from two hundred to three hundred stands at one time, and had experience in the business in the states of Vermont, Illinois, Virginia, Maryland and Minnesota.

When he came to this State he brought fifteen colonies, which were increased the first year to forty-eight, which yielded him 1,500 pounds of as fine box and strained honey as he had ever seen. He had taken a box of honey with him on an eastern trip, which had been pronounced by experts the finest they had ever seen. Minnesota was as good a state as any other in the union for the production of honey.

Most of the honey produced in this vicinity was from white clover. The sample exhibited by Mr. Danforth was made from different flowers, and therefore he had an advantage in producing honey of very fine quality. His apiary was located at 2,520 Bryant avenue north. He had built a house for the protection of his colonies of bees, which was 12x24 feet in size, and was so constructed as to be as frost proof as possible. There were four air spaces, and the house was so constructed as to prevent dampness, and he had no trouble in keeping them through the winter without loss.

Anyone going into his bee-house at the present time would find in the coldest weather the bees apparently asleep, and consuming very

little honey. And they would remain there at the proper temperature until March or April. It was necessary to keep them dry and warm, and if the house was properly constructed, with sufficient air spaces, it would never freeze—not even potatoes. There was nothing like dead air spaces to keep out cold.

A great deal had been said and written about the bee moth destroying bees, but the method of preventing their ravages was as simple as A, B, C. There never was a swarm destroyed by them that was good for anything. It frequently occurs that a colony loses their queen. In passing into the air to be fertilized the queen not unfrequently gets into the wrong hive and is instantly killed, soon leaving the swarm minus any eggs and minus any young queens. As a consequence in four or five weeks, if we do not take the honey the millers will. The proper course to pursue is to introduce a new queen, which is easily accomplished; and in a period of fifteen days the colony will be supplied with a new queen. A queen had been known to lay three hundred thousand eggs in twenty-four hours. It is very interesting to observe their habits. The queen does not feed herself, but is fed by the bees, and requires a good deal of food while laying. He said there were a great many patent hives, as well as a great many theories with regard to the best method of raising bees. The Langstroth hive was the best. It was convenient for handling the honey or controlling the colony. A single swarm should furnish from fifty to ninety pounds of box honey. Bees increase faster in a cold than in a warm climate.

He considered artificial swarming the best, and the process was a very simple one. There was always something to be learned in the business. He could take as much profit from fifty good swarms of bees as could be obtained from fifty good cows, and was not afraid to try it with anyone. He would not agree to do it every year, as there are poor honey years, but in an average year he could do it every time.

Amber cane was no doubt a good thing, but he preferred honey to Amber cane syrup, as being finer and a greater luxury. Honey could be produced with profit at ten cents per pound. He was fortunate if he could get twenty cents for his box honey, and he never had a poor article. When nice white comb honey sold for less than eighteen to twenty cents it was not a profitable business, and it ought not to bring less than that price. But strained honey at a shilling a pound ought to satisfy anyone.

He had been very much entertained with the remarks on the subject

of Amber cane, and also with the topics discussed by the Horticultural Society. He was much interested in tree culture and everything in the fruit line. He had raised four acres of Amber cane in one year. That was twelve or fourteen years ago when we had no improved machinery like we have now, therefore the experience would not be of much benefit in that line. The Amber cane syrup that is now made is very fine indeed. He hoped the industry might be greatly developed in this State. Thanking you, gentlemen, for your attention, I will not take up any more of your time.

Prof. Porter. I want to say a few words on this bee question. I am also from Vermont. I commenced the growth of bees, and had the fever badly about thirty years ago. I got it from Mr. Langstroth. I lived almost next door to him, and I took my lessons in apiculture from him. I prosecuted the business quite successfully for some five years, and I think of all the hobbies I have ever had, I have derived more real enjoyment from apiculture than from anything else. There is more in the management of bees to interest a man, whether he is a scientist or not, than almost any other industry I know of. The whole economy of the hive is something truly wonderful, and it is something that is constantly stimulating investigation from the very first time the bee takes its flight in the spring, until it goes into winter quarters in the fall.

I concur in what has been said on the subject, but I wish to approach it from another standpoint, and that is the horticultural. When passing through the State, I have found thousands of acres of white clover scattered here and there, and apparently hundreds of acres of blossoms where there was a single honey bee. If it had been in Pennsylvania, New Jersey, Delaware, Maryland or Virginia, in such fields you would have seen swarms of honey bees buzzing around you, gathering nectar from these thousands of flowers. This surprised me. Then again, when I have come to look at the fruit trees that have been planted out covered with blossoms, I have wondered why there were not more bees kept for the purpose of accomplishing complete fertilization. And I have often thought that perhaps one reason why we did not succeed better in fruit culture was because we had neglected the development of the bee industry.

We have plenty of pasturage for bees here in this State, and I hope this coming season there will be an effort made to greatly develop this branch of farm industry for the benefit of the people generally, and especially in the interests of horticulture. It seems to me that if more attention was given to the business it would tend greatly towards making Minnesota a fruit-growing State.

Mr. Pearce. I was engaged in bee culture for some fifteen years in Minnesota, and I think they are very nice for those who understand them. I think the bumble bee and the hornet are our best friends. The common bee never works on red clover. We should never destroy hornets, yellow jackets or bumble bees, as they are the agriculturist's best friends. It is the general practice to destroy these insects, but it is an error altogether

Mr. Wilcox Mr. Chairman and Gentlemen: I did not intend to say a word on this honey subject, but you have touched on a tender spot, as I am also from Vermont. I consider that this, in connection with horticulture and fruit culture, is one of the most valuable as well as most pleasant occupations in which we can engage. I brought some twenty-eight swarms of bees to this State with me a short time since, and I expect to make a success in the industry. I believe thoroughly in trying the best, as much as I would in any other stock. I believe in artificial swarming. Many authorities have condemned it, but results show that it is the best. There is hardly any subject about which the general public are so ignorant as they are of the good and bad qualities of the honey bee. About eighty per cent of the honey is composed of pure glucose—in its pure state one of the best sweets we have.

Mr. Dartt. Mr. President, it seems to me Vermont is pretty well represented. [Laughter.] I want to back up the theory of my friends, that the bees are friends to the fruit grower, but I wish especially to confine it to the hornet. I think the hornet is a decided success in that direction. Now on one of my apple trees there was a very fine hornet's nest, and it had also about a barrel of very fine apples, of which I dare say I should not have had any left if it had not been for my friends, the hornets. [Laughter.] One of these prowlers came around who are accustomed to robbing orchards, and when he saw those fine apples he could not resist the temptation to take one or two. He got the apple and the bees got him, and the way he tumbled and rolled in the grass was decidedly amusing. I therefore vote in favor of the hornet. [Laughter.]

Mr Wilcox said he regretted there was not a bee keepers organization in the State, in order that this subject might be fully discussed, and that it might receive more attention than was being given to it. He was satisfied that the lack of bees had a marked effect in the amount of agricultural and horticultural products produced from a lack of fertilizing, which was accomplished by the presence of the bees; although he thought perhaps they could not work on red clover.

Prof. Porter claimed that the Italian bee could fertilize red clover. This species was better than the ordinary black bee, as it worked earlier in the day and later in the season. He thought bees were horticulturists' best friends

Mr. Wilcox said that Italian bees were very much like new strawberries, that did very well to advertise and sell, but most of them would fall back upon the Wilson in the long run. It was the same with Italian bees; among all the importations there was nothing superior to the common black bee.

Prof. Porter said he was thankful for the illustration as to the Wilson strawberry. Of all the new varieties that he had tried during the past twenty-five years, it was about the best, and there was probably a thousand quarts of Wilson grown for a single quart of any other variety. But he believed in Italian bees. For ordinary purposes the black bee would answer, and if not protected the Italian would degenerate and the black bee would take possession of the ground.

Mr. Urie said in regard to the Italian bee, that if it had not been introduced black bees would have gone by the board, and it was the salvation of the business, and no mistake. He was not selling Italian queens, but he handled them altogether, and had been doing so for years. He had some doubt about their fertilizing red clover, unless it was the second crop.

Mr. Hillman inquired if there were any objections raised to the keeping of bees in cities.

Mr. Urie said he now had one hundred and fifty-eight colonies at his place of residence at North Minneapolis, and had heard no complaints from any of his neighbors. If people disturbed them they were liable to be stung, but he had experienced no difficulty whatever. In Aurora, Ill., where he had one hundred and seventy-two colonies, a few of his neighbors had undertaken to have them removed from the city. They petitioned the common council to remove them, but the members of that body took the position that they had no more right to interfere with a man's private business in that way than to take away one of his horses or other personal property. He said Italian bees when aroused had stingers and knew how to use them, but when properly managed were as tractable and quite as little trouble as a lot of sheep. Bees had an aversion to horses and could not endure the smell of ammonia.

Prof. Porter said most of the difficulty experienced in keeping bees in cities was occasioned by the odor from horses, and being brought in contact with them. They should not be hitched too near them.

Mr. Pearce had kept bees in the city, and thought a serious objection to them was the damage they did in alighting on clothing hung to dry.

Prof. Porter said as a rule bees will deposit all their excrement within a short distance of the hive. This difficulty would only be observed in the spring of the year.

Mr. Danforth said they hung their clothes near the apiary, and never had any difficulty of that kind.

Mr. Urie said the objection referred to applied only to the first day's flight in the spring. Some people find fault without reason and condemn the whole honey business without any good grounds.

Mr. Hillman said he did not hail from Vermont, although when a boy he used to look wistfully at the wonderful mountains of that State from the hills of Washington county, N. Y., where he took his first lessons in bee culture. It was a profitable business, and he had been much interested in the discussion of the subject this afternoon.

Prof. Porter here suggested that the Amber Cane Association should unite with the State Horticultural Society. There was no sufficient reason for maintaining separate organizations. This subject of Apiculture and Amber cane culture might just as well be considered in the meetings of the Horticultural Society as to maintain separate associations. The time had come when they could profitably consolidate.

Mr. Kenney felt very kindly towards these industries or any other that would help promote the interests of the farming classes, and thought the suggestion of Prof. Porter a good one.

Mr. Harris said he saw no objection to uniting the two societies. It might have a tendency to add strength to the Horticultural Society, and as he was a thorough horticulturist he did not wish to oppose it. It might be well for the officers of each association to consider the matter and take such action as was necessary.

Mr. Elliott moved that the matter of uniting with the Horticultural Society be referred to the executive committee, which was carried.

Mr. Dartt said he felt inclined to favor the bee men, and was a friend to the honey bee. Bees were good fertilizers of the flowers. Why not arrange so that the bee men could come in with the Amber cane growers every year?

Mr. Wilcox. And why not add maple sugar?

Mr. Dartt. Let us have everything that is sweet, but perhaps we can save the necessity of having a bee association.

Mr. Harris. Horticulturists will certainly favor the honey bee, as it has an important office to perform in the fertilizing of fruits.

On motion of Mr. Dartt the meeting of the Association was then adjourned.

AFTERNOON SESSION.

WEDNESDAY, JAN. 18, 1888.

President Elliot stated upon the adjournment of the Amber Cane Association that the business of the Society would be resumed for a short session.

It was decided to take up the subject of forestry. Following is the paper prepared by Mr. Smith upon the topic:

THE STATE FORESTRY ASSOCIATION.

By C. L. Smith, Minneapolis.

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

Your Secretary has asked me to say something about the work of the State Forestry Association. We have very little that is new to report. The appropriation made in 1883 was only partly expended; 10,000 copies of the Forest Tree-Planter's Manual, prepared by Mr. Hodges, were printed, and nearly all have been distributed.

A bill was presented to the last legislature asking for an appropriation of \$3,000 for the Forestry Association, but it failed to become a law, and consequently we have had no money to do with. If we had received the appropriation the board of directors intended to publish a revised edition of the manual for general distribution, and to have kept the secretary busily engaged in the work of collecting and disseminating information on the subject of forestry. Although we have had no money, we have done something for the forestry interest. During the year 1887 nearly 1,000 copies of the manual have been distributed at farmers' institutes, county fairs and through the mails. I have answered over four hundred letters of inquiry from planters, or those who contemplated planting. I have written over two hundred articles on the subject for the various news and agricultural

papers, and delivered over one hundred public addresses on the subject of tree planting. There is every reason to believe that these efforts have done something towards stimulating intelligent planting and cultivation of trees.

From one county we have reports of over 20,000 evergreens planted last spring; and although the drouth was severe and long continued, the young trees were so carefully handled, so well planted and cared for that over seventy-five per cent of them are alive and looking well. In another county, one prominent farmer became so interested in the tree talks at a farmers institute that he concluded to plant an experimental belt of evergreens, and purchased from a reliable dealer 1,000 each of white pine, Scotch pine, Norway spruce, white spruce and arbor vitæ. He reports, November 1st, 80 per cent of arbor vitæ and spruce, 60 per cent of white pine and 40 per cent of Scotch pine alive. I questioned carefully as to some cause for the excessive failure of Scotch pine, but failed to get any information upon which to base a conclusion. However, as a whole, he is well pleased with the venture. The trees were well mulched and are in good condition to stand the winter. He will add another 5,000 trees to his plantation this year, and replace all that died from last year's planting. The following directions were given him for planting, and he says he followed them in every detail:

Carefully prepare the ground by deep plowing and thorough harrowing; unpack the trees in a cool, shady place; wet the roots; while planting, carry them in a pail half filled with muddy water; open a furrow eight inches deep—only one furrow at a time, so the soil will be cool and moist; set the young trees about an inch deeper than they grew in the nursery; straighten the roots; work the earth closely around them; pack it firmly; never let the sun or wind reach the roots; keep cool and moist until planted; cultivate after, but shallow; let no weeds or grass grow; do not let the surface get hard; if for any reason frequent cultivation cannot be given, mulch with coarse manure, straw or hay.

I traveled over a large part of the State during May and June, and visited many newly-planted tree plantations. The rage for Russian mulberry and hardy catalpa seems to have subsided. Willow, cottonwood, ash and box elder are the principal varieties planted. I have no hesitancy in saying that for the purpose of fuel or shelter from winds, the white willow gives the quickest and most satisfactory results. The demand for young trees for forest planting has exceeded the supply, and I believe all our nurserymen and tree growers have

found a market for their entire stock each year. I am also well satisfied that planting and cultivation is being carried on more intelligently than in the past.

In looking over the cellars and packing sheds of prominent dealers, I find them exercising more than ordinary care in storing and handling stock, with an evident desire to get the stock to the planter in the best possible condition. Such a method of business is worthy of commendation, but I am sorry to say that in some cases there was evident carelessness in handling stock, a disregard of the interests of the planter that should be classed with highway robbery. Evergreens, young tree seedlings, berry plants, etc., stored in compact masses, until heating, fermentation, mold or rot had destroyed a considerable portion; exposure for hours to the direct rays of the sun and to drying winds without protection of any kind, still further injured them. They are sometimes packed in bundles with very slight covering, or in boxes with moldy straw, and are dead or dying before they leave the nursery. We cannot too severely censure such methods, which rob a man of his money, and destroy his interest in tree planting.

Again, when the dealer had faithfully performed his duty and the trees reached the point of delivery, they were destroyed through the carelessness of the planter. Think of trees laying in a wagon box in front of a saloon or grocery store for half a day, without so much as a blanket or sack to shelter them from the sun and wind; then carried home, left in the wagon over night, or thrown on the ground and left to be carelessly planted the next day, where they carry on a losing battle with weeds and drouth, till they give up what little life is left them.

The intelligent and practical information gathered and distributed by the Horticultural Society, the Forestry Association, our able agricultural press and the Farmers Institutes have borne fruit; and good seed has been sown which has not yet germinated. We are certainly improving, many planters are eminently successful, but the field is large, failures are yet too common, our forests are disappearing too rapidly, and farmers do not sufficiently appreciate the advantages of timber.

One careful farmer who has a grove of 1,000 Scotch pines, mixed with deciduous trees to the north and west of his farm buildings, now sixteen years old, and which cost originally \$10, claimed that they had saved in the item of feed alone over \$100 per year for the past eight years. He keeps an average of one hundred head of stock. Anyone

visiting his barnyard during such a blizzard as we had last week would have no reason to doubt his statement.

Driving over the prairie during a recent storm we came suddenly to leeward of a double row of arbor vitæ, ten years old and about ten feet high; the thermometer might not have shown much difference, but nose and ears indicated a wide variation in temperature between the shelter of that slight windbreak and the open prairie.

A man is asked to improve his cow or horse, manure his fields, rotate his crops, plant small fruits, take better care of his garden, and he will respond with interest, for the benefits are immediate, the results apparent in a year or two at the farthest. Then the benefits are all his own, the interests his own, and he is easily induced to investigate and make use of improvements. But ask him to plant a timber plantation. He replies that it takes too long to get results—talk about climatic influences, that is everybody's business; danger of exhausting the timber supply of the country—there will be enough for this generation, let the next one look out for itself. Tell him that gang plows and gang saws will make a desert of the United States in one-hundredth part of the time it took to destroy Syria, he replies, let him who inhabits the desert look out for that.

Forestry, to be successful, to be widespread, must be the protege of the State. The interest is too great, the stakes too high, the individual too selfish, the profits too remote, the climatic and sanitary effects too important and the benefits so universal, philanthropists so scarce, that the State should immediately take hold of the matter and do something definite, practical and extensive.

All the governments of Europe are moving in this matter. Timber plantations are held, mature timber is removed under the direction of a State officer, the growth of young timber is encouraged, land that for any reason is unprofitable for agricultural purposes is planted to suitable timber, schools of forestry are maintained, and men are educated in all that pertains to the subject.

A bill regarding the setting aside of land sold for taxes, or such other land as may come into the possession of the State for timber purposes and relating to the care of such timber, its cultivation, cutting and sale, was prepared and submitted to the last legislature, but the reception it received was not very encouraging.

That we must eventually adopt some such system as that now carried on in Germany, no one could doubt if they have ever given the subject any thought. The earlier our people accept this as a fact and act upon it, the better for commonwealth and individual. The preserva-

tion of existing forests, the multiplication of timber plantations, an increase of evergreen belts on the farms, more trees along the roadsides and about the farm houses, are all questions of public interest. Anything that will increase the interest in tree planting, and give intelligent directions to all efforts in that line, are of value to the general public, and should receive the encouragement and hearty support of all good citizens.

The law under which bounties are paid for the cultivation of timber is a step in the right direction, but there are some defects which should be remedied by amendments. The Forestry Association should be provided with sufficient funds to employ at least one man constantly in the work of investigation, experiment and instruction. Whatever of value is known or learned should be put before the people, and every available means utilized to stimulate and encourage the planting of timber plantations and windbreaks.

The Farmers Institute is a medium through which much may be done to further the interests of horticulture and forestry. I have already referred to some of the reasons why the average farmer is not easily interested in forestry. Of course, from my standpoint, this seeming indifference to so important a subject only emphasizes the urgent necessity for pushing the subject before them. We find that when the subject is properly presented it never fails to interest, yet it is sometimes difficult to find room for it at institutes.

For three years I have endeavored to make use of Arbor day as a means of calling attention to and inciting an interest in tree planting among the country schools. The success has been very gratifying, and last spring I succeeded in interesting the city schools of Minneapolis, and the day was celebrated by the planting of trees on the school grounds, with appropriate exercises, including readings and recitations by scholars and teachers. I hope to have more time this year, and by enlisting the county superintendents and others, secure a still more general observance of the day. Before we can have a satisfactory state or national system of forestry, we must have a public sentiment favorable to such a system. It will take time and earnest work to create such a sentiment. I sincerely trust the members of this Society, and all citizens who feel an interest in this all-important subject, will do what they can to assist in forming this sentiment.

We have inherited a land rich in natural fertility, with leafy groves, bubbling springs, running brooks and verdant valleys. Let us not be so greedy for the dollars as to rob our fields of their fertility or forests of their trees, and so contribute to the drying up of springs

and brooks, bringing cyclones and blizzards, drouth and cold, and bequeathing to our children a barren, uninhabitable desert. We can leave behind us no nobler monuments than trees and groves. If we multiply these, our lands will be more fertile and fruitful, the winds less harsh, our homes more beautiful, and future generations will arise to call us blessed.

Mr. Brand, the chairman of the committee on pine lands, was requested to present his report.

THE GREAT VALUE OF EVERGREENS FOR WINDBREAKS.

By O. F. Brand, Faribault.

We used to have reasonable winters in this State—winters when there was but little snow, and when the mercury did not go more than twenty-five to twenty-eight degrees below zero, such winters as 1877-8, for instance. Since 1864, I think, we have had three winters that might be called mild, and twenty-four of a different character. Then we can only expect one reasonable winter to seven or eight severe ones. But there has been no winter since 1864 but what stock have needed a good windbreak to shelter them from the cold, cutting winds. If one has a real warm yard into which to turn stock in the winter it will be a saving of the value of at least one-quarter of their feed. This is no exaggeration. That is, if in the ordinary yards and good stables you feed \$400 worth of hay, straw, etc., to your stock, in a yard where wind cannot strike the stock running out in the day time, you would not feed out more than \$300 worth of feed to have your stock in the same condition, and in that way save \$100. There is no reasonable doubt about that. It takes a very large amount of feed to resist cutting cold winds.

What is the best and cheapest windbreak to be had? I answer,

A WINDBREAK OF EVERGREENS,

in my own experience. Four rows of Scotch pine set in 1873 have made a good windbreak for the last nine or ten years, but now they are too open below to keep the snow from blowing through. To protect crops and fields they are fine, still I would prefer one or two row of balsam fir for that purpose in this windy country.

For a belt of evergreens of ten or more rows I very much admire

the white pine. It does not start quite as rapidly in growth as the Scotch pine, but it soon passes it and makes a clean, majestic looking tree. For the windy, western part of the State the white spruce, balsam fir, white pine and red cedar are about all that are desirable.

I have a row of white spruce, natives of the State, transplanted from the forest in 1873, and two years later into the row where they now stand twenty-five to twenty-eight feet high—a dense mass of foliage and limbs from the ground up. A high board fence could hardly do better to keep out wind and snow. This tree does not grow quite as fast as the Norway spruce, but is very much hardier and better for a windbreak over the greatest portion of the State.

For a compact, dense windbreak to surround a building spot or barn and stock yard, there is nothing so good as two rows of our own native white spruce. Set in the row five feet apart and the rows ten feet apart, set so as to break joints. Suppose every farmer in the northwest would take a piece of land eight rods east and west by ten rods north and south and surround it with such a windbreak. If well cared for, in a few years it would be twenty feet high, when with a board fence inside to keep stock away from the trees, would make it so protected inside that, let the tempest howl and wind blow hard as it would outside, cattle and horses would at all times be comfortable so far as windbreaks could make them. Then what an ornament to the farm. No money could buy it from the owner. What a saving in feed. In how much better condition the stock, and if the stock prospers well the owner would.

Now we see in the older parts of the State fine barns with warm basements for the stock through the night. In the morning, frequently about sunrise, the very coldest time in the whole twenty-four hours, they are turned out into a yard protected by a windbreak of barbed wires. Of course where there is room for more than two rows I would advise the planting of more, for I yield the palm to no one as being more enthusiastic than myself on the subject of evergreens and the preservation and restoration of our native pine lands. I would like to see from two to five acres of evergreens around every farmer's home, as I once stated in a previous article on this subject.

BEAUTY AND UTILITY.

If a thing of beauty is a joy forever, and gladdens the heart of its possessor continually, of how much greater worth to the appreciative mind of man must it be, at the same time while imparting perpetual joy to its owner, it likewise contributes directly or indirectly to his

material wants? In the horticulture of Minnesota, where man's most vigilant care and greatest skill is taxed to the utmost to counteract the perpetual war of a remorseless climate, I can conceive of no tree or class of trees so admirably adapted to meet the wants of our horticulturists and farmers as our coniferous trees.

There is a grandeur about an evergreen imparted by no other tree. All people of keen perceptions admire them, whether in clumps or single specimens, planted to adorn the humble cottage of the villager with his one small lot, or the palatial residence and extensive grounds of his more pretentious suburban neighbor, or planted in any shape upon the ample and capacious farms. I repeat, there is a beauty and a grandeur about them which fills the heart of every appreciative person with delight. As windbreaks in this climate they should be regarded as indispensable to the comfort of man and beast; of their benefit to orchards and their influence on fruit trees there can be no doubt, while used as a protection from the severe winds. But it is not only as windbreaks that they are valuable. In this climate remote from water, even though we find hardy varieties of apples which, so far as growth is concerned, seem capable of resisting the extremes of our climate, still they produce but little fruit, owing to the fact that their fruit buds kill or their vitality is so impaired that they produce but little or no fruit.

Evergreens, when planted around and among apple trees, are said by one of our best authorities to continually give off an exoderm of warmth and moisture that reaches the distance of its area in height. Such being the fact, if evergreens are planted around and among our fruit trees a double purpose will be filled, and the evergreens, so utilized by the farmer or fruit grower, will thus be made not only a protection but an impartor of life force, whose power will gladden the heart of each and everyone who lives within its influence. Men thrive only on diluted oxygen, purified to a certain extent from the carbonic acid which animals and fires are constantly throwing into it. Collective man enhances the impurity. Is there a remedy? There is, and one entirely under the control of man. It is the absorption of carbon out of the air by increased forest areas, especially of pines, balsam and spruce, red and white cedar. As the commercial world utilizes electricity to do its will, so should the State see that a sufficient number of nature's silent but obedient agents, in the shape of evergreen trees and forests, are raised up to aid in purifying the air and otherwise contribute toward the amelioration of our rigorous climate

Mr. Brand. I received a letter from Mr. Brown, of Lac qui Parle county, containing some items of interest.

FROM LAC QUI PARLE COUNTY.

PROVIDENCE, Jan. 6, 1888.

FRIEND BRAND:—Yours of the twentieth ult. came to hand yesterday. It was marked mis-sent. I will try and answer your several questions. The white pines I got of you are from 8 to 12 feet high. They would have been about 3 feet higher but for being twice injured by hail in June. They are looking very healthy and green. I have about forty white pines. I have not far from 500 Scotch pines; they are looking very fine. Some of them are from 6 to 12 feet in height. They are mostly from 8 inches to three feet tall. I have something over 2,000 white spruce, mostly from 6 inches to 12 feet in height, a few 4 feet, and the one you sent me is 12 feet high and 18 inches in circumference at the ground; it is a beauty. I have about 500 arbor vitæ, nearly all mere seedlings. You will remember that you sent one arbor vitæ tree which was about 4 feet at that time; it is now 10 feet in height. I likewise have fifty balsams, all quite small except one which was planted eight years ago, and was then 18 inches high, and is now about 12 feet high. My evergreens are all looking very green and nice.

I notice A. W. Sias speaks of the Norway spruce as his favorite evergreen. I have had no success with them in this county. Fifteen years ago I planted 300 of them and have not one now. They lived and grew quite well the first season, but nearly all died the first winter. I would take the white spruce first; second, the arbor vitæ; and third, the Scotch pine. These are the most hardy with me of all the evergreens I have planted on my place, and I have seven different kinds. The Scotch pines have made the most rapid growth of any; they have grown from 1 to 2 feet yearly, and sometimes more. I transplanted forty of them last spring which were from 2 to 3 feet high; not one died, and they are looking very healthy now. The white spruce grows more dense in its branches and takes a stronger hold in the earth, and therefore is less liable to get leaned by the strong winds, which makes it preferable for a lone tree. They can be transplanted with as much certainty of living as any of the evergreens. I am now fully satisfied that all may have a fine stand of evergreens about their homes if they will. I see no reason why we may not have evergreen groves, even on these bleak prairies. I am planting them in my grove; they grow well, even where it is quite shaded.

After they have attained sufficient growth I will remove the other trees, when I will have an evergreen forest.

You will see that I expect to live a long time yet. You suggested an article on forestry, but I have not the time now. The snow is so deep and drifted the mail is carried on snow shoes from Canby to Lac qui Parle. It snows most of the time, and the roads are getting worse every day.

Yours truly,

J. H. BROWN.

DISCUSSION.

Mr. Pearce. Mr. President, the growing of timber is a business to which every farmer should give attention. I have been in Minnesota thirty years or over. I have observed that our streams are becoming dryer each year by the process which is going on of cutting away our forest supplies. If this system is continued our winters will become colder and our streams will continue to become less year by year. In fact many of the streams will entirely dry up, and I dare say the Mississippi river will become nearly dry in places, and in time this country will become a cold and barren waste.

Forests should be planted everywhere upon these broad prairies, but I fear, at the rate we are going on, in a short time the country to the west of us will be depopulated, or it will become impossible for the people to make a living. Sir, there must be forests planted; trees must be planted in bodies; a small amount of timber will not answer the purpose. At least one-quarter of the country should be planted in timber.

This work should be carried on under the auspices of the national government. If we are to preserve the fertility of the soil, and make this country habitable, the sooner it is taken hold of by the government the better it will be for all parties concerned.

Last winter I had occasion to go over some of this broad prairie country, and had an opportunity to talk with some of the people who live in those treeless regions, and they wanted to know what should be done. I said "plant evergreens; plant them by the millions!"

I hope this Society will take some action in regard to the forestry question. We ought to urge upon the government to wake up in this matter. There is no good judgment in being quiet on the subject any longer, gentlemen. A thousand years hence and this whole country will be a cold, barren, desert region, if the present condition of things is allowed to prevail.

Mr. Harris. Mr. President, our Society considered this question somewhat last winter and appointed a committee to try and get a bill passed by the legislature to preserve such forests as were still in the possession of the State and that were not valuable enough for agricultural purposes, and to reforest such portions of the State as had been deforested and the land left to revert to the State. Our legislature paid but little attention to the matter, and failed to take any action thereon. There are timber lands in this State that have been cut off and that are growing up to timber, but which lands have been sold for taxes. It is important that this timber which is growing up should be preserved on these lands which revert to the State. If such were the case, large areas in the northern portion of the State would be reforested, and a large revenue might be obtained for the State in years to come.

We need here in Minnesota, in order to make it a perfect garden of Eden, a vast body of water along our northern borders. As we cannot have that the next best thing is to have an abundance of timber, and to reforest this whole western country. If that could be done it would change the climate so that we could raise a great many fruits that we attempt but fail to raise at the present time; it would render the State far better adapted for agriculture of every kind. It is well to agitate this question, and have something definite accomplished.

I tell you, sir, forestry ought to be taken under the wing of the State Horticultural Society. We are recognized as the strongest association in the State of Minnesota in the interest of Agriculture. We, as a society, have labored for the promotion of forestry, and the State Forestry Association should be merged into this Society. I am in favor of keeping up that organization if it could be made efficient, but as it has been managed in the past it would be more successful if merged in this Society. The more organizations we put into one, without interfering with their work, the better.

Prof. Porter said that he had observed, in looking up some matter at the capitol recently that about twenty-two thousand dollars was paid out in a single year for the promotion of forestry, but did not know how the money was appropriated.

President Elliot stated that he presumed the money was paid for bounties for planting trees along streets and highways, etc.

Mr. Gould. Mr. President, I agree with Mr. Brand and Mr. Pearce that the proper thing to discuss now in reference to forestry is the planting of trees on the "western plains" as they used to be called, which embrace Dakota, a portion of Iowa, Nebraska and Kansas.

Now I suppose in order to make this matter of planting forests effective, the national government should take hold of it, but the government never will do it unless the effort is first started by societies or individuals. After the experience of the last week or ten days in which scores and hundreds of people who have lost their lives by the storms which have prevailed on these treeless prairies in Dakota and to the west of us, it won't be necessary to cite any evidence that there is abundant necessity for something to be done to protect life and even existence itself in that region of country; and while we have a common interest in the welfare of our kind we should feel special interest for the protection of the people of our own State. It is well known that many of these people are too poor to get away, and will be obliged to remain. A wall of timber should be erected across those plains to stop the sweep of the furious blasts that come down from the north; and from this side of the rocky mountains, and which seem to gather force as they come across the plains and reach the borders of Minnesota, and strike our timber areas and are arrested in their progress. It is here their force and severity is broken up; it is our forests that afford the protection we enjoy. This Society should exert every influence it can bring to bear for the preservation of forests, and if there is anything that can be done to help cover the treeless prairies with shelter belts it ought to be speedily brought about.

It is said there are localities in Dakota where trees won't grow, and in some places trees will not live to be more than three years old. That may be the fact, but I very much doubt it. I would like to see this Society put itself on record in some way in favor of the national government taking some proper action. One suggestion I would make would be to have a competent man in charge of a bureau of forestry, and placing sufficient funds under his control to enable him to do something in this direction.

Mr. Sias. I think a man must be a fool to undertake to live where a tree cannot be made to live. [Laughter.] If there is anything needed to force him to see the necessity or the good sense of doing what Mr. Pearce says, to plant evergreens out there upon the western prairies by the million, why I would just ask those persons to please read over the list and see how many have been frozen to death out there in that country within a few days past.

President Elliot. We have with us to-day Mr. Oliver Gibbs, a former secretary of the Society, who has recently gone to Dakota. I do not know whether he is a delegate from the Dakota Horticultural

Society or not, but at any rate we would be pleased to hear from him in regard to Dakota tree planting.

REMARKS OF MR. GIBBS.

Mr. Gibbs. Mr. President, I have long believed that one of the greatest blunders ever made by the United States government or by the people of the United States, was in parting with the title to prairie lands without first reforesting them and preparing them for the habitation of civilized man. It is not too late to repair the mistake to some extent. Vast bodies of these lands are yet in the hands of the government, and large tracts are also in the hands of the State governments. I believe in reinforcing the theory that is now being advanced at Washington by the forestry bureau of the agricultural department, in taking proper steps looking toward a system of forestry for the lands that are remaining under the control of the government, so that such lands may be preserved as far as possible for this purpose.

Reforestation in Europe has been conducted for many years under government control, and upon scientific and practical principles, and with reference, also, to the uses to which trees are adapted

He said that timber had a marked effect in the amelioration of the climate, but it should be planted extensively to accomplish that result. A good deal had been said in regard to the timber culture act and its repeal. According to his observation in Dakota, he had been led to believe nearly all that had been done thus far in the direction of growing timber had been done under the provisions of that act, and by people who were trying to protect their tree claims, although as a rule the amount of timber grown on these tree claims was limited and did not amount to a great deal. Trees seem to have been planted with little regard to system in the varieties selected, or proper locations.

The greatest drawback in the way of growing forest trees on the prairies was perhaps in the ignorance of the people who planted trees. Those who undertook to grow them were not adapted to the occupation. Many of them had been brought up without the benefit of schools, and knowing little of the principles of forestry or horticulture in any form.

In speaking of the force of the winds on these treeless prairies, he mentioned the fact that in driving across the prairie on one occasion a distance of some ten miles, facing the wind, with his wife at his side, they drove two or three miles debating in their own minds

whether to turn back or go ahead; and coming upon one of these timber claims where there was a fine little grove of trees, the marked amelioration in the atmosphere in the vicinity of the grove could be readily observed, and they renewed their journey, passing along to other similar spots upon the prairie.

As indicating the force of the wind he stated on coming from home, upon the occasion of his recent trip to the city, he started out for the station, skipping over the drifts with a pair of ponies, about the only conveyance in which he could get across the country, and coming along he saw a black object sticking above a huge drift of snow, and as he came nearer saw it was the end of a stovepipe; and on driving up found a tunnel some three feet square which extended thirty or forty feet under the drift, and was the means of access for the man and his family to and from his dwelling. He saw no smoke coming from the stove-pipe, but concluded there was a family in there, and probably all comfortable and warm, although he did not go inside.

But in Dakota they were becoming awakened as horticulturists and foresters on this subject, and there was no doubt the legislature would take some proper action in the direction of reforesting the prairies. Gov. Church was a very earnest forester.

He would recommend memorializing Congress in regard to taking prompt and decisive action to advance the interests of forestry in the Northwest.

Mr. Underwood said he had had some fifteen years experience on the prairies of Illinois, and more recently personal supervision of timber claims on the prairies of Dakota, and felt like saying a good word for the provisions of the timber culture law. His friend, Mr. Gibbs, did not seem to think very much of these timber claims.

Mr. Gibbs. I do not think they have much effect so far as climatic influences are concerned. It is true they are a good thing for the settler and his neighbors.

Mr. Underwood said he had traveled through Southern Minnesota quite thoroughly while canvassing for the sale of trees some nineteen years ago in the part of the country where there was very little timber. In passing through the same country some fifteen years later he had been greatly surprised at finding the change that had been wrought in the appearance of the country during that time. He could hardly recognize the country, although he had a good memory of places. A large amount of timber had been planted out and was being successfully grown. He had never been entirely foiled in his endeavors to grow trees on tree claims in Dakota, although they had no

moisture there to speak of for two or three years at a time. In the spring of the year he had found very little moisture, and one could hardly dig a post-hole. He had been overseeing quite a number of tree-claims, taking care of some seventy acres of trees, growing them for different parties under contract. He thought the timber culture act a beneficial one and ought to be upheld.

Mr. Pearce inquired what per cent of timber claims were successfully maintained.

Mr. Underwood said about one-third or one-fourth of them were first-class. He referred more particularly, however, to his own experience, and could not say what per cent of timber claims in general were successful.

Mr. Fuller said that one of the land officers at Benson had made the statement that he knew of but two men in his district who were complying with the timber culture law strictly and were making a success in growing trees. That statement was made some six or seven years ago.

[The Commissioner of the General Land Office estimates the proportion of timber culture entries made without securing the results intended by the provisions of that act at 90 per cent.—SEC.]

Mr. Gibbs said the best estimate he had seen of the percentage of lands that had been covered with forests under the provisions of the timber culture act was about 30 per cent in Dakota and Minnesota. Under that act only one tree-claim could be taken in a single section, and only ten acres of trees were required. That was a very small amount of timber for an entire section, and so far as climatic influences were concerned the operation of the tree claim law would be an utter failure. So far as accomplishing anything for forestry in general it would amount to very little. If we wish to reforest this country for the purpose of affecting changes in the climate we must have the machinery of the government set to work, in the manner it is conducted in Europe. He thought there was no better purpose to which the idle millions now lying idle in the government treasury could be devoted than to the reforestation of the treeless prairies in the hands of the government.

Prof. Porter said if any action was to be taken in regard to this matter of sustaining the timber culture act no time should be lost. Bills had already been introduced in Congress for the repeal of the law, and also for the repeal of the pre-emption act.

Six years ago he had gone on a tour of exploration in Minnesota and Dakota, and was convinced at that time the timber culture act

was a failure; but since that his opinion had been entirely changed. In visiting some of the same localities recently, he had been surprised to find beautiful, thrifty plantations of timber growing. He mentioned one instance in particular, on the Grandin farm, in Traill county, Dakota, where some seventy acres had been planted in trees some twelve or fifteen years ago. The trees were as handsome as any he had ever seen grown. It was necessary that trees should be properly set out and intelligently cultivated and cared for. The trees referred to stood from thirty to forty feet high, were beautiful specimens and almost every tree was living.

One of the greatest drawbacks for success in growing trees upon the prairies was the ignorance of the classes who were trying to grow them. Many of these settlers were from other professions than that of farming, such as hod-carriers, hack drivers, etc. Many of those attempting to open up farms in that new country were middle-aged men, who had made failures in their calling elsewhere. They had followed a little of everything except practical farming. When they emigrated to Dakota for the purpose of acquiring a home, they found themselves totally unprepared, so far as experience was concerned, for agriculturists or horticulturists; they were as ignorant as to farming operations practically as a child ten years old was ordinarily, and had to learn by actual experience. On planting out their trees upon their new breaking, because they didn't grow timber large enough for fuel in three years, they pronounced the whole thing a failure. The result was, where there was one such person made a success there were a thousand to make a failure; not because the soil would not grow trees, but people there did not understand how to grow them, or failed to give them proper attention.

Mr. Pearce said the difficulty with many people in that country was they were unable to obtain trees. Many of them lived at a distance from railways, and did not know of reliable parties of whom they could obtain trees and cuttings. If trees could be furnished in large quantities to those who would set them out they might be grown successfully. Scotch pine would grow rapidly, and could be furnished at reasonable rates. Thousands of dollars were paid for trees that were of no value. Another thing, trees were too much scattered and set too far apart. They were neglected and the fire allowed to run through them. Many valuable timber claims were ruined after the trees had attained considerable size.

Prof. Schetzka said that according to his experience it would not do to depend upon farmers to extend timber culture; forestry ought

to be under the management of the general government. In Germany forests were maintained at government expense, which had control, also, of private forests. While conditions were different there from those of America, it showed very plainly that some similar system should be pursued. Ten acres of timber for a quarter section of land was insufficient. As a rule, one-fourth of the area of the country should be covered with forests in order that agriculture might be carried on successfully. Some definite system should be pursued having reference to varieties grown, character of soil, etc. Farmers as a rule are making poor selections, planting such trees as cottonwood, white willow, and other inferior varieties. Those were better than none to start with on the prairies, till such time as more valuable timber could be grown.

President Elliot stated that Prof. Schotzka had recently issued a valuable little work on the subject of forestry, which he advised those interested in this subject to procure.

Secretary Hillman stated there had been a mistake on his part with regard to the transportation of delegates to and from the meeting, and in justice to the St. Paul, Minneapolis & Manitoba Railway company, he desired to read the following letters:

LETTER FROM MR. WARREN.

ST. PAUL, MINNEAPOLIS & MANITOBA RAILWAY Co.,
ST. PAUL, MINN., Jan. 6, 1888.

S. D. Hillman, Secy., Etc.

DEAR SIR:—I am advised concerning the State Horticultural Society which meets at Minneapolis, Jan. 17th to 20th.

As no application has been made for reduced rates for this occasion via the St. Paul, Minneapolis & Manitoba Railway, I will be obliged if you will inform me if such will be desired.

Yours truly,

C. H. WARREN,
Genl. Passenger Agent.

On replying to the above stating that reduced rates were desired, the following was received:

ST. PAUL, MINNEAPOLIS & MANITOBA RAILWAY Co.,
ST. PAUL, MINN., Jan. 10, 1888.

S. D. Hillman, Secy., Etc.

DEAR SIR:—I am favored with yours of the ninth. In reply would

say that I have with pleasure instructed our agent at Minneapolis depot to return delegates from the Horticultural Society meeting Jan. 17th and 21st at one-fifth fare, under the certificate system as described in our circular 95, copy of which will be found herewith.

When writing you previously I supposed the reason you had not made application to us for these reduced rates was that you presumed the arrangement was provided for by your agreement with the St. Paul Association. I regret that such was the case, and think that probably this supposition accounts for the fact that no mention is made in your circular of the St. Paul, Minneapolis & Manitoba Railway as being one of those lines which offer reduced rates for the occasion in question.

I now desire to state that we are always glad to offer the benefit of reduced rates to such societies as yours, and I would be glad if these sentiments could be made known to the members of your association

Yours truly,

C. H. WARREN,
General Passenger Agent,

On motion of Mr. Harris a vote of thanks was tendered the agent of the railway company for the courtesy shown the Society in offering reduced rates of fare.

On motion the meeting adjourned till 7 o'clock P. M.

EVENING SESSION.

WEDNESDAY, JAN. 18, 1888.

The meeting was called to order by President Elliot.

The following telegram from Gov. McGill was read:

ST. PAUL, Jan. 18, 1888.

Wyman Elliot, State Horticultural Society:

Owing to public business which has come up to-day, it is doubtful about my being able to go to Minneapolis this evening; will try and be with you before your session ends.

A. R. MCGILL.

Later the following letter was read, explaining further as to his absence:

EXECUTIVE DEPARTMENT, ST. PAUL, MINN.

Hon. Wyman Elliot, Minneapolis :

DEAR SIR: I made all my plans to go to Minneapolis this afternoon, but have been detained on a requisition case and cannot leave. And thus it goes.

Respectfully yours,

A. R. MCGILL.

Jan. 19, 1888.

The following paper was read by Mr. Cleveland :

STREET AND LAWN PLANTING WITH TREES AND SHRUBS.

By H. W. S. Cleveland, Minneapolis.

Nothing connected with the practice of my profession as a landscape gardener has impressed me so deeply and painfully since coming to Minnesota as the vast amount of wretched work in tree planting from which no satisfactory result can ever be hoped, and the whole cost of which is literally thrown away. The explanation is not difficult. It results primarily from ignorance and false economy, and secondarily from the unscrupulous greed of a class of men who have no reputation to sustain, and are ready to impose upon the parsimonious by doing poor work at a low price, or to swindle those who are willing to pay a good price, by furnishing worthless stock.

The rapid growth of new cities and towns creates everywhere more or less of the fever of speculation in land. The rivalry of real estate dealers incites them to seek to render their suburban additions attractive to customers by adorning them with foliage, and applying the principles which govern the ordinary transactions of commerce, they seek to accomplish the object by a wholesale contract to furnish and plant the trees.

The real estate men are not as a class familiar with trees or their culture. Many of them do not know one variety from another, or at least as one of them frankly said to me, "I know an elm when I see it, and I call all other trees maples."

It is not to be supposed that such men can have any realizing conception of the careful management required in transplanting and subsequent nursing of trees in order to secure the vigorous, healthy

growth which is essential to beauty. Their only object is to sell their lots, and they think the chance of doing so will be increased if the new streets of the subdivision are planted beforehand. They do not expect and rarely find that a purchaser is more critical than themselves, and when the lots are once disposed of they have no farther thought on the subject.

This large demand springs up in every new and growing town and is answered by a class of men, many of whom are as ignorant as their customers, of the nature and requirements of a living plant and think it may be handled with as little care as so much lumber. Their rivalry leads them to under bid each other, and the purchaser closes a contract for the delivery and planting of thousands of trees, at prices that would be ruinous to the contractor if anything approaching the needful care, were bestowed upon the selection, lifting, planting and subsequent nursing of every one of these baby vegetables. The trees are got from the woods or the refuse of nurseries, are torn out of the ground without the least regard to the preservation of their roots, the tops are lopped off, and they are often exposed to sun and air for many hours before being stuck into holes in the ground and left to shift for themselves. The result is that the real estate dealer the next season calls the attention of the would be purchaser of a lot, to the long rows of poles which line the streets, having a few leaves at the top, which in due time are expected to expand into such luxuriant foliage as to over-arch the street, but in reality either perish before the season is over or drag out a miserable existence as unsightly cumberers of the ground. The blame for such a state of things is not to be laid solely at the door of the tree dealers. Its primary cause lies in the all pervading passion for low priced goods of all kinds.—forgetful of the fact that it is fatal to all true economy. Its prevalence is one of the worst evils which taint our social system, and is so much a matter of habit that it betrays itself in absurd inconsistencies,—as for instance the philanthropist who bewails the fate of the half starved sewing girls, but seeks the cheapest clothing store when he has to buy a coat.

There is as much difference in trees as in horses; they show quite as plainly the evidence of good grooming, and I may add that there is quite as much jockeying in the trades.

What should we think of a man who bought horses by the thousand and on contract, "warranted for one year?" Should we give him anything but derision if he complained that he had got only a lot of raw-boned, spavined creatures that had never known the luxury of a

curry comb? The horse is a beautiful animal, and a tree is a beautiful object, but it is hardly safe to say that one horse or one tree is as good as another, though practically this is what such dealing amounts to.

MINNEAPOLIS METHODS.

As a contrast to this, and as an example what good work may accomplish, I may point to the trees in our parks, which have been planted and cared for by the superintendent, Mr. Berry, a man with whose success as a tree planter I had been for many years familiar in Chicago that I felt as if I had secured a prize for Minneapolis when I found that his services were to be had, and introduced him to the park commissioners.

Not three per cent of the trees he has planted have failed to live and make such healthy and vigorous growth that already, in two years' time, the groups in the parks are crowding each other, and we are thinning them by removing individual trees to other points, each group serving as a nursery to furnish a supply for further planting, while those on the street,—as witness the Hennepin avenue boulevard,—already furnish extended lines of luxuriant foliage. But no cheap, inefficient work could secure such results. These trees were procured from a responsible nurseryman, who cares for his trees as he would for living animals. They were packed and transported with careful provision for guarding the roots from exposure to sun and wind. They were planted in excavations large enough to admit a liberal supply of rich earth, in which every root was carefully spread out by hand, with fine mould worked in among their tender fibres; they were well watered and thoroughly mulched, and all through the first and second season after planting they have been liberally supplied with water,—not in dribblets of a pailful each, but with thorough drenchings from a watering cart at intervals sufficiently frequent to prevent their suffering from drouth. The life of a tree is measured by centuries. It is in swaddling clothes at the age of five or ten years, and must be nursed with the tenderness which all babies require.

Anyone who expects satisfactory growth with less careful attending than this will be disappointed. A tree is a vegetable production with no more power to take care of itself than a cabbage. What should we think of a farmer who planted and cultivated his crops in the slovenly way that trees are often treated? Would he not deserve the

penalty he would surely suffer of having only a miserable crop of unsaleable runts? And yet there are plenty of men who are ready to furnish and warrant the growth of trees on terms which render proper care an impossibility, and the reason that such men exist is due to the persistence of purchasers in trying to get good work for poor pay. And as I said before, it is this spirit which casts a blight upon everything we attempt. There is not a branch of art, literature or manufactures that is not tainted with the shams which so many of us are willing to tolerate rather than pay the worth of a sterling article.

As long as there are purchasers animated by such a spirit, there will be sellers ready to supply them, but it is surely a primary duty of such associations as this to warn all who have any hope of satisfactory results to beware of cheap tree venders, and proclaim far and wide the fact that fine trees are an impossibility without expenditure of time and labor, which must either be performed in person or paid for in money. It is simply throwing money away to attempt to do such work cheaply, and thousands upon thousands of dollars are annually expended in the effort.

SELECTING STOCK.

Yet I am well aware that there is another side to the question, and that the evil is not confined to those who expect good results from parsimonious expenditure. Unscrupulous dealers will be as ready to cheat by demanding high prices and claiming a superior quality of goods, as by under-bidding, if they meet with a customer who is more likely to be caught by such a plea. The only safe course is to deal directly with men of established reputation, which they cannot afford to jeopardize by false dealing. A man whose life is devoted to the rearing of trees for sale, who has a large and costly nursery in which the business is systematically conducted of growing the trees from seed, and planting them in nursery rows, transplanting them from time to time as they require wider space, and securing by that means an abundant growth of fibrous roots immediately about the stem, so that they may be removed without injury — a man, in short, who devotes his life to the business, and is dependent for his success upon the reputation he acquires for furnishing good stock, is of necessity a responsible party, with whom it is safe to deal, and from whom it is safe to expect reasonable satisfaction in case of accident.

Such men and such nurseries are easy to find, and if men who appreciate the value of good stock will apply directly to them they can get what they want, and then, if they will pay competent workmen for

planting them and caring for them properly, they may look for satisfactory results; but not otherwise.

In order to secure success in planting it is necessary to know the habits and requirements of the variety selected, and be sure that the conditions of soil and position are adapted to its wants. A tree taken from the woods is sure to suffer from being transplanted to a position where it is fully exposed to the influence of the sun and wind.

Some trees thrive best in rich, deep, loamy and even very moist soil, —others require perfect drainage, and some thrive best even in a sandy soil, and success in planting depends very largely upon the careful observance of these natural wants.

Now I have known here in Minneapolis, of trees furnished by contract for street planting on these arid plains, to be taken from the rich alluvial soil of low lands where they were growing thickly together, and where, having never been transplanted, they had only long spreading roots which were roughly cut off with a spade at four or five inches from the trunk, and then jammed into holes barely large enough to contain them, and the sand which had been taken from the hole shoveled back and tramped around them, and the trees expected to live.

I take it for granted that the audience whom I have the honor of addressing here, is largely composed of men who appreciate the truth of these statements and require no argument for their enforcement.

The question of reform is one that commends itself to your consideration, and is one that I confess my inability to solve. It would seem that the first step would be to enlighten those who are interested and enlist popular feeling in a cause which so nearly concerns our daily and hourly comfort as the beauty of our streets and graceful, homelike aspect of our dwellings and their surroundings. But I have been assured that an audience could not be got together to listen to a lecture on such a subject, while there is no hall large enough to hold the crowds that will gather to see two brutes pummel each other in the prize ring.

What twaddle it seems, to talk of a love of the beauty of nature, and a prevailing rural taste in the face of such facts! I feel this evening that I have listeners who are actively interested in the subject, — but outside of those who are in some way connected with the business there is lamentable deficiency.

VARIETIES.

My experience in Minnesota has been too short to enable me to speak

with authority concerning many of our native trees as regards their adaptation to this locality, but of some I feel no hesitation in report-unqualifiedly in their favor.

There can be no doubt about the elm, the linden, the white ash, the hackberry or the box elder, all valuable trees and well adapted to street planting. I should also place the sugar maple in the front rank, but I hear on all sides complaints of its slow growth, in reply to which I can point to an avenue of sugar maples now averaging two feet through and furnishing a continuous shade, which I planted after I was thirty years old, on the day of President Polk's inauguration, at what was then my home on the Delaware river, and I am still planting trees and urging others to go and do likewise.

My friend, Mr. C. M. Loring, president of our park commission, and one, as you all know, whose taste and knowledge give great weight to his opinion, is a great advocate of the silver, or soft maple, which indeed is a beautiful tree when in perfection, but its liability to be attacked by insects and to be broken by storms, are to my mind insuperable objections. The birches are certainly among the finest of our ornamental trees, and I wonder that they are not in more frequent use. The yellow birch and the canoe birch are superb trees, and the cut-leaved weeping birch has, I think, no rival in its peculiar style of delicate grace and beauty.

I am very confident that the catalpa speciosa will prove hardy here, and I have my belief on the fact that not one of a great number planted three years ago on our Central Park, showed the least sign of injury from the extraordinarily severe weather of last winter. Its rapid growth and the great durability of its timber make it exceedingly desirable for extensive planting. I have here some samples in evidence, which you may be interested to examine. They were sent me by Mr. E. E. Barney, the well known manufacturer of cars at Dayton, Ohio, who uses the timber very extensively in his business, and urged its extensive cultivation. You will see by these samples that it is a beautiful wood, susceptible of a fine polish, and the fact that one of these pieces is from a post that had been in the ground forty-seven years, and another seventy, shows that it is practically indestructible. Unfortunately, the wood is not hard enough to resist the wear and tear of railroad travel, and refuses to hold the spikes when used for railroad ties.

NATIVE OR FOREIGN TREES.

The general statement may be advanced with certainty that our

own native trees are better adapted to our wants than any imported ones, and will be found in the end to give much more satisfactory results; and when, in addition, we reflect that we have more than twice as many species as are found on the continent of Europe, while many of them excel in grace and dignity, and in beauty of autumnal foliage are beyond all comparison with the forests of Europe, it would seem a waste of words to urge upon tree planters to look no further than our own resources for supplying their wants. But the great difficulty lies in the scarcity of such material in our nurseries, which, with the exception of a few native varieties which are well known and in constant demand, like the elm, ash and maple, are stocked almost wholly with foreign trees and shrubs, often inferior in beauty, and always found to be less durable than native stock which may be close at hand and eagerly sought by foreign tree growers.

European trees, after fifty years trial, and in repeated instances with great promise for a long time of highly satisfactory results, have almost without exception proved inferior in beauty and durability to our native stock.

No foreign evergreen can compare in majesty and beauty with our white pine, our hemlock or our white spruce. The same comparison may be made between the English elm, the European linden, ash and maples, and ours.

The European oaks are altogether inferior to ours in number as well as character, and yet we may see how little we appreciate the treasures of our native forests, in the contempt with which we regard the overcup oak, one of the most picturesque of the species, which is highly prized by foreign cultivators, but ruthlessly destroyed with us with the contemptuous remark that "its nothing but a burr oak, and isn't worth saving."

The Norway maple, the European larch and the French white willow, are importations which have proved well worthy of extensive adoption and culture in this country.

The Japanese ginkgo tree has proved so valuable an addition to the list of ornamental trees at the East, that it is well worthy of thorough trial here, and it is probable that many very valuable acquisitions may be made from Japan, China and Eastern Siberia, the climate and aspect of which regions correspond more nearly with our own than any portion of Western Europe.

ORNAMENTAL SHRUBBERY.

It is not as generally known as it should be that the seeds of trees and

shrubs carry with them and perpetuate, not alone the characteristics, but the constitutional strength or weakness of their parents. Thus trees of every variety grown from seed brought from California, are too delicate to bear the climate of the Eastern states in the same parallel of latitude, while the seeds of the same varieties grown on the eastern slope of the Rocky Mountains produce trees which are perfectly hardy.

In order to a proper knowledge, therefore, of what to plant, it is essential to know not alone the limits to which the general distribution of its species is confined, but the exact physical conditions of the particular locality from which the individual tree or seed was brought, and it is largely owing to the utter neglect of this necessity that so small a proportion of the trees that are planted ever attain such a degree of luxuriance and beauty as to excite admiration, or even attract especial notice.

In regard to shrubs for ornamental planting, I should feel that it was presumptuous in so new a comer to Minnesota as I am to offer advice as to selection of foreign varieties best adapted to the soil and climate, but I feel no hesitation in urging the liberal use of the rich store of native shrubbery with which the woods and swamps are filled.

I have wished ever since I have been here that I were so situated that I could make a collection merely for my own gratification of the beautiful wild shrubs of Minnesota, many of which I never saw till I came here. They could be easily grown from seed, and any nurseryman might supply himself, and render a more valuable service by introducing them to purchasers, than by confining himself to the lists which are sent to him from abroad.

I am very glad to learn from Prof. E. D. Porter, superintendent of the agricultural college of the University of Minnesota, that this subject has already engaged his attention, and he has begun the collection of native trees with a view of making an arboretum in which all the trees, shrubs and flowers of this region may be represented. The grounds of the experimental farm certainly offer the most appropriate place for such a collection, and it will form one of the most instructive and interesting features of the institution.

Mr. Berry has drawn liberally from these native sources for planting on our parks, and many of the most attractive groupes of shrubbery are composed entirely of shrubs transplanted from the woods in the immediate vicinity of this city. That which covers the little island in central park and the adjacent shores on each side the bridge

is almost wholly of this description, and no portion of the park has been more admired for its picturesque natural effect than this.

The use of shrubbery for ornamental effect, it appears to me, is not appreciated as it deserves to be, largely owing no doubt to general ignorance of how to make judicious use of it, which cannot be taught in books, and which few of our people will take the trouble to learn by practice.

EMBELLISH THE LANDSCAPE.

One of the most important and desirable objects in the arrangement of grounds, whether public or private, is to secure variety. If on entering a park, or a private estate, you find that you can take in the whole area at a glance—or see all the arrangements from any one spot, you cannot profitably derive the pleasure and interest from their inspection that you would have if they were revealed to you in succession so that each would be a new surprise.

Suppose for instance on entering the grounds of a villa residence of a few acres you find a level area of perhaps an acre between the house and the highway, and the rest of the ground sloping down to the bank of a stream,—beyond which you have a distant view of the city, or of a wide expanse of beautiful country. The whole area, if left open, can be seen at once on entering the place from the highway, and most proprietors would have the feeling that it was on all accounts desirable to impress every visitor with a just conception of the attractions he had secured from the outset, and would perhaps arrange the driveway to the house so as to afford the best possible view of the distant prospect, which would absorb his attention at once.

But now suppose, instead of this, that the entrance drive is so arranged, and groups of trees and shrubbery so planted, that until the visitor reaches the house he would see only the area in front of it, which might be so arranged with lawn and flowers and trees as to have a pleasant, homelike aspect.

He enters the house, and passing into the parlor the whole of the distant view bursts upon him as a surprise as he looks from the windows. The same thing can be repeated in detail in the various subdivisions of the grounds, so that a walk through them will afford a series of surprises, and convey the idea of a much more extensive tract than they really comprise. Now, a chief object in the planting of shrubbery is to aid in securing this effect of subdivision, and if properly done it serves the purpose so completely that paths or other objects may be effectually screened though only a few feet distant.

Very few people, however, ever think of such an object in planting. They buy flowering shrubs with which they are acquainted or which have been recommended to them, and plant them wherever they think each individual will show to the best advantage, and without a thought of the possible effects which might be secured by the tasteful use of groups and masses. The true art lies in economizing the sources of pleasant interest so as to make the most of each, and the value of shrubbery as a means of securing that object in the most natural and graceful manner is apparently little appreciated.

The landscape gardener is rarely able to direct in person the execution of his plans, and the result as carried out by others, whose ignorance or conceit often leads to the introduction of their own ideas, is generally widely different from his original conception.

The chief hope of improvement lies in the action of such associations as the State Horticultural Society in disseminating information and encouraging the taste for rural pursuits, the love of nature and the tasteful development of the resources with which we are so richly endowed. The presence of such an assembly as I have the honor to address this evening affords the best guarantee of increasing interest in the subject, and I beg leave in conclusion to thank you for the kind attention you have given me.

At the conclusion of the reading of the paper, on motion of Mr. Harris, Mr. Cleveland was given a vote of thanks, and made an honorary life member of the Society.

President Elliot stated that Mr. Cleveland was one of the first members to join the American Pomological Society, having attended its first meeting.

Prof. Folwell, of the State University, was then introduced and delivered a very interesting and able address.

THE DISPOSAL OF CITY CLEANINGS.

By William W. Folwell, LL. D., Professor of Political Science in the University of Minnesota.

Civilized man is the only animal which willingly lives in its own filth, while claiming to be the only animal intelligent enough to know the consequences.

The brutes are generally cleanly; and human savages, being wanderers, have the advantage over civilized man that they can easily run away from habitats which have become unendurable.

The civilized man deliberately and knowingly sits down and dwells amid the accumulating offal, trash and excreta of generations.

On the site of old Troy three successive cities have been built on as many layers of made soil. The Roman forum, lately uncovered, has been lying for centuries under fifteen feet of material, mostly decomposed deposits of a cattle market.

Millions of our species have gone into premature graves by the way of black death, plague, Asiatic cholera, typhoid fever, diphtheria and other filth diseases, and to-day in our modern cities and towns thousands are going the same way.

The economic efficiency of vast numbers is reduced by an incalculable amount, and the expense of maintaining invalids is another vast increment of loss.

The mediæval way of accounting for all this death and loss was to attribute them to the Divine vengeance, punishing men for sin. And this was merely a theological expression of a fact not now disputable, that disease and premature death are inevitable consequences of filthy living.

Fortunately sunshine, fresh and unlimited air, and rain water are friendly and protective. Fortunately, also, men are so scattered over the surface of the planet that these protective agencies, co-operating with the natural disinfecting qualities of soil, can dissipate and disarm the diabolical forces of disease.

But this scattering of population is less thorough than it was a few generations ago. City life is always fascinating. Co-operation in comforts and pleasures is easy in towns. Men are gregarious, and enjoy keenly the nervous sympathy and stimulus of crowds.

There is no longer any recollection, there is no actual tradition of great city plagues. That last survival of the feudal institution, the country gentleman, has moved into town. The roadside smith, tailor, weaver, shoemaker and their fellow artisans have been swallowed up by the great factories which environ our town and cities.

It seems useless to lament this inevitable tendency.

The first census of the United States in 1790 showed three and three-tenths per cent of the people to be in the cities. In 1830 that percentage had doubled, in 1850 quadrupled; and in 1880 our cities held twenty-two and one-half per cent of the population.

In England sixty per cent of the people were in 1881, in cities. Our own country will soon see one-half of its population collected in cities.

The most vexatious problems of politics, economics and morals of

the age are city problems. Democracy has failed in many of our large cities and the people are calling wildly on State legislatures for protection. In this very town (Minneapolis) citizens have been publicly asked to contribute to the support of a soldiery, liable to be useful in putting down the "dangerous classes."

Passing without mention a large group of city problems I come at once to the sanitary problem. As life and health are more precious than all other things, the sanitary interests of cities outweigh all other interests. And still I think it can be shown that in the long run the economic interests of a city are best subserved by effective sanitation at almost any cost. If citizens mean to live and live well they must provide for these fundamental things:

1. A well drained and uncontaminated terrain for their city.
2. An abundant supply of pure water.
3. The uninterrupted access of fresh air to all passages and enclosures.
4. The removal and purification of filth and rubbish of every kind.

If cities were built ideally according to plans and specifications, these fundamental things would be attended to first of all. As a matter of fact they are tardily undertaken when the increase of disease and death frightens the powers that be, into action. And it rarely happens in this land of local administration, that any orderly plan is made or followed.

It is of one of these four fundamental things, the removal of city rubbish and filth, that I am, by the kind invitation of your president, permitted to speak at this time. If the subject should prove uninteresting I throw the responsibility on his broad shoulders, well able to bear it.

Next to the people who create the filth of the cities, the market gardeners, fruit farmers and dairymen who environ modern cities, are most interested in its proper disposal. In an ideal state of cultivation every particle of decomposed animal and vegetable matter goes back to the soil whence it came. The waste and offal which are now filling and polluting our streams, lakes and bays and destroying their fish, will some day cover places now desolate with blooming gardens and fruit-laden orchards.

It seems to me that without delay a goodly portion of the city filth should be put to its proper use of fertilization in the neighborhood of cities. I should be glad if this paper would set a single person to work on this problem. I hope it may set more than one to thinking.

Some account of various plans for disposing of city offal may prove interesting and furnish suggestions for further efforts.

The matter to be disposed of is conveniently separated into four parts:

1. Solid matter, not excreta, including sweepings, ashes, garbage and litter.
2. Excreta, i. e. fæces and urine.
3. Foul waste, including house slops, and the waste of factories of many kinds.
4. Surface water.

Let us eliminate the first and last elements.

Of the first, solid matter, not excreta, the only thing to do is to collect and cart it off to some suitable place. As to its ultimate disposition I will speak farther on.

Of the last constituent, surface water, it needs only to be said, that it must be allowed to run off in drains, closed or open. Of late years there has been a very lively debate between advocates of two systems for disposing of surface water. One party clamors for a so-called "separate system" of drains, independent of the sewers. The other party prefer to turn all rain water into the ordinary sewers, enlarging their capacity accordingly. The "separate system" has obtained considerable acceptance in London.

For our purpose we need to remark that any attempt to utilize water-carried sewage is immensely increased in difficulty if it is diluted with surface water. It is, I think, probable that the separate system may come into extensive use on this account, but there are those who question this.

There remain for further consideration the other two constituents:
Excreta and
Foul water.

Before the introduction into England toward the close of the sixteenth century of the ancient Asiatic water closet, it was the custom to remove excreta in wheeled boxes or tubs, and allow foul water to run off in open drains. The formation of sewers was an afterthought. The great Cloacæ of the Romans, the huge original conduit of Paris, the first sewers of London, were constructed to drain off superfluous ground waters, those in particular of certain streams and swamps.

When the slop waters of a city became voluminous and their discharge in open drains intolerable it was a simple device to put them out of sight by turning them into the great underground drains. A rapid extension of lateral and tributary sewers was a natural consequence. The introduction of water supply systems into modern cities has brought the water closet into extensive use, and along with it the so-called

“water-carriage system” of removing excreta. This consists in simply turning all faecal matter at once into the common sewer to float off to the point of discharge. The water-carriage system is so cheap, convenient and effective that it is not likely to be supplanted in our time.

There is but one competing system, the so-called (from its inventor) Liernur system in the city of Amsterdam, Holland. That city cannot discharge its sewage into the sea because it lies too low in the water. By means of powerful air pumps, operated by steam power, the sewage is sucked through iron pipes to a central receiver. There the water is expressed, the solid residuum dried and converted into a valuable manure. The system is reported to be effective, very favorable to good sanitation, but not economically cheap.

Modern sewage is composed, then, of excreta and foul water, with or without rain water. A previous generation thought to have disposed of sewage by turning it into underground drains and shutting it out of sight. All it had accomplished was the partial removal of a nuisance from door yards and kitchens to the mouth of the sewer. I say partial, for the sewer itself now became the nest and brooding place of deadly gases, which no Yankee ingenuity in traps and seals has ever completely shut out of houses. The royal blood of England was poisoned almost to death but a few years since by sewer gas emptied into a palace through the most scientific appliances.

And the question is before us this hour: How shall we dispose of our sewage so that it shall not dispose of us?

English experience here furnishes the most valuable suggestions. The immense increase of manufacturing establishments, such as woolen mills, paper mills, dyeing and printing works, bleacheries, gas works, etc., so polluted the rivers of England that parliament intervened in the famous Rivers Pollution act of 1867. The operation of this act led to numerous experiments for purifying sewage.

Besides this there was, as there had been for centuries, the sewage problem of London. In former times the slops of London went into the Thames as that stream flowed through the town. Then the outlets of the sewers were carried down stream, and then still further down. A half million tons of solid matter turned into that river yearly have threatened to ruin navigation, have destroyed the fisheries and created a nuisance beyond the power of words to describe.

Without going into details, we may group the English experiments under three heads. Of course I do not count the ancient no-system of simply letting sewage flow where gravitation and tide would let it flow.

1. SIMPLE SUBSIDENCE.

This plan is that of emptying the liquid sewage into large tanks or vats, in which the solid matter settles and the liquid overflow passes into the nearest stream or tidewater.

Such is the condition of some English rivers that this effluent water, although loaded with deadly organic poison, is actually purer than the stream into which it may issue. This was the case at Leeds where a costlier plan of sewage disposal was abandoned because it turned out the waste water cleaner than the river.

Under this system the solid matter called the "sludge," is carted or barged off to some place of deposit on land or water. This plan may serve well as a temporary one for small cities.

2. IRRIGATION.

As the word indicates, this system disposes of sewage by discharging it by means of suitable piping over areas of agricultural lands, being itself purified while enriching the soil. The plan is not new.

The town of Bunzlow, in Germany, has had a sewage farm in operation for three hundred years.

The Craigentenny meadows, near Edinburgh, of four hundred acres, have received a good share of the sewage of that city for a hundred years, and that to great profit.

A number of English towns, among them Croydon, Cheltenham and Blackburn have adopted the irrigation system.

The city of Berlin, built on a sandy plain, has of late years introduced this plan on a great scale. Still later Paris has begun disposing of a portion of her sewage on land lying west of the Seine.

A drawback to this plan is that lands do not always need irrigation, while sewage flows incessantly. If no other remedy is devised the surplus must flow off by some waterway. The experience of Berlin and other North German cities shows that the cold of northern winters does not preclude the discharge of sewage upon land.

In mild climates and in the warm season anywhere, a modified form of the irrigation system promises to serve as a useful adjunct for disposing of sewage when not needed for irrigating. This modification consists in flowing the sewage off the fields on to small areas of land thoroughly underdrained to a depth of six feet or more. The soil to the depth of the drainage becomes a great filterbed, holding solid and suspended matter, leaving the filtered water to escape by the drains.

By alternating the flow between several plats, and thus leaving them to the operation of sun and air at intervals, it has been found practicable to discharge the sewage of 1,000 people on each acre of porous soil. Irrigation—"broad irrigation" as we may now call it—requires an acre to each 100 people. The Royal Commission of England in 1832-84 recommended the "intermittent filtration plan" for London.

3 PRECIPITATION.

There are many contrivances under this head all having for their object the acceleration of subsidence of suspended matters. When quantities become large, subsidence is slow, and decomposition sets in. To quicken subsidence various chemical substances are mingled with the sewage in the settling tanks. Lime in the shape of milk of lime at the rate of one ton of lime to one million gallons of sewage has come into commonest use. Other chemicals employed are tar and chloride of magnesium or of lime, sulphate of alumina, protosulphate of iron, and a mixture of clay (alumina), blood and carbon. The system employing alumina, blood and carbon is called for shortness the A, B, C process.

After precipitation by whatever process, the effluent water still holding organic matter in solution may be variously disposed of. It may be discharged into the sea or a stream. It may be used for irrigation or filtered through soil. The city of Birmingham, of 600,000 people, precipitates by the milk of lime process, and irrigates 1,200 acres of land with the waste water.

The disposal of the sludge still remains. It is of little value for manure, and has a gelatinous consistency which makes it very difficult to handle. On the seaboard it can be pumped into barges and carried out to sea. I meet nowhere with any satisfactory suggestions for handling the sewage sludge of inland cities. It can be made into bricks and has been made into a cement, but not at a cost to warrant such manufacture.

An experiment at Aylesbury, a town of 29,000 people about forty miles northwest of London, offers a probable solution of the problem for small cities. The A, B, C process of precipitation is used. The sludge is dried, ground with some sulphate of magnesia and sold under the name of native guano at \$17.50 a ton. The material as it issues from the filter press resembles oil cake, and is quite inoffensive. Ten hundred weight of it doubles a crop. It is reported to be better than stable manure or Peruvian guano.

The difficulty of applying the Aylesbury plan to London and other great cities, is that the immense proportion of inert mineral matter in the sludge reduces its value for manure out of all proportion to cost of handling.

To lessen this difficulty a combination of the systems of simple subsidence and chemical precipitation has been proposed by a Maj. Gen. Scott, of England, who appears to be acknowledged as an expert in sanitary matters.

This plan proposes to flow the liquid sewage from the mains first into great settling tanks, where the mineral matters in suspension are to be allowed to subside. It is calculated that two-thirds of the solid matter, nearly all mineral, will settle. Naturally some organic matter will be carried down. From these settling tanks the sewage water, bearing little but organic matter and that in solution, is to flow into a second set of tanks, when some defecating process, such as the lime process of precipitation, is to be applied to it. This is expected to yield a sludge so rich in organic matter that the manufacture of a fertilizer will be profitable. It is further proposed to enrich this organic sludge with superphosphates. The sludge of the settling tanks must be removed by barges or wagons, and may serve for filling low lands; if not, it must go out to sea. The effluent water, nearly pure, may be discharged as may be found convenient.

4. MECHANICAL FILTRATION.

This system, nowhere in operation except in an experimental way, is interesting because it is a Yankee invention, and because I believe it to point towards a simplification of the sewage problem.

Not many years ago a Mr. Hyatt, of Newark, N. J., invented an apparatus for filtering on a great scale water for house use and manufacturing purposes. An example was shown in the Minneapolis Industrial Exposition of 1886. This apparatus forces the water, treated with a solution of alum, through a filter bed of pulverized coke and clean sand. The novel feature is that of cleaning the filter bed by simply reversing the current for a very short time, once in say twenty-four hours. There can be no doubt of the efficiency of the Hyatt apparatus, on a moderate scale, for cleansing waters. A thousand towns and cities are already using it.

The claim is now made that this apparatus will filter liquid sewage effectually, and deliver the water purer than most unfiltered drinking water. As an instance: An experimental apparatus set up in Chicago has, it is alleged, delivered water purer than that of Lake Mich-

igan, as furnished by the city water works. Mr. Hyatt has lately made a proposition to the city of Paris to filter its sewage, guaranteeing to discharge the water perfectly pure into the Seine.*

The advocates of mechanical filtration are not bound more than other people to dispose of sludge, but Mr. Conant, editor of the *Sanitary Era*, a journal published to advertise the Hyatt filter, advocates with great earnestness a plan for purifying sludge with dry earth. His idea is simply to mix a sufficient quantity of dry earth with sludge to deodorize it, and to repeat the process until the mixture becomes a fertilizer equal in value to Peruvian guano. I do not learn that any machines or appliances have been devised for working this plan. It seems to me to be one of great promise, but the cost may postpone its introduction for a long time.

We have briefly described the systems of sewage disposition worthy of serious consideration.

They are, to recapitulate:

1. Simple subsidence.
2. Irrigation, with or without intermittent filtration.
3. Chemical precipitation of the whole sewage, or of a residuum after subsidence of suspended mineral matter.
4. Mechanical filtration

At the risk of unduly trespassing on the time of this meeting, I propose to devote the remainder of this paper to an answer to this inquiry: What, in view of past experience and present knowledge, may be reasonably undertaken by an inland city, such as Minneapolis in the way of cleaning?

Two things we presume: First, that the cleanings of a city are not to be dumped into rivers, lakes, or other waters, or deposited on lands where they will be a nuisance. The spectacle of a city of the size and pretensions of Minneapolis or Saint Paul, emptying into the Mississippi river thousands upon thousands of tons of solid and liquid filth and offal yearly is one to make angels weep and men blaspheme. Men who will hold the offices of mayor, alderman, or health officer, and not make it their first duty to lift their voices for some kind of civilized scavenging and sewerage are fit representatives of a people who are content to sit in the midst of their filth and pray the good Lord not to scourge them with tuberculosis, typhoid and diphtheria.

Exasperating as official inactivity may be, the mournful, humiliating part of the business is, that we, the people, are so blind, so ignorant, and so intent on living that we forget to live.

* *San. Era*, Dec. 15, 1887.

The first duty of a city is to clean itself, and dearly does any city neglect this duty.

Another thing to be presumed is, that the cost of thorough cleaning is a secondary consideration. A better statement would be that a thorough cleaning at any cost will pay; pay in the influx of population to a healthier city, pay in increase of values, pay in a lessened death rate, and a cleaner bill of health.

A third thing to be most heartily desired is the co-operation of a large body of intelligent cultivators to utilize the best at least of the fertilizing material now filling up and polluting the noble river which belongs to us simply to use and not to abuse. Upon these assumptions let us attack the practical question first proposed.

For clearness, let us recur to the classification of city filth already named. Four sorts:

1. Solids not excreta.
2. Excreta.
3. Foul water.
4. Rain water.

The first class, solids, consisting of street sweepings, dust, ashes, stable litter, garbage and rubbish should be collected systematically under compulsory regulations and removed.

House ashes, dust and garbage should be kept under cover till emptied in the public carts. Stable litter, if not removed by proprietors within reasonable time, should be carted off by the public scavenger and the expense charged upon the property.

Street sweepings are already removed by a public agency.

All of this service should be managed as a department of the city government, just as much as the water supply. It should be compulsory, and should be effective enough to keep all streets and alleys, all grounds and areas absolutely free from accumulations of filth. No syndicate or corporation should be allowed to levy a tax upon the people under the guise of a franchise.

The removal of this class of cleanings must be followed by assortment and ultimate disposition. In the first place, none must go into the river and none on to lands to be a nuisance.

Street sweepings, dust and ashes may go to filling low grounds until they shall be in demand for fertilizing.

Stable litter, garbage and rubbish may be "cremated," in whole or in part. The burning of this material is now rendered perfectly feasible by ingenious furnaces with two fire boxes. Cremation is no new device. The Gehenna of ancient Jerusalem was the perennial fire on which the offal of that holy city was consumed.

The second class, excreta, solid and liquid, is that whose prompt and innoxious removal is of first importance. There is no help for it but that excreta must go into the sewers, until the present fashion changes and better means of removal are organized. And better means might easily be organized. The power of common dry earth to thoroughly defecate night soil has been placed by experiment beyond all question. The day will come when all this material, purified by dry earth, will command a price, which will amply pay for more than the cost of removal. The city of Lynn, Mass., got a clean profit of \$2,176.25 from the composting of night soil in 1886. (San. Era, April, 1887). Minneapolis and Saint Paul waste \$50,000 worth apiece of good fertilizer each year.

As to the third class, foul water, i. e. house slops, and the liquid waste of manufactories; these go to the sewers—of course. In time, some manufactories may be required to purify their waste before emptying it into the sewers. This was frequently required in England.

As to surface water, the sewage question would be most simplified if rain water could be conducted away in separate pipes. But that seems almost impracticable in a climate like ours where pipes must be so deeply buried at so great cost. Until the time shall come when under every principal street there shall be an ample subway in which shall be accommodated all pipes for rain water, sewage, gas, condensed air, steam, and all electric wires, surface water, not escaping by the gutters and open mains, must flow into the sewers.

There remains now, the disposal of the sewage; consisting of rain water, foul water and excreta. Here there is room, not for indifference and uncertainty, but for caution and experiment. The plan must be adapted to the climate, and the topography of the city and its environs.

While experimenting with other plans it is perfectly feasible to adopt that of simple subsidence, letting effluent water, impure of course, flow into the river, and carting the sludge to a sufficient distance.

It remains to be determined by experiment whether sewage farming and intermittent filtration through soil, can be depended on where the snow lies for four months, or can be profitably practiced where the lands lie much above the outlets of the sewers. A sandy or porous soil at least, is almost a necessity to these methods.

The cities of Providence, R. I., and Worcester, Mass., after a long and careful study by their engineers of European and American experiments, have resolved to introduce a chemical precipitation sys-

tem. The Worcester plant is to cost \$300,000, and the annual expense of operating is placed at \$22,000.

In my judgment, there should be no delay on the part of our city authorities in observing the results of these New England experiments, and also of those in progress in Chicago and elsewhere, in mechanical filtration.

The ultimate disposal of sludge presents great difficulties, especially during our long and severe winters. It seems probable that some plan of drying will have to be adopted. What one, can only be decided after careful experimentation on the spot.

The plans to be tried would seem to be these:

1. Drying the whole sludge by means of filter presses, centrifugals, blowers and perhaps artificial heat.
2. Drying the whole sludge after mixture with dry earth.
3. Drying only the organic stuff caught in precipitation tanks after the subsidence of mineral matters in settling tanks. In cold weather it might be found necessary to dry this earthy sludge in order to handle it.

As to the value of our sewage sludge for fertilizing, that, too, must await the decision of experiment. Should the dry earth process of defecation be adopted, the stuff can be used over and over until it shall reach any desired degree of richness, and the sale of it would help to pay expenses. If demanded by cultivators, it could be enriched by superphosphates or other chemical manures. It is at this point that the co-operation of enterprising gardeners and fruit growers will be found indispensable.

Let me briefly recapitulate:

An inland city, like Minneapolis, has four kinds of filth to remove and dispose of:

1. Solid matter not excreta, such as sweepings, ashes, dirt, garbage, rubbish, and stable litter.

These must be collected, assorted and carted to convenient centres. Garbage and rubbish and stable litter should be burned, except such stuff as may be taken for manure. Other solids should be in demand for fertilizing and filling low grounds.

2. Rain water, to go off by open gutters and into the common sewers.

3. Excreta.

4. Foul water.

These two to the sewers.

Our four classes reduce then to two:

1. Solid matter, to be cared for above ground.
2. Fluid matter, to go into the sewers below ground.

The fluid sewage must be purified and deodorized, and the water turned off pure enough to enter any decent river. The solid residue must be handled in such of the ways indicated above as experiment shall show to be most efficient and economical.

Meantime we are in Minneapolis lavishing hundreds of thousands of dollars upon a system of sewers planned to empty the liquid filth of a great city into the Mississippi river. It may be we cannot stop where we are, but from this instant our engineering talent should be devoted to such a modification of plans as may render the sewers we are now laying of some use in a system of the future, designed to discharge its contents at some convenient point for purification.

The city will not be allowed to discharge its filth into the Mississippi river indefinitely. Mighty as that stream is, it is not big enough to dilute and deodorize the sewage of a hundred towns and cities seated on its banks and tributaries. The national government will soon be invoked to preserve this great waterway from pollution, or if not, the riparian cities of our own State will soon be knocking at the doors of its capital for protection against the stinks and offal of the dual cities.

It is none too soon to attend to the problem of caring for own filth. We may now handle it at leisure and with composure. If we neglect it, we may be forced suddenly to adopt hasty plans, and expend millions, only to find those plans unsuitable.

At the conclusion of Prof. Folwell's address, on motion, he was given a vote of thanks, and the address was referred to a special committee, consisting of Messrs. Owen, Gray and Hillman, to take suitable action thereon.

DISCUSSION.

Mr. Pearce. Mr. President, the paper read by Col. Folwell was grand. This subject has been under consideration for some time past by our market gardeners. If this surplus material can be carried back to the soil where it belongs, and utilized, it will prove of great advantage, and we hope the municipal corporation of this city will aid us in this grand and useful enterprise.

Mr. Harris. This was a very important subject. As soon as the people of LaCrosse began to use the water of the Mississippi river some sort of scourge broke out, and many were taken off by diph-

theria and other diseases. If Minneapolis and St. Paul were to dispose of their city cleanings by using the river for a dumping ground, they should be held liable for such conduct. He hoped some action would be taken to prevent this, from the very source of the river itself to where it empties into the sea.

Mr. Underwood said he had occasion with a small party to take passage in a boat in the summer from St. Paul, and to proceed down the river as far as Lake City. The amount of sediment and offal observed on the occasion was something he had not dreamed of. He thought something should be done to prevent the father of waters from being polluted in that manner, and used to drain the sewers of these large cities.

Mr. Gray said when this subject came up before the county society, one of the health officers of the city had met with them and assured them that they should have the co-operation of himself and of the city council in their effort to dispose of city garbage and getting rid of all this filth. That was the question a committee now had before them. It was hoped arrangements could be made with the railroads for removing stable manure to different points near the city where it could be used. He thought street sweepings one of the best fertilizers to be had, and the question was how to get them from the city. Some of the rubbish was of no value. There were questions in regard to this subject that required much thought and consideration in order to make any definite proposition to the city council. As a rule aldermen knew very little about the subject of city sanitation, and many of them cared very little about it, either.

Mr. Cleveland. Mr. President, this discussion has brought to my mind the method considered for the disposal of sewage in Chicago some years ago. At one time I found some members of my family were suffering, and we attributed it to the use of river water. Since living in this city I began the use of very pure water, brought in from Glenwood springs. The disease known as winter cholera; we hear of it everywhere; we had it in Chicago in the winter of 1880-1; it was an epidemic that was almost universal, and scarcely a family escaped. I hear a great deal of it here, but I have had no case of it in my family. I haven't known a family that used the spring water that have suffered with it. It occurred to me that possibly it might be the river water that caused the winter cholera.

In Chicago it is claimed the crib is so far out from the shore that no impurity from the city could reach it, but that never entirely satisfied me; I always felt nervous about the Chicago water. I suggest this

for others to consider whether it may not be the river water that is responsible for what we are suffering here this winter.

President Elliot. To give some idea of the amount of stuff we are turning into the river here, I would state that our health officer stated at the meeting referred to by Mr Gray, that the city was dumping into the river from two to seven hundred wagon loads per day.

Mr. Pearce. It means thousands and millions of dollars wasted.

President Elliot. The market gardeners do not properly estimate the value of this material that is being wasted, and see the necessity of saving it and carrying it back upon their lands. They are coming to that point rapidly. It is high time some method was devised for disposing of this material, and having it deposited on the land in proper shape.

Prof. Folwell. I would like to hear from some nurseryman of the neighborhood as to how far fertilization is necessary, and how much can be used.

Mr. Pearce. We can use seventy-five loads of manure on an acre; our market gardeners are using that quantity now of stable manure. In the vicinity of Lake Minnetonka we could use that amount per acre on a section of land. We ought to have it, and the amount of manure that could be supplied by the city of Minneapolis is inadequate to supply the demand.

Mr. Gray. We calculate to use from fifty to seventy-five tons to the acre. If we use cow manure we put on fifty tons per acre, and if we use coarser material mixed, we put on still more. It is not profitable in market gardening operations to lower that amount any one season. If we do there is a falling off in the crop produced.

President Elliot. We would like to hear from Mr. Hale, the secretary of our board of trade.

Mr. Hale. Mr. President, I guess I have got into the wrong place, but perhaps I can manage to get out. I have never been more interested in my life than by the reading of the paper just read by Col. Folwell, and for various reasons. Later on I may have occasion to speak of what I have done in my own garden.

When you come to take into account, Mr. President, that it is no longer ago than 1837 when Franklin Steele, now dead, entered the first land on the other side of the river, it is but a short time. Since that time a city has grown up here of 160,000 or 170,000 people. Every man that has come here has come with the intention to benefit his condition financially. Taking into account the shortness of the time and the object of the people in coming here, there has not been

time to do everything. But the time has now arrived, and if I am not greatly mistaken, necessity will settle the question before long, as to the sanitary condition and the course to be taken. I believe it is all wrong to adulterate the waters of this river that our neighbors of even St. Paul or below should be injured thereby. But up to this time there has been no way to avoid it. I believe that all the manure of whatever kind can be used within a circuit of a few miles around this city, to very great profit, and the city be benefitted thereby in every respect. Of course the first consideration is that of public health.

Mr. Cleveland has referred to winter cholera. I would state that my wife is a very particular person; she believes the freezing of water purifies it to a certain extent, and she uses no tea or coffee except from melted ice. I can't exactly see how it has any effect, but she still insists that it is the best way and I do not object to it. She would have her way, you know, anyhow, Colonel, and I am glad I am not alone, [Laughter.] This is true, however, there has been no member of our family afflicted with the disease this winter; there may be something in it.

In regard to fertilizing a garden I have had some experience, as I have a small one. You may have been by it several times.

President Elliot. It is a good one.

Mr. Hale. I do know that I never had success in gardening in the past ten or fifteen years without manure. The great trouble with the people in this northwestern country is they try to get over four times as much ground as they can take care of properly. The profits of the farmer would be increased vastly if a great deal more manure were used per acre.

I have three-eighths of an acre in my garden and the buildings occupy a portion, but I raise more garden vegetables of all kinds on the portion devoted to that purpose—three or four times as much as my family consumes. Every year my milkman draws me three or four loads of manure which is used on the land. One year it was a little too heavy and not thoroughly mixed. But the point I am driving at is that the fertilizing material of this city can be profitably used in the surrounding country here and our citizens and the farmers mutually benefitted.

I have been interested in and gratified to see the agitation in regard to this matter by the local society here; I hope the question will be pressed and some means devised for the disposition of all this waste material. I believe in thoroughly manuring the soil. I never had

much success in farming unless I put into the soil a little more than I took out.

Mr. Pearce. Market gardeners are many of them beyond the reach of this manure and it is necessary that it be taken to the country by the cars.

Mr. Hale cited the instance at Chicago, in the vicinity of the stock-yards, where the offal was disposed of in that manner and taken considerable distance.

Mr. Pearce thought there was no great obstacle in the way of the removal of this material in that manner.

Mr. Hale. The various railways could remove it to the different sections of country where most needed; they would doubtless haul it at a nominal rate.

Mr. Pearce said this was an important matter. If market gardeners were to supply the demand for vegetables in the city they should take steps to obtain the necessary material to fertilize their lands properly.

Mr. Cleveland. Mr. President, nearly forty years ago I was engaged in fruit raising and market gardening on the Delaware river, some twenty miles above Philadelphia. I was then a pretty active member of the Pennsylvania and New Jersey horticultural societies, and this question we are discussing to-night used to come up very often. We were very anxious, many of us, for a proper solution of the question. There were various companies started. I remember a certain professor in New York City recommended an article called "Poudrette," and there were companies formed in different cities for utilizing the garbage of cities. I do not know whether it is still manufactured or not. It used to be made very extensively. We used to get stable manure from Philadelphia, which was brought up on sloops, and landed on the banks of the river. A good many farmers used "Poudrette," and it was but a short time until it was such miserable stuff it was scarcely good for anything. The genuine article was valuable as a manure; but there are people who, if they can buy a sham article that is a little cheaper, will get it and think that is economy. But I know I preferred a sloop load of Philadelphia manure to all of that stuff they could bring me.

On motion, the meeting then adjourned.

MORNING SESSION.

THIRD DAY, THURSDAY, JAN. 19, 1888.

The meeting was called to order at 9 o'clock by President Elliot.

Mr. Cleveland was given an opportunity to address the Society at this time and came forward and said:

THE AMERICAN POMOLOGICAL SOCIETY.

Mr. Cleveland. Mr. President, I was asked by your Secretary last evening if I was connected by the Pomological Congress, and I made reply that I took an active part in the convention when that congress was formed, and I was asked to give to-day some reminiscences of it.

I am sorry to say that while I had in my possession all the reports and published accounts of the convention at which that congress was first organized, they were all destroyed in the Chicago fire, when my office was burned and everything in it. So that all that I can tell you of it is from my own memory. I was at that time corresponding secretary of the New Jersey Horticultural Society, and was taking a very active part in horticultural matters, and I was sent as a delegate from New Jersey to New York, to meet delegates from the Massachusetts, the Pennsylvania and other horticultural societies, with a view to the organization of a national pomological congress. We had a very interesting session in New York. I think that was in 1848.

I remember there were a great many of the leading pomologists of the country present at that time. We elected Marshall P. Wilder president, and he continued the president of the congress till his death, only a year or two ago; he was re-elected time after time.

Mr. Sam Walker, who was afterwards president of the Massachusetts Horticultural Society, took a very active part in the proceedings; also Caleb Cook and A. J. Downing, Mr. Ernst, of Cincinnati, and Mr. Patrick Barry, of New York. Mr. Barry was the secretary, and the Pomological Congress was then organized, and held several subsequent meetings at Philadelphia and elsewhere. I attended regularly and with a great deal of interest, and always considered their work very valuable.

Mr. Wilder was the best manager of a public meeting that I have ever known, perfectly firm, frank and straightforward, in all respects, securing the respect and good will of all who listened to him; a man

of a remarkable combination of character, genial and pleasant. The last time I met him was in Chicago, when some six or eight years ago the pomological convention met there. I had not attended their meetings for a number of years, as they were held in the east and I was then fixed at Chicago; but I spent the day with him and met some of my old friends. I had been engaged in laying out parks in Chicago for some years then, and of course took a great deal of interest in showing my old friends what I had been doing there, and they rode around with me and we spent the day together, and had a very pleasant banquet in the evening, which was attended by the merchants of Chicago.

In 1882 I was invited to read an address on forestry to a committee of the Massachusetts legislature. A petition had been sent to the legislature for an experimental forest, under the auspices of the state, and the committee to whom it was referred invited me to read a paper on the subject, which I did. Afterwards the Illinois department of agriculture asked for it to be published in their transactions; I sent them a copy and they published it. And I sent copies of the pamphlet to different friends, and among them one to Mr. Wilder. He sent me the following characteristic letter in reply which I want to read to you. It was the last communication I had from him; here it is:

LETTER FROM MARSHALL P. WILDER.

DORCHESTER, July 4, 1882.

"Thanks, my old friend, for your excellent document on native forests. It is a capital paper. Go on with the good work; it will be a blessing to future generations. Received horticultural documents.

Yours as ever,

MARSHALL P. WILDER."

As I say, the Illinois department published this pamphlet. I have given them away as opportunity has offered. I don't like to give them where they are not appreciated, for I don't approve of "casting pearls before swine," but I felt so sure they would be appreciated here that I brought a lot of them, and which I beg that the gentlemen present will help themselves to if they care to take them home.

President Elliot. This is very interesting to me, especially, as I have had the privilege of meeting Marshall P. Wilder at several of these pomological conventions. This incident brings up many memories in my own mind of a pleasing nature. We hardly realize the great loss the country sustained in the death of Marshall P. Wilder,

but he had done a good work, and he has left a monument after him, surely, that will remain with the American people for ages.

Mr. Harris. Mr. President, I think we can all say that the work of Marshall P. Wilder did not die with him. I believe all over this North America there are thousands of men whom he educated in horticultural pursuits and who gained inspiration from the life and example of Marshall P. Wilder and a love for the cause he adorned. For myself, I can say he was a man who for over thirty years I looked up to as one worthy of emulation, and I feel that we have had no superior in this country in this field which he occupied. He had thousands of friends, and I hope we will keep his memory green in all our horticultural meetings while we live, and that those who come after us may partake in a large degree of the same inspiration.

Mr. Wilcox. Mr. President, I wish to add one word to what has been said concerning the memory of the venerable Marshall P. Wilder. It is a cause of the greatest discouragement to our younger members, and to practical horticulturists of the present generation, when we look at the many chairs left vacant and to be filled, by the death of distinguished pomologists of this country; and among the greatest of these was Marshall P. Wilder. Now, gentlemen, we have one consolation, and that is that the study and the love of horticulture is very much like some diseases, in that it clings till death. Where can we find a man with a name who has once been really interested in this work, and who has once devoted his thoughts and study to the promotion of horticulture that ever left it until his voice was stilled in death?

We have seen this illustrated in the case of such men as the Downings, Mr. Wilder and others, and we have among us now such men as T. T. Lyon, of Michigan, those who are devoting their life work to the interests of horticulture. One characteristic about Marshall P. Wilder was, while there were those that were intimate with him and knew him best could not see the brilliant genius that distinguished some men, still there was that invisible influence about him that no one could meet him without being attracted, and leaving him to remember and admire him forever afterwards.

Mr. Cleveland. What the gentleman has just remarked upon the influence of horticulture reminds me of an anecdote, which I trust will prove sufficiently interesting to pardon my using it. On one occasion I went from New Jersey with a delegation to attend the great triennial meeting of the Massachusetts Horticultural Society, by invitation. The gentlemen who went with me were strangers in Mas-

sachusetts, and as that was my old home I took them to show them what was most interesting in the vicinity of Boston, in connection with every specialty, and among other places I took them to the garden of old Samuel G. Perkins, a brother of Col. Perkins, a man of large fortune, and who has been many years retired from business, devoting himself most zealously to horticulture. We found him past eighty years old and nearly blind, seated on a camp stool in his garden pruning his pear trees, and guiding himself along where to cut by feeling. He could tell a fruit bud from a leaf bud by feeling; and on some of my friends blaming him and expressing their gratification at seeing such self-interest in the cause at such an age, he made a remark that has clung to me ever since, and of which I am reminded by what you have just said:

“Gentlemen, the love of gardening has this advantage over any other taste, that it forces a man to labor as long as he lives; and labor, gentlemen, is the greatest blessing God ever gave to man.”

Col. Stevens was here requested to read a paper prepared by him upon Indian foods:

WILD FOOD.

By Col. J. H. Stevens, Minneapolis.

Mr. President, Ladies and Gentlemen:

I am requested to hand down to this generation the varieties of the primitive or wild food incident to this soil and climate from which the Indians used in part to subsist on.

The lamented Philander Prescott, who was so brutally killed by the Indians on the nineteenth day of August, 1862, informed me in 1849 that when he came to the Northwest in 1819 the natives depended much on this wild food. In most instances it was easily gathered, and I found that while among the Indians in an early day, that even a white man would soon become fond of the wild sweet potato and one or two other varieties of the wild tubers the squaws used to serve up to us.

According to Mr. Prescott the most prominent varieties of wild product used by the Indians were the mendo or wild sweet potato, yesp-senah or wild prairie turnip, panhe or artichoke, omenechak or wild beans, psen-chin-chah or swamp potato, pesich-ah, towahapa or wild rice.

The mendo, or wild sweet potato, is found throughout the valleys of the Mississippi, Minnesota, and other streams in the central part of

Minnesota. It grows about the bases of bluffs, in rather moist but soft and rich ground. The plants resemble the sweet potato, and the root is similar in taste and growth. In a letter to Hon. Thos. Ewank, dated Nov. 10, 1849, a copy of which I have in my possession, Mr. Prescott says: "It does not grow so large nor so long as the cultivated sweet potato, but I should have thought it the same were it not that the wild potato is not affected by the frost" The Indians simply boiled them in water when being prepared for the table. I have intended to have made experiments in the cultivation of the mendo, believing they would bear civilization, and perhaps when perfected a new variety of sweet potato of great value would be added to our products. I regret much my negligence in this matter.

The tip-sne-ah, or wild prairie turnip, grows on the high native prairies, one or two together, in size from a small hen's egg to that of a goose egg, and of the same form. They have a thick black or brown bark, but are nearly pure white inside, with very little moisture. They grow about six or eight inches below the surface, and the Indian women used to dig them with a sharp pointed stick forced into the ground and used as a lever. They were boiled and used by the Indians in the same manner we use our turnips. They were frequently split open and dried for winter use by the squaws. When dried they resembled chalk. Mr. Prescott thought that when thus dried they could be ground into flour and that they made a very palatable bread. The pang-he, or artichoke, grows where the land is rich, near fallen or decayed timber. It was only used for food when the Indians were very hungry. The Omen-chah or wild bean was found in all parts of the valleys in the old territory where the land was moist and rich. In regard to this plant Mr. Prescott says: "It is of the size of a large bean, [with a rich and very pleasant flavor. When used in a stew, I have thought them superior to any garden vegetable I had ever tasted."

The Indians were very fond of them, and pigeons get fat on the product in the spring. The plant is a slender vine, from two to four feet in height, with small pods two to four inches high—with small pods two to three inches long, containing from three to five beans. The pod dries and opens, the beans fall to the ground, and in the spring take root and grow again." There is no question in my opinion but what this plant could be successfully cultivated and civilized.

The psen-chin-chah, or swamp potato, was found—and I suppose it is so to this day—in the mud and water about three feet deep. The leaf is as large as the cabbage leaf. The stem has but one leaf, which has, as it were, two horns or points. The root is obtained by the

Indian women; they wade in the water and gather the roots. It is of oblong shape, of a whitish yellow, with a few black rings around it, of a slightly pungent taste, and not disagreeable when eaten with salt or meat.

The psen-chah I believe to be of the same family as the last but the tuber not so large. The stem and leaf are similar, but grow in deeper water. The Indians are very fond of them. Both of these tubers are found in large quantities in the muskrat lodges, stored by them for winter use. It is not saying too much to call them a luxury.

The ta-wah-pah is another tuber, or rather a root, that the Indians esteem highly as food. Like the two preceding, it is a water product. The stem, leaf, and a yellow flower is like the pond lilly. It is found in the lakes, in water and mud from four to five feet deep. The Indian women used to gather them in large quantities. The root is from one to two feet in length, very porous; there are as many as six or eight cells running the whole length of the root. It is slightly sweet and glutinous. The Indians generally boiled it with wild fowl, but often roasted it in the absence of wild game. All of these roots were preserved by the Indians for winter use, by boiling and then drying them over the fire, or in the sun.

The greatest product of all was the wild rice, at least as an article of food, of which the Indians themselves gathered instead of the women. They used it in all of their great feasts. It was found—and I suppose it is to this day—in lakes and streams, where the mud and water is from three or four feet deep upwards to ten or fifteen. The rice harvest was a short one. It was only of a week's duration. When ripe the slightest touch shakes it off, a strong wind of short duration scatters it in the water. The Indians obtained it by paddling a canoe among the rice, when with a hooked stick they drew the stalks over the canoe and whipped off the grains. They continued to push the canoe on and whipped off the rice until the canoe was full, then carried the cargo to the shore, unload, fill again until the season was ended.

To dry the rice they erected scaffolds about four feet high, eight wide and twenty to fifty feet long, covered with reed grass. On these the rice was placed and dried by a slow fire kindled under the scaffold and kept burning about a day and a half. The beard is longer than that of rye, and to remove it and the chaff the Indians made a hole in the earth about one foot wide and one foot deep, in which they placed a skin, and put about a peck of the dried rice at a time in the hole. Then the Indian, holding himself by a stake planted

near, stamped off the heads. It is then cleaned and stored for future use. It is of a dark color, and many of the pioneers prefer it to the California rice. I never did, but frequently in an early day was obliged to eat it or go hungry.

I do not pretend to give the botanical name to these products. I prefer to let them remain in their own native Dakota, just as Mr. Prescott left them so many years ago.

On motion, a vote of thanks was given Col. Stevens, with the request of a copy for publication.

The following paper was read by Mr. Owen, editor of *Farm, Stock and Home*:

FORESTS AND MINES.

THE RELATION OF OUR UNDEVELOPED IRON AND COAL MINES TO OUR OVERDEVELOPED FORESTS.

By S. M. Owen, Minneapolis.

Mr. President, Ladies and Gentlemen.

This country has now reached a period of intellectual and material development so advanced that new problems are constantly presenting themselves, as new scenes present themselves to the traveler in a strange country. As a nation we have driven such a furious race behind the spirited steeds of progress that we have forgotten everything save the exhilarating sensation of our rapid ride; have been oblivious to the terrific strain to which carriage, steeds and rider have been subjected; have been indifferent to a possibly useless waste of energy and misuse of resources. We have been forgetful of the past and thoughtless for the future. If we feel any gratitude toward our ancestors, the sentiment is not powerful enough to properly impress us with our obligations to posterity.

This unwise, even dangerous, indifference of the present regarding the future is manifest in a thousand ways, but it is my purpose to call your attention to but one of them, though that one is by far the most important of all, for it is one that is leaving in its wake the most of danger and calamity; I allude to the destruction of the forests of our country.

I do not propose to touch upon the climatology of this subject. I

assume that every one of you know how important a factor that is in the forestry problem; but if anyone of you do not, I am certain you have those among you who can discuss that phase of the subject more intelligently than I can. I will not stop here even to discuss the governmental absurdity of giving timber destroyers an immense bounty for demolishing the great forests which temper the north winds to our suffering fields and fruits, while at the same time it gives liberally for planting trees to modify the winds from the west!

My purpose is to give some well authenticated statistics of the present condition of our forests, the rate at which they are being destroyed, their probable duration if the present rate of destruction is maintained, and to suggest means of supplementing them with other resources. It does, indeed, seem incredible that this country, yet in its infancy—as the lives of nations are estimated—and which was endowed with a wealth of timber regarded as absolutely inexhaustible, should enter the front door of the second century of its life to be there confronted with the most melancholy of all problems, that of an insufficient timber supply—a timber area so narrowed that processions of climatic calamities are almost constantly on the march by reason of the narrowness. But however incredible this may seem it is not the less true; shut our eyes to the fact as we may, or sing never so sweetly our bounty-paid lumber lords to the contrary, the present condition of our forests is deplorable. The insufficiency of our timber supply is already appalling, and daily growing more so, because—paradoxical as it may seem—parsimony and extravagance are running a joint race of devastation and waste!

The figures which I am about to present for your consideration are authentic and reliable, and I would have no one consider them as the emanations of an alarmist's brain, or unworthy of attention. It is said that our Western and Northwestern mills have in forty years destroyed the timber that it took two hundred years to grow. The capacity of the present mills in the South is sufficient to exhaust the valuable timber in that region in twenty-five years, and it would take from one hundred and fifty to two hundred years of intelligent timber culture to renew the probable destruction of the next twenty-five years. There are yet enormous belts of timber on the Pacific coast, yet careful calculations have demonstrated that when that supply is drawn upon for the nation's needs—as it soon must be if something is not done to check the present frightful consumption and reckless waste—it cannot possibly last over fifty years.

It requires a serious contemplation of the almost inconceivable con-

sumption of timber in this country to enable us to be incredulous regarding its claimed insufficiency. If your minds can grasp the following figures, you will be better able to appreciate the forestry situation. Careful estimates, based on the most laborious and painstaking research of the forestry division of the national department of agriculture, place the annual consumption of timber at 20,000,000,000 cubic feet—240,000,000,000 feet of lumber; or, if we now number 60,000,000 people, 4,000 feet for each man, woman and child in the land. This amount is made up as follows:

For lumber market and wood manufactures, 2,500,000,000 cubic feet; railroad construction (new construction, based on the average of the past ten years), 360,000,000 cubic feet; charcoal, 250,000,000 cubic feet; fence material, 500,000,000 cubic feet; fuel, 17,500,000,000 cubic feet.

These amounts are actually used, but they do not comprise the total of forest depletion; for our wasteful practices, culling and thinning forests (leaving the residue to die), and conflagrations, add from twenty-five to fifty per cent to the already enormous total. It is known that the carefully protected and intelligently cultured forests of Germany make an annual growth of fifty cubic feet per acre. If our forests were making a corresponding growth—which no intelligent forester will admit—on the basis of the lowest estimate of loss by waste and fire, it would take the growth of 500,000,000 acres to keep pace with our consumption.

Four years ago a careful canvass was made to determine the forest area of the United States. Including the previously mentioned Pacific coast belts, and the vast timbered regions of Alaska, we have a total of only 489,280,000 acres. It is unsafe to estimate the annual growth of our forests at over one-half those of Germany, of twenty-five per cent; and it is certainly not unreasonable to put the loss by waste and fire at thirty-five per cent—less than an average of the various estimates. This gives a total consumption of twenty-seven billion cubic feet, and an annual growth of only 12,231,000,000 cubic feet! Appalling as these figures are, they do not tell the whole story, for it is admitted that many of the above estimated forest lands do not possess a foot of valuable timber—are but swamps of brush, hill-tops of scrubs, and worthless second growths on former timber lands.

It is my candid opinion that the citizens of the United States never were confronted with a more serious problem than the one now under consideration. They never were confronted with a problem which

demanded more intelligent or more radical treatment, nor one fraught with more importance to the future dwellers of this land, which God made so fair and endowed so richly.

In what direction does duty lie, must be our first thought; that point settled, duty's paths must be trodden persistently and uncompromisingly. No consideration of a public or private nature must be considered paramount to this one. Investigation will reveal the fact that this question is provided with two duty paths; one is the planting of timber, the other is the preservation of that which we yet possess. Concerning the importance of the first duty we are all agreed; though it must be admitted that we have not pursued this path with the energy, ability, nor to the extent that the exigencies of the case demanded. Tree planting in this country is as yet but a vaguely defined sentiment. In many localities, on many farms, this sentiment has crystalized into fair timber belts and thrifty groves; these are, however, but drops in the vast ocean of desolation which has washed over and well nigh obliterated our once magnificent forests.

But I do not propose to discuss this end of the subject. Change the sentiment of tree culture, if you will, into a great intelligently organized fact; make it a government work of unparalleled magnitude and efficiency, and yet that will be following but one of the paths of duty to which I have alluded.

Let us now consider the matter of stopping the unnecessary consumption and preventing needless waste. Right here allow me to say that governmental forest planting co-existent with government encouragement of forest destruction, is a bung hole waste and a spigot saving policy so idiotic that our posterity will be amply justified in derisively laughing at our folly; and it is a policy that cannot be changed too quickly.

If we have any resources which can be made to supplement the one of timber, we should surely hasten to utilize them; if we have any reinforcements which can aid our forests in holding their own against the vandalism which is now so rapidly destroying them, we should not hesitate a moment about enlisting them in the holy cause. The reinforcements are at hand; we possess them in untold quantities, and they are marvelously easy of access; these great resources are coal and iron.

We are burning 17,500,000,000 cubic feet of our precious forests every year. At the same time we possess two-thirds of the known coal of the world, but it is so hemmed about by unnatural trade laws, and so dominated and controlled by capitalistic combinations that it is

made one of the luxuries of life, bearing a higher price than in any other country of the globe, and hence enormously and unnecessarily augmenting the consumption of wood. I will not waste words on this branch of the subject; I feel that it would be an insult to your intelligence to enlarge upon so palpable an absurdity. Of iron and its possibilities as a timber saver I must have more to say. First, allow me to quote so much of the report of the United States commissioner to the last International Exposition held in Paris, as refers to our natural wealth of coal and iron. It so tersely calls the roll of the reinforcements I am now considering that I think it can but interest you.

Along the Atlantic slope, in the highland range from the borders of the Hudson to the State of Georgia, a distance of one thousand miles, is found the great magnetic range, traversing seven States in its length and course. Parallel with this, in the great limestone valley which lies along the margin of the coal fields, are the brown hematites, in such quantities at some points, especially in Virginia, Tennessee and Alabama, as fairly to stagger the imagination. And, finally, in the coal basin, is a stratum of fossiliferous ore, beginning in a comparatively thin seam in the State of New York, and terminating in the State of Alabama, in a bed fifteen feet in thickness, over which a horseman may ride for more than one hundred miles. Beneath this bed, but still above the water level, are to be found the coal seams, exposed upon mountain sides, whose flanks are covered with magnificent timber, which can be used for the purpose of manufacturing charcoal iron. Passing westward, in Arkansas and Missouri, is reached that wonderful range of red oxide of iron, which, in mountains rising hundreds of feet above the surface, or in beds beneath the soil, culminates at Lake Superior in deposits of ore which excite the wonder of all beholders; and returning thence to the Atlantic slope, in the Adirondacks of New York is a vast undeveloped region, watered by rivers whose beds are of iron, and traversed by mountains whose foundations are laid upon the same material; while in and among the coal beds themselves are found scattered but rich deposits of hematite and fossiliferous ores, which by their close proximity to coal and a market makes possible the development of an iron industry such as the world never saw. From these vast treasures the world might draw its supplies for centuries to come, and with these the inquirer may rest contented, without further question; for all the coal of the rest of the world might be deposited within this iron rim, and its square miles would not occupy one-quarter of the coal area of the United States.

In very truth it may be said that iron and coal are almost as plenty in this country as dirt! They are almost as boundless as "the empty, vast and wandering air." We have all the materials for iron making in conjunction, and all of them above water level! From their beds they can be carried by their own gravity to the smelting furnaces and rolling mills. In no other country on earth do such conditions prevail; in no other country do they even remotely approximate them! This certainly means that iron can be easily and profitably produced in the United States at a lower price than in any other country, for in all other countries materials must be mined from great depths and brought together from long distances.

Now, with cheap iron given us, what will we do with it, how make it supplement timber, and lessen the consumption of wood? I answer, in a thousand ways! But I will call your attention to but a few. One of our most remorseless timber destroying agents is the railroad. The timber it uses is of the very best. The element it takes from the forests is analogous to the youth of a nation. The prime, sturdiest, most promising representatives of the forest are sacrificed to the demands of the railroad. Whether for ties, bridges, culverts or cars, nothing but the freshest, purest blood of the fast disappearing aristocracy of trees will satisfy the appetite of the railroad giant. Five hundred and ten million cubic feet of such timber is used annually for ties, bridges and telegraph poles alone. Estimating the annual growths of our forests at forty cubic feet an acre, it takes the growth of 12,750,000 acres to provide for these three items, *and every cubic foot of them should be iron!*

Iron bridges and culverts for railroads should be made compulsory by law. The London *Daily News*, in commenting on that terrible disaster at Chatsworth, last summer, said: "And the strangest thing about this strange, sad accident, is that the culvert was made of wood." Strange, indeed, must it have seemed to an intelligent Englishman; and it should be made impossible by intelligent Americans!

The iron railroad tie is no longer an experiment. It has been in use in Europe for twenty years, and substitution of iron for wooden ties is now being made there with marvelous rapidity. In Germany, Switzerland and Holland one eighth of the entire railroad mileage was supplied with iron ties as long ago as 1884. At the present time the percentage is much larger, and is rapidly growing. Even in sleepy old Mexico, on one railroad alone from forty to fifty thousand iron ties are being put in every year. This substitution of iron for wood is done in the interest of economy; but this interest does

not obtain in this country, because of the economic anomaly existing here of a scarcity of timber at a low price and a plethora of iron at a high price. Does it not behoove the lovers of trees, and those who are considerate of posterity, to do what they can to destroy such an economic anomaly?

England mines her coal from narrow seams deep in the bowels of the earth; is compelled to import more ore than she mines, to enable her to make the kind of iron and steel the world wants, and is selling ties to Holland, Switzerland and Mexico, while the United States goes on remorselessly devastating her forests, because the price of her iron is too high to be substituted for wood! Instead of the highest, we should have the lowest priced iron in the world. Then we could not only have railroad ties of iron, but bridges, culverts, telegraph poles, cars and depots of the same material. We could have iron wagon bridges and culverts; our homes might be shingled with iron; our corn cribs and granaries built of iron; and these great buildings which we see going up around us every day of massive brick and stone walls, but great lumber yards for interiors, would be more cheaply built, and infinitely more permanent and safe if iron were used instead of wood. We should be living in a golden age of iron, dominating and controlling the world's markets, instead of blindly ignoring the great wealth at our feet, and constantly looking up to estimate the market value of every noble tree our eyes light upon.

Now, ladies and gentlemen of the Minnesota Horticultural Society, let me say in conclusion, that this question is one that must not be looked at from the standpoint of partisan prejudice, nor of past or present predilections. It is a new question; it has a significance now it did not have when forests were believed to be inexhaustible. The relation of forests to mines has become so close that one cannot be intelligently discussed or treated without considering the other. As our duty to God and our children is above every other duty, so is this question above party creed or party allegiance.

I have presented these facts to you because you are the conservators of the forestry interests of your section of country. My object is to point you towards a means of protecting and preserving your ward, which possibly may not have occurred to you. I trust you will see it as I do; I hope you will not ignore the points I have made simply because they may seem Eutopian at the first glance, or impossible of realization. I desire you to first ask yourselves if the points are right, if they are reasonable; and if you decide them to be so, and do what you can to so mold legislation that the desired end will be attained,

you will be conscious of having done your duty; and whether you succeed or not, you may be assured that posterity will not forget to bless you for the efforts you made to bequeath to it the priceless blessing of thrifty and sufficient forests.

The intelligent conservatism of this Society is known and acknowledged all over the land; and if it should start a discussion of the forestry problem from a standpoint similar to the one I have but imperfectly outlined, I feel satisfied that it would go a long way towards inaugurating a crusade for economic and commercial methods that would eventually prove of inestimable value, not only to our forests, but to our industrial system. It is not necessary for me to suggest to this body the danger of a fanatical or dogmatical agitation of this question. If he whose cause is just is thrice armed, then you have weapons in your hands so potent that calm reason is the power to wield them, and not fiery fanaticism.

In pursuing the present policy we are, I feel satisfied, committing a great wrong against ourselves and a great crime against posterity. The wrong must be righted and the crime must be stopped. Some day the war for the right will be waged on this line. It is none too soon to declare the war, nor is there a more appropriate place to declare it than in this region, where the first and greatest suffering will be experienced, for here we will have the fewest forest trees, yet will have the greatest need of them.

DISCUSSION.

Mr. Sias. Mr. President, I move that we place this most excellent paper on file. and the author be tendered a vote of thanks, and also request its publication in the *Farm, Stock and Home*, and that members of this Society be furnished with copies.

Col. Robertson. Mr. President, I am glad to be here, and to have an opportunity to listen to this paper. It is one of great importance. I have read much, studied and inquired much concerning this subject, and I must say it is the best presentation of it I have ever heard, the most complete of anything of which I have any knowledge. It is enough to distinguish the gentleman who is the author of it, and it is a credit to our State. We are not happy hyperboreans here, but as he has characterized us, we are the finest body of men in the world intellectually and physically. But it is time, as shown by this document, for we will be compelled to leave this country, or our children after us—we cannot live here—we might as well go to Greenland or Ice

land to live—unless we become interested in forestry and plant trees to protect the people. We ought to have a thousand copies of this paper published immediately, and it ought to be distributed widely. We must commence this work of national defense. The war of the rebellion and all other wars possible cannot do the damage that this work is now doing, in order to satisfy the avarice and greed of men, and in consequence of their ignorance, at least many of them. I want a hundred copies of this myself, and I will send them to scientific men throughout Europe, and those who are interested in forestry generally.

Col. Stevens said he hoped the motion would be adopted, as the paper was a valuable one.

Mr. Harris moved to amend the motion by authorizing one thousand extra copies of the paper to be published at the expense of the Society, not exceeding twenty-five dollars. The motion was carried.

Mr. Thompson said he would order a hundred copies for distribution in Iowa.

Col. Stevens. Mr. President, we have an honored member among us in the person of Col. Robertson, who for many years has been traveling in Europe for the purpose of gaining information in regard to agricultural matters and everything pertaining to the benefit of mankind. He is our first president of this Society, and I should like very much to hear from him as to his explorations in Europe.

Col. Robertson. Mr. President, I will not take your time with any remarks, but I may say here that I was requested by your Secretary to prepare a paper upon climatology and other kindred topics. I received his letter while traveling in Northern Europe, and was so occupied at the time that the matter was neglected. But the subject is one of great interest to me, and it will afford me great pleasure to prepare a short paper for publication on the topic of economic climatology for Minnesota.



SECRETARY'S ANNUAL REPORT.

Mr. President and Fellow Members :

I have the honor for the third time to present herewith my annual report. We are to be congratulated upon the most auspicious circumstances under which we meet as a Society on this our twenty-first anniversary. Some of the earnest band of workers in the horticultural field, who helped to do foundation work in Minnesota, are with us still to-day. That unanimity of purpose, as well as harmony of action, which in a marked degree have characterized all the Society's transactions in the past, are yet preserved; and notwithstanding obstacles that may perhaps have been encountered heretofore, there is abundant cause for satisfaction at the progress made.

Permit me here to add with that illustrious pomologist, the late Marshall P. Wilder, in his unique address before the American Pomological Society at Boston, in 1881, when he said: "Happy, most happy am I to join hands with some who aided in the establishment of our institution; who rocked the cradle of its infancy and still survive to rejoice in its progress and usefulness."

In looking back upon the record made in twenty years or more in horticultural work and progress in our North Star State, we find a wondrous field for study and reflection. Some most important lessons have been taught us in the past, from which we should glean wisdom for the future and seek to profit from the same in days to come.

COMMERCIAL HORTICULTURE.

It has been said, "It is no royal road that leads on to fortune;" and that is true, at least on horticultural grounds. In growing fruit there must be neither lack of perseverance, watchfulness nor care; and one must be prepared to overcome most serious obstacles, and only hope to be successful on legitimate lines, no matter how much zeal or skill may be expended when once the object sought to be attained is known to be impracticable and vain. It is unreasonable, for instance, to expect that Minnesota should compete successfully in raising fruit with California, that "horticultural paradise," as it is often called, at least in a commercial way. That state claims greater adapt-

ability to growing fruits of every kind than almost any other clime, and hence the industry is rapidly upon the increase; extravagant reports are given concerning average yields of fruit and prices realized.

RAPID TRANSIT.

One thing that should be borne in mind in this connection is the fact that, by the use of good refrigerator cars, these California fruits are readily transported and brought in competition with the products raised in other states and sections further east. As is well known, in Illinois, Michigan, and other fruit producing states some growers are becoming more or less alarmed at the enormous shipments being made, lest home-grown fruits should be displaced and local markets overstocked.

INCREASE OF SHIPMENTS.

It seems these fruits from the Pacific coast are finding ready sale. Our local dealers and commission men in Minneapolis and St. Paul, who first began a year or so ago to handle western fruits in bulk, received this season several hundred cars of California fruits. In view of these conditions the question seems to be presented what method should be used to meet this competition, what line of action ought to be pursued to bring about the best results for all concerned?

MEANS AND METHODS.

It generally is a waste of time and poor economy to try to grow that which will come in competition with products from more highly favored localities. The prudent farmer, fruit grower, and market gardener as well, will count the cost to see what he can raise to best advantage. Choice products generally command the highest price; and therefore it will always pay to raise the *very best*. Then, too, with thorough cultivation a better and larger yield will be secured.

By studying markets carefully, the nature of the climate, soil, exposure, cost of marketing, and the like, a better understanding can be had of what to grow and when and how to sell the product raised. Results will be more satisfactory by far than carrying on the enterprise, or industry pursued, in the old-fashioned, haphazard kind of style.

HOME GROWN FRUITS.

But after all that may be said in favor of commercial horticulture in

this State, our main dependence, or rather what is wanted most, it seems to us, is some awakening among the masses as to the importance of providing liberal supplies of home grown fruits.

We wish to emphasize this point. There is no wisdom in the farmer bending all his energies at raising wheat and totally neglecting the "plum thicket" and the strawberry "patch." In nine times out of ten the farmer who neglects to grow sufficient fruit for home and family use because it "costs" too much, will go without this almost priceless blessing, which surely is within the easy reach of all. The business of raising home grown fruits for family use should take a new momentum right away. While there is progress in some localities in this direction quite marked and most encouraging indeed, the industry should be increased a hundred-fold throughout the State.

There is good logic in the following in a recent issue of the *Farm, Stock and Home*: "Increase the gardens and small fruits of a country and you increase the comfort and happiness of its people."

THE PAST YEAR

In some respects has been unfavorable for fruit. The drouth had been severe in several western states the previous year, and being still protracted into 1887, results were quite disastrous to the farming interests of the State. The ravages of chinch bugs were more extensive and destructive than ever known before, especially to our leading staple, wheat. The ill effects of drouth were equally as marked, we think, on fruits as on the cereals and vegetable productions. One cause of shortage in our crop of fruits lies in the further fact that many of our orchards have not yet become restored from the effects of our late trying winter; some orchards being totally destroyed. In some localities, however, there was a gratifying show of fruit. The orchards yielding well were mainly those in favorable situations and the varieties produced were of the hardier kinds.

SMALL FRUITS.

The small fruit products of the State were greatly shortened by the drouth; but this deficiency was partly counterbalanced by excellence in quality of fruit produced. Strawberries ripened earlier than usual, and quite a number of our local growers reported satisfactory yields of fruit.

Grapes seldom ever have been known to be a better or a larger crop. The dry and heated spell of weather which prevailed so long proved

very beneficial, and all the leading sorts matured their crops of fruit.

In view of all the circumstances and conditions, the season averaged fairly well.

FRUIT AT THE STATE FAIR.

At our State Fair, held last September, there was a fine exhibit made of fruits, of apples, grapes and native plums. The fruit department was very properly conducted by or under the auspices of our Society.

The well known Duchess and our favorite Wealthy took the lead in kinds of apples shown. The Okabena seedling attracted much attention, as did the fine display made by our genial friend from Steele, who, by the way, secured the lion's share of premiums on the larger fruits.

The grapes exhibited were large and very fine, and numerous varieties were shown. Mr. Latham, our champion grower at Excelsior, was awarded first premium on Delaware, Concord, Moore's Early, Iona, Duchess, Roger's No. 4 and Telegraph; and second on the Janesville, Roger's No. 39, Lady, Brighton and ten best kinds for Minnesota.

Mr. Knapheide of Ramsey county, received first premium on the best ten varieties adapted to Minnesota. He made a fine display of seedling grapes. Some eight years since he sowed a quantity of mixed grape seed and obtained therefrom a number of quite promising varieties which have been bearing for some time, the fruit of which has not before been shown. No names have yet been given these varieties, they being known by numbers only. When fully tested and proven to be valuable, they will be given names. He states that No. 1 is not considered healthy, it being subject heretofore to mildew; No. 5, a small variety, slow grower, healthy, and a good bearer, is very early. Nos. 6 and 7 are healthy, prolific and good growers.

There were quite numerous entries made as well as premiums awarded, and the display in general was creditable indeed. Much praise is due the superintendent, our worthy President, for the attractive way in which exhibits were arranged to show their merits to the best advantage.

FRUIT AT ROCHESTER FAIR.

There also was a creditable exhibit made of fruit at Rochester, at the fair held by the Southern Minnesota Fair Association, it being mostly

shown by local growers thereabouts. Mr. Sias, of Rochester, exhibited some twenty kinds of evergreens. Mr. Somerville, of Viola, who exhibited some twenty-seven varieties of apples, and mostly of new Russian sorts, received the larger share of premiums awarded.

SOME STATISTICS.

Census reports give the value of orchard products in the United States as follows: 1850, \$7,723,186; 1860, \$19,991,885; 1870, \$47,335,189, (gold value about \$38,000,000); 1880, \$50,876,154. For the year 1886, apples, \$50,400,000; pears, \$14,130,000; peaches, \$56,135,000; grapes, \$2,118,900; strawberries, \$5,000,000; other fruits, \$10,432,800.

As indicating the importance of the fruit interest it may be stated that California alone has more than seventy-five thousand acres in vineyards. Seven thousand crates of strawberries, or ten thousand bushels have been received in the New York market in a single day. Between seven and eight million baskets of peaches were grown in Maryland and Delaware in 1875.

The progress made in fruit culture during the past twenty-five or thirty years has been marked indeed. The exports of apples from this country which were 269,000 barrels in 1861, sixteen years later were 2,937,025 barrels. Where a few years ago small plots of ground were occupied in this industry, we find hundreds of acres at the present time. But the demand has kept quite even pace with the supply, and the choicest fruits are no longer considered as luxuries merely but as articles of necessity within the easy reach of all.

The following statistics are given here, made up from reports of different counties in Minnesota to the Secretary of State:

Number of apple trees growing in 1886	474,258
Number of apple trees bearing in 1886	188,955
Number of bushels of apples grown in 1886	123,199
Number of apple trees growing in 1887	478,742
Number of apple trees bearing in 1887	160,926
Number of grape vines bearing in 1886	89,876
Number of pounds grapes produced in 1886	206,200
Number of grape vines in bearing in 1887	87,171
Number of forest trees planted in 1887 on Arbor day	327,130
Number of acres planted during season	3,220
Number of rods planted on highways and farms in 1887	522,837
Number of acres forest trees growing in State	47,431

Without commenting here at length on these statistics it may be

proper to observe, that while somewhat indefinite or unsatisfactory in some respects, they indicate some progress being made—that work is going on to some extent at least throughout the State. Of course if full and accurate returns could be obtained there would be still a larger and better showing given.

THE SOCIETY.

The progress made by the Society in 1887 is quite encouraging indeed. Our annual membership, in view of stringency in money matters, and the low prices which obtain in farm produce of every kind is well maintained. We have to-day a considerably larger list of active paying members than several other horticultural societies that might be named in other sister states. We do not say this boastingly but as indicative of interest felt in Minnesota in the advancement of the cause we seek to foster and promote.

A live society exerts a potent influence at home as well as abroad. The facts and information elicited by the discussions and proceedings at our annual gatherings, when spread upon our minutes and placed before the public in a permanent form, are found to be of special value in awakening interest in horticultural matters generally throughout the State, as well as elsewhere in a greater or less degree. We ought to strive of course to raise our standards higher year by year; to gain such facts concerning best and hardiest varieties as may prove valuable to all.

It is most gratifying to observe the great demand, especially on the part of the farming community, for our published transactions; the care with which the same are read and well preserved upon their library shelves. It should be stated here there is a marked demand of late from other states for our reports from many leading publishers, as well as from the managers of educational institutions throughout the land.

PUBLISHING REPORTS.

At our last annual meeting a change was recommended in the law regarding the publication of our reports, to increase the number of the same to five thousand copies, of which number two thousand copies should be bound in cloth. Accordingly a bill was introduced by Senator Hoad containing such provisions, similar to the present law in force, which promptly passed the senate but was not reached in time for final passage through the house.

Our present number of reports, three thousand five hundred copies,

if carefully and properly distributed, is quite inadequate to meet the wants of the Society. There should be some provision for binding them in cloth. The books in paper covers are apt to go the way suggested by Secretary Gibbs in his report for 1884: "The usual way of pamphlets; first down flat on shelves around the house; dust covered, disarranged and always in the way; then up garret, and finally to the rag gatherer for a tin whistle, and when wanted for reference to help out in a difficulty in the garden or orchard, never found."

The bill referred to failing to become a law an order was obtained from Col. Mattson, secretary of state, for six hundred copies to be bound in cloth, and with three hundred copies bound at the expense of the Society, by using some economy we have done fairly well. Of course discretion must be exercised in sending out reports, as it is necessary to retain a certain quantity for future use.

VOLUME FIFTEEN.

The last volume of our transactions was issued in the month of May or nearly two months earlier than the preceding year. It was a trifle larger than previous numbers and lacked but a single page of the number limited by law,—499. The typographical work was well performed, thanks to the pains-taking publishers, the Pioneer Press Printing Company, and makes a creditable appearance, especially the copies bound in cloth.

PERSONAL NOTICES.

Among the many notices received we quote the following:

CHAMPAIGN, ILL., May 14, 1887.

S. D. Hillman, Secretary, etc.:

Please accept my cordial thanks for your kindness in sending me a copy of your excellent report. I have looked it through with much interest, and am glad to see that in Minnesota as in Michigan, Illinois and many other states the science of horticulture is progressing.

Very truly yours,

CLARENCE M. WEED.

COLUMBUS HORTICULTURAL SOCIETY,

COLUMBUS, O., May 16, 1887.

S. D. Hillman, Secretary, etc.:

DEAR SIR: Copy of your report for 1887 at hand, for which accept thanks. I think you must have a live Society, from the amount of

work you are doing and the voluminous report you send out. So far as I have examined it, I find it good.

Can you not exchange with our society?

Yours truly,

H. S. DEVOL, *Secretary.*

DALLAS, TEXAS, June 1, 1887.

S. D. Hillman, Secretary, etc.:

Copy of Minnesota State Horticultural Society's report received. Please accept thanks and hearty congratulations from the Texas State Horticultural Society. We have live material in our society trying to do effective work, and we hope to be able to send you our published report ere very long.

Yours for horticultural progress,

MRS. J. R. JOHNSON,
Secy. Texas State Hort. Society.

OFFICE OF SECRETARY, INDIANA HORTICULTURAL SOCIETY,
BRIDGEPORT, IND., June 29, 1887.

S. D. Hillman, Secretary, etc.:

Your valuable report at hand. I have looked through it, and find it full of meat. I see you are making the tree peddlers' road a hard one to travel. That is right; he should be suppressed, or made to do an honest business.

The late spring frosts damaged our larger fruits badly. The continued dry weather is seriously affecting raspberries and blackberries. This will be the lightest fruit crop for several years.

Yours truly,

C. M. HOBBS.

KINGSTON, ILL., May 23, 1887.

S. D. Hillman, Secretary, etc.:

I am in receipt of report of Minnesota State Horticultural Society for 1887, which you had the kindness to send me. Please accept my sincere thanks for same. I think your reports are of real value to all horticulturists, but especially so to those who are just starting in the business.

With best wishes for your Society, I remain

Respectfully yours,

JACOB HECKMAN.

EDITORIAL NOTICES.

The fifteenth annual report of this wide-awake and efficient organization is received, through the kindness of its accomplished Secretary, S. D. Hillman, Esq., of Minneapolis. In its number of pages (499) it is the largest, and in its contents certainly not below the best of the series, the possession of which has added much to the practical usefulness of our collection of horticultural and agricultural reports, which now covers those of most of the states and provinces issuing them. Secretary Hillman is aware of the importance of a good index, and that of this volume covers thirteen pages. The horticulture—especially the tree-fruit culture—of Minnesota is of great interest to the residents of the older portions of New England. From Minnesota we received the noble Wealthy apple, which has given greater impetus and hope to our orcharding than any previous accession. There is a good prospect that from the same source we shall get other equally good, and perhaps in some respect—such as long keeping—even better varieties. Two very fine Minnesota seedling apples, the Rollins Pippin and Giant Swaar, have done well with us; and Mr. Gideon, author of the Wealthy, is putting out a number of additional seedlings for trial, that are promising.—*Dr. T. H. Hoskins in Rural Vermonter.*

The annual report of the Minnesota Horticultural Society for the year 1887 is a handsome volume of five hundred pages, embracing transactions of the Society, proceedings of the Amber Cane Association, essays, reports, etc., which are of exceeding great value to those owning a farm or garden.—*Hastings Gazette.*

The annual report of the Minnesota Horticultural Society for 1887, just received, is a volume of 500 pages. It contains the transactions of the Society from March 31, 1886, to March 31, 1887; also the proceedings of the annual meeting of the Minnesota Amber Cane Association, several essays on horticulture and kindred topics, reports of committees and directors of experiment stations, reports of local societies, and of delegates to Wisconsin, Dakota, and elsewhere, and the secretary's portfolio, which contains gleanings from various horticultural sources, a feature which may well be considerably extended in future reports. The report also contains the horticultural enactments of the recent legislature, letters from distinguished horticulturists in other states, list of officers and members, etc. We do not know how large an edition of this book has been printed, but we wish a

copy could be placed in the hands of every farmer in the State.—*The Farmer, St. Paul.*

The fifteenth annual report of the Minnesota Horticultural Society makes a comprehensive volume of 500 pages, containing the essays, discussions, fruit reports and proceedings of the Society for the past year to which is added a report of the Amber Cane Association and reports from delegates to other societies. The book is beautifully edited by the secretary, S. D. Hillman of Minneapolis, upon whom it reflects great credit. The Society is supported by an annual appropriation of \$1,000 from the State, which also prints its reports. Its report is a model. It describes a horticulture entirely new to the great fruit growing sections of the country, for the cold north requires different varieties and treatment from those common to other sections. Every horticulturist north of 42° of latitude and west of the 8th meridian should procure and consult the practical experiences of the successful horticulturists of the Northwest, so well presented in this carefully edited volume.—*Farm and Home.*

We are in receipt of a copy of the annual report of the Minnesota Horticultural Society for 1887. It embraces the transactions of the Society from March 31, 1886, to March 31, 1887, also proceedings of the annual meeting of the Minnesota Amber Cane Association, essays, reports, etc. It is a good work for reference, and a copy should be in the hands of every amateur horticulturist in the State. *Dodge County Republican.*

The annual report of the Minnesota State Horticultural Society for 1886-7 is a volume of 500 pages. It contains the proceedings of the Society for the year, and contains many reports and papers of value and interest on matters of horticulture in its various branches. It is a matter of regret that, so far as we have examined, there is neither a name nor a line in the whole report that would lead us to believe there was such a county as Fillmore in the State of Minnesota. Mr. J. S. Harris of LaCrescent, Houston county, is a prominent member of the society and participant in its proceedings. Besides a report of the proceedings of the Wisconsin State Horticultural Society, where he was a delegate, and a report on seedling fruits, Mr. Harris presented four papers: "Small Fruits for Market and Home Use," "Propagating by Grafting, Budding and Layering," (illustrated), "The Codling Moth," "Fruit Growing in the Northwest," also two reports on fruit in Houston county. These papers fill sixty pages of the annual report.—*Lanesboro Journal, June 3, 1887.*

SELLING NURSERY STOCK.

Considerable discussion was had at our last annual meeting concerning fraudulent practices of itinerant tree agents and commission men. As a result thereof a committee of five was chosen, as you remember, to recommend some proper action to be taken in the matter, and they reported in favor of the passage of a law for the better protection of the public against frauds and willful misrepresentations in the sale of foreign nursery stock.

The Society adopted this report, and a bill was drafted which, with some amendments, became a law. Of course the passage of the bill was bitterly opposed by some—"No rogue e'er felt the halter draw with good opinion of the law." The "unconstitutionality" of the measure was strongly urged; but, after some delay, the senate passed the bill without a single dissenting vote, and later it passed through the house.

While there is some diversity of views among nurserymen and horticulturists in general upon this subject, a majority seem in favor of giving the law a trial. The subject is a most important one, in some respects at least, and is deserving of most careful thought and due consideration.

H. E. Van Deman, chief of the division of pomology, Washington, D. C., under date of Feb. 12, 1887, writes: "Your action regarding the protection of your people against tree swindlers is entirely in accord with my mind. I noticed a rather suppressed report (as I supposed) of the discussion in the papers. It would be an effectual cure of many of these ills if a state law can be passed which makes it a penal offense to misrepresent the stock sold, and impose a license on the agents. Shall be glad to get a copy of the pending bill."

President J. M. Smith, of the Wisconsin Horticultural Society, who attended our annual meeting one year ago, was quite pronounced in his expression of opinion on this subject. In his address before the Wisconsin society in February last he says: "Last month, while attending the convention of the Minnesota State Society, the question of the fraudulent sales of fruit trees, plants, shrubs and ornamental plants came up, and was pretty thoroughly discussed." After referring briefly to the action taken, he thus concludes: "It does seem to me that some effort should be made to protect our citizens from this class of downright swindlers, for to me they seem to be that and nothing else."

Upon the other hand, some indignation was evinced by certain nur-

serymen, or agents, that such a law should be enacted here in Minnesota. At an informal meeting in Chicago, the latter part of June, preliminary steps were taken to test the constitutionality of the law, and over twenty different firms united in a pledge to share in the expense of bringing a test case, agreeing to use their influence, as therein expressed, "to defend what we consider to be the right of every nurseryman, namely, the right to equal business privileges."

However, for reasons best known to themselves, the project was not carried out. A better and more rational view perhaps was taken, that it would be the wisest plan to cheerfully comply with the provisions of the law.

We are informed by Col. Mattson, the Secretary of State, that numerous firms have filed the bonds required, and that so far as he can learn the law is working well. He states where parties understand the object of the law there seems to be no disposition to evade it, and he ventures the opinion that the law will prove effectual in the correction of the evils sought to be repressed, and in its moral influence, at least, will be productive of much good.

Another year we may be able to determine better than at present as to results to be accomplished by the law, and as to whether it should be amended, or peradventure be repealed.

MR. T. T. LYON.

During this last fall we had the pleasure of forming the acquaintance of T. T. Lyon, president of the Michigan State Horticultural Society, and of receiving a visit from him on the occasion of his western tour. He is a prominent fruit grower of that state, and has long been identified with horticultural organization in his own and other states, taking a lively and active interest in horticultural matters in general. He has recently prepared a valuable history of Michigan horticulture for publication by the society of that state. While here, Mr. Lyon accompanied us to the experimental farm, and seemed much interested in the operations being conducted there under the direction of the superintendent, Prof. Porter, and more especially with regard to experiments being made with Russian varieties, methods pursued in making tests, etc.

Mr. Lyon, although quite advanced in years, appears yet hale and hearty, and his step is firm and elastic. On meeting him one cannot fail to admire his quiet and unobtrusive manners, nor to profit from his extensive experience in horticultural affairs. He spent but a

few days in the State, but visited, we learn, a number of points of interest, returning home by way of Iowa, and going thence to Boston to attend the meeting of the American Pomological Society, at Boston, of which he was made vice-president. An excellent letter from him appears elsewhere.

FORESTRY.

We may be pardoned for referring to the forestry problem at some length, because of the importance of the subject and the awakening interest of late throughout the country in general with reference thereto.

Secretary Chas. W. Garfield, of Michigan, who is good authority on this subject, says: "Sweeping timber from our country is fast bringing about conditions which will render wheat growing unprofitable. What then?"

The importance of the preservation of timber, in its relation to agriculture, has engaged the attention of many intelligent farmers, and scientists as well. The national government has established its forestry division; New York, New Hampshire, Colorado and California have forestry commissions, and Ohio has its state forestry bureau.

OBJECTS TO BE SECURED.

Adolph Leue, the efficient secretary of the Ohio forestry bureau, in discussing the subject, says: "The forestry problem briefly stated is: To perpetually keep a certain percentage of the superficial area of our country in forests properly distributed, and to use and husband this in a manner that its usefulness be unimpaired.

"Forests serve, first, to ameliorate the climate by sheltering the ground, keeping it warm in winter and cool in summer; second, to regulate in a certain degree the water supply of our streams; third, to shelter our fields, our farm animals and our homes against the winds of winter; fourth, to furnish material for our various industries."

In addition to these objects there are numerous other considerations, such as the pleasing effect of woodlands, affording agreeable shade, the healthful influence of forests and groves, the protection to insectivorous birds, etc.

TIMBER AREA.

According to the census reports, there were about three hundred and eighty million acres of woodland in the United States in 1870, or

about twenty-five per cent of its entire area. The percentage in Minnesota was given as twenty and six-hundredths.

Secretary B. E. Fernow, of the forestry division of the agricultural department at Washington, in his annual report for 1886, presents some interesting facts concerning the significance of forests, their climatic influence, etc. He says:

“It is generally recognized that forests have always been important factors in the national life, the civilization and progress of the human race.”

With reference to the climatic influence of forests, he states that “forests act like large sheets of water as a starting point for diverging winds. While the forest may not positively cause rain to fall, yet it does not at least prevent it, as the heated bare ground or field often does. The forest is a regulator of climatic, as it is of hydrologic extremes.”

He gives a comparative table showing the farming interest in forestry property of the United States, which it is estimated comprises some thirty-eight per cent of the total area. The timbered area of Minnesota is thirty million acres, as compared with seventeen millions for Wisconsin, fourteen millions for Michigan, a trifle short of three million acres each in Iowa and Dakota, a million and a half acres in Nebraska, and three and one-half million acres in Kansas. From the statement referred to it appears that Minnesota is better supplied with forests than any other state in the union, certainly a most gratifying exhibit.

But while there seems to be an abundance of timber in Minnesota, in other portions of the western agricultural, prairie and mountain regions it appears to be decidedly deficient. Hence the imperative necessity of forestry preservation and improvement on the part of farmers and others.

MINNESOTA FORESTS.

Minnesota is the eighth state in the Union in the importance of lumber manufacturing interests. The principal centers of manufacture are Minneapolis and Anoka on the Mississippi river, Stillwater, Washington county, on the St. Croix, and Duluth, near the mouth of the St. Louis river.

Mr. Putnam in his report on the forests of this State says: “The great hardwood forests of Minnesota lie to the south and west of the pine forests, extending north and northwest from Freeborn and Murray counties into Marshall county, to within fifty or sixty miles of the

boundary line between Canada and the United States. This body of hardwood, which is some 300 miles long by some twenty miles wide, borders upon the prairies, and is the extreme western body of timber of any commercial value east of the Rocky Mountains. The surface of the land is level or gently undulating, well watered, particularly the so-called 'Park Region,' which lies in Becker, Otter Tail, Douglas, Stearns and Todd counties, and in fact extending through Wright, Hennepin, Carver, Le Sueur, Rice and Steele counties."

He describes our pine forests as "extending northwesterly through the counties of Chisago, Isanti, Mille Lacs, Benton, Morrison, Todd, Otter Tail, Becker, Polk and Beltrami, nearly parallel to the line of the hardwood forests, and crossing Red Lake River, extending to the north of Red Lake, thence easterly to the shore of Lake Superior at Grand Portage."

By the census of 1880 the white pine in Minnesota was estimated to be 8,170,000,000 feet, board measure. A little over one-third of this quantity was located on the Mississippi and its tributaries. In the belt of hardwood, extending west and south of the pine region, consisting of white, red and burr oak, sugar maple, poplar, etc., it was estimated there were 3,840,000 acres of timber remaining, capable of yielding an average of fifteen cords of wood per acre, or 57,600,000 cords. The amount of timber cut per year, exclusive of staves and headings, was estimated at 36,884,000 feet.

FORESTRY IN EUROPE.

The causes of the destruction of forests have been the same in the old world as in the new. The greed of men, the desire of speedy gain without reference to consequences, the want of judgment and knowledge as to cause and effect in the courses of nature and its developments, have razed and shorn the forests along the spurs of the Alps and the shores of the Mediterranean with the same merciless energy which has been displayed in this direction along the shores of American rivers and on the slopes of American mountains. As a result of this process large areas of the shore provinces of Austria-Hungary are now almost an arid desert. There is little timber in Dalmatia and Istria and the territory near Trieste. The dearth of timber is so pronounced that the region has been denominated "The Karst," which in common acceptance is almost synonymous with "Sahara."

It is stated that some four hundred and fifty years before the Christian era these woods furnished the material for Roman castles, houses and ships.

The result of this deforestation in a climatic direction has been highly disastrous. The same region which had been famous for its mild and temperate climate has become changeable and unreliable; landslides and avalanches have come and gone, mountain creeks have become dry, and the whole face of the country has been changed from a rich, fruitful and salubrious climate to one arid, sterile plain, interspersed with stony and parched hillsides, populated by meagre sheep and goats and their equally meagre owners.

The work of reclaiming these forest areas is performed under the supervision and the direct advice and control of forest officers, who are paid by the government.

In southeastern France, where the gradual destruction of forests has been pursued for centuries past, the soil of thousands of acres of high pasture land has been washed away by violent vernal and autumnal rains, and sudden floods and violent winds which have prevailed have destroyed large areas of forests. The consequence has been highly disastrous in all that mountainous region. The barren hills have been seamed by rugged chasms and gullies, and the fertile valleys below have been devastated with floods of a turbulent and destructive nature.

To resist this process of destruction the French government began some seventy years ago a system of forest supervision, followed later by the replanting of trees, and under the system employing a large corps of officers and men. Up to 1879 about 250,000 acres of practically waste land had been reclaimed at an annual expense to the state for a period of nineteen years of about \$500,000.

In Germany the destruction of forests has been very notable. It is stated that "many countries which flourished in former times have, by devastation or extermination of their forests, fallen into pauperism and cultured decrepitude." Neheugen, from the destruction of forests in the seventeenth and eighteenth centuries, became a desert. Moveable sand now covers vast fertile tracts in adjacent districts. Villages, where the farming population lived in prosperity, have disappeared or fallen into ruins.

In northern Hanover there are deserts subject to violent hurricanes, which with other causes prove an obstruction to all efforts to prepare the land for cultivation or to renew foresting.

In other localities equally appalling results are observed from the despoiling process.

THE AMERICAN FORESTRY CONGRESS.

At the sixth annual meeting of the American Forestry Congress, held at Springfield, Ill., last September, it was stated that the combined forests of the Northwest are being cut at the rate of 800,000,000 feet per year. At this rate of deforestation it is estimated that within fifteen to twenty years the great pine forests of Minnesota, Michigan and Wisconsin will be obliterated as an article of commerce.

It was there suggested that, if these forests were to be destroyed, "the great rivers of the Northwest would in the dry season become less than the babbling brooks instead of the commercial waterways as they are now."

Col. Robertson, of St. Paul, who attended the meeting above referred to, read an interesting paper on climatology, etc. You have also heard from him in person at this meeting on this and kindred topics.

Mr. Newlon, of Kansas, read an interesting paper on "Helps and hindrances to Kansas forestry." He stated that the farmers of that state had done much in the way of grove and tree planting on their farms and around their orchards. These efforts were already affording a rich return. All that was needed in the future was intelligent discussion and agitation to stimulate in the minds of the masses an inspiration for forestry. Among the "hindrances" were mentioned the great drouths, fires, birds and insects; also the cutting of timber as rapidly as it grew. The slaughter of the birds was particularly deplored.

The reports as to forestry in Nebraska were of an interesting nature. There is awakened interest among the people on the subject, and efforts are there made to interest the children of the public schools.

Among the measures recommended by the meeting was the passage of a bill in Congress for the protection and administration of the forests of the public domain. The bill provides for the designation of public forest lands to be owned and controlled by the United States; withdrawal of such lands from sale, to prevent entries upon public lands; for a commissioner of forests; the establishment of forest reserves; imposing penalty for timber cutting; and appropriating five hundred thousand dollars to carry out the provisions of the act.

Prof. J. L. Budd, of Iowa, read an interesting paper entitled "Possible modification of our prairie climate," in which he states: "We

are anxious to impress the fact that successful orcharding, small fruit growing, and crop production in field and garden, depend more on extremes of rainfall, temperature and atmospheric humidity than on monthly or longer periodic means."

Prof. Budd further says: "Facts too evident for successful refutation lead us to believe that the tendency to extremes of drouth will become still more manifest as the prairies become more generally occupied and cultivated, unless the evils we have brought about be not mitigated or perhaps wholly removed by planting a due proportion of the country with forest trees."

STATE AGRICULTURAL SOCIETY.

January 10th the meeting of the State Agricultural Society was held at St. Paul, for the transaction of business connected with that society. There are, it seems to us, some figures presented by the report of the treasurer that are of more than passing interest. The receipts from the fair, held in September, from tickets sold, entrance money and privileges, was the sum of \$72,303.52. The annual appropriation was \$4,000; other receipts make the grand total \$79,303.98.

Of the disbursements the largest items were: Premiums and awards, \$9,881.64; race purses, \$15,135; special attractions, \$13,438.75. The net profits of the fair were something over \$18,000. The amount of premiums awarded in the horticultural department was as follows: Fruits, apples, \$167; grapes, \$125; small fruits, \$60; flowers, \$188; vegetables (including county societies), \$559; culinary and domestic department, \$312; total, \$1,225.

In addition to the amount of receipts above noted the sum of \$25,000 was received from the State, being one-half the special appropriation in aid of the society. The report shows a balance of something over four thousand dollars in the hands of the treasurer, after paying certain items of indebtedness for improvements made, expense of fair, etc.

The value of the fair ground property, including two hundred acres, estimated at \$200 per acre; main building, \$24,000; grand stand, \$21,000; nineteen stock barns and stables, \$35,500; other buildings and sheds about \$60,000, and including the sum of \$25,000 due from the State, with certain other minor items mentioned in report, give a grand total of \$597,131.92.

A detailed report of the transactions of the Agricultural Society, including statements as to receipts and disbursements made, premi-

ums awarded, etc., etc., will be made by the efficient secretary of the society, Hon. H. E. Hoard. This is the first time in the history of that organization, during an existence of about thirty years, that a detailed report has been furnished for publication in permanent form. This exhibit is one which should reflect credit upon the people of not only this State in general, but upon the able management of the board of agriculture of Minnesota. For further information on this subject we commend our members and others interested to the report of Secretary Hoard.

EXPERIMENTAL WORK.

We wish to call attention briefly to what is being done on experimental lines for the promotion of horticultural progress in the State. It is well known that this important field of work has been too much neglected; that while we have a goodly number who are thoroughly in earnest and doing valient service, and who are making steady progress in this important field, still it is found to be impracticable for this Society to render its material assistance. We haven't the authority or power to use our funds in that direction. Hence the experiments which have been carried on have been conducted almost wholly by individual enterprise.

The obstacles which have been met in this direction have been of such a nature as to preclude the power for rapid or substantial progress being made. Too many have been heard to say "it costs too much" to make experiments; adding that the money will be "wasted," or the results will prove a "failure."

But these short-sighted individuals are far behind the times. They fail to recognize the spirit of the age in which we live when "progress" seems to be the watchword everywhere. They do not seem to catch the inspiration of advancements being made in every field of thought as well as every line of work. Says Mr. Wilder, in his address elsewhere alluded to: "Although we may not be able to prescribe the exact limits to which improvement may be extended, we know that upon the subtle forces of hybridization, either accidentally or by the hand of man, we must ever depend for the improvement of our fruits."

He further says: "From the sour crab, the puckery pear, the bitter almond and the austere plum, came the tender, spicy apple, the melting juicy pear, the velvet luscious peach, the delicious purple or golden plum; and from our rank and foxy grape came the splendid varieties which now adorn our tables and 'make glad the heart of man.'"

We point with pleasure to reports elsewhere presented by several of our earnest workers who are conducting practical experiments on horticultural lines. We trust their efforts will be much enlarged upon and be extended in the future. Since the appropriation made by the Hatch Experiment Station law has now become available, we hope the members of this Society will render every assistance in their power for carrying forward this worthy enterprise.

We had desired to mention briefly some other matters of passing interest, but lack of time and space forbid. We beg indulgence for this imperfect and very hastily prepared report; and in sincerest thankfulness, returning many kindly words and favors shown your Secretary in the past, we bid you in the worthy cause you represent, a truly hearty Godspeed.

FINANCIAL REPORT OF SECRETARY.

The following is a statement of receipts and disbursements by the Secretary for the year ending Jan. 16, 1888, as shown by itemized statement submitted:

RECEIPTS.

Membership fees for 1886-7.....	\$46 50
Membership fees for 1888-9.....	16 00
Amount to balance	8 95
	<hr/>
Total.....	\$71 45

DISBURSEMENTS.

Railroad fare and entertainment paid.....	\$1 85
Cuts and engravings	9 30
Postage stamps, cards and wrappers.....	18 80
Expressage.....	19 35
Printing and stationery	22 15
	<hr/>
Total.....	\$71 45

Respectfully submitted,

S. D. HILLMAN,

Secretary.

TREASURER'S ANNUAL REPORT.

To the President and Secretary of the Minnesota State Horticultural Society:

As Treasurer of the Minnesota State Horticultural Society, I submit the following statement of receipts and disbursements of the Society from Jan. 20 to Dec 5, 1887, inclusive:

RECEIPTS.

1887.		
Jan. 20.	Contingent fund on hand last settlement.....	\$809 47
April 1.	Premiums awarded at New Orleans Exposition.....	50 00
July 6.	State Treasurer, one-half annual appropriation for 1887.....	500 00
Sept. 14.	Andrew Peterson, membership fee, 1887.....	1 00
Total receipts		<u>\$1,360 47</u>

The following disbursements have been made, as shown by vouchers herewith returned:

DISBURSEMENTS.

1887.		
Jan. 22.	A. W. Sias, vice president, expenses, winter meeting.....	\$5 00
	M. Cutler, vice president, railroad fare.....	1 50
	E. A. Cuzner, expressage, etc.	3 25
	J. M. Smith, expenses, by request of Society.....	12 00
	Premiums paid at the Winter Meeting.....	79 00
25.	Donaldson & Ogden, plates, per Brimhall.....	2 28
Feb. 1.	Pioneer Press, 5,000 copies President Northrop's address.....	50 00
Feb. 22.	J. S. Harris, expenses as delegate to Wisconsin.....	12 00
April 1.	S. D. Hillman, first quarter's salary.....	125 00
July 1.	S. D. Hillman, second quarter's salary.....	125 00
	Pioneer Press Co., binding reports and wrappers.....	106 00
28.	S. D. Hillman, postage on reports, 1887.....	120 00
Aug. 5.	A. W. Sias, expenses on Seedling Committee.....	25 00
	J. S. Harris, expenses on Seedling Committee.....	35 04
Oct. 6.	S. D. Hillman, third quarter's salary.....	125 00
Dec. 1.	J. T. Grimes, incidental expenses.....	2 10
5.	J. T. Grimes, salary to date.....	21 88
Total expenditures.....		<u>\$850 05</u>
Balance in Treasurer's hands.....		\$510 42
		<u>\$1,360 47</u>

The contingent fund of 1885 was \$882.40; from which has been taken for the year 1886, \$72 93; and for 1887, \$358.47.

There is due to the Society from State appropriation for current year, \$500.
No report has been made to me by the Secretary of membership fees.

All of which is respectfully submitted,

J. T. GRIMES,

Treasurer.

The reports of the treasurer and the financial report of the secretary were referred to the Finance Committee, composed of members of the Executive Committee.

Mr. Harris, chairman of the committee, presented a report subsequently that the committee had examined the accounts and the same were correct and duly approved.

RESIGNATION OF TREASURER GRIMES.

To Wyman Elliot, President of the Minnesota State Horticultural Society :

Having made arrangements to be away during the winter, so that I will not be able to attend to the duties of the office which I now hold under the direction of the Society, I herewith respectfully tender my resignation to take effect Dec. 5, 1887. A statement of the finances, with the books and vouchers, will be placed in the hands of the Secretary. If there should be any errors they will be promptly and cheerfully corrected.

With my best wishes for the interests and welfare of the Society, I remain, truly,

J. T. GRIMES,

Treasurer.

P. S.—My report shows that there is in my hands \$510.42, which I will hand to you.

J. T. G.

LIBRARIAN'S REPORT.

The number of reports in storage at the agriculture building of the State University at Minneapolis, Jan. 17, 1888: 1886-73, cloth, 208; 1874, paper, 398; 1875, paper, 68; 1876, paper, 693; 1877, paper, 367; 1878, paper, 144; cloth, 32; 1879, paper 7; cloth, 3; 1880, paper, —; cloth, 90; 1881, paper, 1,250; cloth, 206; 1882, paper, 1,744; cloth, 587; 1883, paper, 338; cloth, 987; 1884, paper, 750; cloth, 512; 1885, paper 140; cloth, 3; 1886, paper, 672; cloth 154; 1887, paper, 372; cloth, 78.

Two complete sets were sent to St. Paul and one hundred and sixty-eight volumes, comprising sets in part, were distributed as advised by the Secretary.

E. A. CUZNER,
Librarian.

Mr. Fuller. Mr. President, I see by the report just read that some money was received by the Society from New Orleans. I should like to ask if there has ever been any report made as to the manner in which the money appropriated was expended there. I see the governor of Michigan has been compelled to make a report of the expenditure of money used for that purpose; and the question has arisen in my own mind whether any report has been made as to the money appropriated from this State?

President Elliot. Personally I could not answer, but I think Prof. Porter could give some information, perhaps, upon that subject.

Prof. Porter. Is Mr. Gibbs here? If he was here he could give you a good deal more information than I can. He was commissioner from our State. I was acting commissioner for six weeks while he was at Washington. We not only had no money to meet all the expenses of the State, but we had none to get the exhibits back home and distribute them among those gentlemen who had made contributions. Personally, I devoted a year of time to that work. I never received one dollar from the beginning to the end for my services. Not only so, I paid a great many dollars out of my own pocket to get our exhibits back home and distribute them to exhibitors throughout the State; all of which is charged up to profit and loss.

A detailed report would have been made had there been any funds to defray the expense of publication. Gov. Hubbard, in order to meet the expense of making an exhibit that should be of credit to the State, was obliged to draw from his contingent fund every dollar that he could possibly spare in order to close up in a proper manner. And therefore nothing was left at that time to publish reports.

The plan that was adopted by Commissioner Gibbs for the publication of that report did not meet my approval entirely. He advised that the report should be made by the commissioner. I understand he lays some blame upon Mr. Marvin, who was in charge of the dairy exhibit, and myself, because we haven't made a detailed report to him. I rendered a report of my department as commissioner of agriculture some eighteen months ago, perhaps; I did not render a report as chief

of installation, because I had my hands about four times more than full of routine work, and I had spent a good deal of time already, you know, for the State at New Orleans; and I didn't intend to do any more work "free, gratis, for nothing," and pay my own expenses.

Mr. Fuller. I am glad to hear this statement, because it is a matter of which I know nothing, and inquiries have been made.

Prof. Porter. This report will be published, as that is the intention of both Gov. McGill and Gov. Hubbard. It is understood the report will now be made; the required funds will be furnished by private parties, or from the contingent fund of the State, or from an appropriation by the legislature. It is right and proper that a report of that exhibit should be made. It was the best state exhibit made at the Exposition at New Orleans; our State was the best represented there. The \$30,000 expended by the State should be properly accounted for. It has not been done heretofore only from lack of funds. The officers of the State have desired the report to be made. The State had money enough, but it could only be drawn according to law. I have just learned from Col. Young that the report is prepared and is now in the governor's office.

The following paper was then read:

THE CULTURE OF SMALL FRUITS.

By Wm. Danforth, Red Wing.

That the cultivation of small fruits should be so generally neglected by people who live in the country, is a fact for which it is difficult to account, especially in a land so peculiarly adapted to their growth as this. A large portion of our people in this State of Minnesota neglect not only the cultivation of small fruits, but even the vegetable garden. You may possibly find a few beets, onions and cabbages; but no Lima beans, celery or cauliflower. You may occasionally find a few strawberries in some out of the way place, or some neglected raspberries in a fence corner, to be out of the way of the plow or team, grown up with grass and weeds—stalks mostly dead. Few people would turn away from a dish of ripe, plump strawberries powdered with sugar, or from a plate of melting raspberries and cream, but farmers think this luxury is not for them.

I can look back to the time, when a boy, I watched for the first wild strawberries of the season, to get the first ones for my mother, and traveled along the hedges and stone wall for the earliest raspberries, and how highly I prized the small area that was given me to set

a few cherry and plum trees, and a few peach trees. I know I trespassed, and took more ground than was allotted me.

The success of growing small fruit here depends mostly upon the location, the soil, and the man himself. I find our sandy loam adapted to all varieties of strawberries that we can grow so far, with fair results. We like top dressing the grass land, making it as productive as possible for grass. Then for setting plants the next spring, use what fertilizers you have—there is nothing better than stable manure. Do not be sparing, as the richer the soil is the more abundant crop may be expected. Plow deep as soon as possible after the grass is cut. In the spring plow again, and have the soil well pulverized. Mark off in rows three and one-half feet apart, and set the plants from fourteen to twenty inches in the row, according to variety—fourteen inches for Wilson, eighteen to twenty for Crescent. The latter is a pistillate variety, and the rows should be alternated with some variety that is perfect flowering.

I have raised many varieties, and consider the Wilson, Crescent, Charles Downing, Glendale and Manchester all good.

Care should be taken that the plants are protected from the sun, and the roots kept moist after being taken up till they are put in the ground. One man may take up plants, and others trim them and set as soon as possible. A dibble of good size for making the holes is convenient. Spread the roots, fill in with earth, pressing it firmly about them. Have the crown of the plant just even with the surface of the ground. They need now to be thoroughly watered. Before any weeds are seen the cultivator should be started, working as near rows as possible, stirring the ground but not throwing any earth toward the plants. Continue using the cultivator every ten days or two weeks, through the season, also hoe the plants every two or three weeks. We do not expect fruit the first summer, therefore take off all fruit buds as soon as they appear. In the fall a good dressing of ashes is beneficial. I have used three hundred bushels to the acre with good results. As soon as the ground is frozen cover the field with straw, cornstalks or leaves. The next spring but little need be done except to rake the mulch from the plants, and leave between the rows. After the fruit is gathered, if any weeds are grown, mow them, and if the ground is not well mulched put more on, and then set the fire and burn the field over. If the burning is not too severe, you will find no bad results, and but little labor to secure another crop.

The raspberry may be planted in fall or spring. I prefer early fall

planting, having the rows six feet apart, and the plants in the row four feet. We have the Doolittle, Mammoth Cluster, and Gregg for black; the Turner, Philadelphia, and Cuthbert for red. We cover the Cuthbert and Gregg with earth and mulch all kinds heavily. All large bushes need supporting by stake or wire. We trim as we find time through the summer. Suckers should be treated as weeds unless plants are wanted. The thorough mulching helps keep down weeds and ensures a crop if the season is dry.

For blackberries I make the rows seven feet apart, and plants four feet in the row. I have the Ancient Briton, Snyder, and Lawton. The Lawton with protection is a good bearer. The Snyder has not done well—seems hardy but does not yield much fruit. The Ancient Briton I consider a profitable variety if rightly managed. It must be laid down and covered with earth; and all kinds require to be supported with stakes, or stakes and wires. Our rows are mostly north and south. I have no choice of the points of compass. I find the stalks soon come up straight after being taken up.

To raise currants, work the soil, enrich and thoroughly mulch. In the fall cut out all old wood and leave seven or eight thrifty stalks.

I think small fruit pays richly in the family. Beginning with strawberries in the early part of June, one can have a succession till the frost comes and cuts off the blackberry crop. Then if any time you have a surplus, some one is ready to purchase, or if your home market is overstocked, the wholesale dealer is ready to take all you have to spare.

DISCUSSION.

Mr. Wilcox inquired as to cause of failure of the Snyder.

Mr. Danforth did not know the cause unless it was from lack of drainage. The land needed thorough drainage by tilling and he would try that the coming season. Other varieties had succeeded well. He had a clay subsoil, and there was standing water on the ground at times.

Mr. Busse. I would like to ask how you cover the Ancient Briton without breaking the canes?

Mr. Danforth. We use a fork to loosen the dirt on one side of the hill and then bend them over. The ground descends to the north and we bend them carefully up the hill, using the foot and in handling wearing a leather apron.

Secretary Hillman inquired as to the amount of his grape crop.

Mr. Danforth said it was a good yield, but he had not had much

time at home, and could not answer definitely.

Secretary Hillman. What varieties are you growing?

Mr. Danforth. We have the Concord, Delaware and some of the Rogers.

President Elliot. Have you kept any record of the amount of fruit you have gathered per square rod of any of these different varieties you are cultivating?

Mr. Danforth. I havn't this last season; but I have received from three-quarters of an acre of ground three hundred and fifteen dollars, besides what was used by the family.

Mr. Pearce recommended mulching strawberries between the rows; as early as the first of October putting on four or five inches of mulching and covering the plants to the depth of an inch.

Mr. Danforth said mulching was of advantage to prevent drouth. He had raised good crops for twelve years, and the last was one not to be ashamed of.

Mr. Cutler. As to the plan of burning the plants off after the crop, I would say I tried it with my strawberries and found it injured the plants.

Mr. Danforth. You want to give them a slight burning on a windy day; you can burn too much and destroy the root; you want to do it just right. You will get rid of the vines and have the best crop of berries.

President Elliot. And get rid of the insects too.

Mr. Day. What is your location?

Mr. Danforth. I am two miles west of Red Wing. We have all kinds of soil, but the best results are generally on a sandy loam. I prefer a gentle slope to any other location I can get.

The following was read by the Secretary:

FRUIT GROWING AMONG THE MENNONITES—CULTURE OF THE DEWBERRY.

By Dewain Cook, Windom.

S. D. Hillman, Secretary, etc.:

Yours of Dec. 19th at hand, requesting a short article on fruit growing among the Russian Mennonites, and a few notes on the Dewberry.

About one-fourth of the population of Cottonwood County are Russian Mennonites. They are an honest, sociable and prosperous

people. Coming from a country where fruit was abundant, they take considerable interest in horticulture; nearly all of them have their well-kept groves and flower gardens, their currant, raspberry and goosberry patch, grape vines, apple trees, etc.

It may be of interest to the public to know that they are planting freely of the seeds, and are growing seedlings of many varieties of the fruits of their former homes in the old country. They have grown fine crops of seedling Russian cherries and plums.

They have also many seedling Russian apple trees, and several varieties of Russian pears; the most common is a variety they call the Kruskaeye, which is a beautiful and rapid-growing tree, claimed to be as hardy as the cottonwood. I have seen specimens of this tree twelve feet high, and about six inches in diameter.

At our county fair the past fall our Mennonite neighbors took most of the premiums offered for fruit, including the best collection of fruit.

THE DEWBERRY.

I consider the dewberry of special value for the Northwest, particularly on the prairies, for the following reasons: Being of low, spreading growth, the vines are not injured by our heavy winds or snow banks; they are as easily given winter protection (where necessary) as the strawberry.

The dewberry (Lucretia) is the only blackberry recommended for general cultivation by the Eastern Iowa Horticultural Society. I think the Dewberry will soon be popular all over the Northwest.

My experience in growing the dewberry has been mostly confined to the variety known as the Windom. I will give you a short description of it.

Old canes grow from one and one-half to two feet high, with numerous short branches; is short-jointed, often three or four to the inch; fruit-stems rather long and slender; blossoms all on the outside of the hill, nearly hiding the foliage from view; the blossoms and young berries on each hill usually have the appearance of growing in one immense cluster, but as the berries get size the fruit stem droops, the plant gradually settles, and at the time of ripening the fruit is mostly shaded by the new growth of the plant, and is thus protected from the sun, wind and beating rains. Fruit will keep perfectly on the vines ten days or more after turning black. There is usually some imperfect fruit, sometimes considerable of it.

A few have failed to make a success in growing the dewberry. I

believe the cause in most cases was in not understanding the nature and wants of the plant they cultivated. The difficulty I believe is this. Many varieties are pistillate; some varieties are weak in pollen, but when properly managed are exceedingly productive.

It is essential to success with most varieties of the dewberry that we understand the various causes of imperfect fruit, and when we have learned this, and the remedy, we have learned the art of successful dewberry culture, as well as of many other varieties of small fruits.

To begin with I should select the best variety I could find, and plant on rich soil, in rows five feet apart and about two feet in the row, giving thorough cultivation the first two or three seasons. As a rule they make but small growth the first season; the next season, if the conditions are favorable, they will often make an immense growth of cane, the condition desired for propagating by layering; but as you value your fruit crop do not do it; it is a heavy draft on the vine, causing a late growth and poorly developed fruit buds, and a corresponding tendency to imperfect fruit the following season.

Again give your plants some kind of winter protection, if only snow; they are as easily protected by mulching as the strawberry. If the canes are much injured by the winter or otherwise we can hardly expect them to produce an abundance of pollen, or to perfect a large crop of fruit.

Again the rapid and excessive growth of canes, caused by rich soil and much cultivation, is not its normal condition, and is unfavorable to the production of perfect fruit.

Pinching back the new growth and cutting all the suckers out, will produce extra fine fruit, but with the grower for the market I hardly think it will pay. High culture should end where it ceases to be profitable.

When the dewberry begins to bear well the new canes grow less rapidly, are hardier, have stronger fruit buds and consequently better fruit the next season. I allow the vines to mat in the row and cut out but few suckers. It needs in some respects about the same management as the strawberry. It has this difference, it takes the dewberry two years to get ready for a crop but it will continue profitable in the same patch for many years.

The conditions of success are: Good varieties, good soil, thorough cultivation of young plants, keeping free from all weeds, and winter protection. Always remembering that anything that weakens the vitality of the plant *must* be avoided.

The following paper was read by the Secretary :

EARLY BEETS AND TOMATOES.

By Joshua Allyn, Red Wing.

S. D. Hillman, Secretary, etc.:

Your program at hand. I see I am booked for early beets and tomatoes. I regret I cannot attend the meeting this year, and must give you a brief written report of everything. As this is my own practical experience it may not amount to anything with others, but I will endeavor to give you my method of raising early beets.

About the middle of March the seed is sowed in shallow boxes; my boxes are about twenty-four by eighteen inches in size, four inches deep. I try to have four hundred to five hundred plants in each box; they are placed in hot house and forced to rapid growth until middle of April; then set boxes in cold frames and gradually harden them until they will stand quite frosty air. By the first week in May they will do to set out or transplant in bed. As soon as the ground can be worked in the spring these beds must be manured, plowed, dragged and worked thoroughly and two or three times before setting the plants. This stirring the ground warms and loosens it, and the young roots can soon get the benefit to repay all trouble.

The same directions can be followed for turnips, onions, etc., especially when sets are scarce. Early onions can be grown this way, and only need to be tried with success to be followed each year.

These articles of food may seem of small account, but I find in this small place extra early beets amount to quite a little. I think the Minneapolis market could easily take care of forty thousand bunches before the usual crop is ready.

EARLY TOMATOES.

Tomato seeds are sown in same kind of boxes as beets. For the earliest varieties sow first of March. We use Canada Vick for early. A week later sow late kinds. With us the Acme does best usually for late. The first idea is healthy, stocky plants, and I urge them as fast as possible; with this object in view they must have plenty of fresh, warm air to grow dark colored leaves, heavy roots and thick stock. I do not allow mine to stop growing.

When they have three or four leaves I pick out with care, transplant in other boxes, same size, give same temperature and treatment

until about the middle of April, when they are ready to leave the hot house and to try the compost bed.

The method of forming the compost bed is a point I shall have to explain; it is made of stable manure hauled during winters, and the deeper the better. I place my frames on this and fill them in with earth five or six inches deep; place on sash; in a day or so the dirt is warm; then use all the care possible in setting out the plants. To have root whole set with care; leave sash off all the time it is safe, giving the tops all the air you can. The under heat will take care of the roots, although it may seem to a new beginner too much.

If you give them the proper attention, by the tenth or twentieth of May you will have No. 1 plants, heavy roots, full tops with buds and even blossoms. I have had them well set with tomatoes before setting them out in the field.

They are now ready for the next place, which should have been chosen with care on a light, sandy soil, sloping to the south, should be well worked and manured. The last plowing I have done on the day I set them out, and I give it a good top dressing; then thoroughly drag it. About 4 p. m. set your plants, which must be well watered the previous night. Before taking up the ground must be saturated, then in the morning lift each one from the bed with plenty of earth; press gently between two hands the earth in a ball; place in a cool cellar in boxes until setting out in the afternoon; or even the next afternoon they will keep damp and fresh treated in this way. Of course after a shower is the best time; but do not wait for that as they will do well without.

Now I have one hand go with narrow spade and spade holes about six inches deep, another hand with water, a pint or more to each hole; another hand drops the plant in the hole, and the last one places the plant aright, firmly settles the dirt and the plants will not even wilt; your first buds are sure of fruit unless the frost takes them, which at the twentieth of May seldom happens, although I had a whole field of them cut down after this date.

The cultivator should be started soon, even in a day or two, and often used.

The compost bed is used for lettuce and other early things. When so used a tight board fence is placed around it and the hogs have it for the summer to work and root it. When fall comes I have a fine bed of manure, well rotted and worked over, ready to haul on the land to make room for a new compost bed.

REPORT ON VEGETABLES AND SMALL FRUITS.

By Wm. Lyons, Minneapolis.

The past season has not been as favorable for the gardener or farmer as the average, it being one of the dryest ever known in the Northwest, yet in the vicinity of Minneapolis and St. Paul there were quite a number of refreshing showers, which done a great deal of good; but they were local in their nature. Thus while one location got rain, others only a few miles apart had to suffer from drouth.

Early vegetables were extra fine and abundant, owing to a very favorable spring, and brought satisfactory prices.

Late planted vegetables, such as potatoes, cabbage, celery, etc., were benefited by late rains, and yielded a good crop; and, where properly cared for, brought the best returns for the gardener's labor.

A severe and an unexpected frost in October did a great deal of damage to potatoes, and destroyed nearly all the late cabbage crop, consequently vegetables are scarce and dear in our markets.

At the present time, while the early and late vegetables yielded good crops, the medium planting were almost, and in some instances entire failures, the potato crop seeming to suffer most from the effects of the drouth. Our markets were well supplied with home grown vegetables, in their season, except celery, of which the supply generally came from Michigan.

I don't feel like charging the drouth altogether with our short crop of potatoes; in the absence of a name for the difficulty I will call it a blight. About the 20th of June there were several heavy showers; immediately after I noticed small spots of rust on the leaves, and they continued to grow larger until the leaf was destroyed; then the vine became affected and died a premature death. All the potatoes in my locality that had reached a certain stage of growth were affected in the same way.

Would like to hear what Prof. Porter has to say on the subject. I had seven acres affected in this way; the land had been seeded to clover and timothy, and pastured for a number of years; broke up the fall previous. At the time the blight struck them they were as promising a patch of potatoes as I ever saw.

Early Ohio and Pearl of Savoy yielded about 100 bushels per acre. Clark's No. 1, Beauty of Hebron, White Star, and White Elephant were not worth digging.

FRUITS.

I will speak first of strawberries. They suffered more from drouth

than any other small fruit in this locality. The first pickings were small and inferior. About the middle of the season the drouth was broken by some heavy showers, which gave everything a new lease of life, and strawberries did fairly well to the end of the season; some late patches on moist land yielded a good crop and brought fair prices.

The rain came at the right time for raspberries, the reds yielding the largest crop I ever remember of seeing in this vicinity; black raspberries, what few were grown, did very well.

Blackberries yielded a large crop of fine fruit and brought high prices. This delicious fruit is sadly neglected, by our fruit men. Currants were also a good crop, and brought high prices. If our fruit men don't move faster in this matter in the future than they have in the past, it will be a long time before our markets are glutted with either blackberries or currants. Gooseberries, like the Wilson strawberry, won't grow on my soil.

THE PRIZE ESSAYS.

I am glad our Society has taken a new departure this year, and in the right direction, namely, offering prizes for essays written by young men and young women. I have often felt and remarked that for some reason young men and women do not attend and take part in these meetings as much as they should; the making of intelligent horticulturists ought to begin with youth and vigor. The Society can do nothing that will yield grander results than that of getting the young men and women of the State interested in horticulture.

I would suggest that, instead of offering only one large prize for the best essay, that it would be better to offer smaller prizes and more of them. Composition in the country is sadly neglected. Many of the young folks understand fairly well how to grow crops of fruit or vegetables, but you ask them to put their ideas on paper and they can't do it, since they are not trained in that way.

DISCUSSION.

Prof. Porter. With regard to the cause of blight on potatoes, referred to by Mr. Lyon, I would say that I observed the same condition on our grounds. I have been investigating the matter somewhat. As "two swallows don't make a summer," I have nothing to say as yet as to remedies, at least till another season.

Mr. Smith. I had a patch of Early Rose that was heavily mulched, using about five inches of mulching on the surface between the rows;

the result was a yield of over a hundred bushels to the acre. In another patch adjoining there was no mulching used and the potatoes died and produced no crop.

Col. Stevens. The secret, I presume, was the moisture caused by the use of the mulching. That is no doubt quite important in a dry season like the last one.

President Elliot stated that a covering of straw was often beneficial in retaining moisture, especially with light and sandy soil. When the heat is too intense the vines become cooked and blight results.

Mr. Herzog was called upon to give his experience with potatoes, and stated that he had planted two acres of Beauty of Hebron and an acre and a half of Burbank Seedling; planted side by side on sandy soil. The former variety yielded two hundred and twenty-five bushels per acre and the latter but seventy-two bushels, and were comparatively worthless. He could not understand the cause of the failure.

President Elliot said the Burbank would not thrive on sandy soil, whereas the Beauty of Hebron was at home on sandy soil.

Mr. Smith. I planted two bushels of Burbank on sandy soil and didn't get my seed back.

Mr. Harris, from the committee on award of premiums, presented a report, which was, on motion, adopted:

AWARD OF PREMIUMS.

We, the members of the committee on awards, have discharged our duty to the best of our ability, and report the following:

APPLES.

	Premium.	Amount.
Best collection Minnesota apples, Ditus Day, Farmington	First.	\$5 00
Best display Wealthy, Ditus Day, Farmington	First.	3 00
Plate seedling apples, J. S. B. Thompson, Grundy Centre, Iowa	Honorable mention	

GRAPES.

Best display Brighton, A. W. Latham, Excelsior	First.	5 00
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CRANBERRIES.

Display cultivated cranberries, A. B. Lone, Pine Ridge	First.	5 00
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PLANTS AND FLOWERS.

Display ornamental and flowering plants, Mendenhall greenhouse, Minneapolis.....	First.	\$5 00
Collection roses in pots, Mendenhall greenhouse, Minneapolis....	First.	2 00
Display geraniums, Mendenhall greenhouse, Minneapolis.....	First.	2 00
Single plant in bloom, Mendenhall greenhouse, Minneapolis.....	First.	2 00
Display Begonias, Mendenhall greenhouse, Minneapolis.....	First.	2 00
Display carnations, Mendenhall greenhouse, Minneapolis.....	First.	2 00

CUT FLOWERS.

Floral design, Mendenhall greenhouse, Minneapolis.....	First.	5 00
Collection roses, Mendenhall greenhouse, Minneapolis.....	First.	3 00
Hand bouquet, Mendenhall greenhouse, Minneapolis.....	First.	3 00

VEGETABLES

Best display, William Lyons, Minneapolis.....	First.	5 00
Best display, H. F. Busse, Minneapolis....	Second.	3 00
Early Potatoes H. F. Busse, Minneapolis.....	First.	2 00
Early Potatoes, William Lyons, Minneapolis....	Second.	1 00
Winter and spring potatoes, H. F. Busse, Minneapolis.....	First.	2 00
Winter and spring potatoes, William Lyons, Minneapolis.....	Second.	1 00
Onions, William Lyons, Minneapolis.....	First.	2 00
Onions, Wethersfield, H. F. Busse, Minneapolis.....	Second.	1 00
Turnips, William Lyons, Minneapolis.....	First.	2 00
Turnips, H. F. Busse, Minneapolis.....	Second.	1 00
Beets, William Lyons, Minneapolis.....	First.	1 00
Beets, H. F. Busse, Minneapolis.....	Second.	50
Carrots, William Lyons, Minneapolis.....	First.	1 00
Carrots, H. F. Busse, Minneapolis.....	Second.	50
Hubbard squash, G. B. Gould, Minneapolis.....	First.	1 00
Hubbard squash, William Lyons, Minneapolis.....	Second.	50
Winter cabbage, H. F. Busse, Minneapolis.....	First.	1 00
Winter cabbage, William Lyons, Minneapolis.....	Second.	50

PANTRY STORES.

Display fruit in glass jars, Miss Julia Lyons, Minneapolis.....	First.	5 00
Display canned fruit, C. L. Smith, Minneapolis.....	First.	3 00
Display canned fruits, Miss Julia Lyons, Minneapolis.....	Second.	2 00
Display jellies, Miss Julia Lyons, Minneapolis.....	First.	2 00
Display jellies, C. L. Smith, Minneapolis.....	Second.	1 00
Jar mixed pickles, Miss Julia Lyons, Minneapolis.....	First.	1 00
Jar mixed pickles, C. L. Smith, Minneapolis.....	Second.	50
Home made vinegar, J. S. Harris, La Crescent.....	First.	1 00
Home made vinegar, C. L. Smith, Minneapolis.....	Second.	50

Sample comb honey, William Danforth, Red Wing	First.	\$1 00
Sample comb honey, William Urie, Minneapolis.....	Second.	50
Sample strained honey, William Urie, Minneapolis	First.	1 00
Sample Strained honey, William Danforth, Red Wing	Second.	50
Can Cheney plums, J. S. Harris, La Crescent.	Special.	2 00
Ten varieties pickles in jars, Miss Grace L Smith, Minneapolis ..	Special.	2 00

The meeting then adjourned till 2 o'clock P. M.

AFTERNOON SESSION.

THURSDAY, JANUARY 19, 1888.

The meeting was called to order at 2 o'clock P. M. by President Elliot.

The *ad interim*, or District reports of the Vice Presidents being in order, the following were presented:

REPORT FROM FIRST DISTRICT.

By Vice President A. W. Sias, Rochester.

The fruit outlook in our district is truly encouraging. Messrs. Corp, Somerville, Pond, Johnston, Hoganson, Vine and many others report good crops, and some of them more fruit than in 1886.

STRAWBERRIES.

The introduction of the matchless Jessie adds new vigor and deeper interest in strawberry culture. Hart's Minnesota seedling is panning out much better than we anticipated, its leaves stand nobly against drouth. Mr. Samuel Welch, one of our best gardeners, says it surpasses all others with him. For a late variety we know of nothing better than the Manchester. The Crescent still takes the majority vote.

RASPRERRIES.

Give me the Brandywine for a market berry. It is doubtful if it has a superior as a cooking or canning fruit among red raspberries. The Cuthbert when covered in fall is profitable. Scheffer's Colossal is one of the largest, pretty tart, and not equal to the first named for market.

BLACKBERRIES.

Stone's Hardy fell behind the Snyder and Ancient Briton quite a little this year. Why it was not as good as last year I am not able to say. The Thornless was left uncovered again last winter and froze down to the snow line. Cover everything in the blackberry line, and don't forget that the Windom dewberry is rich and good, and can be covered much quicker than the high bush.

GRAPES.

The largest and best grape crop ever grown in the First district was harvested last fall. Everything, even the Pocklington (which is too late for an ordinary season) ripened fairly well. The leaven deposited in this district Oct. 4, 1866, by such men as Col. D. A. Robertson, John S. Harris, Wyman Elliot, Chas. Hoag, and a few others, has been slowly working, till it finally resulted in the organization of the "Southern Minnesota Horticultural Society."

Mr. Dartt presented the following report, as Superintendent of the Experimental Station recently established by act of the legislature at Owatonna:

STATE EXPERIMENTAL TREE STATION AT OWATONNA.

By Supt. E. H. S. Dartt.

Mr. President and Members :

In accordance with the resolution passed by this Society at its last meeting a law has been enacted establishing this station and requiring its superintendent to report to you in person at each of your annual winter meetings. This clearly recognizes you as the best guardian of the horticultural interests of the State, and it empowers you to ask of the Superintendent of this station in an authoritative manner, What are you doing? What do you intend to do, and how do you propose to do it? And since you have the right to nominate his successor he will be very likely to regard your wishes. It will be my endeavor to answer the above questions as briefly as possible keeping in mind the importance of the subject.

For causes beyond my control I was unable to commence actual labor until the fourth of last May. At that time about three acres of land

in an oat field was set apart for exclusively experimental purposes, and placed under my entire control; this has been surrounded on three sides, or nearly so, with evergreen trees eight to ten feet high, trimmed up four feet and set twenty feet apart, which were well cultivated through the season, and though the drouth was severe, yet every one grew, proving the efficacy of cultivation as a protection against drouth.

I had previously sent out postal cards to our leading horticulturists soliciting contributions, and had ordered a small bill from Prof. Budd of Iowa, and one from Robt. Douglass & Son, Waukegan, Ill.

I received a hundred seedling apple trees from P. M. Gideon, and set about two hundred of my own raising and two hundred root grafts of several varieties. These trees, numbering in all about two thousand, covered about a quarter of an acre of land. They were well cultivated, and the ground was sowed to oats in August with a view of securing partial winter protection.

Of trees not yet thoroughly tested in this locality, I have planted the Catalpa, Russian Mulberry, European Alder, Black Cherry, Golden Arbor Vitæ, White-tipped Arbor Vitæ, Little Gem Arbor Vitæ, Austrian Pine, Hemlock, Spruce, Colorado Blue Spruce, Douglass Spruce and Siberian Fir. I have planted seeds of Siberian Larch, Siberian Fir, Nordman's Fir and Norway Pine, which have proved an entire failure, attributable, I think, to late planting and want of vitality in seed. I have also planted small quantities of seed of Duchess, Tetofsky, Dartt's Hybrid, Orange and Greenwood Crabs, Hard Maple, White Ash, Butternut and Black Walnut.

Since entering upon my duties I have concluded that the growing of trees from seed must of necessity become an important adjunct to a successful experimental tree station. So much knowledge and skill is required to grow evergreens, birches and some other deciduous trees from seed, that men have made it a business of itself, and I raise the question whether it is not best to leave this branch to those men and use our energies in other directions.

Of this plat of land nearly one acre had been entirely abandoned to quick, or quack grass, as commonly called by former cultivators. This was broke the first of June, backset in August and dragged many times over. It is expected that plowing and dragging and raking off roots in spring will make it fit for a crop next season, and that very thorough cultivation thereafter will keep it in good condition.

Whilst our main object may be to test trees as to their general adaptation to our climate as it is, yet if we can do anything to either soften our climate or strengthen the trees, it seems desirable for us

to do so. We know that apple trees are benefited by being partially shaded on the south, but we do not know what amount of shade is best, or what other trees would be thus benefited.

It is, I think, generally admitted that it is our long-continued severe cold, freezing our trees nearly dry, that puts them in condition to have the wreck completed by the drying winds, hot sun of spring or summer. Now if we can supply this needed moisture by spraying our trees, or in any other way acceptable to the fickle Dame Nature, we have gained a point. But when and how shall we do it?

It is claimed that insect pests, injurious to trees and fruits, are on the increase, and we know they are very numerous. It would seem that the proper place to investigate and to devise means for their prevention and destruction would be on an experimental tree station. Thus our field for experiment seems to expand in whatever direction we turn.

In addition to the three acres mentioned, there are many acres more awaiting our occupancy. The buildings of the institution are placed on an elevation, and are entirely exposed to the bleak winds and drifting snows of winter, and the hot sun of summer. The management are eager for the protection of windbreaks and groves, and the home adornment of orchard and lawn, and the subject of more extensive timber plantations has received favorable consideration. It is the legitimate work of this station to supply these prime necessities in the shortest possible time.

It is my intention to make this the Mecca of tree worshipers—to form the most perfect arboretum to be found in all the cold Northwest. And I expect to do it by laboring patiently and energetically, guided by your wisdom.

Mr. Dartt also read his report as Vice President:

REPORT FROM SECOND DISTRICT.

By Vice President E. H. S. Dartt, Owatonna.

Mr. President, Ladies and Gentlemen:

The experience of our people during the past year has not increased their faith in fruit growing, especially as regards the standard apple. The effects of our severe winter were not perceptible till spring. Then the Duchess and other trees of like hardiness standing on lowish

ground, and which had been injured by previous winters, died out to such an extent that we are forced to the conclusion that it is useless with our present knowledge, or want of it, to plant even the Duchess in any but favorable localities.

The crab apples have behaved indifferently for many years. Some have died, some bear worthless fruit, others have occasionally borne a fair crop of good fruit, but barrenness has been the rule. If we would restore the confidence of the people we must present varieties, either standard or crab, that will grow in all ordinary situations and bear fruit of fair size and quality and in liberal quantity; or, in other words, we must give them a perfectly reliable, long-lived, productive *fruit tree* adapted to this climate. I have only one variety that I have thoroughly tested and find fully up to this standard in every respect. It is the Greenwood crab. It ripens with the Duchess, and can only be valuable where that variety is not successfully grown. I offer the Greenwood crab as my contribution towards the formation of a reliable crab list.

The fruit crop was nearly an entire failure, caused, I think, by spring frost, drouth and insects. Currants seem to have been destroyed by frost, strawberries by drouth, and apples and plums by the three causes combined. Grapes did fairly well, and I have no doubt by planting early ripening varieties they will be very profitably grown in future.

We will mention a few of our forest trees under cultivation:

The Norway spruce is not quite hardy enough to withstand all the effects of the snow line; the lower branches are frequently injured, but it makes a magnificent tree and promises long life.

The White spruce is more hardy—seldom browns, is of finer foliage and more ornamental while young. Our oldest trees are only ten or twelve years.

Scotch pine is one of our most hardy and rapid growing trees while young, but in cultivated or soft ground it is likely to be blown over, and it becomes less thrifty and more open with age.

White pine will evidently make a fine forest tree, but may require the protection of surrounding trees. With me it needs further trial.

The European larch maintains its reputation as a rapidly growing beautiful tree, but its desirability for stakes and posts does not much surpass the basswood. Whether it will improve with age and the heart wood of large trees will become durable remains to be demonstrated.

The European white birch and the European Alder seem sufficient-

ly hardy, grow rapidly, and take the correct form without pruning.

The soft or silver maple seems to be growing in favor, the only objection being its liability to split down in heavy winds. A little early pruning to prevent the formation of heavy side branches or forks will tend to remove that objection.

The hard maple seems more sensitive to excessive moisture and drouth, and has died out in some cases after attaining a diameter of four or five inches. It needs further trial.

The box elder is losing ground, for though on deep, rich soil it makes a rapid growth and dense shade, yet on poorer soils it is likely to become stunted and is frequently injured by borers.

The butternut and black walnut trees in this section seem to be doing remarkably well, and have commenced bearing nuts in a way that is very encouraging; and the scarcity and high price of the lumber of the latter point to it as one of the most valuable of all our timber trees.

There seems to be two critical periods in the life of all trees. The first we will call the "snow line" period. Here trees are not only liable to be crushed by snow drifts but they are subjected to the greatest degree of cold, often followed by a sudden change to heat, caused by the reflection of the sun's rays from the snow.

The other critical period we will call the period of "expansion." It strikes the apple tree when it is turned out to grass, or when it produces a bountiful crop. And it strikes other trees when we deprive them of those elements and surroundings which their natures demand. When we use all the means within our reach to adjust nature's balance with the greatest precision, then will our greatest successes be achieved.

"Then let us search through Nature's vast domain,
And treasure well each bit of truth we gain.
For Nature's laws but speak the will of God,
Frail man should bow and kiss the threatening rod."

REPORT FROM THIRD DISTRICT.

By Vice President M. Cutler, Sumter.

Mr. President, and Fellow Members:

As usual, I have to report that but few apples except Siberians were grown in our district the past season, and that the crop of crab

apples was lighter than usual, the Transcendent being the only one that bore largely.

Plums were a total failure. Heavy snow drifts broke down many of the red raspberries; those not broken down bore well. Had they been laid down and covered they would not have been injured by the snow.

I had a big crop of Gregg raspberries on a couple of rows that were covered with snow last winter.

My crop of strawberries amounted to over three thousand boxes, mostly on old beds without cultivation. Being on low land the drouth did not injure them.

Stone's Hardy blackberries that were covered bore quite well, but were not first-class berries.

Currants and gooseberries were a failure. Owing to drouth, but few trees set last spring are alive.

Interest in fruit growing is increasing, and we hear of new plantations of grapes and berries being set out. Some of our ladies are appearing in market with fruit for sale.

Prices of small fruits were good, and demand never better. Potatoes were a very poor crop, and are worth one dollar per bushel.

We have heard little of swindling tree agents, and believe with a few amendments the present nursery stock law is a good one, and should be kept on the statute books.

I received about fifty grape vines from the State experimental farm about the twentieth of May, and although the season was very dry, I think all but two or three are alive. Query: Should grape vines be set as late as above indicated, or earlier?

MARKETING BERRIES.

Marketing fruit is of great importance to the berry grower. A poor salesman may have the finest of fruit and make nothing out of it, while a good salesman without good fruit will be in the same condition. So we find that to be successful we must have nice fruit. The berries must be large, of beautiful color, and look fresh and clean. Unless the market is close at hand they should be firm, and picked as soon as ripe enough. If shipped to a distant market they should be picked the day they are shipped. If there are any dirty berries they should be picked, washed, and used at home, or thrown away, but never sent to market, remembering that a good customer is easier lost than gained. Berries should be shipped in neat and attractive pack-

ages and good measure given. Buyers like to see well filled boxes. I have found boxes bought of A. W. Well & Co., St. Joseph, Mich., the best for my trade. I find that few customers know the difference in size of boxes, and believe the small size well filled give better satisfaction than large ones poorly filled. I have generally ordered the large ones, but I have ordered from Minneapolis a few times and got small ones badly mildewed. Boxes should be bought and made before warm weather. If shipped to distant points, arrangements should be made with reliable firms before the shipping season opens, or great loss may occur. If you have more at any time than your regular customers will take, do not overstock your home market and reduce the price, but ship the surplus to a commission man and get what you can. The markets are not generally overstocked more than three or four days, and it is easier to hold the market at a fair price than to get it raised after it has once made a break.

Another important consideration is in having the shipping season as long as possible. I find that an unmulched old strawberry bed furnishes the earliest berries, and by keeping the mulch on part of the new bed I prolong the season a few days. And that the earliest and latest berries sell the best.

REPORT FROM FOURTH DISTRICT.

By Vice President N. J. Stubbs, Long Lake.

Officers and Members of the State Horticultural Society:

It is with pleasure that I present you with a few notes on the progress of fruit growing the past season, on the north shore of Lake Minnetonka and vicinity.

Although the past season has been remarkably dry, with the exception of apples the yield was an average one.

Of all our small fruits, the strawberry takes the lead for general market purposes. The Crescent and Wilson are planted mostly. On sandy soil the Manchester succeeds well, and is quite free from disease; the berries are large, uniform in size and very attractive in color, making a valuable berry for market.

Of the newer varieties the Bubach and Jesse are very promising; the plants set last spring that survived the dry weather made a fine growth, showing great vigor of plant, and yielded berries that were large and of good flavor. These varieties are slow of propagation.

The planting of currants has increased considerably over that of other years. The crop was light, not over half a yield, caused by late frosts and dry weather. The white grape currant, with its great shining crystal berries and long bunches, is not well appreciated. I see but few of them on the market, so they command a better price than reds.

Fay's Prolific fruited this past season, is immense in size and moderately prolific; when the price of plants gets to be reasonable, if they prove hardy enough for our climate, they will pay to plant largely.

Downing's gooseberry is a failure with us, on account of mildew. Smith's Seedling and Houghton are good, but unless we can obtain something larger and better than we have yet found in gooseberries, it will not pay to attempt their cultivation.

Ancient Briton, Snyder and Stone's Hardy blackberries have been planted in small quantities, with the intention of bending down and covering with earth to protect in winter; no variety will succeed without this care. A few of the Lucretia Dewberries have been planted, with a fair promise of fruit another season.

There are but few making a success of growing raspberries with any varieties except the Turner, for want of care at proper time and winter protection. Cuthbert stands well, and holds a high rank as a first-class market berry, and yet it has a good competitor in the Marlboro, which with me has proved the most valuable of all. The berries are more nearly round than Cuthbert, and have a deeper red, holding their color to the last; they stand shipping extremely well, as it is quite a firm berry and hangs on the bushes well after it is ripe. We commenced picking Marlow the twenty-sixth of June, and picked the last about the twenty-fifth of July. I believe it to be the most valuable red raspberry ever introduced in the Northwest, especially if it does as well in other localities. We commend it for trial everywhere.

The past season has been a very favorable one for grapes, the yield generally being a good one and quite free from disease and insects. As yet, for market purposes I do not think we have any variety in red superior to the Delaware; in black, Moore's Early and Worden are probably the most valuable. Of the newer varieties that have fruited with me, the Jessica has proved exceedingly valuable, as the vines are very vigorous, free from disease, very prolific and as early as Moore's Early; in quality as good as the Delaware; it is one of the best of white grapes.

REPORT FROM FIFTH DISTRICT.

By Vice President G. W. Fuller, Litchfield.

I am supposed to represent the district in which I live, the Fifth, which embraces the northern portion of the State.

I am also supposed to have a "general impression of the horticultural interests of my district."

In Goodhue county some fifteen years ago there were some fine orchards, but I am told that all the apple trees have failed, excepting a few Tetofsky, Duchess and Wealthy on the bluffs near the river.

I can speak from my own knowledge only of the section west of the Big Woods. And a few words tell the story so far as apples are concerned. With few exceptions, all the large apples and many of the crabs have gone the way of the many varieties, with which our tables were filled in the early days of our Society. The Transcendent is the only real iron-clad, and the only one that has brought and is still bringing steady and permanent returns. The Hyslop is not so hardy, and the trees have nearly all failed. Beaches Sweet has stood and borne well in some localities, but failed in others. The Minnesota is hardy, but does not bear the fruit we look for. I hear of some trees of the Virginia Crab are bearing well in the timber.

In regard to the small fruits, I can speak confidently and hopefully. But here we are confined to the few tried varieties. It does not do to depend upon new things. The cherry and the much advertised Fay currant are perfect failures. An ordinary winter kills them, on my grounds. But there is no discount on the old Red and White Dutch, the White Grape and Black Naples. The Houghton and Downing gooseberry do fairly well. The Somers and perhaps the Philadelphia are the only raspberry that will do anything without being covered, and it is much better to cover them.

I think that in the greater part of this district the true course for us to take is to make no attempt to grow apples except the Transcendent and perhaps two or three other crabs, and give chief attention to currants, strawberries, raspberries, and gooseberries, and confine ourselves to the proved and best varieties of them, and leave the experimenters and theorists to experiments and theories, until some permanent result is obtained.

DISCUSSION.

Mr. Sias inquired if Mr. Dartt would recommend the Duchess except in favorable locations.

Mr. Dartt said on the highest ground in his orchards trees stood best, but he had recently grubbed out several acres of his orchard and seeded the ground to grass, thinking grass more profitable than apple trees.

Mr. Smith. What is the soil on that high ground?

Mr. Dartt. In one orchard there is a strong mixture of sand, but considerable clay towards the south part. I have tried about all the locations in the neighborhood, as well as different kinds of soil. My trees on low ground amount to nothing.

Mr. Pearce. Is the general character of the soil rich or poor?

Mr. Dartt. Some of it is rich and some of it is poor. Along Maple creek some of the knolls are sandy. I have a knoll in my young orchard, but the land produces good crops. The grass kills out trees if allowed to form a sod about them.

Mr. Sias. My question has not been fully answered, as to whether it pays to grow the Duchess?

Mr. Dartt. On my best grounds it has paid; on the poorest it has not.

Mr. Bunnell. But you call your highest ground your poorest?

Mr. Dartt. Yes; but I have made it rich, and there it has paid the best. The best young trees in the neighborhood are in a hen yard; the ground has been greatly enriched and the trees have grown finely; so far I have failed to observe any ill effects from excessive use of manure.

Col. Stevens. I am afraid Mr. Dartt, as usual, takes a too despondent view in regard to his orchard. I was there a few years ago, and he then said, like Mr. Ford used to, that we never could do anything here in raising fruit; but lo, and behold! we found a fine orchard loaded with apples as ripe as could be.

Mr. Dartt. How long ago?

Col. Stevens. Not very long; and since then I have come to the conclusion that Mr. Dartt believes just the reverse of what he says in regard to his orchard. [Laughter.] Another thing; it is well known the European Larch is a beautiful tree and lasts almost as long as the oak. I think he must have the common tamarac instead of the larch.

Mr. Dartt. I have tried setting the larch top down, but it rots off in two or three years. I find it season-checks.

Mr. Pearce. The tamarac lasts with us at Minnetonka better than the white oak. Mr. Douglass gives instances where it has been known to last for fifty years.

Mr. Dartt. That may be with heart wood.

Mr. Pearce. The sap of any wood won't last.

Mr. Dartt. You noticed what I said?

Mr. Pearce. Well, that is a misrepresentation. [Laughter.]

Mr. Smith. How old does it have to get before you have heart wood that will be suitable for posts?

President Elliot. At least eight or ten years.

Mr. Smith. I have tried them that were over twelve years old and they would rot in two years. I understand very well what Col. Stevens means, but there are many things stated at times that do not bear investigation. Robert Douglass is a reliable dealer, but he may have been misinformed.

Mr. Pearce. I think it is poor policy to dispute what Robert Douglass says.

Mr. Smith. It may be poor policy but these are solid facts.

Prof. Porter. May it not be that both these conditions of things may be true? May not the difference in experience in one case be due to the difference in the seasons when the timber was cut?

Mr. Sias. There is another feature of this paper with which I was much astonished. He represents his to be a very trying location; but it is singular that the ash leaved maple will not succeed as well as black walnut. With me the ash leaved maple appears to be perfectly hardy and reliable.

Prof. Porter. There seems to be something peculiar about that location. Black walnut succeeds as far north as the Minnesota river. Suppose he has the most trying location in Minnesota, I found terminal buds of box elder there uninjured and apparently perfectly hardy. I went down there and I found things very much as Col. Stevens described them. I don't know exactly how to account for this except on the theory advanced by Col. Stevens.

Mr. Dartt. I don't like to talk so often, but I suppose if I am on one side and all the rest on the other that you will excuse me. They misstate my paper. I have not said that the box elder died at all.

Mr. Pearce. That is the statement as we understood it; we call for the reading of the paper again.

Mr. Gibbs. All he stated was that box elder was failing on his poorest and highest ground and doing well on good ground.

President Elliot. It does not seem to amount to enough to make much ado about; we must not take too much time.

Mr. Dartt. I stated the box elder was losing ground; it does not have a fair chance, and is not planted as much as formerly. I have

used it as a windbreak, and it has not been a satisfactory tree. It has not grown as rapidly as soft maple, and does not get up much faster than the Scotch pine.

Mr. Pearce. I was surprised last week to find the black walnut thriving at Hutchinson.

Col. Stevens. They thrive and grow by the hundreds along the Minnesota, and between here and Glencoe.

Mr. Brand. In regard to the Duchess I would say there are in this State three localities; I might call them most favorable, favorable, and unfavorable. Mr. Dartt is in the latter locality. Only two or three miles from his house there is a Duchess orchard that is very productive. I refer to Mr. G. W. Buffum's.

Mr. Dartt. I can bear a few hits from these men that are inclined to hold onto the old usages in spite of the facts.

Mr. Pearce. You think you are not guilty?

Mr. Dartt. I plead not guilty, sir.

The Society then proceeded to the election of officers for the ensuing year.

ANNUAL ELECTION OF OFFICERS.

The following list of officers were duly elected:

President—Wyman Elliot, Minneapolis.

Vice Presidents—A. W. Sias, Rochester; E. H. S. Dartt, Owatonna; M. Cutler, Sumter; N. J. Stubbs, Long Lake; and G. W. Fuller, Litchfield.

Secretary—S. D. Hillman, Minneapolis.

Treasurer—Ditus Day, Farmington.

Executive Committee—J. S. Harris, Chairman, La Crescent; J. M. Underwood, Lake City; O. F. Brand, Faribault; F. G. Gould, Excelsior; Isaac Gilpatrick, Minneapolis.

Librarian—E. A. Cuzner, Minneapolis.

Entomologist—Prof. O. W. Oestlund, Minneapolis.

The President was authorized to appoint standing committees, the same to be afterwards announced.

On motion of Mr. Harris an additional committee on Diseases of Grapes was added to the list of standing committees.

Mr. Wilcox suggested the propriety of a committee being appointed or of enlarging the duties of the committee on Nomenclature. He regarded it as very essential for the prosperity of horticulture that a

proper classification of fruits, especially of hardy varieties adapted to Minnesota, should be made.

Col. Stevens said the Society in former years revised the fruit lists each year, lists of hardy small fruits, evergreens, and everything on the catalogue, recommending some varieties for general planting, some for experiment, and others for favorable localities.

Mr. Harris thought it would be well to have such a list as Mr. Wilcox suggested, after the plan pursued with reference to classification of varieties by the American Pomological Society. Such a list had never been published in any of our reports.

Mr. Wilcox said he had been unable to find such a classification, and as he was a new comer here desired to know what were considered to be the hardiest varieties.

The report of the special committee on fruit lists was called for and Mr. Sias of that committee presented the following:

REVISION OF FRUIT LISTS.

APPLES.

For general cultivation—Duchess, Hibernial.

For trial—Autumn Streaked.

For favorable localities—Wealthy.

For general trial—Red Cheeked, Plikanoff, Antonovka, Yellow Anis, Red Anis, Yellow Transparent, McMahon's White, Soiree, Russian Green, White Pigeon.

HYBRIDS.

Whitney, Beaches Sweet, Early Strawberry, Orange, Martha, Transcendent, Florence, Powers.

NATIVE PLUMS.

De Soto, Weaver, Rollingstone, Forest Garden.

For trial—Cheney, Rockford, and other best varieties to be obtained.

GRAPES.

Worden, Moore's Early, Concord, Delaware, Brighton, Lady.

For trial—Niagara, Woodruff's Red, Wilder, Early Victor.

BLACKBERRIES.

Ancient Briton, Snyder, Stone's Hardy.

RASPBERRIES.

Blackcaps—Ohio, Souhegan, Gregg.

Red—Cuthbert, Turner, Brandywine, Marlboro.

CURRANTS.

Red Dutch, White Grape, Victoria, Long Bunch Holland, Stewart's Seedling.

STRAWBERRIES.

Crescent, Wilson.

DEWBERRIES.

For trial—Lucretia, Windom.

On motion of Mr. Brand the report was received.

DISCUSSION.

Mr. Pearce moved the adoption of the list of apples recommended by the committee for general cultivation.

Mr. Dartt. Mr. President, I don't think we know enough about those varieties to recommend them for general cultivation throughout the State. I am not in favor of recommending any variety that is not hardy.

Mr. Smith. I don't think they are hardy enough.

Mr. Dartt. A tree may bear under some circumstances and in a certain location, and yet be unsuitable for general cultivation. We ought not to make the mistakes of the past; we should recommend only what we know is good and reliable; so if people plant them, in the course of ten or fifteen years they will have something. I move to insert the words, "for trial."

Col. Stevens desired Tetofsky added to the list, as the hardiest apple grown in Minnesota.

Mr. Harris moved to adopt the *Duchess* for general cultivation.

Mr. Sias. I am quite well acquainted with all these new varieties; I have grown some of them many years. I am satisfied every one of them is hardier than the *Duchess*. They have been before us for years, and we ought to add a little to the list, although there may be many who would prefer to see it limited to a single variety, the *Duchess*. We are certainly making little progress.

Mr. Gilpatrick. We are not making progress.

Mr. Sias. Unless we can show some progress we ought to stay at home.

Mr. Underwood. We had better send Mr. Dartt as a delegate to Iowa while we get up a list.

Mr. Gilpatrick. I don't want him to go.

Mr. Pearce. I am ashamed of Mr. Dartt. When we say for "general cultivation" we mean, of course, in favorable localities. That applies in every state in the Union; a man who is going to set an orchard, whether in Ohio, Michigan, Illinois or in this State, will not set it where it will be of no value. Put Duchess in favorable localities and it will stand.

Now, those other varieties have stood in most unfavorable places for fourteen years; in one place that I know of where every common variety failed, and are still standing and yielding crops of fruit. One tree yielded six bushels of apples. Put the same tree on favorable ground and it would do much better. I refer to Mr. Peterson; his trees stand on unfavorable ground, and yet they have come through all these test winters and have never killed a particle; and now our friend Dartt has the impudence to get up here and say: "Cut them all off."

Mr. Dartt. Mr. President, I perhaps ought to say a few words. If I have been "impudent" of course it has been in questioning the hardiness or the durability of the larch. I have been called to account for disputing the hardiness of the Wealthy for all localities. Notwithstanding you sent me to Iowa, you have found it to be a fact that its hardiness was at least questionable.

Now, sir, whether we have progressed or not, it is a fact that this Society ought not to recommend one thing to the people of our State they do not know to be reliable, and something that will grow under ordinary circumstances, and produce fruit in sufficient quantities and of a quality to be valuable for cultivation. When that is accomplished we will have established the ends of a reliable list, and by so doing merit the confidence of the people of the State. But if we jump to conclusions for the sake of making people believe we are progressing we are doing what is unwarranted, we will have another setback in the future and the result will do us no good. Impudence! Where is the impudence in telling the straight truth? [Applause.]

Mr. Thompson. Mr. President, I can hardly sit still and keep quiet. It appears that my friend Mr. Dartt is backsliding a little, since I roomed with him at Dubuque; he has changed considerable. I came up here expecting to find some good soil, and I still believe there is. He talks about favorable localities. To cut the story short, if you will set your Duchess on a soil that has bituminous clay for a

sub-soil, or if it hasn't feed it, then if you don't raise good apples just call me a fool.

A gentleman over there is looking this way; I will ask the question and answer it also. Feed it with salt and wood ashes. If you can't get that get salaratus, using a pound to a hundred pounds of ashes, and scatter them around and among the trees. It will have a marked effect on the health and vigor of the orchard. I have tried it on the Duchess and have seen the effects at a distance of thirty feet from the trees. I can increase the size of the fruit one-third by feeding. Another thing; every second or fourth year give your orchard a good mulching with manure that has plenty of ammonia in it.

I would advise my friend Dartt to send to his congressman and get a copy of the report on the geological survey of the Northwestern territory and to read that; to pull off his coat and see what he will find with his book; if he don't find bitumenous clay, or soil mixed with magnesia and carbonate of lime, then you have a wonderful soil. Any farmer with the assistance of that report ought to be able to pick out favorable localities for planting an orchard on his own farm. The best orchard I know of in Iowa is located on land that has a sub-soil of bitumenous clay; it is near Emmettsburg, and is situated on a gravelly knoll. My own orchard is in a similar location

Mr. Harris. I insist on commencing with Duchess, as I am afraid we shall never get through.

The motion to recommend for favorable localities was lost. The motion of Mr. Harris to recommend for general cultivation was then adopted.

Mr. Harris moved to recommend Tetofsky for favorable localities.

Col. Stevens said he was opposed to the motion.

Mr. Underwood said they might as well recommend farmers to sell their wheat in favorable localities. They know very well now what to do, and if they don't, a good, sharp tree agent can tell them. This Society spends a good deal of unnecessary time over these matters of recommending varieties. Farmers don't know whether they want a particular variety, and never will know. It is waste of time to quibble about favorable localities; of course they won't plant trees except in their most favorable localities anyway.

Tetofsky was then recommended for general cultivation.

Mr. Harris. I move to recommend Hibernial for general trial.

Mr. Gibbs. I have understood it has been the practice of the Society not to recommend anything for general trial until a sufficient number had been propagated by nurserymen to supply the de-

mand. I want to ask if that is the rule at present, and if trees of Hiberna can be obtained?

Mr. Harris. My impression is that they can.

Mr. Gibbs. If they can be obtained I want to give an order for some.

Mr. Cutler. I think that is a good suggestion. I notice people give their order for something and if dealers cannot fill the order they put in something else.

Mr. Sias. Last fall Mr. Peterson had them for sale, and I think Mr. Tuttle of Baraboo has them as well as some others in this State.

Mr. Gibbs. If you recommend varieties for general trial and they are not generally propagated by nurserymen in quantities to meet the demand, why these swindling tree agents will put them on their lists and sell to everybody from whom they can obtain an order, filling it with something else; hence you place the people at a disadvantage when you recommend anything for general trial that cannot be obtained true to name.

President Elliot. We are going to have honest tree peddlers after this.

Mr. Gibbs. You will pardon me, I have been away two years and I am a planter.

Mr. Sias. I think this won't have much effect on tree frauds the best we can do with it; we don't need to spend much time on that. These agents have their own lists and they are going to recommend and sell them.

Mr. Brand. I prefer to recommend for planting in limited quantities. Hiberna cannot be found anywhere except in the hands of experts. It has been tried only in favorable localities and for that reason should not be recommended for general trial.

Mr. Gibbs. Pardon me once more. I have reason to believe there is not a bearing tree of Hiberna in the State. Trees usually called Hiberna, for instance those of Andrew Peterson, at Carver, I believe to be Lieby; they have been fully identified as such. Mr. Tuttle is growing true Hiberna. I was the first one to call the attention of this Society to the orchard of Mr. Peterson.

Mr. Sias. I have both the Lieby and Hiberna. I procured scions from Washington, and have compared them with others. Hiberna is the better tree; Lieby has a low top and more of a spreading habit, and to my mind there is a marked difference in them.

Mr. Dartt. How many bushels of apples did you ever raise of that kind?

Mr. Sias. I guess that is a little out of order.

Mr. Gibbs. It is the Peterson trees we are talking about, and the proper thing to do is to recommend Lieby.

Mr. Brand. I saw Mr. Peterson's trees in September. He showed me what he called Ostrokoff Glass, Hibernial and Lieby. On a careful inspection I could see no difference in them, or not as much as you will find in a similar number of Duchess.

Mr. Gibbs. He has no doubt followed the labels that he received with the trees. Ostrokoff Glass is a small, ordinary greenish apple; the one he calls Ostrokoff has large stripes and is a coarse grained apple. There is very little if any difference in the varieties on the grounds of Mr. Peterson.

The motion was lost.

Mr. Latham moved to recommend the Lieby in place of Hibernial for general cultivation. Carried.

Mr. Luedloff was called upon to state what success he had with Ostrokoff.

Mr. Luedloff said he had two kinds of trees. They were different from Hibernial. Part of them were received of Prof. Budd. They are the same as Mr. Peterson's, having smooth wood and the same kind of leaf, which is glossy. One kind from Prof. Budd has a sort of woolly leaf.

Mr. Dartt. How many bushels have you ever raised?

Mr. Luedloff said his trees had not borne every year, but they were perfectly hardy. He had thirty or forty Russian varieties that were looking well, while all his old native trees were dead. He had planted about one hundred and sixty of the new Russian varieties.

President Elliot inquired if he had any young trees for sale.

Mr. Luedloff replied that he had, but he said it was not always proper to recommend them. Strawberries may do well in some places and grapes may grow well in the garden, while in other places they may fail. So it is with the apple; one kind of apple may do in one garden and fail entirely in another. When we find a kind that is hardy, that is the kind we want to grow. After all this is experimental work, and every man must experiment for himself.

Mr. Harris said he had received four trees of Ostrokoff Glass from Prof. Budd, which had not yet fruited, but they had stood the last hard winters better than anything else he had.

Mr. Dartt. Does it stand any better than Ben Davis at the same age? That variety was apparently hardy when the trees were small. We had some easy winters when I had Ben Davis. I don't believe in

recommending many varieties. I have heard that this variety has been hardy in several places in this State during the last three winters.

Mr. Brand. Prof. Budd sent me some trees three or four years ago, stating that they were the hardiest kinds he knew of, but none of them looked like healthy trees. So far as I know there are no Ostro-koff trees bearing in this State. The variety which has been taken for that is the Liëby.

Mr. Gibbs. Mr. President, I think I could take two minutes of your time profitably on this matter. The people of Dakota look largely to the reports that reach them from Minnesota and to your recommendations as a Society for direction as to what varieties to plant. The fact of the business is that in all this long list of Russians there is only one variety to be found in the State of Minnesota that has been growing and has been bearing successfully for a number of years, and which remains entirely hardy, and that is the Lieby, and that is being grown under various names. There are some thirty or forty varieties that are being grown in an experimental stage, but there is no more reason why one should be taken up and recommended than any other of these thirty or forty varieties. Mr. Latham has the Lieby that bear well and are hardy. But where can you find another of the varieties received from the Agricultural Department that has proved valuable? At the experimental grounds of Mr. Luedloff and Mr. Peterson the most of these little trees are just coming into bearing.

Mr. Pearce. Do you know anything about Autumn Streaked?

Mr. Gibbs. Nothing more than of about thirty or forty others. In all your reports they have been based on the history of top-worked Russians, and they have been mostly top-worked on crabs. Mr. Peterson, who was educated in horticulture in his native land, proceeded upon a correct basis at the start. He has root-grafted these different varieties and out of the whole department list has only been able to save three or four kinds, and there is nothing but the Lieby that shows entire hardiness after being in bearing for several years.

Mr. Pearce. I think you are in error in saying there is but one variety.

Mr. Gibbs. I mean bearing crops year after year, and a variety that contains elements that justify recommending it to the people for general trial.

Mr. Pearce. I have been watching Autumn Streaked for years and am much pleased with what I have seen of it.

Mr. Dartt. Order; we are not on the Autumn Streaked.

Mr. Sias. I wish to say just a word in regard to these important Russian families. There are a number of varieties that are very similar in character. We have the Anis family, the Transparant family, each containing a number of varieties of very close resemblance, but on close examination we can observe a difference. I have the Yellow and Red Anis and there is very little difference between them.

Mr. Dartt. What about Glass, the one under discussion?

Mr. Sias. I am coming around to the Glass works; it is in the same family as the Hibernial. I do not believe it is the same as that or the Lieby; I admit there is a close resemblance.

Mr. Gibbs. Did you understand me to say that Ostrokoff Glass and Lieby were the same?

Mr. Sias. I understood you to say there was only one variety at Mr. Peterson's, and that was the Lieby.

Mr. Gibbs. I say the variety he refers to as Hibernial is the Lieby. I know Charles Gibb and Prof. Budd identify them as the Lieby.

Mr. Dartt. Strike it out; strike it out.

The motion to place Ostrokoff on the list was lost.

Autumn Streaked was recommended for general trial in limited quantities and in favorable localities.

Wealthy was also recommended for trial in favorable localities.

The further revision of the fruit list was then laid upon the table.

Mr. Brand, of the committee on pine lands owned by the State, presented a report:

PINE LANDS IN MINNESOTA.

By O. F. Brand, Faribault.

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

Pursuant to our appointment to investigate the extent and quality of pine lands belonging to the State from which timber has been cut, their location and practicability of their protection from fire and their improvement by planting, thinning, cultivation, etc., we beg leave to report as follows:

That supposing the most of the desired information could be obtained at the state auditor's office, I called there in November last, but was informed that no record of such lands was to be found in that office. I then addressed the following letter to the county auditor of each of eighteen counties in that part of the State where the lands under consideration are located:

FARIBAULT, Dec. 26, 1887.

Mr. Auditor:

DEAR SIR : I have been appointed by the State Horticultural Society chairman of a committee to ascertain the quantity of land in this State from which the pine has been cut and the land bid in by the State for taxes. Will you kindly inform me of the quantity of such land in your county, together with such information of its character as you may possess. The object of obtaining such information is to enable us to make recommendations as to what disposition had better be made of it. Whether it would be best for the State to undertake to rehabilitate said lands with pine or other forest trees under a comprehensive system of State forestry, or to let them remain as they are or sell them for what they will bring.

Your figures and advice in the premises will be thankfully received.

Very truly yours,

O. F. BRAND,

Chn. of Com.

In response to this letter I received answers from a few counties where no such land existed, but with the exception of one county no answer has been received from counties in which it was supposed the most of these lands were located. and the answer received gave no information as to the location of the lands, whether in forty acre tracts or otherwise. It is useless, in my opinion, to expect to get information from county officials outside of the regular duties of their office.

It is evident the information sought cannot be obtained without a visit to at least one of the counties where these lands are located, and we would recommend that one of our committee be directed to make a visit to the nearest county (say Pine county) to make a thorough examination of the nature and character of the lands in question, and report at our next annual meeting. The expense would be but little, and the object sought is of grave importance to the State. It might be well to extend the scope of the ground sought to be covered to include recommendations of a general character on forestry.

That some measures should be adopted at once to stop the ruthless destruction of our remaining forests, as well as to measure the present area, is a point on which all intelligent persons who consider not only the present, but the future welfare of the country, are agreed.

When the white men first began the settlement of our State, forty per cent of its total area was covered with timber. In 1880 it was estimated that one-half of the original area covered with timber had been cut off, and still the havoc goes on. We should take warning by

the fate of other nations and countries before it is too late. Portions of Asia, Northern Africa, of Greece and even of Alpine Europe, by the destruction of their timber, have been brought to a desolation almost as complete as that of the moon. At this date it is probable that not ten per cent of the proper agricultural portion of our State is covered with timber.

How much do we need? It is estimated by the best scientists of the age and of past ages that Germany needs 23 per cent of her land kept constantly in timber in order to secure the highest agricultural and healthful returns. When we consider her location, midway between the North Sea, the Baltic, and the Mediterranean, if she requires 23 per cent, what proportion is required by us in the interior of this great continent? No portion of the world more needs the presence of great and numerous forests to preserve an equilibrium of temperature than we. The same causes which produce great and sudden changes of temperature have almost equal effect on the amount of moisture in the atmosphere. Moisture is what we lack in our atmosphere. Prof. Tyndall says: "The removal for a single summer night of the aqueous vapor from the atmosphere that covers England would be attended with the destruction of every plant which a freezing temperature would kill. It may be safely predicted that whenever the air is dry the daily thermometric range, or the difference between heat and cold will be very great."

We all know evaporation is measured in a prodigiously rapid ratio with the velocity of the wind, and that anything that retards the motion of the wind is efficacious in diminishing the exhalation from the leaves of plants and evaporation from the soil. Timber is the only thing we can utilize for this purpose, and then when we consider the large amount of moisture that timber causes to be retained in the soil by rainfalls, mulch, and in retarding the surface water from rapid motion on uneven surfaces we realize that no civilized nation should regard the subject with profounder interest, or prosecute it with intenser energy than ours. Then let us take hold of the subject with a degree of earnestness that shall be commensurate with the important relation it bears to the material prosperity of our State.

DISCUSSION.

Mr. Smith said in order to get definite information as to the amount of these pine lands, it was necessary to go to the different counties where they were situated and make personal inspection of them. This subject was one of importance; it would be again brought before the

legislature. It was perhaps well for the Society to lead in the matter. As to the best thing to be done he could not say, and had no plan to submit. He had studied the forestry laws of Europe, and believed some system of forestry supervision by the State and general government was necessary. It was impossible to get the desired information at the state auditor's office, as these pine lands were largely held by speculators.

Mr. Dartt said it would be a difficult task for any man to visit these sparsely settled districts and make a personal inspection of those lands; one would need camping utensils, and it would be necessary to survey the whole country; to be provided with plats, etc. The scheme was impracticable, at least for the Society to undertake.

Mr. Young inquired as to the class of lands referred to.

Mr. Brand said it was the pine lands that had been cut off and that had reverted to the State on account of taxes.

Mr. Smith thought some law was necessary, providing that such lands as were not fit for agricultural purposes should be reserved for forestry purposes.

Mr. Young thought all the necessary information could be had at the office of the state auditor.

Mr. Brand thought it would be necessary to visit one or two counties to obtain any definite information as to the character and the condition of these lands.

On motion, it was decided to continue the committee another year, composed of Messrs. Brand, Boxell and Smith.

The forestry committee was also continued, Mr. Brand being named as chairman of the committee in place of Prof. McGinnis, who had left the State. The other members are Mr. Smith and Mr. Harris.

An adjournment was taken till 7 o'clock P. M.



EVENING SESSION.

THURSDAY, JANUARY 19, 1888.

The meeting was called to order at 7 o'clock p. m. by President Elliot.

THE NEW ORLEANS EXPOSITION.

President Elliot. I believe Mr. Gibbs wishes to make an explanation in regard to a matter that came up this morning, and he is at liberty to do so now.

Mr. Gibbs. It is simply for the purpose of correcting the record, if it needs correcting. During my absence at the morning session I have understood the question was asked by a member if any account had ever been rendered to the State of the expenditure of the moneys that were raised to collect and maintain the State collective exhibit at the World's Exposition at New Orleans; and some gentlemen who were here and who were connected with the exhibit made the best answer they could under the spur of the moment; but I feared in one or two points they might have misapprehended the facts, and to enable the Secretary to get them in the official report, I will answer the question, and also another question that came up.

The itemized vouchers for all expenditures were returned to the Governor of the State, under whose instructions all the work was done, and were duly audited at the close of each month and turned over to the State Auditor; and when the Exposition closed the matters that remained unadjusted were finally closed up, and all vouchers bearing the governor's approval were turned over to the State Auditor, and I presume will appear in the auditor's published report. So far in regard to that.

Then the question arose, as I understand, in regard to the preparation of the commissioner's report upon the subject. I left the State and changed my residence some four or five months after the close of the Exposition, but during all the time I was here I was anxious to and did proceed to make a report, but was unable to do so on account of the delay of two or three parties—who had important employment in connection with the exhibit to submit—to present and furnish their reports which would be necessarily parts of mine. Our failure to receive those reports has prevented the preparation of the complete re-

port up to this time. I am happy to state now, however, that matters are under way, under the instructions of the present governor, and with the aid of ex-Gov. Hubbard, to have a report prepared on that exhibit, and one that will be commensurate with the character of the exhibit itself, which you all remember was regarded as being as fine a State exhibit as there was in the Exposition, if not the finest of all.

That report will undoubtedly in a very brief period be prepared and turned over to Gov. McGill for such action as the next legislature may take in its wisdom on the subject. But I presume it will be published with the proper illustrations, and citizens of the State will be more pleased with the report itself than with the subject.

If the Secretary would now place his pencil upon his ear he would like to state a further fact. He understood the Society had received \$50, 'as premiums awarded on fruits, and some were no doubt surprised at receiving that money.

In the State exhibit there was some two hundred bushels of apples and a quantity of grapes. In his judgment they could not compete successfully for premiums; therefore no attempt was made to exhibit apples at horticultural hall, where competitive exhibits were made; he reserving them to go with the State exhibit in other buildings.

On grapes we had a fair show to make good our pretensions for growing as good grapes as can be grown anywhere in the United States, and several entries were made in the name of the Society, and a number of premiums afterward awarded.

He was very glad the Society had received the money, and the whole United States would share with them in the honor. for in contesting for the palm in choicest varieties they had secured these awards on fruits it was not supposed could be successfully raised in a cold climate.

The report of the committee on floriculture being called for, the following paper was then read:

ARCTIC FLOWERS.

By Mrs. C. O. Van Cleve, Minneapolis.

The mercury sinks in the bulb, men and women hurry along the pathways between walls of snow, as if pursued by some invisible but dangerous foe, and sitting down to write of flowers, I look out the window at my flower bed of last summer and behold a white, shapely mound, beautiful, but oh! so cold! It is the grave of my pretty cypress vine and sweet mignonette, my velvet pansies and bright ver-

benas, and other beauties that I loved; and I could weep, but that I know the spring will come by and by, the snow will melt, the sun will warm the earth, and my garden will bloom again in fragrant beauty. Rejoicing in this hope, there comes to me the thought, "How do people exist in the Arctic regions, with snow and ice and cold always about them? Are their hearts ever warmed and gladdened by the sight of flowers of any kind?"

Our ideas of the inhabitants of the Frigid zone were very vague, and we knew very little of their mode of living, their pursuits, etc., until modern travelers and scientists visited these regions and enlightened us in regard to them. Some have given glowing accounts of the peculiar beauties of those cold countries, and have awakened a strong desire in the minds of many to visit them. Standing in the art gallery at the Exposition, last August, before one of Mr. Bradford's inimitable pictures, more than one enthusiast might have been induced to enlist for an expedition to the North Pole, but the month of January in Minnesota is not a favorable time or place to obtain recruits for such an adventure.

Frederick Schwatka, the explorer, has given as the result of his Arctic voyages, some very interesting accounts of the flora of the extreme north. He says: "The Arctic waters, full of floating ice the year round, make the shores comparatively devoid of vegetation, except a stunted water sedge that is as hardy as the Canada thistle, and perchance a few straggling polar blossoms peeping through the moss, that seem strangely incongruous in the icy surroundings of general desolation, but, inland, the never setting sun, though seldom high above the horizon, can constantly accumulate its heat unobstructed by any loss at night, until it produces a vegetation in the little valleys that seems almost tropical when compared with the desolation that greets the eye in every other direction."

One of the most interesting considerations of Arctic flora is its origin, as given to us by that great pre-historic printing press, the fossil strata of the earth, and especially the revelations of what is called the nival flora of the non-frigid zones, or that which is found at high or Alpine altitudes, among climates similar to the polar region. During one of the geological periods, and not so very far back in the world's history either, a great sheet of thick ice crept down from the base of the north pole, and extended in many places half way across the temperate zone. Arctic weather prevailed to the tropics, and all the surroundings were in accord, even the plant life being only of that hardy, stunted kind that would resist such intense cold. But after a

while the earth got over this chill, and the great sheet of ice started to recede to its home in the north; and along with it went all the Arctic life, plants and animals; willows and walrus; moss and musk oxen. But the northward direction was not the only line of retreat left open to these refugees of the cold. They could also ascend the mountains and find the climate which they loved if they were only high enough, and this they did, even within the tropical region, and when the Alpine climbers ascend the snow-clad mountains of picturesque Switzerland and gather a pretty little bouquet of a dozen different nival flowers, on that barren zone, just before the perpetual snow and ice is reached, half of them will be of the same variety that some polar explorer has gathered that season, in the land of the midnight sun, to store away in his herbarium for future reference. One of the most prominent botanists who has studied this peculiar nival and polar flora was Professor Oswald Heer. In making a study of the nival flora of Switzerland he found 337 species of flowering plants at Alpine height, that is between 8,000 and 13,000 feet above the sea. Only one-tenth of these comprised species belonging to the lowlands of the surrounding country, while about one-half of these plants originated in the Arctic but had come from Scandinavia with the ice of the glacial period, and had been left stranded on the Alps, when the ice receded, as a floating object is left by the ebbing tide. And this word "ebbing" is not a bad one to use, for there are scientists who believe that centuries from now this great sheet of ice will come again, and again recede ebbing and flowing in the life of the world as the ocean's tides do in ours. Therefore only two-fifths of the flowering plants of the Alps are strictly natives of the region they occupy. With a few wolfish dogs tied to a sled and a reindeer or two in the distance, an Alpine climber could easily imagine he was in the "great white zone." I feel like moving that a vote of thanks be given to the learned men alluded to above, that they have placed the next advent of the glacial period so far in the future that this horticultural Society, and all its immediate descendants will not be seriously incommoded by it.

An English bontanist states that the tropics have from 40,000 to 50,000 species of plants, the north temperate zone about 20,000 species, and the Arctic 1,000 or less, with some 2,000 among the Alpine flora, or about 3,000 species enjoying (?) an Arctic climate. Small as this number is, it is sufficient to do away with the popular opinion that the polar regions and snow-clad mountains are practically devoid of vegetation. A fact that may surprise some is that while in the Arctic there are 762 kinds of flowers, a flowering plant has never

been found within the Antarctic circle. This may be because there are very few tracts of land there of any extent, and there is, in fact no inland where the sun's rays can be absorbed and used for warming and vivifying the earth.

Of the seven hundred and sixty-two kinds of flowering plants in the Arctic, only fifty of them are wholly residents of that zone, and very few of the flowers that blossom in that chilly region have any perfume.

The colors generally are of the cold tints, white and light yellow predominating. In the depths of the ocean are found the largest and most vigorous specimens of plant life, such as colossal kelps and similar life that grow throughout the year. Nearly all the plants in these cold regions are biennial or perennial; the seasons are too short for annuals, and these perennials begin to push their growth through the snow at the first cessation of the vernal cold.

Mr. Schwatka says he has seen flowers in bloom on King Williams Land so close to the snow that the foot could be put down and leave an impression on the edge of the snow and crush the flower at the same step. And Middendorf, a Siberian traveler of note, says he has seen a rhododendron in that country in full bloom when the roots and stems of the plant were completely incased in soil frozen as hard as a stone.

Among the useful plants found in the Arctic are the Scurvy grass, a rough, cruciferous plant that is famous as a cure for the terrible disease from which it is named, and Barley; and so rapid is the growth of this last named plant, that, in seasons at all favorable, it is ready to cut two months after sowing, and two crops are raised in one season.

Besides the plants alluded to, which are similar in habit to those in more favored climates, there is another kind that seems to love to burrow and spread their species in and on the bare snow and ice itself. And naturalists have succeeded in separating forty-two species of purely snow and ice plants from the many they have examined. All of these require the microscope to determine what they are, and nearly all are of a rich crimson or some of the tints of red, which would look cheerful if it were not for the suggestion of splotches of blood on the snow. Agassiz thus describes these singular plants as seen on the Alps: "The deep repose, the purity of aspect of every object, the snow broken only by ridges of angular rocks, produce an effect no less beautiful than solemn. Sometimes in the midst of the wide expanse one comes upon a patch of the so-called red snow of the

Alps. At a distance, one would say that such a spot marked some terrible scene of blood, but as you come nearer the hues are so tender and delicate, as they fade from deep red to rose, and so die in the pure, colorless snow around, that the first impression is completely dispelled. This red snow is an organic growth, a plant springing up in such abundance that it colors extensive surfaces just as the microscopic plants dye our pools with green in the spring. It is an Alga (*Protocoitis miralis*) well known in the Arctics, where it forms wide fields in the summer."

This same high authority who seems to find beauty and fitness everywhere, says: "There are valleys in the Alps far above six thousand feet which have no glaciers, and where perpetual snow is seen only on the northern sides. These contrasts in temperature lead to the most wonderful contrasts in the aspect of the soil; summer and winter lie side by side, and bright flowers look out from the edge of snows that never melt. Where the warm winds prevail there may be sheltered spots at the height of ten or eleven thousand feet, isolated nooks opening southward where the most exquisite flowers bloom in the midst of perpetual snow and ice; and occasionally I have seen a bright little flower with a cap of snow over it, that seemed to be its shelter. The flowers give indeed a peculiar charm to these high Alpine regions. Occurring often in beds of the same kind, forming green, blue, or yellow patches, they seem nestled close together in sheltered spots, or even in fissures and chasms of the rock, where they gather in dense quantities. Even in the sternest scenery of the Alps some sign of vegetation lingers, and I remember to have found a tuft of lichens growing on the only rock which pierced through the ice on the summit of the Jung-frau. It was a species then unknown to botanists, since described under the name of *Umbellicarus Higinis*."

And now it would be very delightful if those who have listened patiently to this dissertation on Arctic flora, could step from this hall into one or other of the beautiful greenhouses of which our city has a right to feel proud, and as their eyes feasted on the tropical beauty to be found there, they might be led to think that there are, all over the world, not excluding our own highly favored city, many who are sick and wretched, and, wicked, it may be, whose lives have been very dreary and barren, around whom no sweet tender influences have been thrown, and who have little or no hope for this world or another. And with that thought might come the impulse, to do something to brighten and make better these sad lives. From such an impulse as this has grown the Flower Mission, and the good it has ac-

complished will never be fully known or realized in this life; it is like sowing seed which is to spring up and bear blossoms that may never perfectly unfold here, but which in that heavenly clime where there is no frost or snow, or chilling winds, will open up in loveliness and beauty of which we cannot now conceive. Some years since a city mission was established in the city of St. Petersburg, Russia, which was to labor in various ways to elevate the poor and wretched. One special work given the ladies to do is visiting the hospitals and carrying comforts of various kinds to the sufferers. It is narrated of one who had been on this errand of mercy, and was returning with an empty basket, in which she had taken flowers to brighten the sick rooms and cheer the weak ones, that in passing a church she found a poor girl asleep on the steps. Her basket was ransacked for a single flower; the result of her search was one modest violet, and this she laid on the bosom of the sleeping one. The girl had worn such a violet as she received the parental blessing when, two years previously, she had left her father and mother for service in the distant city, where, alas! she had fallen before the force of temptation and had become a poor soiled daughter of the street. On waking the unexpected flower stirred all the old tender associations, which ended in the resolution: "I will arise and go to my Father," and in his boundless love she found peace and a Savior. And she who did so small a thing for the Master's sake may never know in this world the result of her loving act, but what a glad surprise awaits her when in the "beautiful home over there" she greets among the redeemed ones the sinful girl who lay asleep, alone, in that great city and waked to newness of life, through the instrumentality of a simple heart's-ease laid on her bosom by the hand of a pitying, loving sister. Such illustrations of the salutary influence of flowers prove that they have not been created exclusively for our own personal gratification, but that we may share them with others, for their cheer and encouragement, and adding new zest to our floricultural studies make us feel that they are well worth the time and labor we devote to them.

On motion of Mr. Harris, a vote of thanks was given Mrs. Van Cleve for her able and interesting paper.

FLOWERS AND ROSES.

By Mrs. M. S. Gould, *Excelsior*.

God's first and best gift to man was a garden, in which everything was not only "good for food," but "pleasant to the sight."

The love of beauty in nature is natural Heaven-born. It can be said of flowers, says Dr. Tuttle, but scarcely of any other thing, that they are universally admired. There is no time or place where they are inappropriate, no decoration to which they cannot add a charm. They lend fragrance and beauty to homes of joy and to homes of sorrow. They may tell our love for the living and our mourning for those who have passed away. There is no private meeting of friends, no public festival, nor anniversary of any kind which they may not embellish or grace with some sentiment. They make crowns for children and chaplets for heroes; and our nation could find no more delicate, genuine way of expressing its gratitude for the soldiers who perished in the late war than by covering the places where they sleep with flowers."

It has not been my lot to have much leisure or strength to devote to the cultivation of flowers. But as we have always been blessed with a few, hoping I may help someone less fortunate than myself, and that I may encourage someone who has never tried to raise them, or those who "never have any luck" to try once more, having in remembrance bare and desolate homes in "this broad land of ours," and agreeing with Mrs. Van Cleve that it may be a part of our duty as a horticultural Society to implant and foster in the minds of our youth a love for the culture of plants, I will mention a few of the most hardy which may be grown with the least possible labor:

Perennials come first in the list of easy culture, requiring very little care if properly planted.

Annuals necessitate more labor, the ground needing to be prepared every spring, and early, just when the busy farmer is tempted to reply to such requests, "Yes, by and by; can't do it now; wait till I get over my rush." Could fathers and brothers always realize the blessings these God-given treasures are, they would probably oftener contrive in some way to lend the "helping hand" to provide something "pleasant to the sight."

Gov. Colman once said, while urging this duty: "Grow flowers; they are elevating, purifying, harmonizing in their influence upon the character of yourself, your wife and your children. The farmer who

does not cultivate flowers, or encourage it, does not do his whole duty to his family."

And Miss Shore writes: "The most humble home may be brightened and its coarse surroundings made attractive by flowers. A neatly kept border, or a bed gay with blossoms of even the commonest varieties are certainly more pleasant and restful to the tired wife and mother than an untidy grassless yard, with fences down and pigs, calves, and geese roaming at will, as seen so often in the country. Half the time taken to keep them out would be amply sufficient to cultivate a few flowers.

If it should happen in any family that the willing hands are not strong, and the strong not willing, it is doubtful if more than a few annuals and hardy perennials should be undertaken.

And although it is pleasant to try something new occasionally, it seems wisest to depend mainly on those tried and proved varieties from which we can with confidence expect a reward of almost constant bloom, old, and yet ever new, delighting us continually with their beauty and fragrance.

The following varieties I would recommend by experience and observation as best adapted for those of little or no experience:

Phlox Drummondii, Chinese pinks, sweet peas, pansies, sweet alysum, verbenas, asters, nasturtiums, candytuft, petunias, balsams, larkspur, ten weeks stock, mignonette, and portulaca. Some of these, phlox, petunia, portulaca, and larkspur are self seeding, and labor can be saved by using the same bed, transplanting occasionally in the spring.

For a new beginner I would advise trying only a few varieties. Those wishing more can easily select from the many seed catalogues, nearly all giving directions for planting. If the necessary amount of earth cannot be spared or prepared for annuals try a few perennials. Phlox of many beautiful shades of color; bleeding heart and peonies—hardy, vigorous, and many of the new sorts delightfully fragrant—are improved by cultivation, but will spring up and bloom cheerily if neglected. I will also add the hollyhock (again in favor), in situations for tall flowers we know of nothing better. Vick says: "There are few plants whose flowers so perfectly combine large size and delicacy, quite as double and almost as pure and perfect as those of the camellia." I sometimes think this favorite old flower one of our best perennials. And tulips,—everyone who lives where the winters are so long and cold should have a bed of tulips, they bloom so early. Their visit is short, I confess, but other plants may be set between them so the bed may

not be left bare after they have faded. We have always used petunias for this.

Lastly but by no means least, the rose; the most delightful and queen of all flowers. I am thankful there are a few hardy varieties all may have. The choice and tender ones are worth trying for, though they require careful and skillful treatment. I believe nothing has so many enemies; among the most formidable we have found the aphid, rose caterpillar, bugs and spiders of various kinds, and mildew. Constant vigilance is the price of success.

Rose culture is comparatively a new industry in our family, in which, I confess, there is much for me to learn. Will mention, however, a few (from over one hundred varieties we have tried) which I believe, everything considered, have given best satisfaction, and which may be grown out doors in Minnesota if well protected during the winter.

Gen. Jacqueminot, Fisher Holmes, Louis Van Houtte, Baroness Rothchild, Mabel Morrison, Countess of Serenye, Eugene Verdier, Coroline de Sansel, Alfred Colomb, Salet Moss, Eliza Boelle and La France. Gen. Jacqueminot we value for its beauty, fragrance and hardiness. Fisher Holmes has been described as an improved Jacqueminot, and is, in my opinion, in some respects its superior, the petals having a little more substance, and in sunlight I think the color more beautiful. Of the three varieties, Louis Van Houtte, Fisher Holmes and Jacqueminot, Mr. Gould's choice is in the order named, Louis Van Houtte coming first, but for *evening* decoration the Jacqueminot is always preferred. We consider the Alfred Colomb a valuable rose, being fuller than the Jacqueminot and a better bloomer, giving more blooms late in the season, but not quite so beautiful in color. Baroness Rothchild and Mabel Morrison, though shy bloomers, are so exceedingly beautiful (also hardy) we would not willingly spare them from our list.

Eliza Boelle, white, dwarf habit, is a very free bloomer all through the season.

Gen. Washington, is a free bloomer, but the flowers are often imperfect; when perfect, a fine sort.

La France (Hybrid Tea), a delicate, silvery pink, large and fine, a most constant bloomer, considered by some as the sweetest and most useful of all roses.

Our Teas, Perle des Jardins, Sunset and Bon Silene, were greatly admired for their luxuriant growth and beautiful and abundant bloom.

The attempt to winter them out doors is an experiment; the result we consider extremely doubtful.

To any rose lover who indulges in luxuries, I would recommend these, even if they must be bought at the greenhouse every spring.

What I would give as the "key to success" is good, thrifty plants well planted, and *carefully tended during summer*.

I might add that this care is not altogether pleasurable, viz.: the battle with the rose enemies, but then I suppose we all expect "thorns with roses."

Mr. Sias moved a vote of thanks to Mrs. Gould for her valuable paper, and that it be placed on file for publication. Carried.

The following paper was then read:

AN AMATEUR'S FLOWER GARDEN.

By Frank H. Carleton, Minneapolis.

When your President asked me to say a few words upon an "Amateur's Flower Garden" my first impulse was to say "no," for I felt that I should make a sorry appearance alongside of many of the members of this Society. But the second thought came to me, that there is not sufficient interest in the healthful and delightful pastime of cultivating flowers, and so at the risk of being tedious I will relate a little of my own experience as an amateur cultivator of flowers.

Five years ago I could scarcely tell the difference between a Petunia and a portulaca. At that time my wife, in early spring, asked me to bring home a package of sweet alyssum seeds. As a matter of duty I obeyed, but I purchased the seeds with even less interest than a person usually displays when he purchases a box of matches. A few evenings later, by dint of much persuasion, I acted as a sort of listless laborer, and under strict surveillance and frequent urgings, made a small flower bed, in which the seeds were planted. I was not at all interested until the little things, in the course of about ten days pushed their tiny plant leaves through the soil. The process of growth interested me. Why did they grow and how? Whence came the life? And a multitude of questions which will never be answered until we get into the presence of the Giver of all life, forced themselves upon my mind. As the weeks passed by and a multitude of blossoms un-

folded each day with fresh fragrance, my interest increased and the love of flowers was born in my heart.

When next season came no one had to ask me to purchase seeds. Early in the spring evenings I was busy with the seed and plant catalogue. The close confinement indoors of my profession was telling upon me, and I determined to try a little amateur gardening for my morning and evening exercise. So I divided my tract of land in the middle—the rear part for vegetables, and the front half for flowers. I will not speak of the fresh tomatoes pulled for breakfast, even while the breakfast bell was being rung, or of the crisp lettuce, or of the early peas sweeter than any sugar, whose very freshness gives appetite to an invalid, but I will pass on to my flowers. Of course I made some mistakes the first season. I sowed many of my seeds too closely and did not weed sufficiently. I sowed nasturtiums and bachelors buttons in rich soil and got immense and vigorous plants, but no blossoms. I sowed asters in dry soil and got a few pinched up flowers. One cut worm would prematurely harvest a dozen plants and go undisturbed and grow fatter and fatter. But this was only for one season. I discovered that plants are as sensitive almost as human beings. It won't do to treat all alike,—if you do, some get angry and rebel. Some flowers, like the asters, and stocks, and pansies, are aristocratic, and want rich soil,—plenty to drink and plenty of sunlight,—others like the nasturtium and portulaca can't stand luxury. They want a poor soil and thrive better the drier they get. But all flowers are alike in one respect. None of them can stand weeds.

There is no place in the Union where annual flowers do better than in Minnesota. It is true that there are many states whose seasons are longer, but in none does nature do a better work in a short time than here. Annual flower seed grow quickly here, and flower quickly; and for the past three seasons my flowers have had their full period of blossoms and have gone to seed before the frosts came. The rapidity of growth here fully compensates for whatever we may lack in length of season.

I desire to dissent from the common view that hardy roses will not do well in Minnesota. They do better here than in Indiana or Illinois. It is true that our winters are somewhat severer; but it is the alternate freezing and thawing weather of early spring which injures the rose bushes and hollyhocks and other hardy plants, and not the steady cold weather of mid-winter, when they are protected by a mulch. Many a rose bush will pass unhurt through the severe weather we have been having since Christmas, and finally perish by being

uncovered too early in April. The open winters of Indiana and Ohio are not as good a protection to the rose bush as the heavy snows of our State, which come and stay until spring. In all the northern states mulching is necessary, and no more here than elsewhere. In mulching, however, care should be taken not to mulch too heavy, so as to exclude all air. Roses and hollyhocks and pansies and Chinese pinks (the dianthus) can easily be kept through the winter by a mulch; but the mulch should be loosely thrown on and a little air admitted; and the mulch should not be removed too quickly in the spring.

Rose bushes need pruning. I got my first lesson in this three years ago. On my lawn was a very handsome *Jacqueminot* which had weathered several winters and was immensely large, several of the branches being taller than my head. One spring evening the worthy President of this Society chanced to call. I pointed with pride to my bush. He shook his head. He simply took out an immense pocket knife and said nothing. But he slashed away at that rose bush, and the old shoots flew in all directions. That bush was a sorry sight when he got through with it. I felt bad, but smothered my grief. My grief, however, was soon turned to joy, as the new branches shot forward like arrows, and the multitude of blossoms in due time made it a marked object on the lawn. In this connection I might also add that many who raise flowers are too chary in cutting the blossoms. The more flowers you cut and give away the more you have. One flower in going to seed will take the vitality out of a score of blossoms. Never let a seed pod form. It will rob you of many blossoms. The best seeds are so cheap and accessible that no amateur can afford to raise them. I know a rich lady who, in order to raise a few seeds for the coming season allowed her early blossoms to go to seed and seriously curtailed her entire crop of blossoms, when five cents would have purchased all she wanted for the next spring. She saved her nickel, but practically lost her whole crop of sweet pea blossoms for the season.

It never pays for an amateur to raise seeds. The choicest seeds are now very cheap. The flowers should be picked as fast as they blossom (excepting of course the geranium blossoms on the lawn). Not only is it true that the more we pick the more we have, but it is also true that in the hands of an amateur the seeds will gradually degenerate. For this reason I always buy fresh seeds every year from a reliable house. The only exception to be made is in the case of the old-fashioned balsam, which has been improved so much in the last

few years as to be almost equal to a rose. Most flower seeds lose much of their vitality in a season or two, but a balsam seed ought to be two or three years old to give the best results.

But let us pass from general remarks to certain flowers. I will not pause to speak of geraniums, and heliotropes, and hot house plants, because we generally buy these plants of the florist; but first let us speak of some of the annuals, the old-fashioned garden flowers, which delighted our youth and were cultivated in the days gone by,—the aster, ten weeks stock or gilliflower, sweet pea, hollyhock, "youth and old age" as the Zinnia was once called, the "lady's slipper" or balsam, the pansy, etc. Within the past ten years all these have been greatly improved, and like most everything else specialists are at work each year improving the strain, and the same genius which has developed the dahlias and fuschia and gladiolus from what were once practically wild plants or weeds into the rich varieties which we now have, has also developed new beauty in these flowers.

First of all flowers, both for its beauty and constancy of bloom, I would name the pansy. For a few early blossoms it may be well to buy a dozen plants of the florist, but these from being "forced" at the green-house soon dwindle away. It is very easy to have fine large pansies through the entire summer season. As soon as the weather will permit, plant the seeds. They are slow to germinate, taking from ten to twenty days, but afterwards grow rapidly. When you transplant them into their permanent place do not be afraid of the sun,—they do well in the sun providing the soil is very rich and they have plenty of moisture. Some say pansies want shade. This is not my experience. They want a rich clayey soil and a great deal of moisture. But any rich soil will do, providing an abundance of moisture is furnished very early in the morning and after nightfall. The only benefit pansies derive from shade is from the moisture which shady locations give, and by a little care, according to my experience, larger and finer pansies can be raised in the sun than in the shade. But in buying seed get only the very best. The new shades of red and mahogany and bronze, and the solid single colors are fast taking the place of the common kinds. Indeed the pansy is the only flower which seems to transgress the rule that there is no family of plants in which blue, yellow and red in varieties of the same species, are found.

Next among annuals in point of beauty to the pansy, in my judgment, is the aster. It is a royal flower; many of its varieties, as for instance the Victoria and Truffaults peony flowered are unsurpassed.

this too must have a rich soil and plenty of moisture. Then comes the ten weeks stock or "gilliflower," and scabiosus or "mourning bride," and also the gailardia, of brilliant hues, also requiring a rich soil and moisture. And right here, speaking of plants which require moisture, let us remark that many do not know how to water plants. They sprinkle them. Now this is wrong. Sprinkling as it is generally done with a hose or sprinkler, generally wets only the surface of the ground, which causes the plants to send out many little surface roots, which are soon burned or dried up by the sun. When you water most plants the soil should be thoroughly drenched or saturated. One good drenching of the soil in which the water thoroughly saturates the ground, is worth half a dozen ordinary sprinklings.

There is no more fragrant flower in the garden than the sweet pea; and no bunch of flowers gives more beauty than an immense mass of sweet peas, whether it be on the sideboard as a bouquet or worn as a corsage flower. Many fail in raising sweet peas, and yet they are easily grown in great abundance. First of all they should be sown just as soon as the frost is out of the ground,—as soon as the soil can be worked. Don't wait for pleasant weather or be afraid of frosts, but put them in as soon as the soil can be worked. The richer the soil the better. The rule as given in the books is to plant them four inches deep, but experience has demonstrated a better way, as they often rot or fail to come up when under four inches of heavy spring soil.

They should be planted in double rows, the rows being about six inches apart, and the peas about an inch apart in each row. If they are at the outset planted four inches deep many will not come up, so I believe a better way is to dig a trench or hollow space about five inches deep, and then sow the peas and cover to the depth of an inch or so. Then as the peas grow gradually "hoe in" from time to time, until the hollow or trench has become even with the soil. In this way the roots which form from the germination of the pea will be four or five inches below the surface. As soon as the peas are up two or three inches, put up your frames for them to run upon. Their future success depends upon their being furnished with an early support.

Hollyhocks are again coming into fashion. Many of the double ones are equal to dahlias. When once in a garden they will seed themselves, and a clump of them gives a rustic beauty to any garden or lawn.

But I find my time is passing, and I have not yet alluded to that

grandest and richest of all summer flowering bulbs,—the gladiolus. There is nothing in the garden which requires less care than gladioli. They are raised easier than potatoes, and nothing will attract the eye of the passer-by so quickly. When the bulbs are once in the ground you have nothing to do but keep the weeds out and cut the flowers when they come. It is true that the bulbs are somewhat expensive at the outset, but they multiply rapidly, and if a person will save the little bulblets which form at the base of the large bulb each year, and plant them in separate drills, he will soon have a great abundance. I procured about a hundred bulbs of the named varieties three years ago, and I now have in my cellar about three bushels of bulbs for this spring's planting. If a person does not want to go to expense of buying bulbs let him buy a package of seeds, and many of them will blossom the second year, and from that time onward if he saves the bulbs and bulblets he will have plenty.

But I fear I am trespassing too much upon your patience, and with a brief statement of how I handle cut worms I will close. Of course if a person goes into the garden in the early morning and sees a plant has been cut by the worm at night he can usually find the worm within an inch or so of the plant and destroy it. This is a safe and sure way. But a couple of seasons ago I chanced to leave a small pile of grass which had been cut by the lawn mower in the garden. The next morning in removing it I found several cut worms under it. Whether attracted by the odor of the fresh grass, or not, I will not undertake to say, but they were there, and so now I regularly set this trap for them each spring and generally get a quantity each morning. Somehow the freshly cut grass draws them together.

I thank you for your kind attention to this hastily prepared paper, and in closing I submit whether there is any diversion more productive of health or cultivating to the taste, or where a person can get nearer to nature than by cultivating those flowers which God gives to all as a common blessing? Here nature smiles equally upon the humble and the wealthy, and a little industry is rewarded with gifts which decorate any home.



THE CLAIMS OF ENTOMOLOGY AS A DISTINCT SUBJECT OF STUDY.

By Prof. O. W. Oestlund, Minneapolis.

The number of different kinds of insects now in existence is great, we would almost say innumerable. Their relation to man are manifold, and often of greatest importance. If all insects should at once become destroyed and the work that they now perform left undone, we know that the earth would soon become uninhabitable, at least to man and higher animals. Insects do not exist only as a matter of chance, or perchance to torment us if we become too wicked, or to blast our hopes by destroying the results of our work, as we would often like to believe. Their existence has a deeper significance than this. These small creatures, to which I would now call your attention for a few moments, found everywhere where man has yet put his steps, even to the ice-bound shores of the northern seas, seem to embody the very principles of vitality, activity and destruction.

VALUE OF INSECTS.

One of the most important and far-reaching results of their work is probably as scavengers. As soon as an animal falls dead to the ground, or any other animal matter becomes exposed, these little animated beings, which are ever on the alert, are at once ready to bounce upon it, tear it to pieces, bury it under ground, devour it, and soon again to change it to living animal matter. The great naturalist Linnæus used to say that a pair of blow-flies are able to devour an ox as soon as a lion. If you have observed these flies hover around a carcass, depositing their innumerable eggs, which will soon turn the object into a living mass of maggots, you will not only see the force of the assertion, but become greatly amazed at the rapidity with which nature is able to do away with a putrifying object that would only give off poison and death to every living object in the vicinity; and in place millions of flies are produced, which in turn are ready to perform the same duty as they may be called upon. Not only are the softer parts of the carcass that would first putrify immediately taken in charge by certain species, but even the hide, the hoofs and firmer portions of the body are all in turn attacked by other species, and soon nothing will be left but the dry mineral portion of the skeleton, which is now turned over to the sun and air to further disorganize at leisure, but now without any evil effect upon living beings. Not only

on land do insects perform this important work, but also in water. It is insects, together with other important classes of animals, that keep the water of our lakes and ponds clear and in motion, which otherwise would soon become stagnant and foul from accumulating filth and vegetable matter, and make it utterly worthless to man besides filling the air with foul gases.

The relation of insects to vegetation is a most important and intimate one. Through the admirable works of Mr. Darwin we are all more or less familiar with the important part that insects play in cross-fertilization of plants, and thus in promoting a vigorous and healthy growth. They are also of importance to vegetation by preparing and distributing fertilizing material by hastening on decay. You have probably all noticed how soon a dead tree will become riddled through and through with the galleries of insects or their larvæ, and the loosened bark falling to the ground, soon all will crumble down to dust under the industrious bands of the small workers; and in a few years will the giant of the forest be distributed to serve for a new and more vigorous growth, which may now occupy the very same spot that would else be filled with only the useless and unsightly remains probably for a century or more in the slow decay in air unaided by insects. But while thus a large class of insects are occupied in promoting a healthy vegetation by aiding cross-fertilization or by hastening on decay of dead matter and distributing the same as fertilizers, others and a most important class is occupied in checking a too rapid growth or increase of vegetation. At first sight this would appear to be a paradox, and only to prove that insects are useless and a plague to man. But if we have been lead to understand the balance of nature as a law, and one that is as beautiful as it is comprehensive, we will know that the one class is as important and necessary for the welfare of man as the other. There is a tendency of living objects to increase enormously and to occupy space to the exclusion of all others. Thus if a single species of plant would be allowed to increase without reserve it would soon come to fill all available space to the exclusion of all other plants of similar habit. An example of this law is furnished to every one of you in the tendency of weeds to overrun your grounds, which as native species are much hardier than those we cultivate, which can only thrive under the fostering care of man. To keep this tendency within proper bounds nature has provided more than one remedy, but one of the most important ones is undoubtedly insects. Each species of plant has therefore got its corresponding species of insects that are ever ready to keep it within proper bounds.

It has been calculated that on an average there are at least five species of insects that prove to be more or less injurious to each species of plant. The actual number will probably be somewhat larger, as the number of newly discovered insects has increased unexpectedly during the latter half of the present century. As soon as a plant therefore will increase under some favorable circumstances so as to exceed the proper bounds, these insects that prey upon it will also be favored by such an increase of food-plants, and will soon appear in a proportionately large number and check this undue increase of the plant.

While thus a large class of insects are occupied as scavengers on land and in water, and a still greater number to produce a healthy and luxuriant growth of vegetation, or to check an undue increase; not a small class are occupied in keeping the increase of these insects themselves within proper bounds, by preying upon them. A large class are directly carnivorous, the tigers and lions among insects, by preying upon every insect that comes in their way; another and more important class to man are parasites on other insects, their larvæ or eggs which they destroy. Thus the balance of nature is ever kept up, and this law is most beautifully exemplified in the case of insects.

GOOD AND BAD INSECTS.

Insects are moreover of importance as an article of commerce. Not only does the honey bee supply us with a delicious and healthy food, the cochineal insect with a magnificent coloring matter, but many other important products come directly or indirectly from insects, as shalac and silk the value of which amounts to millions annually. Insects come in more or less relation to man in almost every branch of industry with which we are acquainted.

That relation in which they attract the greatest attention is undoubtedly as injurious to our crops, and as this involves a loss of millions upon millions annually to our country, and to the individual often the greater part of his profit for the year, if not more, it is a question well worth our attention. This is applied entomology, and if time would allow it would be a profitable thing to stop just here and try to make it clear to all of us in what this relation consists, and to what extent the evil might be reduced. This is an evil, if we so must call it, which can never be altogether done away with, and which would not even be desirable under the present condition of things; but it can be reduced to a minimum, and this applied to a single crop of our State—the wheat crop—would make a difference of several millions annually in our favor.

These are a few of the subjects that present themselves to the student of entomology without going into details or into the realm of pure science. Entomology as a distinct subject of study, as a science, is what I will especially call your attention to this evening.

SCIENCE OF ENTOMOLOGY.

Not many centuries ago it was considered to be below the dignity of man to occupy himself with such trifling things as insects, and if anyone in spite of this dared to pursue the study his soundness of mind was liable to be questioned. Since that time we have learned to become a little more liberal. The general opinion is no longer openly against the subject, and we are all willing to concede its importance. But this is as far as we have advanced, and back of this there is yet a general indifference. It is still in the hands of a few.

But the work is ever advancing, and the time is dawning when this study will no longer be in the hands of a few, but the property of the people; and when we will have not only learned to know and concede the importance of the subject, but will have learned to feel its importance and give it that aid and sympathy which it requires to reach its full growth. Then, and only then, can we receive the full benefit that is to be derived from it as a science.

How is this indifference to be removed, and how are our people to be made to feel the importance of the subject? To this I would say there is but one sure and proper way, and that is to educate our people up to it. This is the way in which we have acquired all the knowledge that we do possess, and must acquire what still remains to be added.

The sciences take their birth, no man knows where, somewhere in the depth of the human soul. Their growth is commonly slow, they develop in the hands of the few, and often in the most humble and insignificant habitations. For years man is ignorant even of their existence, but as time rolls on the time will come when they can no longer be concealed, and we begin to comprehend that a new star has made its appearance on the firmament of human knowledge. Its lights may at first be faint and indistinct, but as it comes nearer it grows brighter, and as it is the pride of our nation to add another star to its banner on the admission of a new state, so will also this star be put down on the chart and admitted into the temples of human knowledge, from where it will cast its light over the people of the land.

Now entomology is such a science. It is commonly not recognized

as such at our universities and colleges, but is treated only as a small part of general zoology. There are very few of our institutes where entomology has yet been recognized as a distinct subject of study, or where even the first principles of the subject are taught. I am confident that I do not claim too much when I say that entomology is a subject as distinct as any other of the natural sciences. It has a light of its own. It is a field that will never be recognized nor properly cultivated as long as it is only a part of general zoology. Let, therefore, our higher institutes of learning first recognize entomology as a distinct subject of study. It is their privilege and duty to do so. Let it receive its place along side with the other natural sciences, and its care put in the hands of a proper and qualified person. The time will then soon come when it will no longer be in the hands of a few, but as it will gradually widen out under the fostering care of such institutes, it will soon come to include not only our colleges and academies, but in due time also our common schools. When thus the first principles of entomology will be taught in our schools and as much attention given to this as to kindred subjects, will this great indifference under which we now labor gradually die out, and our people will have learned not only to know but to feel the importance of entomology.

This has been the case with botany. As a science it has developed far in advance of entomology, and has now for years been recognized at all our institutes of learning, and been in the hands of qualified persons. The interest for the study has continually been on the increase, until at present it includes not only our colleges, but also a good part of our common school system, and we have such a delightful book as Gray's first lessons in botany to put in the hands of the children, which has already begun to be loved so much by the children of our country. What the benefit of this study has been and will be to our people it is not for me here to state. It will be enough to say that entomology will not stand back of botany in this respect.

ENTOMOLOGY AND HORTICULTURE.

If I do not misjudge, I think that you as a horticultural society are under somewhat the same condition of things. What is the greatest difficulty that you have had to contend with as such a society to reach the high aim you have before you, and for which you have worked with so much success and energy? Is it not that the general opinion has been against you, and that there is yet too much of indifference among our people on the subject?

We are aware that not many years ago the general opinion was that no fruit at all could be grown with success in Minnesota, and he who dared to differ from this was laughed at and considered to be very short-sighted. Since that time your Society has come to the front, and it has been proven repeatedly that fruit can be grown, and that with profit in our State. But still the general feeling is too much of indifference on the subject, and the industry remains in the hands of a few. It is not until you have removed this indifference and our people have been educated up to recognize and to feel the importance of horticulture that we will derive the full benefit that is to be derived from it.

I might put before you some of the benefits that are to be derived from the study of entomology, as they are many, practical and important. But I shall stop right here and only ask that you will continue to recognize entomology as an important subject for your Society, and give it that attention and sympathy that it at present needs. The time should soon come when entomology will be recognized not only at our State University, and especially at our College of Agriculture, but also by all the other colleges and schools of the State. There is also room for the State, as such, to recognize the practical importance of entomology, by the appointment of a State entomologist as many of the states have already done, besides the work which is now being done by the geological and natural history survey of the State, which is distinct.

Entomology has been slow to develop, but at last it has come to the front and stands before us to-day as a science that stands back of none of its associates in extent, in completeness, in beauty, in importance, and in the benefits that are to be derived from its study by man in almost every department of life.

Mr. Harris, from the Committee on Entomology, presented the following:

REPORT OF COMMITTEE ON ENTOMOLOGY.

Mr. President and Gentlemen of the Minnesota State Horticultural Society:

You cannot reasonably expect a very elaborate report from me, because I am not a scientist or even greatly learned in the science of entomology. But like yourselves I have been frequently victimized by

injurious insect pests and have observed them enough so that I can distinguish some of them when I see them.

My observations have been mostly confined to Southeastern Minnesota. I am very glad to be able to report that within the limits of my observation but very little injury was done our fruit by the larvæ of the codling moth. Our apples were fair and very free from worms. I think this a hopeful sign that some parasite has appeared to prey upon the insect, or that some new bird may have adopted the pupa chrysalides or the perfect insect as an article of food. This condition of things was very unexpected, as usually in years of short crop they generally utilize the whole of it for the purpose of propagating their species.

I have also noticed that upon my place the curculio or apple gouger were not nearly as great as in the three or four years preceding. That might be owing to the presence of greater numbers of birds than usual early in the season, or to the fact that my wife has for two or three years indulged in the expensive luxury of raising turkeys.

Neither have I observed the tent caterpillar to be as numerous as during the preceding year, when almost every variety of tree and shrub was badly infested with it, and young forest trees seriously damaged from being defoliated by it.

The grapevine flea beetle was not nearly as injurious as common. Early in May, or about the time our apple trees were in blossom, I noticed what I suppose to be the leaf-roller or leaf crumpler in great abundance, both upon the bearing and upon the small trees. These caterpillars were of a pale greenish color and at first appeared to curl up and fasten together the small leaves as soon as formed and feed within them; and in this way they appeared to do considerable damage to the smaller trees and root grafts. They did not appear to last more than three or four weeks, but in that time they kept the trees nearly defoliated and in a bad condition to make a strong growth during the dry season that followed. I could not discover that birds molested them, as they were just as numerous upon trees where they had built their nests. At the time, I had not leisure for studying them up or trying any experiments as remedies. At about the same time, or a few days later, the canker worm made its appearance in much greater numbers than we have ever before known them. These could be easily distinguished from the others, as at first they eat small, round holes through the leaves, and towards the last eat nearly all the pulpy portions of the leaves away. They were what we usually term a span worm or looper, and, when full grown, were about an inch long, of a

blackish or brown color on the back, with a yellowish stripe on each side. They not only infested the apple trees, but also the plum and some kinds of shrubbery. Scarcely any of the maybeetle — the larvæ of which is the white grub, so injurious to the strawberry beds and grass plats — were seen flying this year; but the two-year old larvæ, that is now in the ground, were rather more destructive than the average of seasons.

I found an insect of Plantbury family upon the young twigs of the plum; they were apparently feeding upon the juices of the twigs, and wherever one was found the leaves and end of the twig above had turned black and appeared as if blighted. I have sometimes seen a nearly allied specie upon the blighting twigs of the apple.

Aphides, or plant lice, were very plentiful and in many cases injurious. I had a half acre of Lima beans that were nearly ruined by them. They were so numerous that no fruit set, or did the plants make any perceptible growth for about three weeks. The points of the vines and the blossoms were thickly covered with them. I purchased a pound of Dalmation powder and gun, and commenced applying it as an experiment. I soon noticed a variety of the lady bug upon every plant, so after going over about forty hills I concluded that to save the beans at the risk of destroying the lives of so many friendly insects might prove to be an unfortunate speculation. The result proved to be a war of races in which the bug came out ahead. In a short time the aphides disappeared and the bean commenced thriving, although so late that they did not mature their fruit.

Before closing this report I wish to allude to two insects that are doing an immense amount of damage out in our prairie counties, the cottonwood tree beetle and the willow worm. These insects are increasing so rapidly and committing such depredations that it is only a matter of a very short time before these valuable pioneer trees can no longer be grown unless some remedy is found for them. I would suggest that our agricultural department of the State University enter upon an investigation of these destructive pests, and try and aid our prairie farmers to head them off. This is a line of work that calls for immediate attention.

DISCUSSION.

Mr. Gibbs. Knowing as I do that what is said at these meetings is for the benefit of the large number of people that read the reports, and as I am glad to see the annual increase in the number of such

readers, and considering the vast importance of this subject of entomology, in the interest of agriculture and horticulture, it seems to me Mr. President, we can afford to take a little time to place some additional matters upon the record.

And first, in answer to the question of Prof. Oestlund of how to excite a deeper and wider interest in this State on the subject of entomology, that it may be recognized as proper to be made a study in our public schools. The first answer I would make is this, let the specialists in this science carry on their studies, hand in hand with other investigations. As they proceed in the study of insects let them give the public information as to those that are friends to the farmer and horticulturist as well as to his enemies, the means for the destruction of injurious insects, giving warning of approaching foes when discovered.

I have no doubt in my own mind that entomologists could have greatly lessened the ravages of the chintz bug; but what chance was there for them to do it? They could get no audience in the State if they spoke upon the subject; farmers did not realize its importance or pay any attention to it. But why cannot entomology, ornithology and forestry be considered together with reference to these subjects? Let them do all they can to educate the people to the value and usefulness of birds, and warn farmers of the ruinous practice that prevails of encouraging the shotgun all over these prairies, thus destroying the few friends of man that are placed here to keep these insect enemies in check.

A simple illustration will make the matter clear to any reader. In my own neighborhood in Ramsey county, Dakota, there is a very nice man, a friend of mine, who has a family of boys nearly all grown to manhood, and from the father down everyone of them has a shotgun, and their house is full of ducks; and every moment of leisure time they get they are out over those prairies shooting everything that wears feathers. [Laughter.] I don't believe a plover would dare to venture within two miles of that house; and that farmer was the one to complain most of the damage done by insects.

It is admitted I believe there are some four hundred millions of dollars worth of property destroyed annually in the United States by insects. At the same time I do not believe there is a single destructive insect whose ravages could not be prevented or at least greatly lessened by a simple observance of the laws of nature in regard to them.

Insects are rapidly increasing in numbers. We must look to these professors of entomology, to these scholars who are familiar with or-

nithology and to these experts in forestry for instruction in these matters, to lead on bravely in the work of education in these matters Agriculture will soon become impossible unless the importance of entomology is recognized and the people are educated upon these matters. As said by the professor the knowledge of this subject is not carried beyond the few specialists who now take it in charge.

I believe the terrible devastation of crops in Minnesota from chintz bugs has been due simply to the encouragement of the shotgun on the prairies. I have sometimes wished I had the power of the emperor of Russia, that I could banish every shotgun in the land.

Mr. Pearce. Mr. President, I agree with friend Gibbs. I will go still further; I believe our legislature are enacting laws that are working destruction to the State in permitting the killing of our prairie chickens. If they were suffered to live, I doubt if we would have suffered seriously from the chintz bugs.

There is a bounty on the pocket gopher, one of the best friends we have. If I had ten thousand on my place, I wouldn't kill them. [Laughter.] You may say they eat grain. Very little; they eat bugs and all kinds of insects. I have worked among striped gophers where there were thousands of them. A little corn sprinkled around the field will prevent their taking up the growing crop. I have seen them fight over the pile of corn placed out for them to eat. With a peck of wheat you can protect twenty acres of corn. Protect these little animals; encourage them; they are the best friends we have. I never kill one of them, not even a skunk. If we would stop killing these little animals, we would hear less talk of the destruction of our crops.

Mr. Harris. I am glad Mr. Pearce corrected himself by saying he was a friend to the striped gopher, although the pocket gopher was put here for a purpose and has given us a soil that beats the world. I have been condemned for considering the pocket gopher more beneficial than injurious, but I still think there is no animal more useful, unless it is the common skunk. It is useful in destroying the larvæ of the maybeetle. I think so much of it, I have two specimens mounted and placed where I can see them.

There is one bird I think a good deal of, known as the crossbeak. It is really fascinating to sit down and watch it bring the beetles to its nest to feed its young. Last summer I was afraid I would lose my patch of potatoes, but I soon noticed the birds were taking the bugs, and I only lost a few hills in the whole patch. I have not used Paris green for fear of destroying as many of our friends as of our foes. I believe if we understood entomology more thoroughly it would be of

great advantage. I discovered two or three years ago, when our apple trees were infested with aphids, that the lady bugs destroyed them and protected the trees. There is nothing more interesting to children than "bugology" when they once get started in it, and I hope the rising generation will be taught in the science.

Mr. Wilcox. I would like to inquire if the curculio ever prevails on wild plums?

Mr. Harris. I have seen them, but if the plums are thrifty the sap seems to drown a large portion of them and the plum comes to maturity.

Mr. Wilcox. I notice a good deal of apprehension exists among farmers with regard to chintz bugs. I do not apprehend much injury will result from their ravages another season. They are not apt to develop except in dry seasons, and it is stated that three dry seasons in succession is very rare.

Mr. Harris. Chintz bugs are found in large numbers where rubbish is allowed to accumulate; they deposit their eggs, and if the season is dry they are ready to continue their work. If our birds were spared, we would not have so much loss from insects.

Mr. Gibbs. I referred a while ago to the necessity of forestry. I do not think there is an instance known where grasshoppers have crossed over any large body of timber in their migrations. If the government had retained these lands in their own hands till they were reforested, that work could have been accomplished at less expense than the amount of damage done by grasshoppers in their invasions.

President Elliot. I think you are in error in that. We had large quantities of them that came over the timber; they were here but two or three times, but the air was full of them.

Mr. Gibbs. They did not get far from the timber, did they?

President Elliot. They extended over a good deal of territory.

Mr. Gibbs. Prof. Riley in his investigations arrived at the conclusion that grasshoppers were limited in their travels east by the condition of the air. He indicated boundaries beyond which they would not be likely to pass, and the grasshoppers disappeared substantially on the line that he indicated. It may be stated that a large body of timber so affects the moisture of the air that it appears to be quite an effectual barrier to their extension.

Mr. Gould thought timber had a marked effect in preventing raids of grasshoppers. They did very little damage, except in few instances, this side of the timber known as the Big Woods. He was here at the time of their visitation in 1857; they came in August of that year, de-

posited their eggs and reappeared the following season. They did little damage and soon disappeared. At the time of their last visitation they remained a period of five or six years and caused an almost total destruction of crops. In Kandiyohi county, where crops were almost totally destroyed, there was little timber, while in this vicinity there was very little loss. This indicated that timber proved an effectual barrier to their eastward march.

The last on the program for the evening was a paper by Prof. Pendergast.

EXPERIENCE IN ORCHARDING IN MINNESOTA.

By Prof. W. W. Pendergast, Hutchinson.

In the spring of 1856 I had one hundred two-year old apple trees of the standard sorts,—Greenings, Northern Spys, Baldwins, etc.,—sent me from Dimond's nursery in Stratham, N. H. They were planted in a poplar clearing in front of my house in Hutchinson. On account of lack of suitable ground they were set only two feet apart. Nearly all lived and made a satisfactory growth the first season. The winter following was one of the most severe ever known in Minnesota, but the snow was deep and that protected and saved the lower half of the trees. Every twig that projected above the snow line was killed, and some were dead to the ground. In the spring the dead wood was all cut away and the trees were left to grow as nature willed. The next winter there was not much snow, but the trees had grown bushy causing a small drift around them, and the result was about the same as the year before. Some of them lived along at this "poor dying rate" till the Sioux Indians in 1862 burned the house, and the whole place went back to primeval desolation. Thus ended my first and only attempt at fruit raising in the Territory of Minnesota.

In 1866, having satisfied myself that Transcendents and Hyslops had certainly been grown in this State, I bought one hundred yearlings and one dozen three-year olds of each kind, together with a few Duchess and Siberian crabs of an agent from Anoka by the name of VanValkenberg. With the exception of the Duchess all thrived well. In three years the larger ones commenced bearing, the Transcendents and crabs yielding astonishing crops till 1878, when the Hyslops and Red Siberians began to die. From the first they had not shown as much vigor as the Transcendents, which up to this time appeared to be iron-clad. It was not long, however, before they too

showed signs of discouragement, and an inclination to give up the struggle for existence. Each returning spring showed fewer living trees, and those in worse condition. There are now perhaps a dozen of them "cumbering the ground," but their days of usefulness are past. They blossom well but the apples are like angel's visits. A word about the Yellow Siberian. They have always been at home, have made a vigorous growth every year and are now between thirty and forty feet in height with trunk two and one-half feet in circumference. These trees were set in a rich black loam ten to twelve inches deep, underlaid with coarse gravel, and then sand to an unknown depth.

For the first few years my orchard promised so well that I was tempted to venture too far. In 1873 I exchanged eighty acres of land in Sherburne county with Shearman, a nursery man of Rockford, Ill., for apple trees. This gave me 32,000 root grafts and 1,000 two-year-olds of most of the kinds recommended for trial by the Minnesota Horticultural Society. Nearly all of these I planted myself, nursing and caring for them till most of them died a natural death. The kinds were Transcendent, Hyslop, Duchess, Red and White Astrachan, Tetofsky, Fameuse and others. Of these probably 500 Transcendents and half a dozen Hyslops are alive to-day, most of the Transcendents in fair condition. Three or four Duchess trees, planted on the north side of the house and within three feet of it, look bright and sound from the ground to the topmost branches, but they do not bear a peck of apples a year. Probably they are in too cool and shady a place. So it seems that the conditions essential to healthy growth are decidedly unfavorable to fruit-bearing.

Out of several hundred seedlings which I have raised, all are now dead but three. These are about fifteen years old and apparently as hardy as the Siberians. Transcendents, Hyslops, Early Strawberries, Orions, Hebrons, and all the so-called iron-clads have been winter-killed around them, but these are all as sound as oaks. One is a seedling of the Duchess and the other two sprung from the original stock when the root grafts died. Hardiness however is their only good quality. The fruit, though considerably larger than the Siberian, is scarcely better than that of the Hyslop, and that is placing it low enough. The fact that by years of experimenting we can make some improvement in quality and still retain the absolute *hardiness* of the crab is encouraging. Others have done very much better than I have, and the end is not yet. Every year will add its quota, and in the "good time coming" some one will give us an apple as good as the Wealthy and as hardy as the Yellow Siberian.

SMALL FRUITS.

Red Dutch currants are a success wherever I have set them, and yield bountifully whenever the season is not too dry. Other kinds have not proved so satisfactory, though the fruit is larger.

Gooseberries—American Cluster and Houghton's seedling yield enormously about two seasons out of three. The currant worms trouble them however much more than they do currants.

Raspberries and strawberries demand a moister soil than they find in my garden. Outside of the level tract with the gravel subsoil above described, with a little winter protection, they give fairly satisfactory results.

Grapes have proved a failure on the gravelly land, but do well in the woods and on the south side of lakes. I have about two hundred vines on my farm where the subsoil is clay. These are just beginning to bear and the promise for the future is most flattering.

On motion the meeting adjourned till Friday morning.

MORNING SESSION.

FOURTH DAY, FRIDAY, JAN. 20, 1888.

The meeting was called to order at 9 o'clock by President Elliot.

PRIZE ESSAYS.

Mr. Pearce, from the Committee on Prize Essays on Grape Growing in Minnesota, presented the following:

Your committee on the best essay on Grape Growing report that there is one essay competing for the prize, by R. A. Latham, of Excelsior, aged nineteen years, and who is entitled to the prize.

M. PEARCE,	} Committee.
E. H. S. DARTT,	
J. M. UNDERWOOD.	

GRAPE CROWING IN MINNESOTA.

By R. A. Latham, Excelsior, Minn.

LOCATION.

In the selection of a location for a vineyard a place should be chosen in a neighborhood where vine growing is already known to be a success. The place selected should be if possible a south or east

slope. High ground on the south shore of a lake or on the banks of a river, to prevent the late frosts of spring and the early frosts of fall, is preferable. Almost any slope will answer though to plant vines on if it is well sheltered. If there is not a natural shelter near the place selected one should be provided.

SOIL.

Any soil that will raise good corn or potatoes will do for a vineyard, but preference should be given to that which is not too sandy and is underlaid with yellow clay containing fine lime stones in abundance. In such a soil vines will be healthier and less liable to winter-kill.

LAYING OUT.

In laying out the ground the rows should be about eight feet apart running horizontally around the slope so as to prevent the hill from washing. For convenience sake it is better to leave alleys 11 feet wide running up and down the hill about every 150 or 200 feet apart, making it easier to tend the grapes, as will be explained farther on. The vines should be planted from six to eight feet apart in the rows, depending upon the strength of the variety.

VARIETIES.

The varieties that are planted in the largest amount are the Delaware and Concord; but Moore's Early, which is a large dark purple grape, and ripens early, and the Pocklington, a large white grape with a very fine flavor, and a number of other varieties are growing in favor.

PLANTING.

In planting, the holes should be dug slanting and from ten to twelve inches in depth and the width of a spade. It is best not to dig very many holes in advance of the planting as they will dry out. The earth in the holes should be well pulverized.

While planting is going on the vines should be kept where they will not dry out. Young vines one or two years old that have been raised from cuttings in a nursery should be used in planting a vineyard.

The roots should be trimmed back before planting so that when they are put in the holes they may have their natural position, and it would be better if the hole is deep enough and slants sufficiently to

bury a part of the top also. Good rich dirt should be put next the roots and pressed firmly around them with the foot. The vines should all slant in the same direction so they can all be trained on the trellis in the same way. The accompanying cut (Fig. 1) shows the shape of the hole and the vine therein ready for covering with soil.

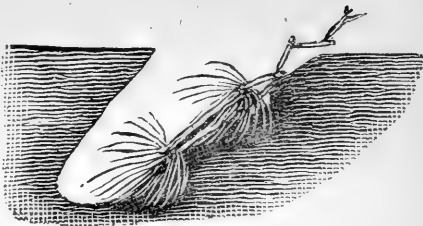


FIG. 1.

FIRST YEAR.

There is not much to be done the first year except cultivate, and keep the weeds out of the vineyard. A crop of some kind can be planted among the vines, such as corn or potatoes that can be cultivated. In the fall select the best cane and prune it back to about six inches in length, and cut all other growth away entirely. This cane should then be bent down and covered with dirt three or four inches deep and then with straw two or three inches. Finally plow three or four inches deep throwing the furrow toward the vines. No fruit should be allowed on the vines this year.

SECOND YEAR.

The vines should be uncovered about the first of May; but if the weather is warm before that time, they should be examined, and if the buds show signs of starting, they should be taken up at once. After the vines are taken up the earth should be removed three or four inches deep from around the base of the vine, and all the roots that are near the surface should be cut away.

This root pruning should be repeated every other year. The ground should be plowed again, throwing the dirt away from the vines. After this stakes six feet long should be set at each vine to train the young shoot to. All the new shoots should be pinched off except the strongest, and that should be allowed to grow till late in July, when it should be stopped by pinching off the end.

The laterals (that is, the shoot that grows from the base of each leaf) should be pinched off, leaving only one leaf; and when another lateral grows from the base of this leaf, it should be pinched off in the same way; and so on throughout the growing season.



FIG. 2.

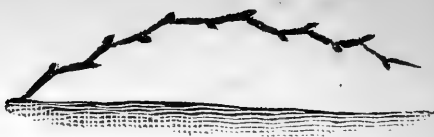


FIG. 3.

Fig. 2 shows the process of pinching or trimming the laterals. Unless extra nice bunches are wanted, the second pinching will generally be sufficient. The ground should be cultivated thoroughly during the summer. In the fall the vines should be pruned back, leaving about two-thirds of its length, and prune off all the laterals. A bunch or two of fruit may be ripened this year without harm.

THIRD YEAR.

In the spring of the third year the vineyard should be trellised. This can be done best before the vines are uncovered. The posts should be seven feet long, so that when they are set in the ground they will be five feet above and two feet under ground. They should be driven in twelve or sixteen feet apart. Four wires are required for a first-class trellis. The lowest wire should be placed eighteen inches from the ground and the others fourteen inches apart. The size of wire to use is No. 12 galvanized. The wire should be fastened to the posts with staples, leaving room for it to play, so that it can be tightened in the spring. After the trellis is finished the vines may be taken up and tied to the lower wire, all being trained in the same direction. The string used by many for this purpose is bag twine; it comes in packages of about ten pounds. Care should be taken not to tie the vines so tightly to the wire as to stop the free circulation of the sap and thus impair the growth. The vineyard should then be plowed, throwing the dirt from the vines, and spaded under the wires three or four inches deep with a pronged spade. When the shoots have grown from four to six inches, so that the difference in their vigor of growth can be seen, then thin them out, saving the strongest and not allowing them to grow nearer together than six to ten inches. As a rule, two shoots should not be allowed to grow from the same bud. When they have grown long enough to reach, they should be tied to the next wire. The laterals growing from the new shoots should be pinched off the same as the direction for the previous year. When the new shoots have grown to the top wire, they should be pinched off at the extremity.

The vineyard should be cultivated and hoed frequently throughout

the summer. In the fall the vines should be pruned by cutting these new shoots off an inch above the second bud from the base. This will leave spurs of two buds from six to ten inches apart. As the vine does not yet cover the entire space on the trellis, it should be extended to do so another year, and a strong shoot should be selected growing near the end of the vine and pruned long enough to reach to the next vine.

In covering the vine this season a little dirt should be taken from under the base of the vine on the side towards which it is to be bent down and a little ditch made about two inches deep the full length of the vine in which it can be laid. It should then be covered and plowed the same as before. Considerable labor can be saved in covering by putting earth enough on the vines with a spade to hold them down, and then throwing a furrow with a large plow, having a long mouldboard, upon the row from each side, being careful not to go deep enough to cut the roots.

Plowing spring and fall as directed with a light plow prevents the accumulation of roots near the surface, which is in many ways a great benefit to the vines. Fig. 3 shows the vine after it has been pruned at the end of the third year. The vine may ripen three or four pounds of fruit this year, but beware of overloading.



FIG. 4.

FOURTH YEAR.

Before the vines are taken out this year the trellis should be examined, and the wires tightened. The vines should be tied the same as the year before, extending the vine to fill the trellis to the next vine, by tying to the lower wire the cane pruned the fall before for that purpose. In thinning this year two shoots should be left on each spur, selecting the strongest. All the rest should be broken off, and the new cane that was left to extend the vine should be thinned the same as per directions for the year before. When long enough the new shoots should be tied to the wire, and the laterals pinched off, and this should be continued throughout the growing season. The vines should not be neglected till they have grown long, but should be tied up and the laterals pinched as soon as they have grown enough to do so, as it is injurious to the vine to take off a large amount of foliage

at one time. When the shoots have reached the top wire they should be pinched off; the stems of green grass are used to tie the shoots; about five strands to one tie. In pruning this year spurs of two buds each should be left the whole length of the vine at a distance of six or ten inches apart. In selecting spurs on the part of the vine where spurs were left last year, a shoot should be selected growing as near the main vine as possible and two buds left on it, and the old spur should be cut just above the new one. Fig. 4 represents the pruning of the spur this year. Cover the same as before explained. This year the vines may safely carry eight to ten pounds of fruit, and after this, as a mature vine, it should bear ten to fifteen pounds yearly; but look carefully to the thinning of the fruit in the early part of the season, to prevent crippling the vine by overbearing.

The after-training of the vines is substantially the same as given for the fourth year.

RENEWING.

In renewing the vine on account of a vacant place on it caused by the lack of shoots to make spurs, a strong shoot should be selected, to be tied to the lower wire in place of the old vine, and the old vine should be cut off just beyond the selected shoot. Spurs should be grown on this cane as directed for the third year.

GATHERING FRUIT.

When enough fruit has been ripened, the vineyard should be gone over and the ripe fruit gathered. Fruit should never be gathered that is not thoroughly ripe, as a grape raised in Minnesota that is not wholly ripe is sour and not fit to eat or market; so, in order to please the buyer and to obtain a ready sale and a good price, do not pick anything but ripe grapes. In picking grapes, care should be taken to handle the bunch as little as possible, as it will rub the bloom off the grape and injure the looks of it. The best basket to pick the grape in is the ten pound air-tight basket with a light cover. After the baskets have been filled, they may be brought to the alleys, covered and loaded. This is one use of the alley; the other is to facilitate the handling of straw in the fall.

COVERING OF MATURE VINES.

The vineyard should be covered with earth every fall, as before directed; but in heavy clay soils, after the vines become mature (about

the fifth or sixth year after planting), the covering of straw may be safely omitted. At this time the roots have acquired sufficient size and maturity, and have penetrated far enough into the ground to be able to withstand the cold; and the roots near the surface that would have killed have been kept down by the plow. In a lighter soil a greater amount of protection is required.

Mr. Pearce from the committee on Prize Essays on Orchardring in Minnesota presented the following:

Your committee on the best essay on Orchardring in Minnesota report that there were three essays submitted. One by Norton F. Brand of Faribault, aged 18 years; one by Edgar D. Sias of Minneapolis, aged 18 years; one by Edwin Deacon of Rochester, aged 26 years. As the latter was not within the requirements of the Society as to age there were but the first two considered, and the committee award the prize to Norton F. Brand.

M. PEARCE,
J. M. UNDERWOOD, } Committee.
E. H. S. DARTT.

ORCHARDING IN MINNESOTA.

By Norton F. Brand, Faribault.

Mr. President and Gentlemen of the State Horticultural Society:

Being freed from school by our recent vacation of two weeks, and seeing your offer for a prize essay on Orchardring, I thought it a good chance to make my vacation pay. I am an inhabitant of Rice county, outside of the most favorable localities for fruit growing. Ours is the third district for apple growing so far as natural advantages are concerned. I cannot boast of age, but have had some chances to learn, having been brought up in a nursery and orchard, and have had the benefit of experience for the most of my life, which began eighteen years past. I also have had many advantages in getting information from periodicals. We now take of papers that treat of the subject whereof I write, *The Farmer, Farm, Stock and Home, Western Rural, Prairie Farmer, New York Tribune*, and frequently obtain others. I am now glancing through a year of the *Country Gentleman*, in which I find some good items to sustain my strong points. We also have the

Horticultural Reports from the beginning of the Society, and some from other states of the Northwest.

To begin with, to make orcharding pay, take as many good papers as you can afford to, and keep informed on your business. Don't leave out your State's papers on this subject. To get an orchard up to bearing size in such a way as to profit by it after it begins to bear, is the greater part of the work, so the most of this paper will be devoted to that branch of the subject.

LOCATION.

First. Select your site. Anything is better than sand. The best soil, however, for our hardy apple trees, is a deep loam or porous clay subsoil, a subsoil composed of yellow, red or blue clay, mixed with either large or small limestone is one of the best. But as you already have your land on which you are to plant and cannot escape using such as you have, you can perhaps better its condition. If the subsoil be sandy or gravelly, dig a hole one foot deep and three to six across, for each tree, and fill with rich loam and clay marl. If old boots, shoes or bones be handy, cast them into the hole. Bones contain much lime, either phosphate or carbonate, and both are important to plant life and growth. Lime is a large constituent of the bark of apple trees. If your subsoil be a cold, retentive blue clay, that will hold water and not more than three feet beneath the surface, you must plow it in such manner as to get about four feet of good soil above the clay, with a drain four to five feet below the surface. This drain may be constructed by plowing from the place where the drain is wanted, two or three times, then sink your plow down in the dead furrow as deep as possible for two or three bouts. Shovel out the earth loosened in the bottom of the dead furrow, then dig a trench one spade wide. You will now find yourself from four to five feet below your land surface; fill the trench with broken stone and gravel. These drains should be twenty-five feet apart. If preferred, tile can be used instead. Remember this, however. So prepare the ground that the tree will get four feet at least of good, friable soil, above the underlying clay. Now sow broadcast manure, lime and ashes. The drains should have descent sufficient to prevent standing water. Now plow towards the drain three or four times, making a ridge over it on which the trees are to be planted. I have now described what I hold the best preparation of ground for our two poorest fruit-tree soils.

Next if your soil be a dry, clay ridge, or a timbered ridge, make a large hole and fill as for sandy land. If a good loam soil on porous

clay subsoil, deep plowing and harrowing will be all the preparation required. If the surface soil be sandy, on clay subsoil, prepare as for gravelly subsoil; and in after cultivation add fertile loam with manures to the surface.

Don't be afraid of wet soil, if it be underlaid with a porous, limestone clay subsoil. Some of our best Dutchess are where we can get water within four or five feet, and they bear our largest and best colored apples. The extreme dryness of our climate requires that the tree get a very large amount of its moisture from the soil.

Prof. Budd says that in some of the dry localities of Russia fruit growers water their orchard by a system of irrigation. This last Autumn my father visited the oldest orchard in the Northwest, that at St. Joseph, Mich. He tells me that the trees are 109 years old, and are still producing good crops. About all left of this orchard is the lower row of trees—near the water, and only four or five feet above the St. Joe river at low water mark. They have been submerged at times to a depth of eight feet.

Again, in our neighborhood, in 1884-5, Dutchess on sandy clay, and gravelly subsoil were nearly all killed. But none were killed or even seriously injured on moist clay subsoils.

To further sustain my position I will introduce to you some of the experienced writers of the *Country Gentleman*. One who signs himself D. S. B., from Washington county, New York, says: "I am led to believe that the cause of the death of many trees is too little moisture in the soil during the severe winters. Lands long cultivated in the usual manner become incapacitated for retaining moisture as they formerly did, and in some way this affects the tree in cold weather. * * * Even in our wood lands after a dry autumn and severe winter many trees die wholly or in part, the following spring and summer. Fifty years ago our best orchards were on our driest hills; now they are on our cooler moist loams and slate hollows, and yet we see seedling trees growing and bearing abundantly in the fence corners, and depressions on dry hills where snow drifts accumulate in winter, and where the soil is always more moist. * * * One orchard of two hundred trees set eighty years ago on broken land—are all dead, but those on the lowest, moistest soil, and these bear in spite of a half century of neglect."

B. F. Johnson, Champaign, Ill., says: "Try the experiment of giving a few fruit trees the benefit of a thorough wetting of the roots before the winter sets in. The advantages are: a soil saturated with water does not freeze so hard, or the frost injure the roots of trees as

much, as a soil that is dry." Mr. Johnson mentions experiments that he has made, watering trees Autumn and Spring with wonderful results, and adds: "Few persons recognize the fact that the roots of the pear and apple love water (but not standing water) almost as much and as well as the orange." He mentions pear trees in Colorado large and healthy in earth so saturated with water as to kill the grass. Speaking of the enormous crops of apples on Duchess and Wealthy in Colorado, he adds: "The essential element of success here was water — an abundance of water — and wet feet from April to October." In another article on an orchard in his own county, he says: "Of an orchard planted between fifty and sixty years ago I observed three or four apple trees remarkable for their size and vigor and laden with fair, smooth and (for their quantity) large-sized fruit. Curiosity being excited, a closer inspection was made and it was found that each one of these trees had one or more hog-wollows under it. The site of the orchard was originally moist, if not wet, and close to the creek's bank. If the largest and most valuable of our timber trees grow best in a soil wet six months of the year, and moist twelve, why not the apple?"

In further support of my position I refer you to a report in your last volume of transactions, in which mention is made of an orchard of three hundred trees in Northeastern Iowa, set in 1865, and described as follows: "Many of the trees are from ten to fifteen inches in diameter and twenty to thirty feet in height. * * * The soil a rich black muck and so saturated with moisture that the lower edge of the orchard is a springy bog."

In the *Gardeners Monthly* of 1884 I read: "It is well known that trees endure a much lower temperature in moist atmospheres than in dry ones."

Our esteemed friend Mr. Harris has always advised rich, moist land for an orchard site. Facts are what count. I have given the facts.

The old Wolf River is growing where its roots were in water at certain seasons. An old seedling mentioned by E. Wilcox, of Trempeleau, which once bore twenty bushels in a year, stands on low ground, near a marsh.

If you have no water near your orchard site, and have slopes or hillsides, if the soil be all alike, the northern slope will contain the most moisture, and on that account be best for the ordinary farmer, who is apt to neglect it too much. A north slope with high, thick timber at the north end is not so good as where the orchard does not extend to

the bottom of the slope, leaving a long, open descent below, thus affording a free circulation of air to the orchard.

Let us emphasize the fact that all kinds of trees grow very much alike on all kinds of slopes, all other things being equal, such as soil, protection from wind, sun, fire, etc.

VARIETIES.

Having got ready to plant, if for profit and you live west of a line running between Lake Pepin and Rochester, take my advice and of the varieties of apples now to be had plant nothing but the Duchess of Oldenburgh; when you are able to get the Itasca and Peerless, plant them. If you plant for home consumption, plant five Tetofskys, twice as many Duchess, five Wealthy, and of crabs and hybrids two Early Strawberrys, five Transcendents, five Whitneys and three Meader's Winter. These are the three best apples and four best crabs of thoroughly tested varieties. There are other hardy crabs, but bearing so little as to be unprofitable. The Tetofsky will not bear much, but are early and good. The Wealthy will bear considerable fruit, if cared for as I am about to direct.

PLANTING.

Secure sound trees not exceeding three years of age and with good roots. A tree grown in Minnesota one Summer from the graft, cut back to the ground next Spring, making a growth of three and a half feet that Summer, healed in the ground that Autumn, is a good tree to plant; or a well-grown, perfectly sound tree two or three years old and having no scars on its body where limbs have been trimmed off. See that the bark be perfect. Be sure you buy of a Minnesota nurseryman, and one that does not pretend to be doing an immense business. He may be doing so much that he knows nothing of your little order and trusts it to Tom, Dick or Ole to fill.

If you plant to raise apples to sell, either plant root grafts, three grafts eight inches apart where your tree is wanted, or else buy selected one or two year old trees. Be sure they are dug in the autumn. A tree that stands out through a Minnesota winter, except it be a winter like 1887-8, is not fit to be transplanted in the spring. To get your trees home safe be sure that they are well wrapped up root and branch as soon as they come into your hands; secure them from wind, frost, and sun; keep the roots moist until they are planted; see that the bark and roots be not bruised in any manner, for in our rig-

orous climate a little bruise will work much damage to a tree. Should there be any bruised cover with wax, the preparation of which I will mention further on.

In planting apple trees plant early in the spring, as soon as places can be dug for the roots. It is very important that the tree should get a good healthy growth the first year, so that it may start life with a good reputation. This is as necessary to a tree as to a man. If the top makes a good growth the root will also. Plant early so that the ground will be settled and the roots ready to lay hold of the ground at the first opportunity. Unless the soil is wet by recent rains use plenty of water, so that the soil will be so thoroughly wet that the earth will settle around every fibrous root. One advantage in the use of water is that the soil settles immediately, without waiting for rains which may be long delayed.

Plant each tree so that the top of the root will be about six or eight inches below the level after the loose earth settles. In light soil, 10 to 12 inches. Frost and air penetrate sandy soil deeper than heavy soil, and the mechanical action of air with frost is very injurious to the roots of trees in dry soil. Set each tree leaning slightly toward the 2 o'clock sun. If you use water in planting do not fill the hole quite full of earth. The next day fill in with soil without water and press it down firmly. Then throw about three inches of loose soil on top. The roots of each tree should be straightened to their natural position; the ends of each bruised root be cut smooth with a sharp knife. Nothing but well pulverized soil and water should be used in planting the tree. If the tree has branches place the longest and heaviest branch to the southwest side of the tree; keeping in mind that the top of the future tree must be more than half on the south side of the trunk. The tendency of a tree in this climate is to grow toward the northeast, and you will be obliged to keep a sharp lookout every year in order to direct the growth of the tree's center and south limbs, by cutting back the north limbs. It will be sometimes necessary to drive a stake and tie the leader and largest south limb to it, in order that it may be started in the right direction. Remember, that strict attention to these little things is often the dividing line between success and failure.

Why do we wish the tree trained toward the southwest? Because the unbroken rays of the sun shining on the body and forks of the tree is one of the most injurious things that can happen to it. And the easiest and cheapest way to prevent it is by making the top low and thick on that side. Five minutes work on each tree now spent in

shaping the top will save a great amount of labor in setting up boards or constructing other protection during the ensuing fifteen years. A stitch in time saves nine applies with ten-fold force in this place. Shape the top low, three feet is high enough, trim every year for four or five years in June, then you will cut only wood of the same years' growth and leave no wounds.

PROTECTION.

Plant trees, if Dutchess, sixteen feet apart, north and south, and twenty to twenty-five feet apart the other way. Cultivate the ground often during the early part of the season, stirring the soil to a depth of six inches until the twentieth of June or first of July, then mulch with refuse hay, straw, cornstalks or like material. This should be spread about the tree to a distance of four feet from the trunk to keep the ground cool and to keep down weeds. The object is to make the trees grow all they will during the first part of the season. If the soil is not in good condition add well rotted manure in late autumn as a mulch. Ashes strewn broadcast over the ground in early spring will be very beneficial.

The first and second autumns after planting remove mulch from contact with the tree, throw a mound of clear earth not less than six inches high around each tree. Then wrap the body up with rye straw, cornstalks or gunny sacks. And let it remain on till the last of April. This is to keep the sun from injuring the bark during the winter and spring; and it is all important in keeping the heart of the tree sound. Every autumn thereafter until the top shades the body set up boards in September to keep sunlight from reaching the body of the trees, or when you wish to give the tree especial care put on bark from poles peeled in May or June. For this purpose use poplar, elm, butternut or white birch. Fasten this on and leave it until the next May. Now do not plant an apple tree unless you are willing to do this. If you neglect to do so until the top is large enough to shade the trunk, the south side will be injured. Then there can be but little growth on that side, and the top will incline toward the northeast and give still better opportunity for injury from the sun. Few think it is the heat of the sun which kills our trees off, but it is to a large extent. My father informs me that he saw in 1873 a number of pear trees protected from the sun on the previous winters, and that came through all right, while those exposed to the sun were killed. Of course they would not have been killed if the cold had not been extreme, and on the other

hand the others would have been killed if the sun had shone on them.

It is my opinion that the sun injures the bark and cold injures the wood of a tree. We have many trees shaded by evergreens, the wood of which was entirely killed by the winter of 1884-5, but their bark is as green and healthy as ever.

Here let me refer to an article in the *Farmer*, of Oct. 21, 1886, by C. Gaylord. He says: "Our Fameuse are all dead, or nearly dead, except one. This now appears in fair condition. This I attribute to the tree being set close on the north side of a picket fence some twelve feet high. It has strong, hardy roots, properly grown from the stem of the tree." The article was written on "Fruit Trees on Their Own Roots."

In reply to the same in the *Farmer*, Nov. 25, 1886, we read: "First. A fence twelve feet high affords considerable shade to the ground immediately north of it, which shade prevents the evaporation of moisture from the soil, and the trees standing in the shade of the fence had the necessary amount of moisture to enable it to withstand forty degrees or more below zero, inasmuch as the frost was taken out of the body of the tree while in the shade. Second. Had the fence been taken away before the south side, or any part of the tree had thawed after the intense cold of that winter and the frost had been taken out by the sun, the tree in question would have gone with its fellows, even had it been on a hardy root." The same writer, a Mr. Brewster, further says: "The second great factor in the killing of trees is a lack of sufficient moisture in the soil to enable the roots and leaves of the trees to properly perform their functions in storing up in sufficient quantities those elements which enable it to withstand extremes of heat and cold."

I think he takes a right stand. Sunshine in winter and spring, roots in dry soil, with the aid of cold, kill our trees. Cultivate the ground among the trees for four or five years. Raise small fruits (beans or potatoes), but not corn, since corn shuts out the wind and causes the intervening soil to become too hot. Add as much fertility to the land as the crops extract. Use short whiffletrees when cultivating or plowing, and never let a whiffletree touch a tree. Don't allow any kind of crop to grow within six feet of a tree, but stir the earth around the trees often, and five or six inches deep, for four or five years. The feeding roots will by this time have extended eight or ten feet in all directions, and cultivation must cease. A good mulch to a distance of five feet from the tree will now prevent growth about the tree and be better and cheaper than further cultivation.

FERTILIZERS.

Lime is one of the chemical elements of the apple tree, and unless your soil has it in abundance, it may need some by the time the trees begin to bear. Some soils, if very sandy, may need a pound of sulphur to each tree, sown broadcast with lime and harrowed into the soil, alkali being necessary to render the sulphur soluble. Crabs and Wealthys will be most benefited by its use. Iron scrapings from a foundry buried in the soil six to ten feet from a tree are also valuable. You don't know what your soil may lack. Bury dead animals four to five feet beneath the surface and not nearer the tree than six feet; provided the orchard is not above or near your well. Don't expect to get much fruit without adding fertility to the soil. If there is grass in the orchard, mow it and allow it to remain for mulch.

If you have apples for sale, pick by hand and take to market in baskets in a spring wagon if possible. Make poor apples and crabs into cider vinegar rather than try to sell them on a full market. If you have a large supply of Duchess on hand keep in an ice house till you have a market.

Farm, Stock and Home says: "Success in farming is the result of proper business methods." The same holds true of fruit growing.

Ours is a windy State, and apples are liable to be blown from the trees in summer. A windbreak is needed the nature of which will depend on the location of your orchard. In our city of Faribault our heavy winds in summer and autumn are from the west and south. If your location admits of it set two rows of European larch one hundred feet from your orchard. Twenty feet outside of them plant two or more rows of evergreens. Use Balsam Fir, White spruce, and White or Scotch pine. If you are in a very windy part of the State, plant two rows of white willows twenty feet apart ten rods from your orchard; inside of these fifty feet plant two to four rows of evergreens.

On account of the infinite variety of locations and slopes it is hard to lay down any arbitrary rule for protection; and the planter must fall back on his own good sense, if he has any, and adopt means to ends; ever keeping in mind that fruit trees need lots of air and room; the closest protection on level should be on the south side; and that drifting snow must be guarded against, by stopping it outside the orchard.

Last summer while canvassing west of the Big Woods I saw many orchards entirely ruined by the drifting of the previous winter.

Nothing but stumps left. This was because the windbreak was too close to the trees.

PROTECTION FROM RABBITS.

Rabbits are a fruitful source of annoyance to a young orchard. To protect the bodies of trees set laths or split staves around the bodies of the trees, and tie the tops fast to the tree by means of a cord. But it is often the case that the snow is so deep that rabbits can walk among the branches of the trees. If such be the case they must be trapped, poisoned or otherwise destroyed. Rabbits are easily caught in figure 4 traps. Bait the trap with a sweet apple. Then catch him. Now proceed to eat him. But the easiest way to destroy them is by the use of poisoned fragments of sweet apple placed on sticks a few inches above the snow. This is very effective. The animal in question is usually found beside the apple or outside it.

Borers sometimes do considerable damage in the vicinity of poplar and hickory timber. They are hatched from the larvæ deposited by a beetle during the summer. The beetle splits the bark from three quarters inch to an inch and a half in length, and deposits the eggs under the edge of the split bark. The scratch will resemble that made by a cat. An experienced eye will detect the scratch at once. They are generally to be found on the upper part of the trunk or lower half of the large limbs. There will generally be from four to eight eggs under the bark. Take the back of a pruning-knife and draw down over the scratch, pressing hard on it. You can hear the eggs crack distinctly. If unmolested the eggs will hatch in about ten days from the time when they were deposited. The little fellow begins to eat at once, and its presence may be detected by pellets of dark colored sawdust exuding through the bark. An examination will discover one or more little worms at work under the bark. Either cut them out at once, or drown them by holding a large rag over the spot, and pouring on it warm soapsuds for ten minutes. If the borers have been at work for some time, there will be some dead bark. Remove this, and then take a wire and probe the holes you find there. Generally the wire will reach and kill the worms. After killing the borers be sure and wax the wounds over.

CODLING MOTH.

To the orchardist expecting to realize money from his orchard, to know how to overcome this prevalent and destructive pest is of the

utmost importance. So great are its ravages in Illinois that the loss from its depredations is estimated at nearly five millions of dollars annually. The means of overcoming it are simple. Take a 50-gallon barrel; into it put 32 gallons of water; add one-third pound London purple, or one-fourth pound Paris green. These poisons should be thoroughly dissolved in water before adding. With a force pump and hoze and nozzle made for the purpose, spray the trees affected, using about one pail of the poisoning mixture to a tree. This should be done directly after the falling of the blossoms, and then again in two weeks, or before the little apples hang down.

When the trees grow old, pigs are a good thing to keep among them. For aphids or green lice on the new growth, boil up tobacco stems, and while the liquid is warm dip the affected limbs in and keep immersed for a few seconds, and repeat in two or three days. Very strong warm soap-suds will answer.

Trap and poison pocket gophers.

OLD ORCHARDS.

Now I will address a few lines to the orchardist who already has an orchard or a part of one.

If you have some old, sickly trees of Duchess or Wealthy, cut all the sickly limbs from the Duchess about two feet from the trunk or main branches, cover the wounds with wax, wash the bodies well with hot soap suds or with a whitewash made as follows: put into a barrel one peck of lime and two pounds of sulphur; pour onto the mixture four pails of warm water; stir till well mixed. Wash the trunk and large limbs of the tree with this while hot, using an old broom for the purpose. Manure them well to a distance of from four to ten feet from the trees. Cut your old Wealthy off at the ground and let new branches spring up. In four years you will have good bearing trees. Save the seeds from the largest and latest Duchess apples. Plant them and care for the young trees that grow from them.

Grafting wax may be made as follows: Melt one pound of white resin very slowly; take from the stove and stir in one tablespoonful of turpentine. Then with constant stirring pour in alcohol slowly until the mass is about as thick as syrup — about five ounces of alcohol to one pound of resin. Another wax is: tallow, 1 ounce; beeswax, 1 ounce; resin, 2 ounces; melted together. Always wax a wound as soon as it becomes dry. In using this wax in cool weather, keep in a bucket of warm water.

And now, my friends, what more can I say? If my article is long, I don't see how I can leave anything out without injury to my subject. That part relating to varieties does not refer to most favorable and favorable localities. I will add that if you are seeking a location for growing apples with the greatest success, go into Eastern Winona or Houston county, and in the selection of your varieties for planting be governed by the advice of the Hon. J. S. Harris, of La Crescent.

Learn how to graft from an expert or from any of the good farmers' papers, which you will take if you expect to be a good fruit-grower.

Mr. Latham, from the Committee on Prize Essay on Strawberries and Raspberries, reported that papers were presented as follows: By Miss Lulu E. Danforth, Northfield; Miss E. Bessie Vandervort, Mankato; A. N. Wilcox, Hastings; John Lyons, Minneapolis; S. A. McHenry, St. Charles; R. A. Pierce, Minneapolis.

They award the prize to Master A. N. Wilcox, age 18.

STRAWBERRY AND RASPBERRY GROWING IN MINNESOTA.

[By *Archie N. Wilcox, Hastings.*]

STRAWBERRIES.—HISTORY.

The strawberry derives its name from the Anglo-Saxon "strahen," or "straw"—to scatter, as applied to the berry from the straying or scattering habits of its runners.

Its geographical range extends over both continents, from the frigid zones to the equator. The first allusion I have found to its garden culture is about A. D. 1480.

In the play of Richard III., Gloucester says: "My lord of Ely, when I was last in Holborn I saw good strawberries in your garden then; I do beseech you, send for some of them."

A hundred years later there was a garden in Holborn, then the most aristocratic part of London, among whose products four kinds of strawberries are mentioned.

Lord Bacon says: "As we have housed the exotics of hot countries, lemons, oranges, and myrtles to preserve them, so we may house our natives to forward them; and thus have violets, strawberries and peas all winter."

This idea of hot-house culture seems to have been adopted to some extent, for Switzer, writing in 1724, informs us that strawberries and cherries have been forced by bottom heat from time immemorial by the London market gardeners.

Early in the seventeenth century the strawberries from Virginia were introduced into both France and England, but do not appear to have thriven to any great extent, for in "Langley's Pomona," published in 1729, only three kinds are mentioned.

Others were introduced about this time from Chili and Surinam, one of which, the "*fragria grandiflora*," has been reckoned by botanists as a distinct species.

Their wholesome and medicinal qualities have always been highly approved, and no less authority in the botanical world than the great Linnæus recommends them for the cure of gout, and attributes his cure from that disease to the free use of strawberries.

Old Dr. Parr, when on his death bed at the age of 120 years, it is said, exclaimed: "If I can only live till strawberries come," and seemed to think that their presence was the one thing needful to effect his cure.

While highly approved, but little progress was made in its culture until within the last half century, during which time it has been developed from the small, sour fruit of our fathers into the sweet and delicious "ideal of the epicures" and often made to attain the weight of a quarter of a pound and more.

SOIL.

With its wide range of habitat and extended list of varieties, the strawberry will succeed on any good, rich or well-fertilized soil, and if the right kinds are chosen, seems equally at home on light sand or strong, tenacious clay. If we wish to plant on clayey land, we must look carefully after the drainage; for we must avoid excess of water as well as drouth. Yet the strawberry will thrive, especially on sandy land, with an amount of moisture that would prove disastrous to many other cultivated crops.

Rev. E.P. Roe says: "Though we give our strawberry plants everything else they need, our crop of fruit will still be good or bad in proportion as we are able to maintain abundant moisture during the blossoming and fruiting season." If this can be attained by irrigation or in any other way, then we may look for the best results from a given outlay on a light, sandy, easily cultivated soil. We must not allow the long hot days of June to check the growth of plant and fruit

at a period most critical in the proper development and perfection of the crop.

With this precaution and with such varieties as are best adapted to such locations, with the Crescent, alternating with the Chas. Downing or Countess as a fertilizer, the ordinary market grower will be most likely to succeed; or, if a single variety be preferred, perhaps there is nothing that has yet been thoroughly proved that is more likely to give satisfaction than the old Wilson. One of the greatest recommendations of this light soil, and why I like it best, is its easy cultivation; for we can certainly tend two acres during the season as easy as we can one on a strong, wet clay.

Soils are like individuals; every one possesses a distinctive character of its own unlike every other, and I am willing to admit that the largest and best crops of strawberries I ever saw grown without irrigation were grown on a moist, heavy soil underlaid with clay. To succeed with this, however, we must use an entirely different system of cultivation, and instead of matted rows use hills and grow strong, vigorous varieties like the Jewell and Sharpless, or Manchester and Mount Vernon, that will form a large number of strong fruit crowns from a single root.

VARIETIES.

When the Wilson strawberry was introduced to the public some 30 years ago, in its primitive vigor, it so far surpassed all other competitors in the good qualities necessary for an ideal market berry, that it fairly revolutionized the business of commercial strawberry growing; but with old age its vigor declined, and it must now yield to its younger rivals the leadership it has so long maintained. Of the varieties suitable for the climate and soil of Minnesota, which it is safe for the large growers to plant with reasonable assurance of success, (always remembering to plant the perfect flowering variety, as often as one row in four among the pistillates,) I would recommend the Crescent, a large, conical, scarlet berry, of good quality, hardy, vigorous, and healthy, and very productive, (season middle of June,) but with the fault of berry rather soft, and a pistillate or obtuse staminate blossom. Manchester, a large, round, conical, crimson, firm and good late berry, (season the last of June,) with pistillate blossom and liable to rust. Mount Vernon, a large, round, conical, scarlet, bisexual late berry, of good quality, steadily growing in favor where best known. Season last of June. Countess or Downer's, medium, round, conical, scarlet, very good bisexual, of firm texture, hardy and vigorous.

Season middle of June. Sharpless, a very large, oblong, conical bright red, excellent berry, liable to grow coxcombed; plant bisexual; strong and vigorous; needs hill culture and protection against spring frosts.

Of the new varieties many are very promising, and seem destined to surpass everything that has gone before. But when we remember the great cry that has accompanied the advent of so many that have proved disastrous failures, we should hesitate to commend any of them, except to amateurs for use in an experimental way. To such I would say, try the following list, some of which I shall test for my own satisfaction: Jessie, Jewell, Alpha, Arnold's Pride, Cornelia, and Parry. Alpha for early and Cornelia for late will extend the ripening season for six weeks or more.

CULTIVATION.

To grow a crop of strawberries alike pleasant and profitable to the grower will require the most careful attention and thorough culture at his command.

For most varieties the matted row system with judicious thinning is best, while some like Sharpless, Jewell, etc., will not succeed except in hills.

For matted rows prepare your ground as you would for an onion bed, smooth and fine, as early in the spring as possible. Mark your line by running a red string through it every eighteen inches, drawn tight across one edge of your field, close to the ground for the first row. Prepare your plants by thoroughly cutting not more than one hundred at a time, and if your ground is full of cut worms a little Paris green in the water will make itself manifest. With a small boy to drop a plant at every mark, then follow with a trowel and set your row about three inches from the line. Remember to spread the roots as much as possible, and press the dirt very firm around them. Draw your line for the next row four feet from where it was before if early in the spring, or three and one half feet if later, and repeat the operation. In this way it is an easy matter to set an acre a day, and the plants will thrive better than in any other way.

The after culture will consist of keeping the ground clean of all weeds and grass with the cultivator and hoe, and as nearly level as practicable, continue this until about September first, when they should be properly thinned and left entirely alone for the formation of fall or fruit roots, on which will depend the abundance of next season's crop. After the ground is well frozen apply mulch for winter protection,

and rake it between the rows in the spring if there is room for it there, if not remove the most of it, and they will need no more attention until time for picking.

After picking is over it will sometimes pay to harrow the field and clean it out for another crop, but this is generally a poor policy, and the better way is to plow them under and plant the field to some other crop.

Good plants for another field may be obtained by thinning the first year's growth before the field has ever borne fruit; but never take them from a field after it is exhausted by the production of a crop. We must always select some bisexual variety that will blossom at the same time when we plant the Crescent or a pistillate flowering kind for the main crop.

PICKING AND PACKING.

The cost of picking a large field of strawberries will be about one and a half cent per box for the pickers, besides the necessary supervision. Furnish each picker with a carrier holding four or six "Hallock" quart boxes, and have them returned to the packing house as soon as full, to avoid exposure to the sun. See that they are picked clean, and, if the rows are wide and thick, place two pickers, one on each side. See that the berries are picked, not pulled, from the stem and handled carefully to avoid jamming. Pack in sixteen or twenty-four quart crates, which can be procured, with boxes of the best white wood, from Michigan for about twelve cents for the sixteen quarts and seventeen cents for the twenty-four quarts.

HILL CULTURE.

For hill culture, which is essential to some of the large kinds, we may use primary plants, which may be obtained from your plant beds about the fifteenth of July or the first of August (which should be entirely independent of your fruiting beds) by cutting away all the fruit stems as soon as they appear in spring. Set these about sixteen inches apart each way, and cultivate thoroughly not later than September 15th. Cut away all runners. Mulch after ground freezes, and leave it where it lies in the spring, except to clean a small place over the crown of each plant, and the result will often prove a pleasant and profitable surprise to the grower.

PROFIT.

With a good location, suitable soil, thorough culture and intelligent

management, the pomologist may reasonably hope for a crop of three or four hundred cases per acre, providing everything is in the most favorable condition. Anyhow, he may enjoy the pleasure of anticipating an immense crop of mammoth berries as a reward for his efforts. But if the drouth comes in June, or unseasonable rains, or worms or bugs destroy, and he secures but one hundred, he may still feel that he has done better than his brother who grows wheat at sixty cents or corn at thirty cents per bushel.

RASPBERRIES.

Blackcaps (*Rubus Occidentalis*), European Red (*Rubus Idæus*), Native Wild Red (*Rubus Strigosus*).

The first of these species includes all our native blackcaps, whether black, purple or white. They propagate themselves by rooting the tips of the branches of the current season's growth, and not from root cuttings or suckers. The two latter species perpetuate themselves from root cuttings or suckers, and are distinct varieties. There is a small class of hybrids, originated by cross fertilization between these two, which may be produced by either tip-rooting or suckering. Of these the Caroline alone is worthy of cultivation.

The common name of raspberry is derived from the stahan *rasp*, probably because of the roughness of the wood. In Italy it has been cultivated in gardens since the time of Paladine, a Roman agricultural writer of the fourth century. The name "rasps" is still used in Scotland. The best varieties of blackcaps for general cultivation in this climate, are the Tyler or Souhegan for early, and the Ohio or Mammoth Cluster for late berries. Doolittle is good when young, but loses productiveness with old age.

With a desirable location and adequate winter protection, the more tender Gregg or Hillborn, or Shaffer's Colossal, will amply reward the extra pains its cultivation requires. Of the red kinds, I would place the Turner at the head of the list, followed in the order named by the Cuthbert, Marlboro, Brandywine, Thwack, and Philadelphina. Of these, the Turner, a medium, round, bright red, early variety of excellent quality, a strong grower, hardy and productive; and the Cuthbert, a large, round, crimson, firm, late variety, good quality and productive, but less hardy than the Turner, I would alone recommend for general use.

Raspberries will thrive on almost any well-drained soil of moderate richness, but wet land is always injurious and often fatal to them.

Plant in late fall or early spring, in straight rows, seven feet apart, with bushes three feet apart in the rows. If planted late in the spring, the tender shoots are liable to retard future growth. For the first season give clean culture, and, if desirable, other crops may be grown among them without injury.

Mr. Harris, from the committee on prize essays on blackberries and dewberries, and currants and gooseberries, presented the following report:

The committee to whom was referred the essays, written by persons under 25 years of age, upon the subjects "Blackberries and Dewberries in Minnesota," and "Currants and Gooseberries," would respectfully report that they have carefully examined the essays on the above subjects, and made the award according to their unbiased judgment. We find three competitors for Blackberries and Dewberries, and have awarded the Society's prize of \$25 to Master Burton T. Wilcox, age 16 years. The paper is well written, and is practical as well as clear in its description of methods of propagation, planting, cultivating, protection, training, picking and marketing. We congratulate the author upon the good fortune of being "born (not made) a horticulturist," and trust that he will meet with such pleasure and success in the pursuit of horticulture that all thorns shall bear roses, and briars bow their fruit-laden heads to him.

We also recommend that the essay of Miss Edith A. Kellogg, of Janesville, Wisconsin, which is also an able and valuable paper, be published in our volume of Transactions, and that the Society do extend to her a vote of thanks, and elect her an honorary member of this Society for the term of five years.

We find only one paper on Currants and Gooseberries, written by S. A. McHenry, age 23, and report that he is entitled to the prize offered by the Society of \$25.

J. S. HARRIS,
A. W. SIAS,
WILLIAM LYONS, } Committee.

GROWING BLACKBERRIES AND DEWBERRIES IN
MINNESOTA.

By *Burton T. Wilcox, Hastings.*

SPECIES.

High Blackberry (*Rubus Villosus*). Dewberry, (*Rubus Canadensis*).

Both these species grow abundantly in the wild state all over the United States south of latitude 45 degrees, and are the parents of all our cultivated varieties. Stems three to ten feet long, pale green to dark brown color, and covered with strong, sharp prickles; does best on rocky or sandy soil in a wooded region; flower racemed, long, with short bracts; fruit oblong or cylindrical; high blackberries, strong and erect canes; dewberries long, low and trailing in habit.

Some hybrids have been successfully produced by cross-fertilization between these two species, whose descendants have proved our best market berries. But the difficulty encountered here by the fruit-growers of Minnesota is in the want of hardiness, characteristic of both parents. Still we may hope, when our worthy pioneers in pomology have devoted one-half the energy and effort to produce hardy varieties of blackberries which they have given to the equally tender apple, to see them successfully grown in every county of the State.

The blackberry and dewberry are so near alike in the requisites for their successful cultivation, that I shall consider them together in a general way in the notes which follow.

With its wide geographical range the blackberry seems to thrive upon almost any kind of soil, and will resist drouth better than any other of our small fruits, and my preference for a moderately light sandy soil would only be because in such a location it could be much easier cultivated, especially when laying down for winter and would be more likely to fully ripen the young wood before the frosts of winter came upon it; still the Snyder will often lose its foliage on sand. When you are choosing a location bear in mind the fact that a field of blackberries well established will continue to improve for many years, and select just what you wish to use permanently for that purpose.

Plow deep, even subsoiling will pay, and work fine as you would for a premium crop of corn. Then mark in straight rows seven feet apart, and set three feet apart in the row, be sure to spread the roots when setting and press the dirt very firm about them. Set full as low as the plants formerly stood, and you will have little difficulty

about their growing. Early in the spring is the best time for setting, before young shoots start. If you wish to plant potatoes or beans among them; it wont hurt them as bad as a crop of weeds.

When the canes have reached a height of two feet the first season, or three and one half feet afterwards check the growth of the main stems by pinching back, or if they get the start of you, cut them back to the desired height. This will cause the formation of lateral branches and give much better results than it will to allow a tall and unchecked growth.

The best way I have ever seen to do this is to walk on each side of the row with a long sharp butcher knife, strike quickly right and left at every sprout that shows its head above or outside your ideal row. This is a much faster as well as better way than the old style of pinching back with the thumb and finger; and it enables you to keep them as even and handsome as a well turned hedge row.

As soon as picking is over remove all the old wood by cutting close to the ground, and at the same time thin if necessary to what you desire for your next season's crop, four or five good strong canes in a hill or one in six inches if grown in a row is better than twice as many. After the old wood is removed one good thorough cultivation of the ground is all that is necessary, as we wish to check the growth in time to harden the wood rather than induce a late and tender fall growth.

If this part has been well done, the ground made smooth and mellow, and the canes properly thinned, it will greatly facilitate the next operation, which is the most important of all to the successful culture of blackberries and dewberries in Minnesota.

While the strawberry and raspberry are generally hardy, and will sometimes return good for evil, rewarding their owners for their neglect, the blackberry is far more tender, and naturally grows as an undergrowth among the trees somewhat protected from the influence of our prairie zepthers. So while some hardy varieties with small berries, and more like the type of their wild ancestors will stand our climate fairly in favorable locations, we must not expect our better varieties to do so, and our only safety lies in regarding them as tender, and giving them all the winter protection possible. I would rather risk the tenderest blackberry with a good covering of dirt than the hardiest without it.

Pinch back between two and three feet high to increase the growth of lateral branches, and stop cultivation in season to harden the wood before freezing weather. In spring prune laterals to one foot in

length, and if injured cut back to sound wood. And here I might say take no risk of losing a crop by winter-killing when they can be so easily saved by covering over, the same as the blackberry. We may rest assured they will pay by extra yields for all the extra labor, even if it is not necessary to save the crop. As soon as convenient after the bearing season is over, cut out all the old wood and the new shoots to four or five inches in each hill, always bearing in mind that all raspberries are perennial, and that we must lay the foundation for the next season's crop by securing a vigorous growth of healthy shoots at this time. Besides, a careful pruning now will greatly assist in the after culture and winter protection.

We cover by removing several inches of earth from one side of the hill, so that the plants may be bent over by bending the roots, and then cover the whole plant with earth. This must not be done until or near freezing weather as possible, and should be removed early in the spring. After lifting them in the spring, cultivate shallow but thoroughly. The best mulch to guard against drouth is three or four inches of fine, loose, easily stirred soil. When the time for picking arrives, gather as often as once in two days, and pack directly in the boxes in the field when picked. For blackcaps, use quart boxes and 16 quart cases, and for red, pint boxes, and 24 pint cases, and market as soon as practicable after picking, as they are never better than when first taken from the bushes. Crates will cost, with boxes, 12 or 14 cents each. There is probably no branch of horticulture that pays better for a series of years than a good field of raspberries, as they are a comparatively sure crop, besides always bringing a fair market price, as their soft natural condition and rapid deterioration prevents our southern neighbors from filling our markets with hundreds of carloads in a season, as they often do with the firmer strawberries and grapes.

In conclusion I would say, while I have worked with great pleasure in our berry fields, and enjoy both their cultivation and the opportunities for study they afford, yet this is my first, and I fear my last, attempt to describe our various operations. Besides on every page I find, on reading it over, that I have omitted many things which time and limited space will not permit me to rewrite and describe. Therefore I will close by wishing prosperity and extended usefulness to all the members of the Minnesota Horticultural Society, hoping when my school days are over to be worthy to sit at their feet and learn wisdom from their councils.

We cover the canes late in the fall as possible before freezing weather, and it may be done by one man, or what is better, by two

working together. It is always desirable to lean all the bushes in a row in one direction, and this is done by thoroughly loosening the dirt, and moving two or three spades full from the side we want them to go; then place a fork on the opposite side, and as you press them over place your foot on the canes next the ground so as to press them all together, and avoid breaking by binding them in the roots and below the surface of the ground; fasten the tops down with a shovel-full of dirt, then press down the laterals and cover thoroughly from root to top with two or three inches of dirt.

Some varieties, like the Wilsons and Dewberries, of low, slender habit, cover much easier than those of larger and more woody growth. Some leave the latter after fastening the tops, which may do in favorable seasons, but large fields of Lawtons left in this way last winter in Michigan were killed when they stuck out of the ground by a hard freeze when there was no snow over them.

In the spring, gently lift the top of the bush from the ground with a fork, and after shaking off the dirt, leave it in its leaning position for a week or ten days, during which time it will gradually assume a more erect attitude; then go through the field with shovel and shears, placing the bushes erect in line with a little fresh dirt at their bases, and pruning away all injured or superfluous wood, and you will have a field that will gratify the eye of an artist and the taste of an epicure, as well as the avarice of the owner.

Keep your field clean and cultivate fine until the first blossoms appear, and they will be better to be let alone until after picking is over, unless it is necessary to stir the surface lightly to counteract the effects of drouth, in case of which constant cultivation will often save the crop. The best mulch known is to have four inches of finely pulverized soil all over the top of the ground.

Blackberries should be picked two or three times a week after they begin to ripen. This is best done by a picker on each side of a row, armed with a carrier and six quart boxes each, and will usually cost about one and a half cents a quart, or one half the cost of strawberries and raspberries.

Pack in sixteen or twenty-four quart cases and they are ready for market and will ship five hundred miles or more in perfect condition.

Twenty-five years ago there was but one prominent variety, the Lawton, in cultivation; this long remained, like the Wilson strawberry, far in advance of all competitors, but with the present stimulated interest in pomology several newer varieties promise to supplant it in popular favor. Among these — the most hardy and best adapted

to the soil and climate of Minnesota, besides possessing many of the good qualities desirable in a market berry — I would recommend Snyder, Taylor and Ancient Briton, for a succession from early to late, as likely to succeed as any I could name. Stone's Hardy is small, but well liked in some places. Western Triumph is hardy, and that is all the good I know of it. But if God should decree that I should pass my life in Minnesota, I shall endeavor to grow the Wilson's Early, Wilson's Junior and the Lucretia dewberry, as the largest, earliest and best of all the blackberry kind. Still they are all tender, and knowing they are tender we propose to take care of them. Who would think of succeeding in dairying if they left a herd of fine Jersey cows to "rustle" for themselves through the winter around a straw stack.

The best plants for setting may be obtained from root cuttings by dividing the roots into sections of two or three inches in length and planting in soil the spring before we want to use them. These make roots freely if the soil is moist and pressed firmly around them, and are far preferable to plants obtained from suckers in an old bearing field. If you are obliged to buy them, they will cost from \$3 to \$10 per 1,000, standard varieties.

The profit of blackberry culture depends entirely on our success in protecting them through the winter; for they have no insect enemies and but small liability to disease to cut short the crop. Yet I well remember how a fine field of the "ironclad" Taylor, which my brother and I rented last year in Michigan, failed to give us a single case; and our Western Triumph were no better, while our "tender" Lautons and Wilsons, that were laid down on both sides of them, were very fine.

I have known the Snyder, which is best adapted of all kinds to a heavy, strong soil, to produce as high as six hundred cases of sixteen quarts each per acre, but one-half of this is a large yield under the most favorable conditions, while fifty cases was more than the average last year in Michigan.

In exposed locations on our prairies, where the wind would be liable to break over the bushes and injure the fruit, we may protect them by sticking posts about thirty feet apart in the row, and drawing a wire on each side, tight, about two feet above the ground. One of the wires can be easily removed when we want to lay them down; or the dewberries may be trained to these wires. But these precautions may be unnecessary if we trim back more, and make a low thick bush, instead of a taller and more slender one.

Blackberries must not be neglected at any period of their cultivation, and the beginner will derive more satisfaction from a small field well cared for than from a much larger one if it is allowed to get the start of him; for of all slovenly and unprofitable fields a lot of unkempt and neglected blackberry briars will take the prize.

BLACKBERRIES AND DEWBERRIES IN MINNESOTA.

By Miss Edith A. Kellogg, Janesville, Wis.

What varieties of blackberries are best adapted to culture in Minnesota? Have we any variety hardy enough to bear well in Minnesota without winter protection? No. The best varieties for culture are Ancient Briton, Snyder and Stone's Hardy. I should plant Snyder for early, Stone's Hardy for medium, and Ancient Briton for late. I would prepare the ground by plowing deep, manuring heavily, forty to sixty loads per acre, and thorough cultivation. Have the rows eight feet apart, and the plants three feet. Keep them in hills, and do not allow them to spread over the ground. Keep all the suckers down if you want choice fruit (this is easily done with a horse and cultivator), and pull out where they grow too thick. Do not allow over five canes in a hill. All blackberries should be protected in this latitude. A spadeful of earth may be removed on one side of the plant, binding the plants down till the tops touch the ground; then fastening down with a little earth, and covering with dirt, marsh hay or corn fodder; or even coarse manure will answer the same purpose where there are no mice. Remove the covering in the spring as soon as freezing weather is done. Raise them up with the fork, and press the dirt firmly with the foot on the side where it was removed in the fall, and tie to a wire stretched on posts, two and a half feet over the row. Work the coarse manure well in under and about the bushes; this serves the double purpose of choking weeds and grass, and keeping the ground moist during the scorching days that, as a rule, are to be expected in August. Pinch the new canes back to about three feet and three and a half feet in June and July. This causes them to branch out. Do not prune the laterals, for if you do, you will cut off the part where our best fruit grows. Take off nothing but the top of the upright cane. The cost of covering is from six to ten dollars per acre. Some think that it is better to place a trellis on each side of the row, and the wires about two and a half feet from the ground, and stakes twenty feet apart. One wire on each side is sufficient. Dew-

berries require the same culture and care as blackberries. The best varieties are Lucretia and Bartell's Mammoth. Cover with marsh hay, and in spring tie them to a single wire eighteen inches above ground.

CURRANTS AND GOOSEBERRIES IN MINNESOTA.

By S. A. McHenry, St. Charles.

Currants and goosberries though not the most valuable of fruits have their places to fill as well as the strawberry and the more delicate fruits.

They are natives of this country, and are generally found on damp, heavy soil when growing wild. As they by nature have chosen a damp heavy soil it would be well to give them a similar soil when planted for cultivstion. When such a soil is not to be had, much may be done to insure success by deep plowing, subsoiling, and by an abundance of mulch around the plants throughout the summer. Currants and gooseberries require a great amount of nutriment, and should receive an annual dressing of some heavy compost in which muck, leaf-mould, wood ashes and cleanings from a cow stable are largely present. The best time for transplanting the bushes is in the fall any time after the wood is ripe, but if set very early in the spring nearly the same results may be obtained. They should be planted in rows four feet by six. By planting this distance they may be cultivated both ways.

A hoed crop may be planted between the rows the first two years. The plants should be set about two inches deeper than they stood in the nursery row. If two year old plants are set, fruit in paying quantities may be expected two years from time of setting.

After the first three years they will require less cultivation and more mulching. They may be trained in either the bush or the tree form, but if fruit alone is the object the former method is best and is most natural for the bushes and requires less labor. If for ornamental or other purposes the tree form is desired it would be well to train them so from the cutting, by removing all but the top bud from the cutting at the time of setting. Young wood produces the best fruit. The old wood should be cut out as soon as it begins to show signs of weakness and bears fruit of inferior size.

One great advantage of currants and gooseberries over most small fruits is that they may be left on the bushes for some time after they are ripe, but when so left they do not ship as well as when promptly

attended to. They are sometimes picked in quart boxes but are generally handled in baskets of larger size. Currants should be picked in bunches and shipped on the stem. If torn from the stem the skin is broken and they soon decay.

PROPAGATION.

Currant and gooseberry bushes are easily propagated by cuttings and layers. Cuttings are best cut in the fall during the month of September. They are made of the last year's wood and should be about eight inches long, and should be planted at once in a rich moist soil, and the ground pressed firm about them.

Only one bud should be left above ground. Before the ground freezes in the fall the cuttings should be well mulched with stable manure.

Cuttings may also be cut in the spring or may be cut in the fall and tied in bunches and buried or kept in moist earth in the cellar, but they do not root as well set in the spring as when set in the fall.

The following paper was read by Mr. Brand:

THE APPLE.

WHAT MAY WE REASONABLY EXPECT FROM IT IN MINNESOTA?

By O. F. Brand, Faribault.

For the purposes of this article the subjects of cultivation, pruning, location and soil are each too comprehensive to be more than incidentally alluded to.

ORIGIN.

That the common apple is as old or older than the human family there is little room to doubt. Aside from Holy Writ apples are mentioned by Theophrastus, Herodotus and Columella. The latter, who wrote in the early part of the first century, describes three methods of grafting as handed down to him by the ancients, as well as a fourth method of his own. Philip, the elder, who wrote a few years later than Columella, said: "There are apples that have ennobled the countries from which they came, and our best varieties will honor their first grafters forever; such as took their names from Matius, Cestius, Manlius and Claudius." Speaking of apples at Rome, he

wrote: "There were some trees in the villas near the city which yielded more profit than a small farm." Thus, in those ancient times the introducers of a new apple were esteemed honorable among their fellows, and their names will go down to remote posterity as benefactors of their race.

AMERICAN APPLES.

The introduction of the apple into our country dates back to 1629, when seeds brought from England were first planted. On April 3, 1632, Governor's island, in Boston harbor, was granted to Gov. Winthrop, on condition that he should plant thereon a vineyard or orchard. Many of the first trees grown from seeds in Massachusetts lived to be more than two hundred years old. From this date we find that an effort to raise apples was made by nearly all the pioneers of our country, and their efforts were nearly always crowned with success.

The oldest orchard in the West of which I have any knowledge is at St. Joseph, Mich., just across the lake from Chicago. They consist of less than a dozen trees on the banks of the St. Joe river. The seeds from which these trees grew were planted by an Indian trader named Burnett, in 1776. The best of these trees, which are now a hundred and nine years old, stand less than two hundred feet from the river, and not more than four feet above its level. They are still productive.

In Wisconsin apple seeds were among the first things planted. In 1839 G. De Neven planted apple seeds near Fond du Lac. They soon came into bearing, survived the severe winters of 1842 and 1856-57, and were bearing large crops when I last saw them, in 1869.

The success of these seedlings encouraged all to plant apple trees, and that county became famous for its large crops of fine apples. I paid a visit to that locality last fall. But very few of the trees set from twenty-five to thirty-five years are left, and they are Duchess, Talman Sweet and Seeknofurther. The best old trees are now on moist land. The Duchess is alive everywhere.

In stating what our expectations of the future of apple growing in this State are, and what they are based upon, I will say that we must be careful that we interpret correctly the lessons of the past—experience in the history of apple growing in our country and especially of the last 35 years. The lamp of experience is a safe guide if made to reflect the united wisdom of millions of people through hundreds of years.

IN WINONA COUNTY.

We will now review the history of apple growing in our State. In the fall of 1851, John Shaw, of Exter, Maine, gathered by the aid of his neighbors from ten to twelve quarts of apple seed. He arrived at Minnesota City in the spring of 1852, and after having selected a piece of land prepared a piece of ground in the timber for his apple seeds. He only lived to see the seed come up, and his dying request was that the trees should be divided among the members of the colonial association to which he belonged. This was done; enough to plant a large orchard being kept by the widow. All the farms in the neighborhood had enough for a good orchard, when the seedlings had attained sufficient size. Here is the first record I can find of the beginning of apple growing in the best fruit district in our State. It is recorded of this lot of trees that their product in one year was between five and six thousand bushels.

In the fall of 1871, traveling as a member of the committee *Ad Interum* for this Society, I visited the original orchard of the widow of Mr. Shaw and found about three hundred trees in heavy bearing, bringing in a handsome income. I think it was in that year that it bore 600 bushels. I am told that some of the trees were very productive up to 1884-5. Taking it for granted they began to bear when seven years old, we find they were in bearing twenty-five years. Is there anything discouraging about that? Now let us investigate the ancestry of the seeds from which these trees sprung. In an article by Henry Little of Maine, written in 1853, we find among one hundred and forty varieties mentioned the apples grown there were largely Sops of Wine, Maiden's Blush, Gravenstein, Hubbardstons, Nonsuch, Rhode Island Greening, William's Favorite, Ribston, Pippin and Baldwin. He says the Duchess was first brought there in 1847; it is very unlikely that its seeds were among those secured by Mr. Shaw.

If such results as those above mentioned can be produced by the use of such ill-adapted means, what may we not expect from seedlings grown from our own hardiest of all acclimatized apples, the Duchess de Oldenburg?

In the fall of 1871, as before mentioned, I visited many orchards in Winona county, which were of the best grafted varieties, set from 1856 to 1860. In numerous instances I found trees bearing twelve to fifteen bushels on a tree. Among the many I will mention those of our old friend and co-worker Hon. Norman Buck, who raised that year nearly 300 bushels; Hon. C. F. Buck, 200 bushels; G. W. Clark,

250 bushels; Orion Clark, 200 bushels; Mrs. Mary A. Campbell (formerly Mrs. Shaw), 600 bushels; M. K. Drew, 300 bushels; S. Bates, 300 bushels; W. R. Stewart, 400 bushels; L. Thomas, 600 bushels. These were mostly tender Eastern varieties. In one orchard I saw five trees from which the owner told me he had gathered one crop of 100 bushels, worth \$150.00. A good record for a climate where we "can't raise apples." These trees were alive and bearing in 1873.

IN HOUSTON COUNTY.

I visited the same fall several orchards in Houston county, and the great quantity of fruit on the trees astonished me. In the orchard of our friend Harris I was shown two trees from which one crop sold for \$44. They were St. Lawrence. His Talman Sweets were bending under an enormous load of apples. A few trees of that variety gave him 40 barrels that year and over 200 bushels the year following, that being the ninth year in bearing. Here also I saw that grand apple (but very tender tree) Jersey Sweet in bearing, and many others too tender for other portions of the State. Price's Sweet, only six years planted, bore two barrels to a tree. Is there any other portion of the United States that could do as well? He raised twenty barrels of Northern Spy in 1872. In our section the Spy has never blossomed.

Now let us reason together. If the same causes that killed this orchard for Mr. Harris also killed trees down in Central Illinois, Indiana and Ohio, why is it not reasonable to conclude that that portion of our State is as valuable for growing apples as the the other states mentioned?

In 1867 I traveled on foot all over Houston county once and a large part of it twice, and have been there a good many times since up to 1876, and I state now what was my opinion when I was among the orchards there in 1876: that if all the good orchard sites on a strip ten miles wide from the mouth of the Zumbro river to the Iowa line, in the eastern part of Winona and Houston counties, were devoted to apple growing in a businesslike way, the people of our State would have no need to send outside of our borders for apples.

The orchard of Mr. Harris was indeed a wonder for a State like ours, where but a few short years ago Mr. Lo held undisputed sway. Let us figure the sum realized from his Talman Sweet and St. Lawrence. They began to bear well about 1864 and bore their last crop in 1884. The two trees of St. Lawrence paid him about \$200 net, besides the fruit used from them in his family; they were in bearing each alter

nate year for sixteen years. We can plant ninety trees to the acre, the trees standing about twenty-four feet apart each way. At that rate the crop of each acre would be worth \$1,125. Talman Sweet also began to bear in 1864 and bore full crops each alternate year up to 1884, some of the trees being still alive. Mr. Harris thinks 1,000 bushels a low estimate of the total yield. These sold for about \$1,200, or \$120 a year for each bearing year, or an average of \$6 per tree. At that rate an acre would produce \$540 each bearing year, or \$270 per acre for the whole time.

THE "ORANGE BELT."

In these times of pension vetoes, chintz bugs, sixty cents a bushel for wheat, no more free passes on railroads, and the tariff likely to be taken from wool, are not St. Lawrence, that pay over \$500 a year, and Talman Sweets, that pay \$270 per acre a year, as good as anything we can go into, provided we live in Houston or Winona county — the orange belt of our State?

Another small tract at Reeds Landing and along Lake Pepin is also favorable for fruit growing. Here there is always or nearly so open water. Pear trees bore three bushels on a tree at Reeds Landing in 1867, and the crop from two trees sold for \$100.

Let us now leave the "orange belt" and go back north and west where the fierce winds coming from the treeless, arid plains of the bleak Northwest, destitute of moisture, blow scorching and withering in summer,—pitiless and enervating to all vegetable or arboreal life in autumn, winter and spring. Here we find apples also, but less varieties; the hardiest list from the orange belt lived in many places up to 1873, but the quantity of fruit produced, except in a few instances, was not sufficient to give much encouragement to the planter. Many varieties which seemed hardy in tree up to 1873 did not seem to form hardy fruit buds. The one notable exception being the Duchess of Oldenburg. A few other varieties were more or less fruitful in very favorable seasons. This great district has localities in it more favorable than others. Such as can be found along the Mississippi river, extending back in places thirty or forty miles; and also along the southern tier of counties west from Albert Lea to the State line. In this district not only do the Wealthy and Duchess look better than in a large part of the State, but there are some old Golden Russets to be found and a good many seedlings planted as long ago as 1863, are still in fair condition. This region extending to Blue Earth county on

the northeast and up to the high land north of Lu Verne, is of somewhat different formation and climate. It is in fact influenced more by the Missouri than the Mississippi valley. The Ben Davis stood very well in 1884-5 at Sioux Falls, right at the west end of this district.

I am led to this view of the matter also by the further fact of so many old seedlings standing so well all through this region, while in the counties northeast, such as Rice, Le Sueur, Scott and others, the seedlings were nearly all killed in 1872, and the remainder, with but one exception, completely annihilated in 1884-85; the one exception being the orchard in which the Peerless stands. That southwest portion of the State, together with the river portions above mentioned, not included in the first district, we can call district No. 2, and reasonably expect it to produce apples that cannot be grown in the larger portion of the State.

Over the rest of the State south of the forty-fifth parallel, and in some localities above that, the Duchess, or anything equally hardy, can be grown with great success by any one who will inform himself how to plant and care for trees, and then give them the same business-like care and attention that insures success in any honorable pursuit in life.

IN RICE COUNTY.

In the fall of 1855 Franklin Kelly brought with him a lot of apple seeds from New Hampshire and planted them on new land that fall. They began to bear in 1863 and bore well ten years, bearing a single season 150 bushels. The total crop in the ten years was 800 bushels; it was on a southern slope on the prairie near the city of Northfield. No grafted varieties except the Duchess have done as well under similar conditions, and it killed out in 1872-3. The seeds came from a section where they raised nearly the same list they did in Maine; such as Early Harvest, Grauenstein, Astrachan, William's Favorite, Spitzenberg, Baldwin, etc. From such ancestry we could hardly have expected more.

In our locality are to be found good Duchess trees that have stood twenty-five years and are still very productive. We have seven trees of Duchess set in spring of 1867. I believe they are good for twenty years more. They stood so close together they could not bear well. I cut out a number of them last spring. We never lose any Duchess, although we have lost nearly all the Wealthy and hundreds of trees of

other varieties. We now have about four hundred Duchess in orchard, and last spring set about five hundred more. Duchess will become still hardier if we propagate from our best and healthiest bearing trees, and it may be deteriorate by being propagated from feeble young trees. It needs a plentiful supply of moisture in the soil. The most of those that have died in Minnesota have become enfeebled either from lack of moisture to enable them to make a perfect and healthy growth, sunscalding of the body when exposed to the winter sun before the bark had become rough, or from being left in the fall with a clean, cultivated surface around the roots. Duchess needs a low, large, spreading top on the south and southwest sides. With such a top, soil reasonably moist and the roots protected with a thin mulch in the fall, it will not be injured. As long ago as 1872 our friend Harris put himself on record saying apple trees will grow any place where water stands within two feet of the surface.

The unusually wet fall of 1886 taught me a valuable lesson on soils and conditions of soils for apple trees. The latter part of September and first half of October was extremely wet. I then had one hundred and twelve seven-year-old Duchess on some very moist timber land. I said to myself those trees will show a yellow, sickly leaf next summer and undoubtedly will die from a wet root. The summer found them with a fair crop of fruit and a vigorous, healthy leaf and growth, and notwithstanding the ground was so wet in April and May, 1886, that we could not get onto a part of it till very late, they bore a fine crop of fruit, and are now models of health and vigor. They stand on a western slope with ground descending gradually to the south and west for a mile.

The past two summers I have seen *thousands* of good, healthy bearing Duchess trees scattered through all of the following counties: Rice, Steele, Faribault, Waseca, Le Sueur, Redwood, Lincoln, Lyon, Sibley, McLeod, Scott, Dakota, Carver, Ramsey and Goodhue. I am firmly of the opinion that before the close of this century we may reasonably expect to supply our own market for apples of its character with our own productions. In the summer of 1886 Duchess apples were so plentiful in our market that they sold as low as fifty cents a bushel for a few days, and some were sent to other points. The trees are now being planted largely.

FALL AND WINTER APPLES.

As we have now been informed where our summer apples are to come from, where shall we look for our fall and winter apples. I an-

swer, we must look to the seedlings of the Duchess of Oldenburg. Why? Because its trial of thirty years in the unfavorable localities of this State prove it to be more nearly perfect in its adaptation to the requirements of our rigorous climate than any and all other varieties. Among the very first large orchards planted in the State was that of the late George Dorrance, of Rice county. This orchard consisted of several hundred trees set about 1857, as I am informed by the oldest settlers. The varieties seemed to include almost the whole list of popular Eastern sorts—among them the Pippins, Seeknofurther, Wine Sap, Fameuse, Swaar, Talman Sweet, Golden Russet, and, fortunately for us and the future citizens of the Northwest, there were of those that lived to bear six Duchess. The site of this orchard is in the town of Walcot, Rice county, in the extreme eastern edge of the Big Woods. It consists of a bench and hillside on the east, the top of the bench being about forty or fifty feet higher than the meadow or slough land east of it. In an early day there was timber about sixty rods west of the orchard. The soil is a marl or clay—a soil on which the Duchess does not live as long as on a rich alluvial soil on clay subsoil. In 1867 sixty-four trees bore thirty bushels of fruit. In 1867 the Duchess bore very heavy crops, and a large number of the other varieties were in bearing that year. From this crop of Duchess apples G. J. Miller, a neighbor and relative of Mr. Dorrance, living on the prairie two and half miles distant, sowed and planted a large lot of seeds and raised more than two hundred trees. I saw the trees in 1875, several of them bearing well; six of them are still alive and bid fair to live for years. Many of those that died in 1884-5 bore a great many large crops of fruit, and proved to be profitable. Of those still alive, one of them named "Itasca" has always, from 1875 to 1886 inclusive, borne enormous crops of apples. In size and color about like Rawles Jannet. In flavor rather poor, but somewhat better than the hardiest of the new Russians. Its season is October and November. In productiveness the Itasca is the equal of any tree of its size I have seen in the State.

Another tree is almost a reproduction of the Duchess, and about ten days later. Two others are worthy of mention, but I omit them. The best of the lot is the Peerless, which by a vote of this Society last winter was pronounced the best seedling apple known. I bring the Peerless up, and offer its achievements in evidence, to prove my claim that as the parent of a class of apple trees perfect in their adaptation to the wants and requirements of our climate the Duchess has no equal.

It must be remembered that these seedlings are in an unfavorable

locality. They are out on the broad prairie, remote from water, and one hundred miles northwest of the best fruit-growing part of the State; the soil a black prairie loam. Here the Wealthy trees were all killed in 1884-5, and out of thirty Duchess trees planted the same spring with the apple seed (1868), and a good many planted since, only four or five trees now remain. Now, all of these seedlings being later in season than Duchess, the Peerless keeping in good condition till February, is it not reasonable to conclude that by a proper system of selection trees may be produced that will bear apples of long-keeping qualities?

I have now planted in orchard about seventy-five trees of selected Duchess seedlings. I undertook to begin this business in 1873, after the previous winter had swept away nearly everything in my locality except the Duchess. That summer I had seen in the orchard of our friend Norman Buck, at Winona, two good bearing trees standing apart from the rest of the orchard; one was the Rawles Jannet, and the other was Duchess. It occurred to me that here would be a good chance to get a cross combining the ironclad constitution of one parent with the flavor and keeping qualities of the other; but the Duchess blooms earlier than the other, so, to obviate that difficulty, I made arrangements with Mr. Buck to mulch the Duchess well on the snow, so as to retard its blooming to correspond with the Jannet. I was then to have the crop of Duchess apple seeds, for which I was to pay him \$10. He did the mulching, but the hens went up, either while he slept or at some other time, and scratched it away, and our experiment failed.

NEW RUSSIANS.

My attention was then diverted to New Russian apples, and for awhile expected great things by a shorter cut than seedling apples, not knowing that we were simply repeating an experiment that had been tried in Europe before I was born, repeated in this country in the first half of the present century, and that as the result of those trials the Duchess had been handed down to us as the best of all.

Outside of professional nurserymen it is hard to find a single tree of New Russian apples, although hundreds of thousands of them have been sold and planted since 1873 up to 1884. So general was their destruction that out of three hundred and thirty varieties sold our friend Pearce offered to give \$5 each for every tree that could be found alive in 1886. In my section some of them live, but don't bear fruit. I have a tree fourteen years old on which I have never seen but one

poor little apple. I have a sample of the wood. You will see this wood looks all right. I have several varieties but little better so far as productiveness is concerned. My observations have not been confined to my own grounds or locality. I have traveled extensively, and with my eyes open. Surely, our experience has been great enough and costly enough to decide us against a further trial of New Russians.

Of the origin of the Duchess we are not told. In 1882, when Prof. Budd was at Kazan, on the Volga, he wrote that he had doubts about its being a full-blood Russian, although he saw a large list of its type. It seems to me that he was at those northeast points too late in the season. It may be that if he did see the trees, he did not recognize them under their changed condition. Kazan is about five hundred miles east of Moscow, and half way between the Caspian sea and the Arctic ocean; eleven degrees north of St. Paul, and nearly at the extreme northern limit of apple-growing in that direction. But, irrespective of its origin, it has proved to be the most valuable tree known on this or any other continent for us to raise a race of acclimatized seedling trees from. In 1882 that old Western pomologist, F. R. Phoenix, wrote for this Society an essay of about 6,000 words on "Hardy Apples From Seed." The article was ably written throughout, but the gist of it, as applied to us, was: "Raise your apple trees from seeds of Duchess." His views were warmly indorsed by Harris, Dartt and Gibbs.

About twenty years ago Col. D. A. Robertson, at that day the most eminent authority in the State, advised me to go to raising seedlings from Duchess, and, although we have had the world, the flesh and the New Russian apples to contend with, we have made some advance.

Our friend Harris has often advised us to raise seedlings. Our president in his last annual address said: "Should we not rather seek for hardy varieties among our own native seedlings?"

That great and good man, pre-eminent in pomology, the late Marshall P. Wilder, writing upon this subject, said: "The immense loss to American cultivators from the importation of foreign varieties * * * suggests the importance of raising from seed native sorts, which in most instances possess peculiar advantages. I am confirmed in the opinion that the best means of producing new and excellent varieties suited either to general cultivation or to particular localities, is to plant the most mature and perfect seeds of the most hardy, vigorous and valuable sorts, on the general pathological principle that like produces like. The skillful agriculturist saves the best seed of his various crops and selects the best animals from his herds for breeders.

Why should not this law of reproduction regulate the practice of the pomologist as well as of the farmer? * * * Our object is not to controvert the opinions of those who believe in the running out of varieties * * * but to enforce the importance of raising new varieties from seed."

Fellow members, the lessons of the late war taught us that fearful repulses like Cold Harbor and Chicamauga will precede final victory. We have *met* our Cold Harbor and Chicamauga, but athwart the darkness of defeat, to those of us who with faces toward the foes which have confronted us, the star of hope shines brightly and victory is just ahead.

"No waters can swallow the ship where lies
The Master of ocean and earth and sky."

All we need now is faith and perseverance. The prospects to my mind have never been so bright as they are now. If we read aright the lessons of the past and are guided by their teachings there will be no more failure, and the pomology of our State will be placed fully abreast of the advanced progress of the age.

Mr. Brand also placed on file the following correspondence:

LETTER FROM NORTHFIELD.

NORTHFIELD, Jan. 10, 1888.

O. F. Brand, Esq.

DEAR SIR: Your card of December 29th is received, asking for the history of my old seedling orchard. The seeds were brought from New Hampshire by my father, Franklin Kelley, in 1855 and planted that fall on land broken in the spring. The trees grew vigorously and commenced bearing in 1863, and continued to bear until we got as many as one hundred and fifty bushels in '69, and as many two or three years following.

One year I exhibited fifty varieties at the Hennepin county fair at Minneapolis and received a premium of \$10. The same fall I took the premium for cider, of which I made several barrels. I had the honor of making the first barrel of cider in Rice county, which was exhibited at the Rice county fair in 1868, I think.

My orchard continued to do well, with the loss of an occasional tree, up to the winter of— You know, when they got such a scorching that every one has since given up the ghost. I had commenced to propagate some of the best varieties, and had out about a thousand

root grafts which shared the fate of the old orchard. Although I was a member of the State Horticultural Society in those days, and attended the annual meetings with a view to "acquiring knowledge," I never found out what killed that orchard, and why I am obliged to pay my grocer twenty-five dollars every fall for a winter supply of wormy Michigan or Missouri apples.

A few of those trees were heavily mulched that fall—so much so that the ground did not freeze, others were exposed, while still others were banked with snow into the very branches a greater part of the winter.

A few varieties were superior in texture and flavor to any fruit I ever tasted from other states. Three or four varieties, although not properly winter apples, would keep till April or May.

If I have not covered the whole ground, shall be pleased to answer any questions desired.

Yours truly,
D. F. KELLEY.

NEW RUSSIANS.

FARIBAULT, MINN., Jan. 4, 1888.

Friend Somerville,

Will you kindly inform me—

1. How many trees of New Russian apples have you in profitable bearing?
2. How many bushels have you ever gathered from a single tree in one year? Name of best bearing sort?
3. How long have trees been planted?
4. How old were they when planted? Names of six best sorts in order of productiveness?
5. How many bushels have you ever gathered in a year of New Russians?
6. What is your soil and slope?
7. Are there any valleys near your orchard? How near, on which side, and how deep and wide are they?
8. Are you protected by timber? How much, and in what shape?
9. Is there water near the surface? How deep is your well?
10. Did you ever raise the Talman Sweet there, and about what year did they bear their last crop of apples?

In the interest of pomology an early reply, with the return of these sheets, will greatly oblige me.

Yours truly,
O. F. BRAND.

REPLY.

VIOLA, Jan. 9, 1888.

Friend Brand,

I will try and answer your questions as near as possible:

1. Twenty or twenty-five of the New Russians.
2. I cannot answer that question very correctly, but one tree last fall, I think, had six bushels of apples.
3. Nine years this spring, those in profitable bearing; but I have planted some each spring since. I think I have fifty or sixty varieties in my orchard.
4. Three and four years. The largest apple I raise is the Charlamoff; the best bearer is the Antonovka and Red Streaked; the prettiest apple is one I cannot name, nor could Prof. Budd. Mr. Sias calls it the Wax Transparent; a biennial bearer. Then I have the Winter Oporto. I have a yellow apple; its name I do not know, but a good bearer; fruit fair. I have Red, Yellow and Sweet Anis; trees young and shy bearers.
5. I do not know correctly, but in 1886 I think I had twenty-five or thirty bushels.
6. Hazel brush or clay soil.
7. Yes; a spring branch on the north near the orchard; timber on the west; valley narrow.
8. Yes; on the west natural timber; north, willows and burr oaks; east, willows; south, Norway spruce. All around the orchards are rows of evergreens, and some scattering trees in the orchard.
9. The spring branch runs water the year round. The well water comes in at a depth of thirty feet.
10. I have raised Talman Sweet apples, Fameuse, Golden Russet, Ben Davis, and a number of other varieties. The last crop of Talman Sweet, Golden Russet and Snow apples was raised in 1883.

My orchard is on a northern slope; clay subsoil. I pasture it with hogs in the summer, and mulch heavy each other year. By so doing the hogs and mulch keep the grass from the trees. Twenty-nine years ago I set out fifty Duchess trees. I cultivated for three years, then seeded down and pastured with hogs. I have that number of trees yet, all sound and right, and get over two hundred bushels of apples per year.

While I have great faith in some of the New Russians, I have some varieties that bear the poorest apples I ever tasted.

Yours,

WM. SOMERVILLE.

DISCUSSION.

Mr. Fuller. Mr. Chairman, I don't know that I ought to say a word in regard to this, but I have thought several times when I have been hearing these things that if a lot of boys were in here they would say "chestnuts." Sixteen years ago, when I first attended the meetings of this Society, our tables were filled with perhaps thirty varieties of apples, and we had a number of seedlings of the finest quality; and the same things precisely that were said in this essay were said then; and it was reiterated again and again that we must raise our seedlings from our hardy apples. Any of the old members of the Society know very well that we have been running down hill ever since then, as far as large apples are concerned; we have less seedlings to-day than we had sixteen years ago; we have less apples. I don't speak of this discouragingly; I always answer when people say "Are we ever going to raise apples in Minnesota?" by saying "I hope so;" I feel like still trying. But it seems to me entirely useless to reiterate, again and again, these theories, unless we can show some results for them.

Now, a year ago last fall we had some splendid seedlings at our State Fair, and I don't know when I have seen them excelled. But a few days afterwards Mr. Sias and myself went down to see the trees. Well, it shows the difference, perhaps, between Mr. Sias and myself; I may be disposed to be over-critical and to look for the faults in a thing; but as Mr. Sias would open his eyes so widely at those "splendid apples," I said, "Mr. Sias, look down here, that tree is dead." And there it was, rotten all through the sides and half the limbs; the tree was already killed.

So with all these seedlings; this Peerless seedling may accomplish something, but if it has been growing so long as Mr. Brand states, why haven't we some results from them? Let us graft it and see what it will do under other conditions, and before we reiterate it again let us have the results.

Now, there is our friend Gideon out here, who talks so hopefully; his Wealthy apple is failing. And I don't know to-day—except in our favorable points in our State—of a single apple that will stand; I know it is so at least in our section of the State. I believe in telling the truth about these things, and not deceive ourselves or deceive others with these grand platitudes that mean nothing. I believe in experimenting with these things hopefully, and doing the best we can and not saying much about it until we get a few results. [Applause.]

Mr. Pearce said he believed in the principle illustrated by the story

of the preacher who delivered the same sermon repeatedly—to continue preaching the same sermon until he got the people to “act.” The planting of seedlings had been advocated for thirty years, and when the advice was heeded they would then have fruit.

Mr. Sias said as Mr. Fuller was a Bible student, he wished to call attention to the fact that a tree is known by its fruit. The tree alluded to was Hart No. 1. On the occasion referred to the ground was almost completely covered with large, fine fruit, larger than the Baldwin or Ben Davis, and resembling the latter, and the tree was very well loaded. It was closely environed with willows and wild plums, and showed injury from blight, but was living to the very tip buds. If such fruit could be raised only on “dead trees,” he favored planting that kind. This tree had been very productive and began to bear when seven years old.

Mr. Fuller said Mr. Brand had fallen into the error of judging the good or bad character of a tree not from its hardiness but its fruit.

Mr. Harris said he had seen the Hart seedling before the last hard winter and found it injured on one side from rabbits, a plow, or some other cause, which was sufficient to destroy the Duchess or anything else. He did not consider it as hardy as some other seedlings, but had found sound wood upon it on examination after the recent hard winter, and it was somewhat hardier than Wealthy.

He could not agree with Mr. Brand that Duchess was the only Russian variety that was hardy; from the great number of varieties discovered by Prof. Budd and Mr. Gibb several could be named that were hardier. Hibernial, with Mr. Tuttle of Baraboo, was the finest of all in his orchard; the tops come out and make a beautiful tree, and he has two trees without a blemish; it is bearing well and the season is December. It is hardier and may be better to propagate from than Duchess. By growing seedlings we may hope to develop a pomology that will produce the finest fruits on the continent. The time is coming when Minnesota will have an abundance of fruit of her own, and some to supply Eastern markets. Let us test these Russians, for there may be many valuable varieties among them. He had tried over three hundred varieties to ascertain if there were any of the old varieties that were hardy. He made more money from Talman Sweet than any other one variety, but many never paid first cost of the trees.

We have had something unusual in our winters the past three or four years. The first injury to trees the season of 1884-5 was about the sixteenth of November. Mr. Lord, of Minnesota City, called at-

tention to that fact, and we examined a lot of trees and found two-thirds of them injured before there was any frost in the ground. In February and March there was a number of summer-like days when the sap came up and the thermometer again ran down suddenly to zero point, causing a further injury to trees.

Mr. Smith. Have you ever known a similar combination of circumstances before?

Mr. Harris. No. And I wanted to mention the wholesale slaughter of trees in 1872-3, when the cause of injury was root-killing. That winter Duchess and other hardy Russians on their own roots were injured more badly than native varieties.

Mr. Thompson. Mr. President and Fellow Horticulturists: I have come up here to try and learn something, but I find that your Society or the most of its members are different from ours. We should benefit by the exchange of ideas and from each other's experience. In the first place, our friend over there and several others, seem to be of the opinion that if they don't see and feel and know, and have it right in their hand, they won't believe anything. The only way to do is as the schoolmaster did with those who didn't believe in the North Pole—pound it into their heads some way or other. I am a seedling man; and here I want to quote a few sentences from the report of the pomologist, Mr. Van Deman, and from Dr. Hoskins, of Vermont.

Speaking of his visit to Arkansas Mr. Van Deman says: "One thing that interested me particularly was the large number of seedling apples of high quality; I think fully fifty varieties were shown that were entirely new. Some of these are worthy of further trial by experimenters, and a very few are described and illustrated in this report, as well as some already somewhat known."

To save time I want to read further and let you know that you have the best apple in the whole catalogue, originated right here by your own door-step. You say prove it; well, I read from what Dr. Hoskins says, along towards the last of this same report.

"But the future leading winter market apple of the cold North must surpass Scott's Winter in size and in dessert quality, and I am anxiously looking to Mr. Gideon's extensive orchards, produced under his system of crossing, for the desired apple. He has already announced a seedling of the Wealthy almost duplicating its other qualities, with a longer season, which he calls the 'Peter;' and I believe he, or some other Northwestern experimenter, proceeding on the same principle, will soon give us a Northern equal (or superior) to the Baldwin. This is alone needed to give the cold North the lead in orcharding, for it is

a well ascertained fact that the long days of our Northern summers are in the highest degree favorable to that combination of high color, delicate texture and fine aroma which sells an apple in the markets of the world. Already the Wealthy is being shipped to England from Canada with profit, and a long keeping Wealthy is all that is now required to become the leading commercial apple of America."

You want something better! Why don't you use what you have, farmers? [Laughter.] And in addition to that try experiments, every one of you. Plant the seeds of every good apple that comes in your way; save the good and discard the unworthy. If we are to produce good apples we must originate them from a combination of native seedlings and New Russians, to supply every quarter section with orchards, in Minnesota and Wisconsin.

Mr. Dartt. I don't know as I would say a word on this question only for a sort of fellow feeling I have for my brother delegate from Iowa.

Mr. Thompson. Be a little careful you don't get me into such a scrape as you did when we roomed together at Dubuque. [Laughter.]

Mr. Dartt. I would say that I have hopes with Mr. Harris of getting hardy varieties of apples, but I don't believe in these theories that we have them now. It is easy to take the ground of our friend Pearce; on the theory perhaps that a lie well stuck to is as good as the truth. [Laughter.] If this theory will win I have no doubt we will have lots of apples in Minnesota. That may be so, and perhaps I had better not say anything more.

Mr. Sias. Mr. President, I desire to say just a word of [this paper of Mr. Brand's. I notice that he gave us some valuable statistics in the first part of it. In the last part there was something objectionable, to the effect that we have nothing from the old country but Duchesses that are valuable. Let us look at that point a moment; doesn't it seem a little singular that we have imported five hundred varieties from Russia and that this is the only one among the number of merit?

Mr. Thompson. There are over 1,700 I think in Prof. Budd's list.

Mr. Sias. Yes; it seems to me very improbable that Duchess is the only valuable variety. It reminds me of the Know Nothings who wanted to put none but American born citizens on guard—a very grave mistake, indeed! We admit Duchess is of foreign birth, and it stands at the head of the list. The cut-leaf weeping birch stands at the head of the list of ornamental trees; and for general cultivation there is nothing better than the Norway spruce. We must not be too selfish, and we do not want to go from this convention leaving the

impression as the sense of this meeting that there is nothing among those 1,700 varieties that is good for anything. Let us test them a little further. We have many varieties hardier than the Duchess and there is no doubt about it. This discussion would appear much better in Southern Iowa, Illinois or Kentucky.

Mr. Dartt. If we have found but one valuable apple in over 1,700 does that class them in a very favorable light before the people?

Mr. Sias. I do not admit we have found but one good variety among that number.

Mr. Harris. I contend that they haven't had a fair show.

President Elliot. I have been very much amused to see how this paper has stirred up the animals, especially the Russians, this great Northern Bear. Brother Fuller asks the question why we are always tinkering at this seedling question. We have got to keep this thing before the people, or we shouldn't accomplish anything. Out of a great deal of brush we may find something of value. We are going to get something, and in this method, if no other, I hope we shall keep trying, and if we don't secure the object sought for this year perhaps we will in the next one. When we look at the vast territory of Russia and see how they have succeeded it should give us hope that we may be fully successful:

Mr. Smith. Mr. Fuller makes a mistake in saying we have less apples now than we had sixteen years ago. I am not an enthusiast in regard to the general planting of apple trees, but I do believe Duchess is the best of anything we have for the people at present. We have to-day more than ten times the number of healthy fruit trees in Minnesota we had ten years ago.

Mr. Dartt. No, we haven't.

Mr. Smith. In the last three years there have been more good, clean fruit trees planted than at any other stage of our history.

Mr. Cutler. I think not.

Mr. Smith. Trees that went through the winter of 1883 and 4 will be worth something. If we continue to plant, as Mr. Harris says, we will soon have an abundance of fruit, for we may not experience such another winter in twenty-five years.

Mr. Dartt. It hits us about every other winter; we got it last year.

Mr. Smith. I have talked with farmers in all portions of the State and believe we are gaining ground. I saw more than a hundred Minnesota seedlings on exhibition at fairs last fall, and there are numerous trees to be found all over the State that bear fruit and do not show much, if any injury.

Mr. Thompson. If we only have faith we shall reap.

Mr. Dartt. Faith without works is dead.

Mr. Thompson. If it wasn't for faith we could accomplish but little. We are commanded to make use of the talent placed in our hands and we must do it if we are to make our farms pleasant, beautify the country and produce healthful food.

Reports were then called for from experimental stations.

EXPERIMENT STATION AT MINNESOTA CITY.

By O. M. Lord, Superintendent.

The season has not been favorable in experimenting with seeds, plants and trees at this station.

Some apple trees that were transplanted and set carefully at the usual depth perished with drouth. Others that were set at the least two feet deep, made a good growth

NATIVE PLUMS.

Of plum scions that were set in good season and with more than usual care, not more than one per cent grew; probably owing to a violent storm of rain, sleet and snow that immediately followed the fine weather when they were set.

A quantity of seed also failed to germinate that had been exposed to frost and planted in the usual manner. The ground has not been disturbed, and they may grow next spring, but a year's time has been lost.

Ten varieties of plums were received from the Iowa Agricultural College; two from Mr. Pond, of Kasson; two from Mr. Brand, of Faribault, and a few others from localities near by, which has increased the collection here to over thirty kinds. Some of these will prove to be valuable for general cultivation; and others, particularly the Chickisaws, will be abandoned; also *Prunus Simoni*.

I would like to call attention here to the remarks of "The Farmer" upon the statement of Mr. Harris, published last spring, in regard to the hardiness of Chickisaw plums at this station. "The Farmer" assumed that the failure of one nursery to carry trees through the winter was no test of their adaptability to this climate. Mr. Harris was acquainted with all the conditions, while "The Farmer" was not. I would say that this station is not a commercial nursery, and

could have no object in jumping at conclusions. And from the fact that we have heretofore grown in this vicinity grafted and seedling apples and other fruits that have not succeeded in other parts of the State, it is generally conceded that this location is most favorable for fruits not entirely hardy. Add to this the fact that the last few winters have not been considered test winters, and we conclude that when trees winter-kill to the ground here, they are not well adapted to general cultivation when exposed to greater risk.

SMALL FRUITS.

The protracted drouth materially interfered with some of the work in small fruits, and very little was accomplished. One row of Stone's Hardy blackberry was set next to a row of Ancient Briton for the purpose of comparison. Also a row of Cook's Windom Dewberry by the side of a row of Lucretia for the same purpose.

Of grapes Iona, Worden, Moore's Early, Empire State, Massasoit, Lindley and Wilder have been added to the list. The only strawberries set for trial are Crawford's No. 6 and the Jessie.

EXPERIMENTAL WORK.

In regard to the work of experiment stations a superintendent of one of the Iowa stations writes me there is a good deal of burlesque about some of them. Query: May the same criticism, or even a more definite one, be applied to ours? If our critic should base his remarks upon what we have not done, I fear he would have a wide field of labor. If, however, he should carefully consider the difficulties under which we labor, the subject would be placed in a different light. A very few of these difficulties may here be stated as an apology, or excuse, for light work and meager reports. So far as I am acquainted with the experimenters, not one can devote his whole time and attention to the work, and if he could, the results are always doubtful, and the money value thereof (to himself) more than doubtful. We have no organized means of obtaining seeds, plants and trees to experiment with, but have been wholly dependent, so far, on our own resources. We have had no clearly defined system of work, of instruction, nor advice; and the only intimation I have seen as to what is expected of us was in a late number of *The Farmer*. In noticing the call for the annual meeting, it said: "Above all, those present will expect to hear detailed reports of operations at the experiment stations."

In appointing these stations it was understood that the Society de-

sired fruits tested, as to their quality, adaptability and hardiness, and also desired the results to be made known generally for the benefit of those who would plant; but in looking for these reports it would be well to bear in mind that for most fruits a series of experiments, extending over several years, may be necessary to establish their value. If results are given by only one experimenter there is room for doubt whether a thing may succeed or fail when tried by another in a different locality, unless all the conditions are understood in making the tests. It is therefore suggested that the Society establish some system of uniformity of work among the stations, in pairs, or among a greater number, if a larger range is desired for any specialty

EXPERIMENTAL STATION AT ROCHESTER.

By A. W. Sias, Superintendent.

Mr. President and Gentlemen of the State Horticultural Society:

We have now sixteen experimental stations and are anxious for more providing there is another man in the State who is so heavily laden with love for the business that he is willing to "work for nothing and board himself," as Brother Dartt said in reference to extending the borders and increasing the laboring force of the Olmsted County Horticultural Society. In common warfare, volunteers make the best soldiers, while those who enlist for fame or money make the best thieves. Now in this battle for the "coming winter apple" and the amelioration of other fruits, we want superintendents that will work hard for the love they bear the cause, whether paid or not, and leave the responsibility for short comings and poor work at the door of the State legislature.

Our last report shows only seven superintendents heard from. What does this mean, unless it is that it takes money to make the mare go? The majority of these superintendents are men of limited means, and cannot be expected to put much time into experimental work without a reasonable compensation. O. M. Lord struck the "key note" when he made the suggestion that the superintendent at each station be given a specialty for which he was best adapted. For instance, give the superintendent at the State University farm a branch of work that requires the deepest scientific research; O. M. Lord the development of our native plums; Peter M. Gideon to continue the grand work left by Dr. Van Mons, whose "nurseries con-

tained in 1823 no less than 2,000 seedlings of merit ;" the superintendent at Rochester would like to ape Andrew Knight (on a very small scale, of course) and so obtain a cross between the McMahon White and the Autumn Streaked, also cross the Red Cheeked, Red Anis, Antonovka, White Pigeon and Russian Green with McMahon or some better keeper. In other words to make a specialty of hand fertilization. In this way let each superintendent choose a specialty for which he is best adapted. If this plausible scheme of Mr. Lord's could be carried out the whole Northwest would soon begin to see that our experimental stations were made to perform a grand work. C. G. Patten hit the nail square on the head when he remarked: "Gentlemen, we need a Van Mons and an Andrew Knight in every state of the Northwest."

The past extreme winter, and summer's drouth, admonish us of the necessity of clinging to the Russians. This and many other generations shall pass away before they go out of date. At least our experiments point to this conclusion.

Our experience is that the Brandywine raspberry is about what we want. It stands the summer's heat and winter's cold equal to the Turner; yields better with us, and is more attractive on the market. We think it has no peer as a keeper or shipper among red raspberries. Schaffer's Colossal is very large, but inferior to the Brandywine as a shipping berry.

The Jessie strawberry has only been with us one season, but looks very promising; but as we are never satisfied short of perfection, we propose to fruit a seedling from the Jessie as soon as possible. The Manchester was one of the very best with us this year. Old Ironclad, best of the early varieties.

The Windom dewberry behaves better than the Lucretia. Shellbark hickory trees grown from seed raised on the grounds of J. S. Harris in Houston county, now two years old, are likely to stand the racket.

EVERGREENS.

The thirty varieties of evergreens on our experimental grounds, prove to us most conclusively that Minnesota, any part, is the genial clime and soil for evergreens. The Norway Maple and Sycamore have proven too tender. The Rocky mountain conifers from D. S. Grimes of Denver, Col., and from Robt. Douglas, of Waukegan, Ill., are doing finely.

The Rockford plum from C. G. Patten, is fine. Fay's currant is a

failure with us. The plants from Chas. Luedloff, Ostheim cherry, weeping willow from Europe, the new lilac, philadelphus, etc., are all doing nicely. We had a round bed of thirty or forty *Hydrangea paniculata grandiflora*'s all in bloom at one time that made a grand display.

EXPERIMENTAL STATION AT LA CRESCENT.

By J. S. Harris, Superintendent.

Mr. President and Fellow Members :

My report of the work of last year shall be very brief. I think I am making progress slowly.

The few varieties of Russian apple trees heretofore reported upon came through last winter all right. The variety I suppose to be Ostrokoff Glass, Antonovka, Orel and two or three varieties of the Anis, are making the most satisfactory growth. One tree of Anis, bore one specimen of medium size, green and red striped; quality excellent, ripe September 10th.

Have added to my list of Russian apples for trial: Yellow Transparent, Early Glass, Repka, Lords apple, Juicy Burr, Red Cheeked, Beautiful Arcad, Switzer and Vargil.

Plum trees bloomed freely but did not mature any fruit. I have added one variety of Russian plums.

Owing to the drouth and an attack of sickness when my trees needed most attention, some of them failed to live, and none of them have made a strong growth; so if they kill out this winter I shall not attribute it to the varieties, or blame the parties I procured them from. I have also added six trees, one year old, of Hotchkiss Seedling; all lived and doing well.

Russian pears did not kill out, but are not making a satisfactory growth. The same may be said of Salome apple. The celebrated Mann apple again killed to the ground and it is useless to try it longer. Have one tree of the Gideon apple; it did not winter kill but was bark burnt by the October freeze.

The Niagara grape is not doing well with me. It drops its foliage too early. Shall try it again with new plants.

I now have good facilities for conducting experimental work, and will promise to take charge of and give a fair trial to any new varieties of fruit sent to me and make impartial reports upon the same. Promising varieties of native plums are especially desired.

Thanks are due to O. M. Lord, Chas. Luedloff; Carver, Dewain Cook, and Joe Wood, Windom; S. D. Richardson, Winnebago City, and J. O. Barrett, Browns Valley, for favors received.

EXPERIMENTAL STATION AT FARIBAULT.

By O. F. Brand, Superintendent.

This station is on comparatively high timber land. The surface soil is a deep, rich, black loam, underlaid with a yellowish and blue, porous clay subsoil; soil naturally moist; exposed to west and south; protected by higher ground north and east; the valley of the Strait being less than a mile west and less than a mile south; the river being about 150 feet lower than our station.

Here we never have been able to raise a good tree or get fruit of any account from Fameuse, Perry Russet, Golden Russet, Haas, Red Astrachan, or Talman Sweet. Such early bearing sorts as Price's Sweet or Wealthy have borne one good crop as young trees and then died.

In 1877 we planted about one thousand two-year-old Wealthy which nearly all died in 1884. In 1875 we budded a large number of crab trees with Miller's seedlings of the Duchess; all of the crab trees on which we budded were killed with blight, except two Beaches Sweet; those two are fine, large trees and have borne fruit for nine or ten years. One of them is an apple a few days later than Duchess and not quite as large; less acid than the parent, but otherwise almost an exact reproduction of Duchess. An examination since the extreme cold of Jan. 21, 1888, (48° below zero), and also since the thaw which has taken place since the extreme cold, shows no perceptible injury to the wood. The original tree of this variety, now about twenty years old, is still in good condition and a heavy bearer. The other tree bears an apple very much like the Janet, and seems to be equally hardy. In quality it is third rate or about like Lieby or Hiberna, as known to us. The young trees of this variety are as hardy as Duchess. It forms a low, spreading top, similar to Leiby. We have one seedling about nine years old which bore a fair crop in 1886. The fruit is nearly as large as Fameuse, of fair quality, about a month later than Duchess; seems to be crab wood.

We also have a crab or Hybrid thirty-two years old, called the Berry, named after the originator, the late Hon. J. M. Berry of Minneapolis. The fruit is the size of Transcendent, about the same

season; handsome and better in quality. The tree is fifty-two inches in circumference and thirty feet across the top. It is a true ironclad.

We have one tree of Drake apple, top worked on a seedling crab. This tree bore more than a barrel of fine apples in 1886. The original Drake was a seedling near Northfield, grown from seed from New Hampshire about 1856 or 1857. It was dug out as worthless in 1873. Our live bearing Drake is the only one left of several fine top-grafted trees; and the reason why it is a good tree is because it is on a hardy stock, and has formed a low spreading, heavy top to the southwest, that shades the forks of the tree from the sun.

Of the Peerless apple last spring we used it to top-graft seven varieties of crab apples besides putting in a few hundred root grafts. All the top grafts made a good growth and we will be able to report upon it more fully after another season's growth.

RUSSIAN APPLES.

We received from the Department of Agriculture in the spring of 1873, sixty-five varieties of New Russian apples. Some of them I top-worked on bearing crab trees and the rest were stock-grafted close to the ground on four-year-old seedling crab trees. All of those top-grafted on bearing trees came into bearing but soon killed with blight. Some of them were on the Berry crab, above mentioned; not one was left in 1879. Of those grafted at the ground nearly all came into bearing but soon died—with blight or cold. Most of them bore fruit of a worthless character. Four trees are still alive, two of them bear a small crop of worthless apples. One bears a few very small, early apple, not so large as Transcendent; a very fair fruit for its size. The other is a very fine tree but bears only a small crop of fair-sized sweet apples. There were two fine trees of Longfield that bore a fair crop in 1882, but killed in 1884; were badly injured in 1883.

In the spring of 1883 we set out one hundred two-year-old trees received from Prof. Budd. There has not been a blossom on any one of them yet, and but few if any of them will stand this climate. At the present time they do not look as though they were adapted to this latitude.

Last spring we transplanted about seventy-five seedling Duchess into orchard rows. These trees were grown from seed saved from Duchess apples which were latest in ripening. Every tree made a good growth last season. A few months more time is necessary to enable us to see what effect 48° below zero has had on newly transplanted Duchess seedlings.

We have about thirty seedlings from Peerless, many of which show a good leaf, but they are only one year old; still it is possible that some one of them may become prominent in some future report. We have about forty good bearing trees of Tetofsky left, out of 150 grown from root grafts, set in 1870 and 1872. The greatest loss among them was in 1884. We have never lost any Duchess, and have seven trees that have been growing in our orchard twenty-one years.

We have used evergreens freely for protection and windbreaks, hundreds of which are more than thirty feet high. We strongly recommend the use of evergreens around every farm home. White Spruce, White Pine, White and Red Cedar, and on moist or clay soil the Balsam Fir. The Norway Spruce is not desirable in the windy prairie portion of the State. The Scotch Pine is valuable both for timber belts around fields and for fuel. We have learned that a dry round stick of Scotch Pine eight inches in diameter will keep fire in a heating stove longer than a stick of hard maple of the same size. That is something worth knowing.

EXPERIMENT STATION AT LITCHFIELD.

By G. W. Fuller, Superintendent.

The Russian apple trees obtained from Prof. Budd in 1885 have all failed. Of the trees obtained in 1886, the cherries and pears all died or were killed to the snow line. A few varieties have done fairly well, the Hibernial I think doing the best.

The Red and Yellow willows and some of the poplars promise very well. I cannot but doubt that we shall obtain from them some valuable additions to our forest timber.

REPORT ON FRUIT.

Our crop of apples was very small, only a few Transcendents; and these were mostly grown on a few orchards in the timber. The few raspberry bushes we have bore exceedingly well, especially where the canes were buried. Gooseberries and currants bore less than quarter of a crop. The strawberry promised very finely in the early part of the season, but the dry weather diminished the crop very much; still our strawberry crop was the largest we ever had.

EXPERIMENT STATION AT CARVER.

By Chas. Luedloff, Superintendent.

With great pleasure I send my report of results in horticulture the past year. I begin with the apple as our leading fruit. I cannot say much about the fruit crop, because the old trees are all dead, as they are also in the surrounding neighborhood. Next spring I will replant, for a new beginning, with one and two-year old Russians.

The little Russians I experimented with last year suffered greatly from the effects of drifting snow, most of them being broken down. I had to cut them back, but most of them made a growth of four feet and over, in a very dry season, none of my trees blighting. There is a prospect of getting more durable trees from the Russian kinds than from Minnesota and Wisconsin seedlings, as the latter kinds do not ripen their wood early enough to enter the winter in good condition; most of my seedlings were lost on account of this.

It is evident that a seedling may flourish and bear well in its native place for many years, but when propagated and transplanted in a different soil and location, it may prove to be a failure.

All new seedlings recommended to us should first be tested at every experimental station, and we must also test the Russian in the same way. In this way we will reach the point we are seeking sooner, and find the hardiest kinds for general planting.

My plum crop was good, but the fruit was not as large or of as fine a flavor as in previous years. Most of my trees are the best of native and seedling varieties; besides these I have under culture the Weaver, De Sota, Newton Egg, Peach, Forest Garden, Miner; Wolf and Speer are new. My Russian plums not being quite as hardy, I cover them, as I wish to use them for crossing with the natives, and, if it is possible, to get a kind with firm flesh that will be good for drying.

The strawberry crop was poor; the first picking was middling; after this the berries were small and of a poor flavor, the plants were nearly dead on account of the drouth, but happily on the first of July we had a heavy rain, more following later, and before winter the plants were in a splendid condition, with a good prospect for a fine crop next year.

My grape crop was fine in quality and quantity, over thirty kinds bearing. The best are Barry, Rogers No. 43, Rogers No. 33, Brighton, Beauty of Minnesota, Eldorado, Worden, Rochester, Duchess, New Haven, Green's Extra Early and Martha. But it should be stated as

a fact that no one grape is suited to all localities; neither is there any one locality which is suited to all grapes; this must be determined by experiments.

The blackberry crop was short. Snyder was small and sour; Ancient Briton was much better.

ORNAMENTAL AND FOREST TREES.

Ornamental trees should be planted on a larger scale around dwellings, school houses, churches and in public parks, and thus beautify the country.

But we must not neglect the replanting of forest trees to take the place of our destroyed forests, and also the planting of new forests, that the climate may be healthy and productive. I give a list of the kinds I find to be adapted to our climate:

Acer campestre. A small, stocky tree, small, handsome foliage.

Acer Wier's lancineatum. Wier's cut leaved silver maple. It is a variety of the silver leaved; shoots tender and drooping; one of the best lawn trees.

Acer platanoides. Only hardy enough in shady places.

Acer atropurpureum. Cut leaved purple Japan maple; foliage dark purple and deeply cut; very ornamental; stood the last two winters very well.

Acer polymorphum atropurpureum. Blood leaved Japan maple, bushy shrub and dark purple, deeply cut leaves; very fine; stood the last two winters well.

Betula alba fastigata. Pyramidal birch of elegant pyramidal habit, like the Lombardy poplar.

Betula alba European white birch of rapid and graceful growth, and having silvery bark; after the trees get to a moderate height the branches droop.

Betula pendula laciniata. Cut leaved weeping birch. One of the best of all weeping or pendulous trees, with finely dissected leaves and white bark.

Betula atropurpurea. Purple leaved birch, having purple foliage; stood two winters well.

Catalpa speciosa. Western Catalpa. Did well in sandy ground and timber.

Larix European. European Larch. An elegant, rapid, pyramidal tree; small branches drooping; should be more of them planted for timber.

Populus alba Calleana. Similar to the lombardy, with silvery cut leaves; very ornamental.

Populus Petroosky. *P. beroelensis*. *P. pyramidalis fastigata*. *P. pyramidalis Siberica*. *P. laurifolia*. *P. certinensis*. Fine ornamental and timber trees.

Populus monilifera Van Geerty. With yellow leaves.

Pyrus acuparia. European mountain ash; a fine tree, covered from midsummer till winter with great clusters of bright, scarlet berries.

Quercus bicolor. *Q. coccinea*. *Q. palustre*. *Q. prinus*. All do well in our climate.

Quercus pedunculata. From Europe; growth more rapid than our white oak; in wood it is just as good, and should be largely planted for timber.

Salix laurifolio. Laurel-leaved willow. A fine ornamental tree, with very large, shining leaves.

Salix rosmarinifolia. Rosmary-leaved willow; foliage silvery.

Salix purpuria pendula. For weeping it must be grafted on some stock five to seven feet high.

Salix regalis. Royal willow; a fine tree, silver foliage.

Salix fragilis. A rapid growing tree, for timber.

Salix Kapoleanis. A fine weeping when grafted on some stock.

CONIFERA AND EVERGREENS.

From the many kinds I have experimented with I find hardy for our climate as follows:

Abies Douglas, *Abies alba*, *Abies nigra*, *Picia concolor*, *Pinus cembra*, *Pinus massonianã*, *Pinus resinosa*, *Pinus munhus*, *Pinus ponderosa*, *Abies pungens*

Juniper Sabina. *Sabin Juniper*. A dwarf spreading shrub, suitable for rock work.

Juniper tamariscifolia. For rock work.

Juniper squamata. Scaled juniper; fine for rock work.

Juniper Venusta. A rapid grower with fine, silvery foliage; very ornamental, the best of all.

Thuja burrowii. *Th. compacta*. *Th. Geo. Peabody*. *Th. globasa*. Little Gem. Tom Thumb. All of dwarf, compact growth.

Thuja Siberica. Siberian Arbor Vitæ. Is the best of all the genus of this country, keeping color in winter; grows compact.

Thaja pyramidalis. Douglas pyramidal arbor vitæ; pyramidal in form, foliage distinct, like a *Petinispora*.

Petinispora rurea. Beautiful golden-tipped foliage; needs a little protection.

THE CLIMATE OF MINNESOTA.

By Chas. Luedloff, Carver.

Has the climate of Minnesota changed since the first settlement?

Yes, since the virgin soil of Minnesota was first opened to agriculture and horticulture there has been a great change in the climate. Our water supply is gradually becoming less, in lakes, creeks and rivers. Our creeks formerly full are now dry most of the year; the water in lakes and rivers is slowly receding, the banks and the shores being broader and higher. The sloughs not ditched becoming dry, the wild grass dying, making it necessary to sow tame grass, so that we may have food for cattle. Our rivers formerly navigable almost to their sources, can now be navigated for short distances only, the low stage of water and snags stopping navigation or making it dangerous. This increasing dryness is dangerous to the interests of agriculture and horticulture as well as manufacturers.

Now a word about its effect on fruit culture. As examples of our first immigrants in the apple were Plumb Cider, Haas, Perry Russet, Golden Russet, etc. These all did well for a while then they died. After them the Lezion crab was tried, which did well for a time; then the blight destroyed them. Now we are sifting out the hardiest kinds of Russians and seedlings. Some of these are standing well but how long will they flourish in this dry climate?

What is the question? I will give you my opinion. The temperature of the climate is controlled by the moisture in the air; moist air breaks the extremes of heat and cold, as we can prove by referring to the coast section.

A person living where the air is very dry is subject to the extremes in temperature during night and day. In the dry air of the desert after sunset the temperature falls very quickly, until ice is often formed during the night. This proves that there is a lack of moisture in the air.

Now, let us look at the climate in a timber region. There the air contains more moisture. During every month of the year there is

more rain and dew. The timber breaks the wind—makes the summer cool and the winter warmer.

Everybody must admit that our timber is fast disappearing, and we must take care that we do not reach the point that some countries of Europe and Asia have. There the timber was ruined, the climate changed, the rainfall decreased, cereal products became less, and farm industry was at a stand. We should make application to our legislature and to Congress to pass laws to protect our timber and replant our forests. Then the time will come when our climate will be improved, and agriculture and horticulture will flourish.

REPORT FROM WINONA COUNTY.

By O. M. Lord, Minnesota City.

The yield of small fruits for the past season was considerably below the average owing to the drouth. Beginning with strawberries the quick sandy soils produced a fair crop of the early kinds, but very few of the late ones matured. The main market supply of Winona is produced upon clayey soils; which being naturally later produced a very light crop.

Red raspberries blossomed abundantly, but continued dry weather injured them beyond recovery. The kinds principally in the market were Turner and Cuthbert; the retail price was quite uniform at 15 cents. Blackcaps were shriveled in appearance and of poor quality.

Currants may be put down as an entire failure. Blackberries bid fair for a full crop in the early part of the season. The bushes were loaded with fruit which literally dried up on them without ripening.

Grapes were considered a fair crop, both in yield and quality. The market was at all times well supplied, and the prices lower than usual.

APPLES.

The Duchess in some few places produced fairly, sufficient to nearly supply the market, and different kinds of crab apples were abundant.

Wild plums were not offered for sale in plenty as usual. The trees in some localities did well, but from the failure of other fruit more than common were kept for home use. Prices ranged from one to two dollars per bushel, though the fruit was not of average quality.

What effect the excessive drouth may have on the next crop it is difficult to determine. Some predict a failure from the supposition

that the vitality was too much lowered to properly form fruit buds. Others hold that what vitality they possess is expended in the perfection of fruit buds, as the only means of perpetuating the species, and that we may confidently look for a fruitful season after an unusually dry one, if favorable weather supervenes.

REPORT FROM WINONA COUNTY.

By S. A. McHenry, St. Charles.

On account of extreme dry weather the strawberry crop was very light and quality poor. Windsor Chief, Parry, Crescent and James Vick were the leading varieties. Raspberries were a fair crop, good quality and generally sold at a paying price. Turner and Schaffer's Colossal were the best of the red varieties and the Taylor and Elmira best of the blackcaps.

Blackberries, where properly mulched, were a good crop, but where not mulched were somewhat injured by the drouth. Quality and price were generally fair.

Grapes were the best they have been for years. Moore's Early ripened first, but all varieties ripened before frost. Delaware and Concord were very heavily loaded.

Apples yielded well, but the quality was not as good as last year. The dealers here shipped 1,240 barrels the past season.

It is now generally admitted throughout this section of the country that small fruit can be successfully grown here. Most of those now in the business are enlarging their plantations, while many more are beginning. Windom dewberry is attracting considerable attention in this vicinity, and we are in hopes that it will prove of great value on account of its hardiness and productiveness.

REPORT FROM HENNEPIN COUNTY.

By M. Pearce, Minneapolis.

The past season was very dry. The grape crop here, comprising Concord, Worden, Delaware, Niagara, Brighton, Cottage, and Roger's Nos. 4, 15 and 29, together with several other varieties were very fine, ripening in good season and yielding abundantly.

All the raspberries that were protected during the winter and had

proper cultivation, also did well. The same is true of blackberries and strawberries. The Turner and Cuthbert were the best varieties of red raspberries, and the Gregg of the black varieties. Of the blackberries, Ancient Briton and Snyder; strawberries Wilson and Crescent; currants Red Dutch and Stewarts seedling.

APPLES AND CRABS.

Crop very light; blasted in the blossom. The trees made a good growth, but most of them were more or less injured by the previous winter. The wood of Wealthy, Duchess, and most of the Russian colored crabs and hybrids wintered well. About fifty seedlings of the Wealthy, three years old were not injured in the least.

NEW SEEDLINGS.

Victor, three years old, thirty trees, not injured in the least. This variety has fruited with us for six years. Fruit medium in size, striped, sub-acid, juicy; of the very best quality. Season, September and October. We have great faith in this variety. It is now on trial at various points in Minnesota and Dakota.

Unknown, a Russian variety ten years old, has never been injured. It is a rapid grower and an immense bearer; fruit as large as Wealthy and keeps as long; striped; a good second quality.

Tonka, a hybrid grown from a cherry crab; supposed to have been fertilized by Duchess. Fruit flat, red, larger than Transcendent, and ripens after that variety is gone. Very juicy; sub-acid, no crab quality; a prolific bearer, and never water-cored. Tree hardy; has never blighted. It is being tested at various stations. We expect good results from it.

We are satisfied from years of experience that it is useless to expect a full crop of good strawberries, raspberries, or blackberries without proper winter protection. During the last three years we have given all our plants winter protection, at a small cost, and the good results secured were far beyond our expectations. We are satisfied that the great problem of small fruit growing in Minnesota is solved.

REPORT FROM WASHINGTON COUNTY.

By M. C. Bunnell, Newport.

Mr. President, Ladies and Gentlemen:

Allow me to say that I have had but little time to prepare my report, and so you must not expect anything very elaborate. As to the

growing of fruit in Washington county, more especially standard apples, I find many among the farmers who are discouraged about re-planting where their trees were killed three years ago by the hard winter. They do not stop to think that the varieties they were accustomed to raising in Southern Wisconsin and Northern Illinois (even as far south as the central part of the latter state) were injured during the same months in those localities, and that, if one would keep his orchard up, so as to receive benefit from it, he must renew his trees occasionally. Perhaps if they would become members of our Society they would learn from the experiences of others, gain more courage and not be so disheartened about apple growing in Minnesota.

CAUSE OF FAILURE.

Too many trees are carelessly planted, put in narrow, contracted holes, and not enough fine earth worked in among the fibrous roots, thus setting them firm in the ground. Also, not mulching after planting, but leaving the trees to take care of themselves; the planter, however, hoping some day to pick and eat apples from his trees. But, alas! he will be doomed to disappointment. They perhaps never leaf out. What comes next? Why, of course, he condemns the tree peddlers, as they are termed; or, if he can't attach blame to them, he goes for the climate, and concludes that it is no use to bother with apples in Minnesota.

I know that tree agents, as a rule, have great notoriety wherever they travel; but still I think they are quite useful at times, to get around among the farmers and stir them up to the idea that some sorts of fruits ought to be mixed in with other products of their farm, and that they ought not be confined to vegetables and animal food altogether for a living. No one denies but that ripe fruit is healthy for anyone to eat, and promotive of the welfare and happiness of mankind. One old patron of mine, whom I was stopping over night with, says: "I presume I shouldn't have had an orchard if it hadn't been for the agent." The careful planter, loses his trees, some times, through the effects of climatic changes; but he is generally ready to give an order to an authorized agent of a good, responsible company for more, for the purpose of keeping up his orchard.

HOW TO PLANT.

As to the best method for purchasing and planting trees in Minne-

sota. In the first place patronize those agents who can show you a certificate from a responsible company, and give you honest information regarding the hardiest varieties, and most farmers do prefer to buy from one who can give them information as to varieties, planting and care of trees.

For apples, select a northern slope, if you can get it convenient to your buildings. Then obtain the Duchess and Wealthy with a sprinkling of hybrids, viz., Whitney's, Early Strawberry, Orange, Transcendent, and Hyslop. It might be well perhaps to try some of the New Russian varieties. Clay soil or a rocky soil is preferable to any other. Dig good sized holes, planting the trees two or three inches deeper than they were before being taken up out of the nursery. See that your earth is put in well around the fibrous roots and packed firmly. After planting mulch well and keep your stock away from the trees. Plant plums in groups, as they bear much better in clusters, selecting DeSota, Weaver and Forest Garden.

For grapes, select a south or southeast slope, fertilizing with a rich compost. Old bones are beneficial if put around the roots when planted. Plant six to eight feet apart. For trellis use posts with three wires. Prune and lay down in the fall about the first of November, and uncover about the first of May the following spring, putting them upon trellis. You will be amply rewarded for your time and expense.

SMALL FRUITS.

For raspberries select Gregg's Mammoth Cluster for black; Cuthbert, Turner and Philadelphia for red. Plant them in rows six feet apart and four feet between hills; cultivate well and keep suckers from spreading. Mulch well. Of the red, after they are through bearing, cut out all dead canes, leaving about half a dozen new canes in the hill to be laid down in the fall for winter protection. In the spring take them up cutting them back to $3\frac{1}{2}$ or 4 feet. I think if you adopt this plan you will be sure to get a good crop almost every year.

For strawberries select good soil and cultivate well the first year; putting the plants $3\frac{1}{2}$ feet between the rows and 18 inches to two feet in the row. Fertilize the pistillate varieties every third row with a staminate variety. Wilson, Crescent, Manchester, Chas. Downing, and Windsor Chief do well in Minnesota.

Currants, planted on good soil, can be raised very readily. Give them plenty of manure. Select such as Red Dutch, some Cherry,

White Grape, Black English, etc. For blackberries select Stone's Hardy and Ancient Briton.

In conclusion I will say that in Washington county I did not find many standard apples in bearing the last year, owing to the old trees being killed three winters ago, and those that have been replanted are not far enough advanced to bear yet. Transcendent and Hyslop bore some. One man by the name of Gilla, eight miles from St. Paul had some fifty bushels of Duchess, which he marketed at a good price in the city. I think the Whitney will give general satisfaction as more of them come into bearing. Quite a number of Early Strawberry are in bearing in different sections, which suit the tastes of most people. Some are commencing to plant the New Russian varieties.

The plum crop was a failure in this section, owing I think to the hail storm we had in April. Grapes were quite a profitable crop and bore in abundance where they were well cared for. Currants, raspberries and strawberries were all good crops, and commanded a pretty fair price.

I trust, as members of the State Horticultural Society, that our practical knowledge in fruit growing in Minnesota may be disseminated to others outside of our Society, which is calculated to make mankind healthy, wealthy and wise.

REPORT FROM CHIPPEWA COUNTY.

By O. E. Saunders, Granite Falls.

I have no very flattering report to give, as the fruit crop was very light. The causes that produced the failure, or partial failure, were such as are liable to occur in any country or climate. Just at the time when currants, gooseberries and plums were in blossom, a heavy southeast wind prevailed, which removed the pollen, or from other blighting influences prevented fructification, so these crops were almost an entire failure.

There was no rain in the spring, so that transplanting was not successful, save when done very early. Strawberries, although affected by drouth, made a fair crop. Raspberries were badly dried up.

Blight was uncommonly severe upon apple trees, scarcely a variety of standards or of crabs escaping its withering influence. From present indications it would seem to be time and money thrown away to plant any of the old sorts of standards. Quite large sales from the

nursery of Peter M. Gideon were made this fall, and we hope varieties approaching ironclad have been introduced.

The grape vines received from Prof. Porter succeeded well, making a healthy growth.

We think the growth of all fruits last season was healthy, and went into winter quarters in good shape, which, with the depth of snow covering the ground, would warrant the hope of their coming out in good shape in the spring.

Much difficulty was experienced in securing the germination of garden seeds, and many gardens were nearly failures on this account.

The heavy winds that prevailed in early spring blew the seed entirely bare on many a grain field, and in many cases reseeding was resorted to, and in many more it should have been.

Increased attention is being given to small fruit culture, which is a hopeful indication.

REPORT FROM NICOLLET COUNTY.

By C. F. Brown, St. Peter.

As per request, I hand in a rough report of fruit for the county for 1887. Could have made it more elaborate, perhaps, but have been pressed for time.

I cannot give a very flattering report of the fruit production of this county for the year 1887. On account of the drouth, fruit in general has done very poorly.

SMALL FRUITS.

Strawberries on one year vines produced a very fair crop Old vines did not do well.

Raspberries, a short crop, but usually do well with good care.

Blackberries coming into bearing so late in the season felt the effects of the drouth very severely, and were a failure.

Grapes were a good crop and of excellent quality. Col. J. C. Donohew has kindly given me a list of those raised by him last season, which demonstrates that, under an intelligent management, in a favorable season quite a variety can be produced, to-wit: Brighton, prolific and very satisfactory; Worden, prolific and very satisfactory; Moore's Early, prolific and very satisfactory; Martha, prolific and very satisfactory; Rogers No. 15; Amber Queen. doing better each

year; White Ann Arbor, not satisfactory; Concord, good; Hartford Prolific, prolific; Wilder, or Rogers No. 4, splendid grape, but drops from vine. He also has other varieties, but has lost names for them.

Apples were a capricious crop; in some localities Transcendents, Hyslops and Duchess produced good crops, though not of the best quality, but generally speaking they were a failure. A few Gen. Grant were marketed. Most of the old orchards have died out, and parties who have been trying to raise apples for the past twenty-five years are discouraged; and many of the "coming seedlings" have gone the way of the "ironclads." Mr. E. Myer, of this county, who is a veteran pomologist, pins his faith (what he has left) on the Duchess and pronounces it the most reliable for this locality. His orchard of Duchess—now nearly all dead—have paid him well, yet he is inclined to let some younger enthusiast carry the fruit banner in the future for this locality.

Currants were a very poor crop, the lightest ever known in this locality.

I am not a practical fruit man, and only have a natural inclination and love for the subject without a chance to put my theories into practice.

REPORT FROM MURRAY COUNTY.

By O. F. Norwood, Balaton.

The past season, although a little dry, was on the whole a favorable one. The few trees scattered over the prairies all bear some fruit, and where good care had been bestowed apples were a good crop.

Leonard Aldrich, on the shores of Lake Shetek, raised over one hundred and twenty-five bushels of apples from only a few trees that have fruited three to four years, and sold for over one hundred dollars, besides raspberries, strawberries, and other small fruit, which was plenty.

With us fruit was about the same as last year, grapes being a good crop and of good quality, but this year I have to report the first appearance of blight on the Transcendent, which killed a few twigs about a foot in length. We planted last spring two hundred trees of different kinds for trial, and every one of them made a good growth and seem to be in good shape at present. The rabbit is the worst enemy we have to apple trees here, and if they are not exterminated there is little use in planting largely of apple trees. I have tried all

remedies I have seen, but nothing avails except wrapping paper around the trees and binding it on well, so the wind will not blow it off.

The conclusion reached after a five years' observation is, that every family can have all the apples and berries they want for home use, if they will plant and care for a small fruit-garden, and can raise fruit to sell if he has the inclination; but it is a duty every man owes to his family to raise all the family needs, and that enough to last the whole year.

THE RABBITS.

I have interviewed many farmers the past week or two, and the general complaint is that the rabbits are much worse this year than ever before, and that unless the plague is done away with it is useless to plant apple trees, as in many places every tree is entirely destroyed.

I take it for granted that the same trouble exists all over the State, and that something ought to be done to at least diminish the numbers of this, the worst enemy to fruit trees. Would it not be advisable to have a law enacted placing a bounty of, say, twenty-five cents a rabbit? This would do away with them on short notice, and cost no more than a smaller bounty extending over a longer period, thus costing as much in the end.

REPORT FROM MURRAY COUNTY.

By John Fitch, Tracy.

I have an orchard of eighty-five trees set about eight years. Of these twenty-five are Duchess, a few of Wealthy, Transcendent, Hyslop, Early Strawberry, Orange, etc. The orchard commenced bearing about four years ago, but it was nearly destroyed last season by the snow and sleet breaking down the trees.

Wealthy has proved very hardy. I lost about five per cent of my trees from drouth the first year, but most of the vareties raised have proven hardy. Location on northeast shore of lake Sarah; soil, dark, sandy loam, northeasterly slope; drainage good; sub-soil sand and hard pan. Trees appear to be healthier than on richer land, and freer from winter killing.

Have raised Wilson strawberries with good success; also a few

Mammoth, Bidwell and Sharpless. Mammoth proves to be the best with me. For winter protection I mulch with wheat straw and chaff after the ground commences to freeze. In the spring I rake off the straw and leave between the rows until there is no danger from frost. Have grown some very fine crops, having an abundance for home use and some to spare. Have supplied my neighbors with plants, who are now raising their own berries.

Have several varieties of raspberries. Blackcaps of the common or native varieties, such as grow along the lake shore, succeed better than the cultivated sorts. They are very productive and require no protection; fruit smaller than of tame varieties. Have had indifferent success with grapes.

We have a number of enterprising farmers in Murray county who are growing fruit successfully. Capt. Aldrich, one of the first settlers here, near Currie, on Lake Shetek, is one of our most extensive fruit growers. He has a large number of bearing apple trees, and has apples on the market every year, both of standard and hybrid varieties. Duchess and Wealthy are his favorite sorts. He has some twenty acres of natural timber for protection. He is also a very extensive grower of strawberries, raspberries, currants and grapes. He has a favorable location for grapes and is growing a number of varieties.

Mr. McIntyre a neighbor of Capt. Aldrich, is raising small fruits quite successfully; also apples of which he exhibited some fine specimens of Duchess and Wealthy at the fair the last two years. He has no protection from the north and his trees were not broken by the snow.

My neighbor, J. R. Cleveland, has very good success with strawberries and red raspberries, and markets several bushels of fruit each year. He had a similar experience with myself with apple trees; snow spoiled them last spring. If I were to set out an orchard again I would set it on the north side of a grove. Trees on the prairie need protection from winds in summer. Our heavy southwest winds shake off the fruit. There is no trouble raising Duchess, Transcendent and Hyslop here without any windbreak from the north, as they stand quite as hardy as the oak.

We experience no difficulty in growing small fruits where any attention is given them whatever. Every farmer should raise enough for his own use. They are no harder to grow than the common vegetables of the garden. Besides the pleasure and satisfaction afforded there is the gratification of having the choicest fruit, gathered fresh from your own grounds. More attention should be given to it,

especially to the growing of small fruits. It may not be profitable to spend too much time on apple trees, but everyone can have an abundance of choice home-grown small fruits of every kind.

Very little attention is given to native plums, as they grow wild and can be gathered by the hundreds of bushels along the shores of our lakes and running streams, and the fruit is very fine in its season.

Mr. Mellen, north of Curry, on the Tracy road, has a fine farm and a good orchard. His trees look healthy and bear well. He exhibits some fine apples at the fairs. He also raises fine crops of strawberries and raspberries; I do not know what varieties.

Alfred Terry, of Slayton, has a farm south of town, and is taking a great deal of interest in fruit and ornamental trees. He is growing standard and crab varieties of apples successfully. A number of others might be mentioned who are engaged in fruit growing in this county, and who find it both a pleasurable and lucrative occupation.

STATE EXPERIMENTAL STATION.

UNIVERSITY OF MINNESOTA EXPERIMENT STATION OF THE COLLEGE OF
AGRICULTURE.

Report of Prof. Edward D. Porter, Supt., St. Anthony Park.

Mr. President and Gentlemen :

I should present to you a much more detailed report of the operations of our experiment station, were it not for the fact that my work will be embraced in my own published reports, and it is not worth while perhaps to duplicate the report. You will find a portion of what I have to say in my first bulletin, which has been issued recently. I will refer to that briefly.

INTRODUCTORY.

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

The act of Congress of July 2, 1862, donating public lands to the several states, for the benefit of agriculture, and the mechanic arts, authorized the expenditure of a sum, not exceeding ten per cent, of

the net proceeds of the sales of such lands, for the purchase of experimental farms.

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

Prof. Lacy withdrew from the institution in 1880, and in January, 1881, Prof. Edward D. Porter was placed in charge of the department of the Theory and Practice of Agriculture. After operating the farm for one season he was convinced that from the character of its soil, its proximity to the city, and continued subdivision by public thoroughfares, it was entirely unsuited for the purposes of an experiment station, and urged upon the board of regents the necessity of disposing of it and purchasing a more desirable location. The plans proposed were approved, and the legislature having given authority for the sale, and provided that all the proceeds of the same should be used in the purchase and equipment of the new farm, the old one was subdivided and sold from time to time up to the present, yielding sufficient funds to purchase and equip the new station. The location of this farm, its character and equipment, and the work accomplished up to Jan. 1, 1887, are fully set forth in the report of the department of agriculture, to the board of regents, and published as a supplement to their fourth biennial report to the governor.

The legislature of 1885 directed the board of regents of the University of Minnesota to establish, as soon as practicable, in connection with that institution, an Agricultural Experiment Station for the purpose of promoting agriculture in its various branches, placing it under the control and supervision of said board, making the professor of agriculture its general superintendent.

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

present time, has been done with limited and unskilled assistance, and in such intervals of time as the director could secure from a mass of other duties.

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

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

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

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

OUTLINE OF WORK.

There are several other matters to which I desire to call attention. As already intimated, the work of our experiment station is not confined exclusively to horticulture; it is designed to cover all the operations of agriculture, and we have of course to devote a due amount of attention to each; horticulture comes in for its proportion, and up to the present time it has received the lion's share of our work, for the reason that the facilities at hand enabled us to devote more attention to this line of work than to any other.

I have felt that this Horticultural Society is the best organization of farmers in the State, and that you were at my back to second my efforts, and I may add that I have been trying to do the best I could for the interests of horticulture in Minnesota. Our first work in this line has been, the tests of Russian apples. At the present time we have 302 varieties of these apples under cultivation. The most of these of course are from the experimental lists of Russians, and as to their behavior you will find a detailed report in our Bulletin, No. 1.

A word in regard to these Russian lists and for the benefit of persons unfamiliar with their nomenclature; the numbers, standing alone, are those of the government importation of 1868. When the letters "M." or Orel, or Vor, or Riga follow the numbers, they indicate later importations from Moscow, Orel, Voronesh, or Riga, in Russia.

We have selected for trial only such varieties as are thought best adapted to the soil and climate of Minnesota, and the experience of the last three winters will compel us to reject many of them. We have, however, found a few varieties that have proved to be perfectly hardy, passing through the severe tests of our climate without a bud injured, and if we can secure but a single one out of the three hundred on trial—hardy, of good quality and a long keeper—we shall feel amply repaid for our expenditure of time and labor, as this will constitute a foundation for future work.

REPORT ON CONDITION OF EXPERIMENTAL ORCHARD OF RUSSIAN APPLES.

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

As was said of the Russian orchard in the report of this department for 1886, it had been planted in the spring of 1885 in the most exposed situation the farm afforded. It may be claimed that such a situation does not give the trees a fair chance, since any intelligent farmer would choose a protected location for an orchard; but the Russian

apples were heralded as being absolute ironclads, and if there was a possibility of their growing on the open prairies of Western Minnesota, then surely they should withstand the greatest exposure that could be given them in this timbered region.

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

The summer of 1886 was as favorable for tree growth as could be desired, and the trees were well matured when winter set in. Potatoes had been planted between the tree rows, and good cultivation had been given the entire orchard until about the middle of July, after which time the weeds were kept down by scalping, the ground not being disturbed save at the surface. In the forest tree nursery, cultivation was continued longer, and the plow was more frequently used, but the forest trees passed through the winter without injury, showing complete ripening of the wood.

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

THE VARIETIES.

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

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

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

Possart's Nativ. Killed to snow line.

287. Riga Transparent Juicy. Dead.

287. Kremer's. Almost dead.

87M. Herren Apple. Weak.

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

Green Sugar. Almost dead.

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

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

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

542 Yellow Calville. Planted last spring; weak. Made but four inches growth in 1887.

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

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

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

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

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

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

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

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

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

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

262. Charlamoff. Killed back to old wood.

361. Pointed Pipka. One tree killed eight inches; new growth ex-

cellent, averaging twenty-one inches. One killed but little, being the best in the orchard; no scald; fine growth; healthy foliage.

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

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

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

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

Gruchevka. Two trees have stood the two winters better than any others in the orchard. Killed back one inch. Good growth the past season; leaf not so thick as in many more tender sorts. Growth of sixteen inches in season of 1887.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

461. Ribbed. Dead to snow line.

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

396. Killed one-half.

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

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

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

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

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

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

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

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

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

378 Hibernial. Killed very little; good growth.

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

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

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

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

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

Duchess. Of fifty-two Duchess trees planted in the spring of 1885, at the same time and in the same orchard with the foregoing lists of Russians, half are dead and of the remainder the new growth killed back almost as bad as did Antonovka. The average growth of these trees in 1887 was sixteen inches. In another orchard, which stands on a northeast slope and is well protected on the south and west by an oak grove, the Duchess killed back but little.

REMARKS.

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

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

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

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

been known to winter-kill in this latitude, but all apple growers regard it as a safe investment, and they take it as a standard of hardiness.

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

The experience of the past two trying winters has compelled us to reject many varieties. But we have some that are hardier than the Burr oak, because if you examine the terminal buds of the oak you will find them killed back two or three inches, while I have Russians so hardy that the terminal buds are not injured. Hence it is patent that when we have a tree of that character we have a foundation to build upon and something of real value.

In addition to the foregoing list of Russian apples we have devoted much time and attention to the culture and comparison of all the leading varieties of fruit grown in Minnesota, embracing native and foreign plums, Russian bean, forty-two varieties of grapes, all the promising varieties of strawberries, currants, gooseberries, blackberries and raspberries, as well as a full line of trees, shrubs and plants for forestry and ornamental planting; these are in their third season of growth and their value will be reported upon at your next meeting.

In the line of market gardening we have had growing the past year almost every variety of vegetable known to our catalogues, and their condition and value attested by the hundreds of visitors who have manifested an interest in our work by making a personal inspection.

Before closing this report I wish to call the attention of this Society to the importance of the collection, improvement and dissemination of the best varieties of our native trees, shrubs and plants. In many of them I see large promise for the future of horticulture in Minnesota. Our native varieties of plums, grapes, wild fruits and flowers, from their value, beauty and hardiness, furnish a splendid foundation for new and improved varieties. Many of them have a local reputation and their merits are reported from time to time at our meetings, but for want of systematic attention they are lost sight of, and their dissemination postponed for a generation. The collection and testing of these native productions should be the duty of our experimental station; and this brings me to the subject of

CO-OPERATIVE EXPERIMENT STATIONS,

a plan for which I wish to outline to you, and if it meets your approval, to give it your endorsement and support.

I would propose the selection of one or more persons in each county in the State who are well qualified to undertake the work in their special lines of agriculture and horticulture, who should be invited to become correspondents and observers for the central experiment station. To these assistants the station would furnish free of cost collections of seeds, plants and cuttings, for trial and dissemination in their several localities, instruments for making observations of temperature and rainfall, blanks and instructions for their reports, and such other assistance as might be required, only asking in return that they would render a report of their work and send back to the station any new varieties of trees, plants or shrubs, which they might find in their sections of the State for further examination and distribution. Those reports would be collected and arranged by the scientific force at the central station and published for the benefit of the whole State. Such in brief is the plan I would propose for the organization of this experimental work. Does it meet your approval?

President Elliot. We will take up this subject this afternoon. Different ideas are entertained in regard to this work. Let us take time to consider this matter and give it such endorsement as we think it best to give.

The meeting then adjourned till 1 o'clock P. M.

AFTERNOON SESSION.

FRIDAY, JAN. 20, 1888.

The meeting was called to order at 1 o'clock P. M. by President Elliot.

Mr. Smith moved as the sense of this Society that the plan of co-operative experimentation, as outlined by Prof. Porter, be heartily approved, and that we pledge him our active assistance and support.

Mr. Cutler. Mr. President, I think it would be well enough for the Society to understand this question before voting upon it. There are some matters in reference to it that I don't fully understand. If this money is to be expended it seems to me it ought to be used so that every part of the State will receive the benefit, and if there is to be a division of the work why should not the fund be divided? I understand

there is \$15,000 appropriated by Congress to make these experiments and to establish experiment stations. I do not think that one central station should get the whole of that appropriation.

Col. Stevens. It seems to me the terms that Prof. Porter mentioned are most liberal, as he will furnish the tools, seeds, shrubbery and nursery stock and everything of the kind, and the man who attends to those things that he furnishes, gets the benefit. If he has fruit trees or anything else that he raises, he sets them in his own yard and orchard, or gives them to his neighbors. I think there are plenty of men to be found who would be glad to render the assistance and receive the benefits.

Mr. Smith. I don't think there will be any difficulty in obtaining plenty of good men in every county for this work.

Col. Stevens. No; I don't think we should be too selfish in this matter. I think the terms offered are very liberal. McLeod county was my old home and I think Mr. Cutler will be very willing to take hold as one of the enterprising horticulturists in that county and help to build up this great enterprise.

Mr. Young. Mr. President, I don't think it is necessary to discuss this question at all. The Society is not expected to force anybody to make experiments. It is proposed that its members volunteer, or that the Society recommend the adoption of this system, and it is expected that farmers and others will come forward to help themselves this much, and if they will not they alone will be the losers. But I am very confident, that there are men out on the Western prairies that are spending their money trying to make a success of their farming operations there, who would be only too glad to take hold of this work. I get letters every day or two asking information, from these men, and I think Prof. Porter will be backed by the most intelligent part of the community, in the western part of the State.

Mr. Underwood. The gentleman says it is not worth while to discuss it. I don't understand it is a question for discussion, but it is simply whether he can secure a strong expression in support of this undertaking. Now, as an individual member, I think I should feel proud to assist Prof. Porter as a member of the Horticultural Society, and to hold up his work in every possible way. That is what this question is brought up here for. And as far as men volunteering to give their time to this work, if it is proposed to do that, I think there are plenty of farmers in the State who would be glad to give their time and take the benefits of the knowledge they will gain thereby and the assistance they will receive from the central station.

Mr. Young. I did not mean to say that it was not worth while to discuss the project, but we might discuss whether volunteers could be obtained or not.

Mr. Gibbs. If I understand this question,—I was not here this morning to hear Prof. Porter's report, but if I understand it,—a person is not required to procure stock for distribution or furnish trees for other parties, but his stock is furnished ready to his hands and all he is expected to do is to plant it in a favorable situation and to take care of it, and to make a report from time to time to the central station.

Prof. Porter. That is the idea, only it is designed to be upon a definite plan to secure uniformity of work and reports. For instance, we make experiments with Russian wheat. We take forty or fifty bushels of wheat grown or procured by the central station, and distribute it in sufficient quantities for the farmers to test. All I want to know is the manner in which the experiment is conducted, the locality, character of soil, and to get reports that are uniform, and to send out these reports in our bulletins, for the benefit of every farmer in the State.

Mr. Gibbs. I had in my mind the experiments to be conducted in the line of horticulture; is it the intention to combine these with other experiments?

Prof. Porter. We expect to secure specialists in every line of agriculture and horticulture, men who will take an interest in the work entrusted to them, and well qualified for its execution. From such men we always get the best results.

President Elliot. The question came up in regard to how these experimenters were to be reimbursed for their trouble. I think perhaps when Mr. Cutler comes to look at it and to see just the bearing it would have, if we were to go to work and distribute this \$15,000 all over our State, he would see that it would be so thin that we should lose all the results. But if we can have one central station to guide and conduct this work, and have volunteer workers outside, as Prof. Porter has outlined, then we would get at something that would be definite. If we attempt to spread out it seems that we could not accomplish so much.

Mr. Gibbs. I know Mr. Cutler, here, and there is not a man in this Society, I think, that will do more than he in aiding in this work, and the object of my speaking was to relieve his mind as to the effect this would be likely to have upon the general public, in sending out these different things for experimentation. It is not expected that

Prof. Porter will send out things that are not likely to succeed. Those will be confined to his own station, and he will only send out the best. He is, therefore, really conferring a favor upon anyone, whether an orchardist or gardener, in putting only reliable stock in his hands. I only wish he had the territory of Dakota under his jurisdiction, and that some of us out there might share in these advantages with the farmers and gardeners of Minnesota.

Mr. Sias. Our chairman says that we want to separate this \$15,000, and if it was spread out over the whole State for the support of these different stations it would be pretty thin. That reminds me of a remark that Fred Douglas made at the time that Franklin Pierce, of New Hampshire, was running for President of the United States. He said that "Mr. Pierce was a good third-rate lawyer of New Hampshire, but you come to spread him out all over this Union he will be so thin he won't amount to anything." Mr. Douglas was simply mistaken for he did amount to something. He became soon after a President of the United States.

I have been experimenting at Rochester for the past twenty-five years and I have not received a dollar to meet the expenses; have been working hard and living cheap, experimenting in trying to find that "winter apple." I think a number here have been trying, and directing their attention in the same direction. I am satisfied from my experience during these twenty-five years that we should still continue and follow the direction given by Dr. Von Mons and of Andrew Knight. And I think that the plan of Mr. Knight, of cross-fertilization, is probably the shortest route, and I intend to follow that with some varieties that are much hardier than Duchess, and I think by careful crossing we may hope to find a late keeper and in this way be likely to get a winter apple. If it can be done by any of these superintendents I am satisfied; but I believe Prof. Porter can use this fund to good advantage, and I believe he will do it in the way of experimenting. I believe his plan is a good one.

Mr. Pearce said he had drawn up a resolution similar to the one under consideration, which had reference simply to horticulture. He had experimented at Minnetonka a number of years and become fully satisfied that fruit could be grown in large quantities all over the State. During the past winter he had written to many persons and proposed to furnish them stock on a small scale to start with. Prof. Porter proposed to divide this work among specialists. One man should make a specialty of fruit and nothing else. He would suggest the sending out of nothing but known and tried varieties to experi-

ment upon; every farmer should put them out, and by following a particular system the same results would be secured in every instance, and then not one in fifty would make a failure. He thought this plan would do more in five years than had been accomplished heretofore in twenty in the way such work had been conducted, because it would reach every man in the State. Every man would know what his neighbor has, and know the quality of what he received and its duplicate could be obtained at the station. He had known such instances and considered it the best system that could possibly be followed; there was nothing equaling it. He was heartily in favor of the measure.

President Elliot. This subject has now been fully discussed, and if I understand it, the question is upon the endorsement of the plan outlined by Prof. Porter. What is your pleasure in the matter?

The plan for the co-operative experimentation was unanimously approved.

Mr. Cutler offered a resolution favoring the passage by Congress of the bill for the reduction of postage on seeds and books, which was adopted.

CORRESPONDENCE.

The following letter was received from Mr. Keffer of the Dakota Agricultural College.

FROM DAKOTA.

BROOKINGS, DAK., Jan. 17, 1888.

S. D. Hillman, Secretary, etc.:

I regret that business prevents my being with you at the meeting of the Horticultural Society, which convenes to-day. I should have written this letter last week, but, as you are probably aware, we are blockaded. I write now more in hope that the blockade will be "raised" to-morrow than in faith of such good fortune.

I congratulate your Society on the good work it has accomplished during its legal infancy, and now that it has arrived at man's estate, we on the outside—especially we of Dakota—will expect still greater things.

The meeting at Huron was but slimly attended, but great interest was manifested, and I feel sure we have the nucleus on which to build a strong society. We were very glad to see your delegate, Mr. Sias;

he proved a veritable missionary, and the gospel he brought was good sound horticultural gospel. Do you know the addresses of parties who have planted Russian apples? I would be under obligations to you if you would send me a list.

Hoping you may have an especially profitable and pleasant session, I remain.

Yours very truly,
CHAS. A. KEFFER.

FROM RUSSIA.

MOLIE-LEV-UPON-THE-DNIEPER, RUSSIA, FEB. 19, 1887.

S. D. Hillman, Secretary, etc.

I duly received your favor of Dec. 27, 1886, and must apologize for not replying to it sooner.

I have not had opportunity to write the promised paper, having been engaged all the time in this northern region.

I have received to-day a letter from Mr. Ragan informing me that he has received the scions, and will send you the package destined for your Society. Hope that the scions will arrive in good state and be of use to the Society.

I intend to send you, next fall, scions from trees grown here in Petrosavosk under the 62° north latitude.

I wrote you that I have not seen nor eaten of the fruits of the varieties that were praised to me; one that I had the disadvantage to taste was bitterly sour. It is also not fair to claim of a tree grown in such latitude to give first-rate fruit.

But taking in consideration that they endure here often 29° ream of frost, and all the winters are blowing blizzards, such tree must be a truly hardy one, and can be undoubtedly of use as material to your intelligent orchardists to train for your State for an ironclad variety of apple.

Leaving this country, I have asked friends to send me, next fall, seeds and scions from apples of this place, and shall send you some for trial.

Your amiable offer to send me the last report of Iowa will be duly appreciated, if you shall have the kindness to mail me a copy.

I take also the liberty to ask you to have the kindness to send me seeds of Western Catalpa (*Catalpa speciosa*) and box elder (*Acer Negunda*) as samples, and to give me prices for one kilogram. In the

report of the commissioner of agriculture I have read that these trees are easily propagated, rapid in growth and give valuable timber.

I have the intention to recommend them to be tried by our southwestern railroads to protect their tracks from snow drifts.

Have the amiability, also, to name me a reliable seedsman from whom it would be possible to have these seeds in greater quantities.

I remain, with great respect,

Yours truly,

G. DOPPELMAIR.

Aug. 6, 1887.

S. D. Hillman, Sec'y, etc.

Returned from a long absence to Mollie lev. I have had the pleasure to receive your kind letter and the regards of your Society. Please accept my warmest thanks for the same.

From Kiev I have sent you the promised report of our department of agriculture, about fruit growing in Russia. It was sent by my bookseller to a false address and returned to Petrosavosk. Hope that you shall receive it this time.

The summer here was very cold and rainy; hail and storms were very frequent. The leaves and apples have suffered severely.

Very respectfully yours,

G. DOPPELMAIR.

FROM SECRETARY GARFIELD.

GRAND RAPIDS, MICH., Sept. 27, 1887.

S. D. Hillman, Secretary, etc.:

Your pleasant note sent me at Boston has been forwarded here. It would please me greatly to visit your State, and I hope to do so some time.

I feel that the American Pomological Society is more truly national to-day than ever, and by careful methods and earnest labor, it can be made to serve American Pomology better than ever before. I shall always gladly receive a letter from you.

Sincerely yours,

GARFIELD.

FROM ONTARIO.

GRANTON P. O. ONT., April 26, 1887.

S. D. Hillman, Secretary, etc.:

I must apologize for being so tardy in sending my fees for membership in your Society. I belong to a number, and from no other report do I get so much valuable information. Enclosed please find the amount of membership fee.

Dear Friend, will I ever have the privilege of meeting you again on this earth? if not, may our Lord Jesus guide, keep and save us, so we shall meet again in his eternal world of blessedness and rest.

Yours truly,

JOHN LITTLE.

FROM NEBRASKA.

TABLE ROCK, NEB., June 15, 1887.

S. D. Hillman, Secretary, etc..

Permit me to acknowledge the receipt of one dozen copies of your State Horticultural Report for 1887, and to thank you for the same. Will reciprocate as soon as our new volume is out, which will not be completed until late in July or first of August.

Crop prospects are good; fruit not to exceed one-half crop except blackberries, which promise a large crop.

Yours fraternally,

S. B. BARNARD,
Sec. Nebraska Hort. Society.

Following is the paper contributed by Hon. D. B. Wier on Native Plums:

NATIVE PLUMS AND HOW TO FRUIT THEM.

By D. B. Wier, Lacon, Ill.

The Native plums are the indigenous, or wild plums, of this continent and their direct descendants from seed. These plums all belong to the genus *Prunus* of the sub-order *Amygdalea*, (the Almond family) of the order *Rosacea*, to which nearly all our cultivated fruits belong. To the genus *Prunus* belong nearly all the stone fruits in cul-

tivation, and it has representatives with edible and useful fruits, in the wild state in nearly every portion of our country, and perhaps of the continent.

SPECIES.

The plums proper range from south Florida to the Arctic circle, and are divided by botanists into four or more species, namely: *Prunus Americana*, found in nearly every portion of the country; *Prunus Chicasa*, generally confined to the Mississippi valley; *Prunus Maratima*, peculiar to the sea coast south and east; and *Prunus Umbelata*, generally confined to the extreme south. The student who investigates these so-called species over their entire habitat will soon find that they cannot be divided into true and distinct species; and if he gives them attention he will eventually find that they are, possibly with one exception, all one species, or can be all graded the one into the other. That they all freely cross by fertilizing each others' flowers, and that they are simply well marked climatic and geographic races ranging in size of mature plants from six inches to twenty-five feet in height. Europe and Asia have given us of the Almond family the cultivated and wild plums of those continents; also the peach, almond, apricot, and cherry. These are all quite near to our wild plums, for they all freely interbud and graft on them. And we know that some of the most distinct species cross sexually and produce hybrids with them.

For the present we will follow the classification of the native plums, as given in our text books of Botany; but I will here warn the student that it will be impossible for him to refer many of these varieties to any of the species therein given, and that if he studies them comprehensively he will find many groups and races showing as good or better distinct species than those given in the text books.

A word of explanation will help us greatly to a full understanding of this point. We will say that the student visits the Mississippi valley, between the lower Arkansas and Red river, there to study the Chickasaw species of plums. He will there find it a small tree, ten to twenty-five feet in height, with fruit of all sizes from that of a cherry to a hen's egg, with every color from yellowish white to yellow, pink or scarlet to darkest crimson, and ripening from early in May to September.

Then if he should search in the ravines of the higher plains of Colorado, he will find a little dwarf shrub six inches to a foot in height, perhaps loaded with edible fruit as large and good as the average of that in the valley, but more nearly constant in size, color

and time of ripening. At these two points we have found seemingly two very different things or species of plums. But, if the student starts from the Chickasaw Bluffs, opposite the mouth of the Arkansas river, and follows the so-called *Prunus Chicasa* up the valley of the Arkansas river, he will find the tree of that species continually decreasing in size. Where this river enters Kansas, his plum tree is a shrub three to five feet high; where it leaves Kansas, one to two feet, and then in the centre of the great Colorado plain, the little dwarf thing before spoken of six to twelve inches in height, when he will have before him what Botanists have called *Prunus Pumila*, or the Sand plum of the plains. Yet the two are one and the same species, and the Sand plum is the remote ancestor of the Chickasaw plum. The seeds of the Sand plum were carried down by the two great rivers, the Red and Arkansas, into the valley with its rich soil, longer summers, warmer climate and humid air, and after many generations the result is as we now find it. In the same way can we trace the *Prunus Americana* up the Missouri river, until it runs it into the dwarf Sand Cherry of the North; and by a study of these two dwarf forms, between Montana and New Mexico, he might be able to find and raise a dozen distinct forms up to the grade of species. So we also find all the so-called species differing widely in their different habitats, and all gradually and perfectly grading the one into the other at places where they intermingle; but nevertheless, we will find true types of all the species where they are all growing together.

With the two most prominent species the only marked specific difference seems to be that *Prunus Chicasa* is not found indigenous north of Illinois. But the other, *Prunus Americana*, seems to cover nearly the whole continent. These two species seem to reach their highest excellence in fruits, as found wild, the last named in Wisconsin and Northern Iowa, and the former in Tennessee and adjoining states. With these two species this paper has to do. Of the other species we have as yet no varieties worthy of cultivation, though *Prunus umbelata* is said to give delicious fruit in southwestern Texas. Basset's American is an example of *Prunus Maratima*, for which we have no use. This much is necessary for somewhat of an understanding of our subject. We will now take up the practical part.

PLUMS FOR PROFIT.

We gather from the foregoing that our wild plums, in some of their species and varieties, are fruits natives of and adapted to cultivation in every part of this country and beyond, both north and south. Are

they worthy of culture? It is safe to say that the majority of persons who have planted these plums for fruit, would answer this question emphatically in the negative, that they are not; they being forced to give this answer from the result of many trials, all resulting in, perhaps, complete failures, for reasons that would be presently explained. But a few of us who have learned their needs, and have planted them rightly, either by design or accident, have found them to be very profitable, and to bear enormous crops of marketable and useful fruits nearly every year, with but very little care.

PROPAGATION.

How should they be planted to insure regular crops of fruits? In rows running north and south, with the trees four to eight feet in the row, several varieties (or even species) alternating; the more varieties the better. This is as near as we can come at it with our present knowledge. The rows should be twelve to twenty feet apart.

Why is it necessary to so plant them? Because it has been determined that very few of these plums can fertilize or pollenate their own flowers, and that they must receive pollen from some other variety or species of the Almond family, or the ovaries of the fruit will not be fertilized, but will all fall from the trees when quite small. A few of them are fertilized with their own pollen, but I have found none but what is more productive when near another variety with acceptable, potent pollen. Farther, we know that all varieties are not mutually fertile when near each other. Therefore, with our present knowledge we can only say as above, plant many varieties near together. If you were farther south we could give you a safe, simple rule, meeting all cases so far as tried, namely: Plant these plums six feet apart in the row, with every third tree of the variety known as Miner, for it seems to have pollen fertile with all and all others with it, and it is a good market plum. It is a cross between *P. Americana* and *P. Chicasa*, but as it is not hardy with you, you will have to plant by the general rule given and experiment for yourselves.

None of the Chickasaw plums are fully fertile on my place with their own pollen, or with that of other varieties of the species; therefore seeds produced on these, when fertilized by pollen of Miner or any variety of *P. Americana*, are hybrids or crosses, and from such seed I have, and you may all expect our best new plums.

The Wild Goose plum, in its peculiar characteristics, shows good proofs of being a hybrid between the Chickasaw and the peach; and

so far I have found no pollen that will render it fully fruitful except that of the Miner. It is partially fruitful with nearly all members of the Almond family. Many trees of it, old enough to bear fruit for the past ten to twenty years, entirely isolated from other members of the Almond family, have never produced fruit.

FERTILIZATION.

That we will eventually gain new and valuable hybrids, between nearly all the species of the Almond family I have no doubt. In fact, we have many such now, these peculiarities of the Wild Goose and other varieties are given here to prevent mistakes, for we might cast aside a most valuable thing that seemed entirely barren, but which if given a consort with acceptable pollen might be of the greatest value, and an important point which we must bear in mind when sending out any new plums we may gain from seed, or find in the woods, is this. I know that these plums (and many other fruits also) are sometimes changed radically, often in all their characteristics, by the pollen their flowers are fertilized with. That is to say: a plum that is not fertile with its own pollen, may give very choice fruit with the pollen of one variety and very poor with that of another. So plainly has this been shown on my place that I now fear to send out any of my new plums, until I have fruited them in a different environment.

And this fact explains why so many native plums that have been sent out, went up like a rocket in glory for a time, but eventually came down like a stick. They either have no fruit or very poor fruit when their location was changed. It is probable that a smile of incredulity may be spreading over the faces of this audience at this remark, but my friends I am giving you *facts* not fiction. Pollen has a powerful influence over the fruit and all its appurtenances at times, and I am confident that it has over the whole vitality of the tree or plant in some cases. You are not astonished at your corn mixing in the grain, when one very distinct variety is fertilized by the pollen of an other, nor with the members of the gourd family (*Cucurbitacea*) especially the watermelons. It is even claimed, and correctly I think, that two varieties of potatoes will have their tubers changed by pollen when grown side by side; such instances are, of course, the exception instead of the rule. Many other plants show such effects of pollen.

I have often seen and carefully studied complete changes in apples from this cause. In fact pollenization, hybridism, and the crossing of

varieties and species are *the great* studies of the future now barely commenced.

MARKETING.

Are these plums profitable as a market fruit? Growing fruit for market has been my principal business in North Central Illinois for forty-five years, all the fruits that could be grown in that region, and I have found no fruit that will nearly approach these plums in net cash returns for the amount of ground occupied and care given.

They sell everywhere readily. Our little town of 2,000 people absorbs 300 bushels a year at from \$2 to \$4 per bushel. Other large producers give the same report. One firm in northern Indiana reports sales of 2000 one-half bushel cases of Wild Goose plums, the past season at from \$1 to \$1.75 per case. When we consider the fact that these plums range in quality from those utterly worthless for any purpose, to large, luscious, most beautiful fruits, two or more inches in diameter, and ripening from June 20th until October, it is, of course found that value is dependent on variety. Nor is it true that the variety most profitable for market, is the one of the most value for home use. Miner and Wild Goose are the largest and handsomest of the older varieties that are passably good. They have a market value because they have been cultivated for many years and have become known, yet as fruits for home use, compared with others, they are very poor. The two best native plums for all home uses, that I have seen, are so inferior in looks that they would hardly be sold at any price in the open city market. Yet these two plums are so fine as to compare favorably with the best California apricots when canned and both placed on the same table, on a test of quality by fruit growers. They are both pure northern plums, free-stone, with very thin skins, and no bitterness; I shall not name them for there are no trees of them now to be had. I only give these facts to show what we may expect from these plums in the future. For one, I am convinced that they will prove our most valuable fruit for the Northwest, and of great value throughout the country.

VARIETIES.

What varieties should we plant? To this question I can give you Minnesota planters but very little advice of value. You must experiment yet for many years. All I can now say is, for you to plant of all the Northwestern varieties that you may deem worthy of trial, by hearsay or otherwise, such as DeSoto, Weaver, Wolf, Spear, Rollingstone, Pottawattamie, Forest Garden, Hawkeye, etc., etc. Hunt for good ones in the woods, plant seeds, get trees from Manitoba; a friend

says he found fine ones there in the woods. Top-graft the Chickasaws on the branches of the free-growing, hardy Northern plums. Get the "sand plums" and "sand cherries" from the West, and plant all near together, all mixed up. The Newman and perhaps Mariana seem to be the hardiest of the Chickasaws; they and possibly the Robinson, and I think the Miner, should be grafted in the branches of Rollingstone and Weaver.

THE CURCULIS.

Do not fear the plum curculio (*Conotrachelus neumphar*), for this insect has no practical effect on the fruit crop of these plums whatever. The twenty years of my experience with them shows this conclusively, and I will give it to you in a few words. This insect seems to prefer these plums as a food plant, and to lay her eggs in its fruits above all other plants, for the very good reason that they have through all time been her natural food plant. By most careful study I have found the facts as follows: (1) The plum curculio seeks the native plums the first warm days of spring for food, and reaches them generally before they bloom. (2) The curculio can at that time be very generally destroyed by spraying the trees just before the blossoms open and a week later they have fallen with the arsenical poisons, Paris green and London purple, as the insect is at that time feeding freely on the young growth of the tree. I give this plan, not to protect the plums, but as a means of a general destruction of this most injurious insect to other fruits. I have found no necessity for protecting any of these plums from the curculio. (3) If the curculio is even so plenty as to lay from one to twenty eggs in every plum, my experience has been that if the plums have been fully fertilized the trees will mature a full crop of marketable and useful fruit. (4) For but very few of her eggs laid in these plums hatch, and still fewer of her young, or larvæ, reach maturity. My estimates here, during four years of careful observation, proves that it takes more than 3,000 eggs laid in any of the over 3,000 varieties of native plums in fruit on my place, to produce one well matured curculio grub, except in the variety known as Wild Goose; and even in it not near enough mature to keep up the species, not more than one grub to each six hundred eggs laid. Therefore, as each curculio averages only one hundred eggs, then even if confined to this plum for breeding purposes the insect would eventually disappear. All of this is fully proven by experience with me. For, since my first great crop five years ago, nearly every plum which showed from one to twenty ovipositing

marks of the curculio, each succeeding crop has shown a marked decrease in the numbers of the insect, the last crop being practically free from her ovipositing marks, and showing by careful estimate a decrease in the five years of ninety-eight per cent, and this without anything whatever being done to destroy the insect or to protect the fruit from her. (5) These facts prove, I think, that a large amount of these plums in fruit will free a neighborhood of this most pernicious insect; that the fruiting of these plums alone in quantity will do it, and in that way deliver all our other fruits from its ravages. And, besides, we have absolute experimental proof that spraying the plum trees, as before mentioned, will protect the other fruits near by.

Propagation.—For the North, all the native plums should be on their own roots, or those of other fully hardy plums of the North. The “sand plums” and “sand cherries” of the West may prove useful. Your cherries should be top-grafted on these hardy plums.

Soil and Experience.—These plums are partial to a deep, rich, moist soil; near the base of a hill is a choice place for them, though they do finely on any reasonably good soil; but, if possible, should have a location somewhat sheltered from the strong winds of spring. This bush, in all its hardy varieties, you will find a most excellent windbreak for shelter. Many are planting them for that purpose. They fruit finely when growing very thickly.

P. S. Since writing the above, I have received a letter from Dr. C. V. Riley, Chief of the U. S. Entomological Division of the Department of Agriculture, Washington, D. C., in which he makes certain admissions and explanations, that settles for the time all questions in dispute, and I forward him my answer to his criticism on my paper. In the position that Dr. Riley sustains before the whole American people, he is obliged to be very communicative on new questions of fact, and knowing him intimately for twenty-five years, and having not the least doubt of my facts, I have no hesitation in placing the whole matter in his able hands for future adjustment. For the grower of stone-fruits a new era has dawned.



The next on the program was a paper by Mr. Barrett.

BENEFITS OF FORESTS.

By J. O. Barrett, Browns Valley.

As a guide to right conclusions, let us for a moment consider Nature's law of equilibrium between the animal and vegetable creations. The animal breathes out carbonic acid, mixture of oxygen and carbon; under the intervention of solar rays, separating and purifying the compound, the animal appropriates the oxygen and the plant appropriates the carbonaceous portion. Thus the two great divisions of nature reciprocally support each other. Obviously, then, that country is safest to live in and promises the surest profits for industry, where, other things being equal, the animal and vegetable creations mutually balance each other. It is no doubt true that our atmosphere holds its gasses in certain specific proportions over the entire surface of the earth, but it is also true that soils, forests, water and the configurations of a country effect the chemical condition of the atmosphere, that some localities may generate more of one kind of acid than another. For instance, where there is a large quantity of decaying vegetable matter, or gaseous fissures at or in bog lands, the immediate atmosphere will be unduly charged with carbonaceous gasses. Another fact is patent, that even in localities where the acids are in chemical balance, volume with volume, or weight with weight, they cannot be appropriated for the objects desired unless their quality is adaptable. Let me make this plain:

CHEMICALLY CONSIDERED.

Here is an acre of ground amply manured. It exhales at least one hundred and fifty cubic feet of carbonic acid every twenty-four hours. Are we yet sure chemical conditions are all right for a successful crop? If the raw material of the soil, such as lime, selicia, iron, magnesia, soda, is crude and non-vitalized; if the manure is "fire fanged," neutralizing its ammonial properties; if the genuine excrement is heavily mixed with wild, dry grasses, retarding decay, the crop will be a comparative failure. The nitrogen in such a manure pile, or in the fertilizer you buy for a soil dressing, may not be any better than a stone to feed a crop. Success hinges upon *quality* in the *quantity*. The primary elements of the original rocks, composing the constituents of the soil, must first undergo innumerable triturations and transposi-

tions, climbing the several steps of progress through nature's chemical crucibles, ere they can be nutritiously appropriated by the higher organisms of our culture. Fitness to selection after nature by our arts applied has passed the primaries through the necessary evolutionary processes. This is the order of assimilation and growth. Here is where our chemistry fails us; why its analysis of our soils proves little or nothing in *vital* economy. Nature mixed her waters and atmospheres, bone and develops her children in ways that confound all our boasted wisdom. Why is lime from the bones of animals far better fitted for agricultural purposes than lime direct from the rock? Why is scientific butter from the cream of the cow ninety-nine per cent better than oleomargarine from the chemist's greasy vat? Why are ashes from hard woods better than ashes from anthracite coal that was a coarse-grained forest about a million or more years ago? Why must the delicate rose have a peculiarly fine soil to warrant a blooming that enchants the very air? Ask the divinity in nature. The answer ever returns that success comes by adapting the laws and forces of nature to the instinctive needs of all living dependencies. For plants to grow well and harvest bountifully, for horses to be healthful and spirited, for cows to give rich milk, for any domestic animal to thrive on our lands with profit, for the angels of the household to be developed strong in body and mind, they all must be protected and have food of adaptable quality.

The decayed remains of trees generate acids far more potent than those of grasses that largely form the *humus* of unforested soil. As a test, apply the ashes of wood and the ashes of straw or hay to your crops. The difference is very marked. The ashes of different species and varieties are equally marked. To make substantial soap, the housewife wants the ashes of hard wood; soft wood does not produce the requisite strength and quality of potash. What will make good soap will make good crops. Where hard woods grow, and their decay becomes a cardinal constituent of the soil, is considered the most promising place for fruit plants. Are we of the prairie lands prepared for the hard woods? Our soil may not yet be fitted. The nut-bearing trees, such as the hickory, the walnut, the butternut, the white oak, are waiting their turn for trial. Meanwhile we must pave the way with the native trees of the new Northwest, such as the box elder, the ash, the cottonwood, the basswood, the willow, the elm, the pine, the balsam, the spruce.

As the digestive organs of the body develop food into blood, thence nerve and brain, so do the roots of the trees sip up the decomposing

salts, where they are embedded into their electro-chemical batteries that transform them into new structure, building life-cells. lifting higher its lung-leaves and blossoms that draw from and exhale upon the air nitrogen, oxygen and inter-linking carbonic acid. These with hydrogen and other gases are constantly generating, acting and reacting in nature's chemical laboratories, and by election and selection are ever passing through processes eluding our arts, to be fitted for construction in new forms of life. Take, for instance, nitrogen that enters largely into the constituency of plants; one of them is ammonia, and ammonia is a product of the decay of manures and other fermenting and putrifying substances. But how nauseating and sickening are these gases when just arising from the rotten garbage! When the plant roots have found the filthy stuff and carried its supporting acids upward, reconstructed, refined, vitalized, sun-fused and electrified, a bloom with fragrance and beauty, they are the same gases, but how changed, how inspiring to all sentient things! Now the higher organic creation can breathe such air and live. Thus trees not only fit the oxydizing salts in the soil, and thence their gases, for life-support, but serve to neutralize the breeding of malarious atmospheres.

DANGEROUS DISEASES.

Our State Boards of Health over all the country, maintain that Diphtheria, Scarletina, and other germ diseases are traceable to bad sewerage, barnyard washings in the water, and other unclean environment; and they recommend better drainage and the burning of all possible putrifications in the way. It is wise, but what health committee or legislation enforces nature's tree-hygiene? The more roots we can get into decaying matter, the safer for all things that live. Cattle men are studying how to eradicate pluro-pneumonia from their herds. Kill them off is the order; but this does not remove the cause. So long as they feed around malarial sloughs, on treeless plains swept by poisoned simoons, compelled to drink water full of deadly miasma and breathe feted air, subject to excessive heat or chill, microbic germs, latent in their organism, or imbibed by their surroundings, will be quickened into activity, preying upon their lungs and introducing consumption among the people. More forests for the herding cattle and colts with ample drainage of vacterian pools—this should be and must be the governmental order everywhere enforced. To neglect this duty is the unpardonable sin of agriculture. To procrastinate is the robbery of soil and atmospheric nutriment. To

plant no trees and cleanse no "augean stables," is to invite epidemics, then slay our herds and our children. Would there were trumpets of tension loud enough to thunder into some men's ears like an earthquake, and wake them up to a proper sense even of their own weal and happiness.

PRAIRIE PICTURES.

Go west, not farther than the Dakota border, and observe the pitiful dearth of forests on the prairie farms. Scarcely a field, or a pasture, or a barn, or a house is properly environed with trees. Indeed, on some farms not a single tree, or vine, or fruit plant, or cultivated flower can be found. The owner proposes to get rich raising wheat while head over heels in debt, and that continually. There is such a destitution of trees to demark the highways it is most perilous to venture out on a journey over the prairie in winter lest of a sudden a blinding blizzard stab with white daggers. The prairie emptiness when frozen up and down; the prairie dreariness amid wolfish howls of wind, iced in every breath, does make the settler long for the forested East or South whence he came.

We of the farther west are living in the great continental wind-trough that stretches from the plains of Texas to the Saskatchewan, from Eastern Kansas and Nebraska and Western Iowa along the western trails of the Big Woods in Minnesota to the foothills of the Rockies—a trough practically two thousand miles long and five hundred miles wide—territory enough for fifty millions more of people. True, there are belts of forests along the windings of the rivers, and under the enforcement of the timber culture act and the praiseworthy efforts of intelligent homesteaders, here and there is a forest; but in the main this vast extent is the sport and prey of remorseless winds that sweep unchecked from the frozen pole or from the tropic furnace, blasting in winter, blighting in summer; all men and beasts are strung on wire nerves through and through and all over. And don't we have to fight our way against oceans of weeds and devouring insects? against snow-blizzards that stuff a fellow full of borean wrath? against dust-blizzards that fill eyes, ears, nose, mouth and the entire epidermis with dirt and dinge, slimed on in the sweat of labor, till we look like so many resurrected mummies haunting the prairies in familiar companionship with the impudent gopher and jackrabbit?

FERTILITY AND FATALITY.

Our state geologists tell us the force of the winds are two times

greater on the open west than on the east side of our Big Woods; and that cold air in motion extracts heat proportional to its velocity, and with the heat goes moisture. According to this, if the ratio holds, during cold winds, heat and moisture pass off twice more rapidly on the open prairies west of the Big Woods than on the east. Would it not be a defensible scheme to extend the local advantage of the east side over all the western domain by forestry?

Everyone who has lived on the treeless prairie knows that snow, so essential to the protection of our plants and preparation of the soil for next year's crops, cannot long remain there on a level as on woodlands. It may be moist when it falls, but when a cold wind rolls its æreal wheels over, it soon laps up the moisture, and in a few hours cultivated fields are barren again as if swept by a thousand new brooms. With great struggle the fibrils send up their moisture to supply the depleted parts, but this, too, takes wing, and the plants are ruined by "winter seasoning." When the mercury is twenty or thirty degrees below zero, the air chilled to a dead lock, if properly clothed, you can endure the temperature quite comfortably, far more so than when the mercury is ten degrees above, and the wind plays a mad-cap race on the prairie. If you want to cool off a fretful sweat, stand at the northwest corner of your house just fifteen minutes, while old Boreas blows his horn. The experiment will give you some idea of the peril our stock and plants are in when thus exposed. In the summer season, on the open prairie, during the more chilly hours, you can actually see the moisture of the cultivated grounds drifting away on the air waves. At the right angle of observation there looms up to view humid strata, trembling, undulating in the wind, rushing on and on like the sea when vexed with storm. But the charm of it all soon fades into disappointment, when you reflect that the wind is thus savagely bleeding our early crops. Some of our most destructive winds in summer are from the south, almost burning up the very breath, and everything wilts as if touched with fiery flames. Hence, the necessity of forest belts at that point of compass, and elsewhere in the lines of prevailing winds.

WOFUL WASTE

From ten to fifteen per cent of our crops are annually destroyed by winds. The blossoms of wheat, corn, oats, potatoes, beans, apple and small fruit plants are thereby largely robbed of their fertilizing properties, and the harvest is therefore thin and scattering. Sometimes the ground covering to the cereals is swept off and piled up in dirt-ridges, as was the case last spring on thousands of acres.

Did you ever attempt to raise strawberries extensively on the open prairie? After a good enrichment of manure and cultivation, they branch out strong and prolific in July, and they do look so promising for a crop next year; but, of a sudden, comes a wind in saucy frolic, that rips up the half developed roots, twisting and driving them into clumps, poor, forlorn things! Despite the ruin wrought a few take root again, and again the cultivator does its work; and when the ground freezes for winter (following the rules laid down by Eastern horticulturists who may never have seen a prairie, presuming their methods are applicable to all localities), you throw on four or five inches of straw, and say confidently, "lie still, my darlings, safe from harm!" but sometime in March, or earlier, a genuine snorter from the northwest, or other point of compass, pries under the straw and rolls it up into heaps, smothering to death the plants underneath and leaving the rest out in the cold, to frost, heave and dry up. Courage, man! some are alive next spring; how tenderly you foster the brave starvelings destined to be robbed of nearly all the pollen they can produce! But the berries—they are like little child angel visits, few and far between; but enough to warrant the honest report—"We can raise strawberries on the open prairie at a cost of fifty cents a quart—fact!" But, for all that, strawberries and other small fruits, including some of the hardy apples, can in time be made a success, if, lessening no energy in the fruit line, we haste to develop forest belts, evergreens especially, safely enclosing our precious charges at proper distances.

A plea, too, for our stock that suffer so for want of trees. Finding no cooling shade, how the cows madden in midsummer, besieged by flies sucking out their life-blood! How the beautiful colts, finding no thicket to escape into, dash along the barbed wire fences, slitting up their ears, tearing open their breasts, maiming themselves perhaps for life! Such a fence is the most develish thing ever made; but has the farmer a just reason to curse the inventor, while the injury to his stock may be mainly due to a famine of trees in his pasture? Nothing creates such a reign of peace among stock as trees. Reposing under their green arches, the cattle there chew their cuds in sweet satisfaction. The horses there huddle together, their heads resting upon each other's necks half asleep, and near by the sheep with their noses close to the ground to sniff the coolest air. How well they appreciate their master by good behavior!

It is problematical whether, in the long run, thoroughbreds can retain and transmit their superior points and qualities, pastured and fed

in a treeless country. Environment develop corresponding attributes in everything else; why not in stock? Some of us settlers, known in the East for our Christianly mild disposition, have, strangely to relate become ill-tempered, living on the treeless prairie. Like man, like horse or dog, your answer.

Our business, too, will materially suffer, and that very soon, unless we early and promptly attend to forestry. We are fast depleting the valuable timber. Where shall we get our supply in the future for fuel and manufacturing? What are we doing to compensate for the loss? Doing? Why, cutting and slashing where there is anything of the kind left, with a vandalism more implacably avaricious than ever characterized the feudal ages. By mathematical measurement it is found that our Minnesota river drainage has an area of 19,000 square miles, nearly destitute of forests; the upper Mississippi drainage is about 23,000 square miles, mostly forested; thus the Mississippi has about a quarter more drainage than the Minnesota, and yet at the confluence of these rivers near St Paul the Mississippi gives us seven times more water than its competitor. There can be no other cause for this disparity than the water ratio between a treeless and a forested country.

The Minnesota is largely fed by springs from the Coteaux in Dakota near the western boundary of our State, a mountainous rampart stretching nearly north and south about seventy-five miles. These springs flow down numerous ravines wherein long, zigzag forests, have been growing for centuries. In keeping with the marauding instincts of the whites the Sisseton Indians are using up the great trees for wood to sell in our markets. Are they blamable? You would not think so were you to inspect their condition. Something should be speedily done by Congress to preserve these forests, and thereby preserve intact the headwaters of the Minnesota, whose valley cannot be excelled for richness and for business that leans dependently upon the river for refreshment to crops and force to manufactures.

The same depredation, on a larger scale, is going on around the sources of the Mississippi—fast slaying and burning the forests. If not soon arrested, the whole climate of the State and contiguous states will be colder and drier, irreparably damaging agriculture and all its correlative branches of industry. Not only such calamities will follow, but the whole country along the river channels will be subject more than ever to great floods, spreading ruin in their march to the south.

POINTS TO PONDER.

Not only do forests trap the snows and rains, holding back the spring floods, but, by their shading leaves and limbs, they check excessive evaporation, thus husbanding moisture for more equable and economical distribution and increasing the precipitation, which in Minnesota is but twenty-eight inches. Not only do they serve as media that connect the minerals of the soil with the gases of the atmosphere to fit them for appropriation by the higher organisms, largely neutralize the breeding and ravages of germ diseases, protect our rivers and lakes from drying up, break the force of destructive winds and shelter our State and homes, but they invite hither the furry animals to people again the woody retreats, and insect-devouring birds that save our crops to a large extent from the depredations of parasites on all our plants in field and garden; they conduct electricity between the air and ground, and quicken all living things into new vigor; they furnish healthful acids and fragrances for man and beast; they spread their humid mantles over us, warming the landscape in winter, cooling it in summer; they check the escape-ment of heat at night and send it back to the plants safe from killing frost; they beautify all the country, evoke poetic and artistic thought, inspire lofty endeavor and nobility of character.

Summing up all these benefits, which are but a moiety of the great whole, can we in justice to ourselves and future generations postpone the matter of forestry? It is possible and practical for us to bridge over the continental wind-trough of which we spoke, with a humidity that will transform it into an Eden. As it is now, the rain-sheets from the Alleghanies and other mountained regions of the east, expend their force ere they reach us; and the rain sheets from the Pacific, winged eastward, surge against the western slopes of the Rockies, cutting off supply from that direction. Thus the richest part of North America becomes almost neutral ground, less subject to precipitation than more remote localities that have soils far inferior. Being mostly treeless prairie, the north and south winds, deflecting southerners nearly in the same direction, driving hot or cold daggers into everything, produce an excessively dry atmosphere which would speedily change our adopted country into another Sahara, were it not for porosity of soil and understrata of clay that reserve what water filtrates through to feed the roots in seasons of drouth. Under all these local disadvantages, the great enterprise of conquering a climate suggests itself. If all the provinces and states in the Red river and

Mississippi valleys from Hudson's Bay south to the Gulf of Mexico, would pull together, and with munificent appropriations reclaim by forestry all the now barren regions, constructing dams across the outlets of the innumerable spring fed ravines to hold back the surplus waters running to waste, and induce the thousands of farmers throughout the mid-continental domains to develop each ten acres of native trees; if our own State, co-operating with Dakota and Manitoba, would embank the deep basins in the far north, converting a wild and desolate expanse into great lakes over which the polar winds blowing, will bring to us vapor blessings instead of frigid curses; if Congress would early execute the late recommendation of the Commissioner of Agriculture at Washington by the construction of vast water reservoirs among the Rocky Mountains, wherewith to irrigate bountifully all the plains below, and bring to our prairie lands, laden on every breeze from these elevations, supplies of rain, and moist, and dew, and protecting snow; if all this be done with unity of force, within our century we shall have initiated a conquest over our climate, whose beneficence cannot be measured. Is not the enterprise feasible? A people that has vanquished the wolf, the savage and the great rebellion, can accomplish anything.

FORESTRY PROTECTION.

By Clarence Wedge, Albert Lea.

I understand that our Society spent much of its time at its last meeting on the subject of forestry. I wish to heartily commend its course. A very practical way of getting hardy varieties of fruit is to reduce the hardness of our climate; and when we shall have accomplished this by systematic forestry, fruit will be one of the lesser blessings following in its train.

Protecting, extending and systematizing our forests is one of the police duties the State owes to its people. We need protection from blizzards almost as much as we do from burglars. Great belts should be planted in the prairie districts, belts half a mile wide, extending through each township east and west, north and south, forming a network of barriers to our storms. Waste land, swamps and bluffs, should be given a leafy covering, and be made to contribute to the public welfare by holding the snows of winter and the rains of spring for our summer drouths.

The necessity for this work is urgent, and the benefits resulting therefrom will be universal. And when to this general and public work is added the evergreen shelter belts which every farmer should erect about his home and barns; and the rows of elms, maples and walnuts which should line our highways and avenues, we shall have completed the transformation of a snowy wilderness into the happy garden spot of the earth.

Albert Lea, March 1, 1888.

The following paper by Robert Hale, secretary and treasurer of the Minneapolis Board of Trade, was then read:

GARDENING AND FLOWERS

By Robert Hale, Minneapolis.

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

When invited by your President to prepare and read a paper upon some branch of horticulture, I was not a little astonished, as I never laid claim to a sufficient amount of knowledge of any branch of this complex science to prepare a paper that would be either interesting or instructive to an audience of practical horticulturists; but having a great love for all pertaining to the science, and in early life some practical experience in agriculture, and in the past few years in cultivating a town or city garden, I consented.

It will hardly be expected at this time, when there are so many able publications, and books treating the subject, by some of the most learned men and women of this age, who have treated all branches of agriculture and horticulture with eminent ability, that anything very new or original can be produced by an amateur.

I have read many of the works and found great pleasure in them, as well as cultivating my garden. What may therefore be expected can hardly be more than the thoughts and views of many others, commingled with some of my own personal experience.

The subject to be considered by this paper is that branch of horticulture relating to gardening, and the moral influence of flowers and the cultivation of them. The subject will be briefly treated under four (4) heads.

1. Market gardening.
2. Farmers gardens.
3. Town or city gardens, and
4. The moral influence of cultivating a garden and flowers, and of flowers.

By horticulture as a general term is understood to embrace all that part of the culture of the soil which pertains to the cultivation of fruits, vegetables, flowers and all that pertains to the ornamentation of grounds, and some adornments by means of everything growing out of the soil.

The first and most important consideration in the cultivation of any garden is the soil and location or situation.

It is of great importance that the soil be adapted to the purpose, and to receive the warmth of the sun in that part of the day between the middle of the forenoon and the middle of the afternoon.

A soil containing a large proportion of loam with a small proportion of sand, or sandy loam, with good and ample drainage, either by the natural slope of the land—or if too flat for natural drainage—under or tile drains—and with a southwestern inclination, is the best.

Heavy clayey soils are not so well adapted for garden culture, but if only such can be had, it can be greatly improved, by the application of sand, or sandy loam, in proper quantities, and with plenty of fertilizing material of the proper kind—all thoroughly incorporated by well and thorough mixing and cultivating.

The importance of thorough drainage cannot be too strongly urged—for no vegetable can grow in pools of water.

Whatever the character of the soil, or location, the best success with any crop will depend on the quantity of manure applied, which must be thoroughly mixed by cultivating, and the more thoroughly this is done the more certain will be the crop. From my own experience I feel warranted in the assertion that with plenty of manure, and the required amount of labor to incorporate them—the elements combined so that the roots of young plants may reach and take in the elements of plant life, will be certain to produce a good crop even though the season may be unfavorable. This will hold true in nine cases out of ten.

If any other requirements should seem to be needed, I should emphatically recommend frequent applications of liquid manure, and frequent stirring of the earth, or cultivation. In my own garden I use liquid manure for all flowers and a few vegetables, no matter what the condition of the soil may be—with good effect.

The last, and one of the most important considerations for good crops in any garden is that all weeds should be exterminated as soon as they appear. They are to a garden what anarchists are to enlightened society, and neither should be suffered to exist, but be eradicated—exterminated upon first appearance.

MARKET GARDENING.

In the immediate vicinity of cities and large towns, the cultivation of vegetables and small fruits for the daily supply of the market has become one of the large industries, and in our own country employs a large army of people of both sexes. In the cultivation of vegetables for market, the land should be laid out, and the rows such distance apart as admit of the largest part of the work to be done by horse cultivators; the longer the rows when so laid out, the more economical the cultivation of the crop. In this class of gardening, the owner if well versed in his business, should and will arrange for the earliest vegetables that can be grown, when followed by others throughout the season, and of some kinds, several crops may be raised on the same land. It will be of great advantage, and increase profit to the owner, to start many kinds of vegetables in hot beds, which are not expensive, and even raise them in such beds for market, before they can be grown in the open air.

Of the particular kinds of vegetables to cultivate for market, the intelligent gardener well understands, and will arrange to have them, or some of them for all seasons, and the small fruits in their season, strawberries, raspberries, blackberries, currants, etc., all of which find a ready market in their season, at good prices.

The best method of cultivating any one of the garden vegetables, or small fruits, would require an entire essay, and many have been written, and I have no doubt been read by every person in the audience, and I omit anything further on the subject.

FARMERS GARDENS.

I am aware that few farmers plant and cultivate such gardens, as they would find of great benefit and profit in cultivating, and the oft assigned reason is, other and more important farm work, want of time, etc.; when garden work is necessary to be done, such are not valid reasons. The preparation of a garden plat, plowing, manuring, etc., will require but little time, and when seeds are provided, and on hand, either raised or procured from the seedman, before the com-

mencement of farm work, but little time needs to be taken from other work to do the planting, and much of the care of it can be done by the children, and odd jobs by farm help. Every farmer's garden should be set with all the small fruits, which will require but little attention for years.

I remember reading an able article several years ago, by the late Geo. Geddes, of Syracuse, N. Y., who was one of the best writers (as well as farmers) on agricultural subjects, that I have read, in which he says, that the average farmer entirely underestimates the value of the products of a good garden, as it would supply a large part of the living of the family, and at the same time increase the health and pleasure of the whole family, workmen and all. I can fully confirm the statement, by my own experience in early life as a farmer, and later as a gardener to a small extent.

TOWN OR CITY GARDENING.

The writer cultivates a vegetable garden in this city, and has for several years, making no pretensions to scientific skill, but has been successful in obtaining a large quantity of vegetables and small fruits from a small plat of ground; all the bed vegetables—corn, potatoes, beans, squashes, tomatoes, melons, cucumbers, pie plant, horse radish, lettuce, radishes, etc., etc., with an abundance of currants and raspberries, and a much larger quantity than the family can consume. I have raised five or six crops of radishes, and the last season two crops of beans on the same land; the seed of the second was from the first crop on the same ground, and we had an abundance of string beans before the frost, and if I had planted them as early as I could, we could have had shell beans before frost. The plat of the second crop, a beautiful light green, after all the other vegetables ripened and passed, were as handsome as any portion of my flower garden. Every person understands the advantage of being able to gather from one's own garden any of the vegetables or fruits over those obtained from the green grocer, which may have remained over for days and withered, or far from being fresh. I regard the labor bestowed upon the cultivation of my garden as one of the best investments I could make; the result is very great pleasure and greatly improved health, therefore I make the most of it, and do all the work myself except cutting the grass on the lawn

MORAL INFLUENCE OF THE CULTIVATION OF FLOWERS—AND OF FLOWERS.

The cultivation of the beautiful should be the desire of everyone. Goethe's beautiful sentiment, "Cultivate the beautiful, for the useful encourages itself," is worth remembering and practicing. "Flowers," says Ruskin, "seem intended for the solace of ordinary humanity—children love them; quiet, tender, contented ordinary people love them as they grow; luxurious and disorderly people rejoice in them gathered. They are the cottager's treasure, and in the crowded town mark as with a little broken fragment of rainbow the windows of the workers in whose hearts rests the covenant of peace. To the child and girl, to the peasant and manufacturing operative, to the Grisette and the nun, the lover and the monk, they are precious always."

I have a great pity for any one who does not love flowers.

"The love of the beautiful never becomes extinct in the human soul. It may be crushed by selfishness and avarice, blurred and stained by sin and crime, but deep in every heart the latent spark remains, and needs but some purifying influence to spring it into healthy action."

"Flowers," says Pliny, "are the joys of the shrubs that bear them," and that eminent observer might have added, "and those who cultivate them."

The health and pleasure derived from the cultivation of flowers to those who love them are of the highest importance. I never pass the dwelling of a person in whose yard or window I can see but a solitary flower, but that a feeling comes to me that within is a cultivated taste, a kind and loving heart, and a happier home than where no flowers are seen.

The list of flowers I usually plant are: Geraniums, pansies, verbenas, heliotrope, rose geranium, phlox, of variety; nasturtium, feverfew and golden feverfew for borders, on account of colors; sweet allysum, balsams, foliage plants (colors), tulips, hollyhocks, peonies, lobelia, portulacca and poppies. They are planted without regard to scientific combination, but very much as wild flowers grow on the prairies or in the woods, considerably mixed.

The writer has never seen a flower, either wild or cultivated, that was not handsome; nor have I, in a long life, seen a person who loves flowers that was a bad person. Of late years I have derived more real pleasure and happiness from the cultivation of a few old-fashioned flowers than many a man with his millions.

My own pleasure is not all, for *mine* is by no means diminished, if others, strangers and neighbors, derive pleasure by seeing them.

During the past years I have had ladies call and personally thank me for the pleasure they have derived from viewing them as they passed. I have frequently seen people passing, suddenly stop, and use such expressions as "Beautiful!" "Ain't they handsome!" and others similar, and I plead guilty to a little vanity—if that is the best name—that others are pleased at the little I have done; it adds greatly to my own pleasure. Nothing has, however, given more pleasure than to see a class of persons having a taste for flowers but not the means of obtaining them come round to view mine. I allude to nurses in charge of little ones in their little carriages; and I have seen the past summer at one time five of this class apparently deriving pleasure from seeing the flowers.

I have a little neighbor, one of the finest children I ever saw, just able to walk and talk, who loves flowers as well as I do, and when he visits me he always gets a few for himself and a few more to take to his mamma, and with the sweetest smile I ever saw on the face of a child, the "thank you" he never forgets to return is to me the highest compensation that could be returned. I love that child, and all others that love flowers.

Who can measure the happiness and pleasure, not to mention the advantages to the health, to the poor and sick, who are supplied by the Flower Missions!

I am sure they are great, and hope such missions may be extended to every town and village in the land where none now exist, even if none others than wild flowers can be had. I have quite a number of very pleasant notes from friends to whom I had sent flowers when sick, and from some who were not sick, which are very gratifying. So great do I consider the refining, and, if you please, the Christianizing influence of flowers, that I would have all school children taught how to grow them; and I would have a bed in the yard of every school-house, at the cross-roads, in the village and city, as well as in the yard of every prison and reformatory institution in the land where the unfortunate are kept for the safety of society; and in every park where people go for pleasure; and in every cemetery where the remains of dear ones are deposited. Some of the latter in the East are the most beautiful places I have ever seen, and I hope the custom will become general.

At the present time, the only apparent use of life seems to be to obtain great wealth—a reasonable amount does not satisfy, and in

order to obtain it with greater rapidity than individual efforts can accomplish, "trusts" of all kind are formed, which are none other than combinations to put up prices of all articles to consumers and compel them to pay unreasonable prices—light, fuel, bread-stuff, meats and almost every article of daily consumption. Such are the causes now so often heard of the cry of oppression, and not without reason. This is a digression from the main subject, but is admissable only on the ground that a halt should be called and the rising generation educated in a different way. In my experience, with a few exceptions, any great amount of wealth is not a source of greatly increased happiness. I would, had I the power, teach the young to love the beautiful, and be satisfied with a moderate share of this world's goods.

I have recently been interested in reading some accounts of a lady of great wealth, mainly inherited by herself and husband, who has distributed hundreds of thousands of dollars, and the manner she used it, to benefit those less fortunate than herself,—the late Mrs. Astor, of N. Y. I am of the opinion the lady received more real happiness in giving than the recipients in receiving. I will read a short article taken from a late paper of that city.

"Beneath a glass case in one of the magnificently furnished rooms of the Astor mansion, at Fifth avenue and Thirty-third street, were some wax flowers and other little fancy knick-knacks. If put up at auction to be sold on their merits, the whole lot would hardly have fetched the price of a song, certainly not of a popular imported song when it first comes out. The workmanship was neither skillful nor artistic. It was exceedingly amateurish. And yet, surrounded as she was by beautiful pictures and other costly products of skill and genius, Mrs. Astor prized highly these exceedingly rudimentary attempts at art, and gave them an abiding place among her treasures.

"To a few favored friends she would explain why. They were the offerings of childish hands. They were given her by poor children, into whose lives she had brought sunshine and happiness, and lessons of goodness that might bear fruit in later years. They were voluntary offerings from the children of the Industrial School in East Fourteenth street, near Avenue B, which Mrs. Astor founded nearly twenty-five years ago, and which she watched over with loving care while she lived, although the school was under the supervision of the Children's Aid Society. Mrs. Astor loved children, and prized these humble gifts because they were mementoes of childish affection which she had won. They represented that which wealth could not purchase. Truly their presence in the Astor mansion was significant of much."

I have been informed by a person who was an intimate acquaintance of the lady, that she was passionately fond of flowers, and I imagine that, with the additional pleasure of seeing the efforts and results of children, who no doubt also loved them, and who she had aided—and who had only been able to produce very imperfect imitations—were the two causes why she gave them so conspicuous a place among her costly works of art.

Mr. President, if you and your associates think this an unwarranted digression, it only proves the great mistake you made in inviting me to prepare a paper.

Finally, whatever conduces to the pleasure and happiness of the people, if useful and elevating, and which will elevate the aims and purposes of life, should be encouraged. Such, to me, is the aim of your association, and the result of the untiring labors of your Society; for the twenty-one years you have devoted to it, will be felt long after your work has been finished. I may be permitted to say, that I am well aware, in this rigorous climate, much has to be done beside cultivating the beautiful, and few can spare the time to do very much; but the example on a small scale, and by a small proportion of the people, will exert a far greater influence than many people believe. Many people, at this time wholly occupied in business affairs, apparently think it a small matter, and beneath their notice, to give time or attention to the adornment of homes. Whoever entered the parlors of a friend, where but a few old fashioned flowers are seen on the mantel, but were pleased. No marriage ceremony can be consummated without beautiful flowers; nor the last rites of burial of dear friends without them. They are beautiful at all times, and everywhere, and exert a powerful influence for good.

My eyes have never beheld a more beautiful and inspiring sight than is seen on the table in front; no artist was ever born that can equal nature; they may, and do, approach very near. The God I worship is as beautiful and lovely as the most beautiful of his works, which surround us on every hand—with no hate or revenge, but who would have all His children as good and pure and lovely as these beautiful flowers.

“ Look at the lilies, how they grow.”

’Twas thus the Savior said, and we,
E’en in the simplest flowers that blow,
God’s ever watchful care might see.

“ Shall He who paints the lillies’ leaf,
Who gives the rose its scented breath,
Love all His works, except the chief,
And leave His image, Man, to death.”

“ There is not a flower can grow upon the earth
 Without a flower upon the spiritual side ;
 All that we see is pattern of what shall be in the mount
 Related royally, and built to eteine significance.”

THERE IS NOTHING SMALL.

“ No lily, muffled hum of summer bee,
 But finds its coupling in the springing stars,
 No pebble at your feet, but proves a sphere,
 No chaffinch, but implies a cherubim.”

“ Earth is full of Heaven,
 And every common bush afire with God.”

DISCUSSION.

Mr. Dartt. I wish to call attention to the blighting of fruit last season. Some ten days before blossoming time last spring we had a snow storm and frost. I examined the fruit buds after that and found the blossoms literally full of insects, that are known, I think, as thrips; they were of all sizes from a sixteenth of an inch to the merest speck. They seemed to be moving about but I did not know why they were there; and it is a question with me whether those insects did not destroy the plum crop last season. The blossoms remained a short time and then withered.

Prof. Porter. My theory in regard to the loss of the plum crop is that it was mainly caused by the dryness of the atmosphere at that season and a want of fertilization of the fruit blossoms.

Mr. Urie. Might not that condition have been avoided by spraying the trees? I knew a man in Illinois who raised large crops of plums every year, and he sprayed the trees with warm water.

Mr. Harris. The cause of the failure of the crop last year was no doubt the dry weather. Spraying of the trees might be of advantage.

Col. Stevens. There is a valuable plant growing wild on the prairies in Dakota that ought to be cultivated generally, it seems to me it is very valuable. I refer to the shrub *Sheperdie argentea*.

Mr. Gibbs. The Dakota Horticultural Society mention it as one of the wild shrubs or trees, which it recommends for general trial. It grows wild in both South and North Dakota. It is probable the seeds were brought by birds. I have it growing on my farm.

Prof. Porter. I have experienced difficulty in the germination of the seeds and would like to know how to grow it

Mr. Sias. Mr. Benj. Bear of Eyota, a friend of mine, when coming

across the plains brought some sprouts of the buffalo berry and planted them. I was at his farm several years ago, and found his trees eight or ten feet high and literally loaded with fruit. He gave me a number of trees which I have set, and they are looking fairly well.

Prof. Porter. I shall get trees from the Sisseton reservation, as I am informed they grow there in large quantities.

Col. Stevens. I was there in an early day and did not find them. I think you will find plenty of them at Devil's Lake. They bear transplanting very well.

Mr. Sias. I planted a pint of seed and had the same trouble with them Prof. Porter speaks of.

Prof. Porter. I consider the buffalo berry one of the most promising trees we have.

Mr. Brand said, J. H. Brown, of Lac qui Parle county, had a good many other trees in his garden. He had examined them and considered them a nuisance as a hedge.

President Elliot had received a number of the plants from Fort Lincoln, three years ago, a part of which had lived, but he had doubts as to their value for a hedge.

Col. Stevens. As a hardy plant there is nothing superior. It grows at Fort Buford without sprouting out at all. It is one of the finest plants we have in the northwest for ornamental purposes and for a hedge; I am not speaking of its fruit.

Mr. Smith. Are there not two varieties? I have seen those that succored very little.

Col. Stevens. I think there are two varieties.

Mr. Urie. Chas. Hoag has them growing in North Minneapolis.

Col. Stevens. The fruit is almost equal to a currant after the frost.

Mr. Gibbs. The Shepherdie is on our list for trial. There are characteristics about it that make it very attractive. It is an ornamental plant. It is the latest tree to hold its fruit that I know of and it keeps its leaf until late, and is valuable on that account.

Mr. Smith. It bears cutting well.

Mr. Gibbs. Yes, and it is almost independent of drouth and bears abundantly; one of those plants adapted to a dry country. It seems to be at home in the arid regions of Dakota; where the annual rainfall is less than twelve inches. For an ornamental hedge it must be desirable. The fruit is good but it takes quite a time to fill a box with them. The flavor is similar to that of the cranberry; it makes nice jelly. If any of the horticultural experiment stations in this State

want specimens of the plants for trial I shall be glad to supply them.

Prof. Porter. I shall be glad to give you an order and to pay for all expenses, as I am exceedingly anxious to propagatate it. I have not had success in making the seeds grow.

Mr. Pearce. Plant them in the fall under a board and I think they will grow.

Prof. Porter. I planted seeds a year ago in October.

Mr. Harris. They may come next spring. I planted some plum pits that failed to grow the first year.

Prof. Schotzka. Mr. Chairman, nature teaches us that these berries remain on this shrub during the winter; if allowed to remain till spring and then planted when they are ready to drop they will grow more readily. The same holds good with cranberries. The seed will germinate five days sooner than if picked when they first ripen. One thing I wish to mention in regard to the larch being hardy. When it stands alone it is the hardiest. Norway Spruce is the hardiest when the trees are grown close together. A larch twelve years old is worthless for fence posts; the wood is spongy. We have to ripen the wood and then it is valuable for any purpose.

Mr. Pearce. Is the larch good for posts?

Prof. Schotzka. It is just as good as any other wood, except red cedar and locust, which are the most durable of any timber we have for posts.

Mr. Pearce. How long will it last?

Prof. Schotzka. It lasts fifteen years. Where the area in timber is limited there should be greater economy used with wood and timber. Posts may be preserved, and will last twice as long if they are charcoaled.

Mr. Fuller, from the committee on the president's address, presented the following report, which was adopted:

REPORT ON PRESIDENT'S ADDRESS.

The committee on the president's address would call the attention of the Society to the following recommendations:

1. We recommend that the committee on legislation continue to look after the tree law and secure any amendments found desirable.
2. That the same committee, or a new one be appointed, to secure an efficient law to protect our State from the depredations of the incoming English sparrow.
3. That the same committee, in connection with the forest tree

committee, also secure the best law possible to secure the forests of our State.

4. That the culture of small fruits be urged on all our people, in country and village, and that amateurs use only the old and well known varieties.

5. That the dissemination of information in regard to fruit growing and tree planting is very desirable, and that the press, and especially the platform of the farmers' institutes, should be used for this purpose.

G. W. FULLER,
J. S. HARRIS,
A. W. LATHAM,
Committee.

The report of the committee on legislation being called for, Prof. Porter said there was nothing special to report that had not been pretty well ventilated during the present session. A larger number of copies of the transactions of the Society should be printed, and more of them should be bound in cloth. He wished to emphasize what the Secretary had said on this subject in his annual report. It was better to have fewer copies printed, if need be, and have more bound volumes.

Col. Stevens, from the committee on final resolutions, presented the following which was adopted:

FRUIT RESOLUTIONS.

The committee on resolutions would respectfully report:

That we desire to thank the citizens of Minneapolis, for their hospitality during the session of the Society. We also desire to thank all of the railroads that reduced their regular rates for the transportation of the members of the Society in attendance at the annual meeting.

The committee would also recommend the continuance of the committee on seedlings and fruits for another year.

Mr. Smith moved that the question as to the publication of the prize essays be referred to the committee on publications.

Col. Stevens. Would it not be better to print all of them?

Mr. Pearce. I think not; to print those that received the prize will be sufficient.

The motion of Mr. Smith was carried.

Mr. Pearce extended an invitation to the Society to hold its summer meeting at Lakeside Nursery, near Lake Minnetonka, and promised

to see that ample accommodations were afforded to members of the Society in attendance.

Secretary Hillman called attention to the meeting of the American Horticultural Society in California.

Mr. Harris said he understood J. T. Grimes would represent this Society at the session held at San Jose. He moved that President Elliot be requested to act as a delegate if possible to do so at the session to be held at Riverside, in February.

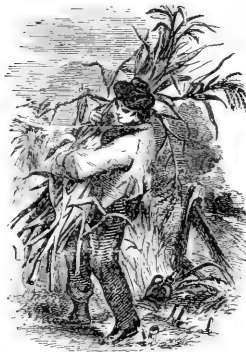
The motion was adopted.

On motion of Mr. Pearce the Executive Committee were authorized to appoint delegates to horticultural meetings.

Mr. Harris moved that the salary of the Secretary for the ensuing year be fixed at \$500; of the President, \$25; of the Treasurer, \$25; of the Librarian, \$10; that the Vice-Presidents be allowed their traveling expenses on making a report for their several districts; that members of the Executive Committee be allowed mileage or traveling expenses when necessarily called together. Adopted.

On motion, Messrs. Harris, Sias and Wilcox were named as a committee to make and present at the next annual meeting a catalogue on fruit.

On motion of Mr. Smith the meeting adjourned *sine die*.



SECRETARY'S PORTFOLIO.

DEFERRED PAPERS, REPORTS, NOTES, EXTRACTS, ETC.

INTRODUCTORY NOTE BY THE SECRETARY.

We are much pleased with the high order of the essays, papers and other contributions which appear in this report. A great variety of subjects are thoughtfully considered, evincing an awakened and lively interest in the cause of horticulture, as well as kindred topics.

Garfield, the model secretary of the Michigan state society, says: "I earnestly believe there is no occupation in the world that may be made so delightful and captivating as horticulture." This is a proposition he no doubt has proved to his own satisfaction by personal observation and experience, since he is both a practical horticulturist and indefatigable worker in literary fields as well; and in connection with his report he furnishes each year a valuable and interesting portfolio.

It would afford us pleasure to follow his example by gathering together some of the numerous articles, items, editorial gleanings, and the like, which may be found from time to time in leading papers and horticultural journals of the land. But as our space is limited we must give room in our reports to matters mainly of a local nature and seek from year to year as far as practicable, to furnish a faithful outline or history of horticultural progress in this State. In our report of the proceedings at our annual meeting, we have endeavored to condense to some extent in order to avoid unnecessary repetition and save sufficient space to bring the present volume within a proper limit as to size. We therefore feel compelled to limit the succeeding pages somewhat, although omitting many worthy things of real interest and value.

IN MEMORIAM

Following is the report of Committee on Obituary :

During the past year death has taken from us William Cannon, an old and highly esteemed member of this Society. He was formerly a resident of Minnesota, but for several years past had resided at Fort Abraham Lincoln, Dakota.

PHILO WOODRUFF.

The subject of this sketch, an honored member of this Society, and one of the pioneer horticulturists of this State, died April 21, 1887. The *Faribault Republican* of April 27th, says :

“ Hon. Philo Woodruff, a well known and highly respected citizen, died very suddenly of heart disease, at his home on First street in this city, on Thursday evening last. He had been in his usual health until within an hour or two of his death.

“ Mr. Woodruff was born near Binghamton, Broom Co., N. Y., in April 1815. His father was a Calvinistic clergyman. The son came west to Indiana, when a young man, attended college at Crawfordsville, and while completing his education worked during vacations at carpentering and other mechanical trades. He assisted in the building of the first Presbyterian church erected in Fort Wayne, Indiana. He lived at and near St. Joseph, Mich., until 1852, when he went to California. He came to Minnesota in May, 1855, and settled on a farm in Waseca county, and was prominently identified with the early development of his county. He was a man of good education, and possessed of much general information. He represented Waseca county in the legislature in 1864, and for four years after was engaged as special examiner and appraiser of lands in the Sioux reservation. In 1856 he planted a quantity of apple seeds, from which he raised a number of fine seedling apples, which were productive for a number of years. In 1857 he sent to Washington and got some Sorghum seed; that fall he made the first syrup made in Waseca county, if not in the State. In June, 1846, at Cleveland, Ohio, he was married to

Mrs. Elizabeth A. Cable, a very esteemable widow lady, whose maiden name was Craw, and who survives him. Mr. Woodruff was a firm believer in the religious doctrines of Emanuel Swedenborg, and was very zealous in propagating them. One among the last acts of his life was the gift of a case of new church books to the Faribault Public Library."

CHARLES HOAG.

Charles Hoag died Wednesday Feb 1, 1888, at his late residence 528 Aldrich avenue, Minneapolis, in his 80th year. The immediate cause of his death was water on the heart, but his last illness may be traced to a fall which he received while picking cherries in October.

Charles Hoag was born at Sandwich, N. H., June 29, 1808, and was educated at Wolfboro Academy and a "Friends" school in Rhode Island. At the age of 15 he commenced teaching and remained in that profession until he was 42 years of age. He was principal of a Philadelphia, Pa., grammar school thirteen years, and came from that city to Minnesota in 1852, bringing with him a cultivated taste for trees, fruits and flowers, acquired in that staid city. He took up 160 acres of land, a part of which now forms the site of the West Hotel in the city of Minneapolis. He was a member of the first council, second treasurer of the county, and superintendent of schools four years. In 1874 he removed to his farm "Diamond Lake," Richland township, and resided there until some three years since when he returned to Minneapolis. Within a few weeks after his arrival in the then frontier settlement he had the distinguished honor of giving the name Minneapolis, a combination of the Greek and Indian tongue, (literally water city) to the little hamlet of scarce a dozen actual settlers, which has in less than forty years grown to be one of the largest, busiest and most beautiful cities in the Northwest.

During the early years of the city he was a man of wealth and influence, and a recognized leader in all public improvements, but the panic of 1857, as with hundreds of others, caught him with his real estate heavily mortgaged, and he was only able to save enough from the wreck with good management to make his old age comfortable and leave his widow independent for life. Mr. Hoag was twice married. His first wife died in 1871, and two years later he married Susan F. Jewett, who with his daughter, Mrs. Charles Clark, and a brother, Levi Hoag, now living in Wright county, are his only surviving relatives.

The writer first formed his acquaintance at the State Fair at Roch-

ester in October, 1866, and became attached to him for his many virtues, generosity, hospitality and hearty co-operation in all efforts for the development of the agricultural and horticultural resources of Minnesota. He was present upon that memorable occasion Oct. 4, 1866, and took an active part in the meeting that resulted in the organization of the State Horticultural Society, then named the Minnesota Fruit Growers Association; became a member from the start, and was elected the first vice president, Col. D. A. Robertson of St. Paul having been elected the first president. At the same time he was a prominent member of the State Agricultural Society, and at the next annual meeting of that society advocated the cause of the Fruit Growers Association by offering a resolution that some means should be adopted to procure from Russia for naturalization in Minnesota, apple, pear and cherry trees. At the next annual meeting in 1867 he was re-elected vice president.

At the meeting held at Minneapolis, Oct. 1, 1868, he was elected president of the Society, which position he filled for one year with honor to himself and profit to the Society. His name also occurs among the charter members in the act of incorporation of the State Horticultural Society. At the annual meeting held at Minneapolis Jan. 16-18, 1862, he was unanimously elected a life honorary member of the Society. He attended nearly all the meetings of the Society and usually took an active part in its deliberations, and by his wise counsel and hearty co-operation in all measures that would tend to advance its interests, has endeared himself to the old pioneers who survive him.

The Committee on Obituary recommend that copies of the transactions for 1888 containing the above notice be put up in extra binding and presented to the widow, Susan F. Hoag, and the daughter, Mrs. Charles H. Clark, and the brother Levi Hoag.

The following is clipped from the *Minneapolis Tribune* :

“THE NAMED OF MINNEAPOLIS.

“There will be carried to its final rest to-day the body of a gentleman who played a leading part in the early history of Minneapolis; but who, owing to increasing age and infirmities, has for some years been in retirement, and has therefore been little known to more recent comers. We allude to Mr. Charles Hoag, or ‘Uncle Charley,’ as he was familiarly known.

“Mr. Hoag was one of the original settlers of Minneapolis, having

a claim upon which are now located some of the most valuable improvements in the city—notably the West Hotel. There were not a dozen actual settlers west of the river at the Falls of St. Anthony, now nearly forty years ago, when Mr. Hoag arrived here with his family, and within a few weeks of his advent here he had the distinguished honor of standing god-father for the new frontier settlement. Having been a school teacher in the East, he conceived the idea of combining in the name of the new settlement a word from the ancient Greek and one from the Indian tongue, hence the name, Minneapolis (water city, literally). There are one or two old settlers still living who were present as the little company of residents gathered at the christening. A multitude of names of the Smithville, Brownstown, Jonesburg order were suggested, when a ballot was ordered and taken, after an eloquent appeal by Mr. Hoag, ably seconded by Col. John H. Stevens, and the name Minneapolis was chosen on the first ballot.

“Mr. Hoag was noted far and wide for the pioneer virtues of generosity, hospitality and benevolence. His hearth and home were always open to his old friends and associates; and the hearty tones of his welcome will linger long in the memory of his intimates.”

ILLUSTRIOUS DEAD OF 1887.

Outside of the circle of our own State and Society, the death rate of men, who have had much to do with the advance of horticulture, during the last half century in Europe and America, has been more than usually great. It admonishes us, that we too who have borne the heat and burden as pioneers in our own Society, will ere long receive a summons to come up higher and join that larger society, that meets “over the river.” It is also a source of sincere gratitude, that a kind providence has spared so many of them, to ripe old age, to see the fruits of their labors. We can here only mention the names of a few, who are most widely known.

Mahler Moon, the well known nurseryman of Morrisville, Berks county, Pa., died on the twenty-fourth of January, in his seventy-third year. He was a genuine lover of flowers, and a nurseryman noted for his strict integrity.

Henry Ward Beecher died March 8th, in his seventy-fourth year. Though not a professional horticulturist, he was an earnest devotee of the art, and had much to do with the increase of horticultural taste, during the last fifty years, and thousands have been brought, through

his example and precepts, to have a pleasure in gardening they would not have known, had he never lived.

James Powell, one of the old time florists of Philadelphia, died April 17th, in his seventy-third year.

John B. Moore, whose name is familiar to grape and rose growers everywhere, died August 22d, at the age of seventy years. Few men have labored more earnestly to improve the American grape, and the variety which bears his name "Moore's Early," is a lasting monument to his memory.

Garret R. Garretson one of the great fathers of the American seed trade, died at his home in Flushing, Long Island, N. Y., August 28th, in his seventy-fourth year.

C. M. Hovey died September 2d, in his seventy-seventh year, thus closing one of the most useful lives that has ever been spent in the field of American Horticulture. As an author we find him, in 1830, contributing to the *New England Farmer*. In 1835 he commenced the publication of the *American Gardeners Chronicle*, which was the pioneer of horticultural publications on the continent. In 1837 the name was changed to *Hovey's Magazine of Horticulture*, and under that name it continued its influential usefulness for about thirty-four years. He was one of the oldest members of the Massachusetts Horticultural Society, and it is said, that out of five hundred members of the latter, in 1835, but five survive him.

As early as 1830 we find him exhibiting thirty varieties of strawberries. He was the originator of the old favorite *Hovey's Seedling*, which for thirty years, according to the records of the Massachusetts Horticultural Society, gained the first premiums against the efforts of all other kinds to take this high honor from it. Numbers of the best new plants and fruits of the last fifty years were first introduced to the public from his nurseries and seed-house in Boston, and many new seedlings of great merit originated with him. A great and good man has gone, but his good words and works remain to bless generations yet unborn.

Sarah Hoopes. This good mother of horticulture, passed away at Westchester, Pa., on the 10th of October, in her ninetieth year, before most of us were born she was famous as an amateur horticulturist. The love of trees and flowers which took such active form around the homestead on Cherry Hill Farm had an immense power for good, and it is said that to her we owe the famous nursery firm of Hoopes Brothers & Thomas.

These, and Dr. George Thomas, of Chester county, whose last words

in his eightieth year before his spirit departed to join the great band on the other side of the river were "Let us go out and plant some trees;" and Alexander Mitchell, the great railway president, of Milwaukee, who was one of the most munificent patrons of horticulture in the Northwest, are a few of the names of the departed of 1887 which are as familiar as household words to us all. Let us ever cherish their memory and profit by their example. May our words and works be such that when we are gone other generations may be able to say that the world is better for our having lived in it.

J. S. HARRIS,
C. L. SMITH,
S. D. HILLMAN,
Committee.

IOWA HORTICULTURAL SOCIETY.

The annual meeting of the Iowa State Horticultural Society, at Des Moines was well attended. President Patten, in his annual address, stated:

The society has established trial stations, offered premiums for the introduction of new and adapted varieties, and the systematic practice of crossing and hybridizing which it is advocating will be productive of great good. It is demonstrating the wisdom of critical analysis of the situation before proceeding. It is, in short, every day making horticulture more of a success.

The annual election of officers resulted as follows:

President—C. G. Patten, Charles City.
Vice President—Eugene Secor, Forest City.
Secretary—George Van Houten, Lennox.
Treasurer—H. Sthrom, Iowa City.
Custodian and Librarian—G. B. Brackett, Denmark.

WISCONSIN HORTICULTURAL SOCIETY.

The annual winter meeting of this society was held at Platteville, Wis., beginning Jan. 10, 1888.

The following list of officers was elected:

President—J. M. Smith, Green Bay.
Vice President—B. F. Adams, Madison.
Secretary—B. F. Hoxie, Eyansville.
Corresponding Secretary—A. L. Hatch, Ithica.
Treasurer—Matt Anderson, Pine Bluff.

LOCAL SOCIETIES.

The following, embracing a number of letters and valuable papers, read before local horticultural societies, are here presented, in addition to the regular reports made at the annual meeting of the Society, which elsewhere appear.

Following is a report of the Ramsey County Horticultural Society:

GERMAN AGRICULTURAL AND HORTICULTURAL SOCIETY, OF RAMSEY COUNTY.

S. D. Hillman, Secretary, Etc.:

At your request I send you list of officers of the Ramsey County German Agricultural and Horticultural Society, to-wit:

President—H. Christoph.

Vice-President—Ch. Bunde.

Secretary—E. A. Venzke.

Financial Secretary—F. Spangenberg.

Treasurer—A. Giesmann.

Executive Committee—Ch. Bunde, A. Richter, Peter Hahn.

Society meets monthly as before stated in report last year.

Yours truly,

E. VENZKE, *Secretary.*

SOUTHWESTERN MINNESOTA HORTICULTURAL SOCIETY.

A local horticultural society was organized at Mankato April 13, 1888. Following is an account thereof from the *Daily Free Press* of April 14th:

“A meeting was held at Mr. Daniel Buck’s office yesterday to organize a local horticultural society. The following officers were elected:

President—Daniel Buck.

Vice-President—George Keenan.

Secretary—Edwin Rodgers.

Treasurer—Curtin Cooper.

“A committee was appointed to draft a constitution and by-laws. A great deal of interest was developed at the meeting and there is no doubt that the society will be of great benefit to the community. It is intended to have specialists prepare papers on various topics and read them before the meetings, to be followed by general discussions.

The meeting yesterday was devoted largely to grape culture. Mr. Buck presented a list of twenty-nine varieties with which he had had experience, and explained the excellence of each. The next meeting will be held the first Friday in May."

In its issue of May 5th the *Free Press* says:

"The recently organized horticultural society held a meeting at Mr. Daniel Buck's office yesterday afternoon and completed an organization. A constitution and by-laws was adopted. The name of the organization is 'The Southwestern Minnesota Horticultural Society.'"

The annual meeting will occur on the first Friday of October, while the next meeting will be held June 1st. Considerable interest is being displayed in this work, and it is expected that the society will attain a large membership.

MCLEOD COUNTY HORTICULTURAL SOCIETY.

The following papers were read at the annual meeting of the McLeod County Horticultural Society.

GRAPE GROWING FOR FARMERS.

By John S. Harris, La Crescent.

Mr. President and Gentlemen:

I am an ardent admirer of the grape fruit. It is a luxury that every farmer ought to be able to furnish for the use of his family in unlimited quantities. You are all familiar with its history and growing importance in this country, so that I need not take up your valuable time with pretty preliminaries and prefáces, but confine myself briefly to those methods that in my own experience have brought certain success.

I will start out with the broad assertion that good grapes can be successfully grown in many portions of Minnesota by all who select a suitable location and soil, plant the right varieties and give suitable attention to the preparation of the soil, planting and management. The best location for planting a grape vine is one that is high and airy and near lakes, rivers or other considerable bodies of water. A southern or southeastern aspect is the best for this climate, for the reason that our summers are short and the varieties we now have in cultivation require every advantage in warmth and sunshine that can be given to bring them to perfect maturity.

But few of our farmers have the lakes, rivers or other bodies of water, or even hillsides convenient at hand, therefore they should make the nearest approach to the latter condition that circumstances will permit. For setting a few vines for his own use let the farmer select the highest ground in his garden, and if it is not sheltered upon the north by a wall, fence, hedge, building or a grove of timber, let him improvise some other kind of shelter, if it be only two or three rows of plum trees.

In selecting the soil it is well to remember that a deep, warm, sandy loam, rich enough to produce a good crop of corn, and having a sub-soil that is not retentive of water, is about the best. Avoid deep, moist, mucky soils if possible, because they tend to promote a rank growth of pithy, immature wood, that is very likely to be killed by the autumn frosts, and produce fruit only of an inferior quality. If such soil must be used, let it be made as dry as possible by deep drainage and ridging. Stiff clay soils are not desirable, unless they are thoroughly drained and deeply worked. Stony ground, where there is soil enough to hold the roots, is excellent for the vine, and so rocky that it cannot well be plowed may be profitably used for growing grapes. It would be unwise to plant grape vines in the door yard by digging a hole in the sod, just large enough to receive the roots, or upon any new land until the sod had been broken up and rotted or brought into suitable condition for growing farm crops.

In the fall, before planting, the ground should be plowed or dug over as deep as the holes for planting will be made. If the land is comparatively new and reasonably good it is not best to use any fertilizers at the time of setting, or for several years afterward, unless it is vines instead of grapes that is wanted. If the soil is sandy or poor and worn out, lime, ashes, bones or the carcasses of dead animals are all useful to restore it to a normal condition.

On the farm land is usually plenty and cheap, and therefore it is good policy to give the vine plenty of room. Rows ten or twelve feet apart and the vines eight feet apart in the rows is a very good distance.

I consider the spring the best season for setting the vines, but it may be done with safety in the fall if they are well covered with mulch the following winter. Two-year-old plants grown from cuttings to a single cane and cut back to two or three eyes, or strong one-year-old layers are considered to be the best to use. In setting, dig the holes large enough to receive all the roots without cramping or crowding when spread out in a natural manner. Such plants, grown

from cuttings, have two sets of roots; let the bottom ones be spread out first, while the others are gathered up and held around the top with one hand, instead of mingling them all together. Fill good soil around and over them, making it somewhat firm; then spread out the upper set of roots and finish filling up the hole with the same kind of soil, taking pains to see that it comes in contact with every root; tramp the whole rather firmly, then draw about two inches of loose dirt over that. When finished but two eyes should remain above the ground. Some people advise deep planting. I would not dig the holes more than ten or twelve inches deep, and then if the top of the vine comes too high above the surface set them slanting enough to obviate it.

Treatment the first year.—If both eyes break and throw up canes leave but one to grow the first season, giving preference to the lower unless it is much the weakest. It is a very common practice to allow the vines to grow trailing upon the ground the first season, but it is better to train them upright to lathes or small stakes, but no pinching or summer pruning is to be tolerated more than to remove surplus canes that may start from the base. They will require frequent hoeing and cultivating about the same as corn and no weeds or grass must be allowed to grow to rob or smother the plants. At the close of the season after the leaves are fallen, say about November 1st, the vines are to be pruned, which is a very simple operation, consisting of cutting away all of the season's growth from about one inch beyond the first well developed bud above the base from which the cane started. Before extreme cold weather sets in they should receive winter protection, which is best given them by covering with dry evergreen leaves, boughs, straw, cornstalks or earth.

Treatment the second year.—The first operation after the opening of spring, is to remove the winter protection. This year two canes are allowed to grow instead of one, taking the strongest that start, one from base, the other from the opposite side of the spur that was left in pruning. All others that start are to be pulled out as soon as these have grown to a length of six or eight inches. These two canes must be tied to stakes which may be made of any small poles. When they have reached the height of about six feet they may be stopped once by pinching out the end bud (nothing more) and the ends of laterals may be pinched out after one leaf has formed, and if they start again after another good leaf has been formed, may be pinched out again beyond it, but no pinching allowed after August 1st. This practice is to insure stocky canes and well developed buds, but it should be borne in

mind that it is injurious to remove full grown leaves at any time. At no age of the vine should any summer pruning be allowed more than the pinching out of the points of the growing canes. Cutting and slashing to develop fruit buds and ripen the grapes is a humbug and injurious to both vines and fruit. Clean cultivation should be given this season and every season hereafter. Early in November of this year the vine should again be pruned. The operation consists in cutting one cane back to two buds or eyes above the base, and the other to about four feet, and winter protection should always be given.

The next spring, which is the beginning of the third season, we should decide upon some system of training. The one arm renewal is an easy and a good one and very simple, and one that at any time can be changed into some other system. A trellis may be used in this system or sufficient support may be furnished for the vines by using two upright stakes, six or seven feet long, set two feet apart, one each side of the vine. For this system the cane that was left four feet long is to be tied to the stakes in the form of a bow, and the end of the canes that grow from it, should be pinched out after six or seven leaves have formed. One cane only should be allowed to grow from the short spur, and that is perhaps better to be stopped when about six feet long and the laterals treated as before recommended. The vine may be allowed to carry some fruit this season, after this liberal crops. In the fall after the fruit is gathered, and the leaves have fallen we do our pruning, and you can readily see why it is called a renewal system. In the pruning we cut off the single cane grown from the short spur at the top of the stake, and cut away all of the other cane, which has fruited, and its branches to one inch above the lowest branch, and that back to one or to eyes above the base. The long cane is designed to bear the principle part of the fruit next year, and the spur to grow a cane for fruiting the next year following.

If the vine is strong and healthy about the fifth or sixth year we double the fruiting capacity by pruning in such a manner as to have two fruiting canes and two spurs for growing fruiting canes each year, and in some instances double again. In these cases it is essential to have a trellis and tie the fruiting canes to it in a spreading or fan shape. If we intend to adopt the fan system from the start, we prune and manage the first and second season precisely as we have recommended at the commencement of this paper, but in the fall of the second year, instead of pruning one cane back to two eyes and leaving the other about four feet, we cut both back to two eyes and grow a cane from each eye. The next fall prune each of these canes back

to two eyes. At the end of the next season we will have eight canes, each alternate one of these we prune back to a single eye, and the other four according to the strength of the vine, from two to four feet. The following year one cane is grown from each single eye spur and the long canes are allowed to produce a crop of fruit. In the fall the canes from single eyes are cut back to a suitable length, and those that have borne fruit to one inch above the lowest side branch, and that to a single eye.

The best varieties for cultivation by farmers are Moore's Early, Worden, Concord, Delaware, Brighton and Martha. If a sour grape is desired for cooking purposes, the Janesville and Clinton might be added to the list.

SKILLFUL GARDENING.

By M. T. Ridout, Lakeside.

Mr. President, Ladies and Gentlemen:

By request of your worthy president, I appear before you this afternoon to give you a little plain talk on the vegetable department of horticulture.

Experience, although many times a dear teacher, is the sure method of gaining a true knowledge of what is required to bring about the best results in our immediate locality. The United States of America in its vastness, embraces a widely varied climate and soil.

Our soil and climate are well adapted to vegetable growth, and with proper culture great size and perfection are secured. As a matter of economy, also in a sanitary point of view, more vegetables should be grown and more consumed. This everlasting bread and meat business puts many a dollar into the doctor's purse while our own becomes depleted.

Fruit and vegetables should be allowed a more prominent place on the farmer's table. They are not only conducive to health, but they tend to expand and strengthen the intellect.

I will proceed to give our method of management, which has met with tolerable success, both financially and otherwise:

Select a piece of ground as nearly level as possible. If sloping at all, let it be towards the south. Manure heavily—say seventy-five wagon loads to the acre, with composted manure. Manure from the stables is better than that taken from the yard. Let your compost heap consist of two loads taken from the horse barn to one from the

cattle sheds. So alternate until you have the desired amount. Fork over and reple as often as smoke is seen issuing from the mass. Do not neglect this, otherwise it will "fire-fang" and thus destroy its value as a fertilizer.

This composting, if properly done, will kill all the weed seeds it may contain. Apply this to your garden early in the season and plow under at a depth of eight inches. Harrow as often as any signs of weeds appear until all are subdued. Manure again at the rate of twenty-five loads to the acre and turn under as before, only put the plow down ten inches instead of eight. This prevents the liability of clogging the plow with the manure first turned under. Harrow as before until all signs of weeds disappear. This gives you a clean, rich piece of ground for a next season's operations.

Next in order is, what shall we plant? And where can we procure good, reliable seeds? And when and how is it to be done? I will answer the first question, "What shall we plant," by giving you a list of seeds all "A No. 1," that will probably fill the bill: For early cabbage, Northrup, Braslan & Goodwin's Deep Head or Peerless; for late, Marble Head, Mammoth or Flat Dutch; lettuce, Early Prize Head; cauliflower, Henderson's Early Snowball; celery, Boston Market; egg plant, Black Pekin. For early tomatoes, Canada Victor or the Conqueror; late, Turner's Hybrid; peas, American Wonder, Dwarf and Wrinkled; parsnip, Hollow Crown; carrot, Danver's; beets, Eclipse for early, Long Blood for late; sweet corn, Cory for early, Stowell's evergreen for late; cucumbers for pickling, Green Prolific; melons, Water, Cuban Queen or Mammoth Ironclad; Muskmelon, Hackensack or Nutmeg; squashes, late, Hubbard, Boston Marrow or American Turban; early, Summer Crooked; turnip, Sweet German; string beans, Golden Wax; radish, White Strasberg; asparagus, Conover's Colossal.

Growing garden seeds is separate and distinct from gardening, as the term usually implies. Amateurs had better leave the growing of their seeds to professional hands. In former years I was of the opinion that seeds grown in the northwest were inferior to seeds grown south and east of us, but I have materially changed my mind, and so have seedmen generally. The majority of seed catalogues that find their way into our homes advertise northern grown seeds. But like the old renowned Hamburg cheese, no matter where made or grown, if the name is there the article itself must be all right. For the past two or three years I have purchased my seeds of Northrup, Braslan & Goodwin Co., of Minneapolis, and I find their seeds fully as reliable as any seed firm that I ever dealt with.

SOUTHERN MINNESOTA HORTICULTURAL SOCIETY.

At the fifteenth annual session of the Olmsted County Horticultural Society held at Rochester Jan. 7, 1888, the society was merged into the new organization, entitled as above, at which time a number of letters were read and papers presented, among which were the following:

Mr. Deacon read the following letter from Mr. Wyman Elliot, President of the Minnesota Horticultural Society:

LETTER FROM MR. ELLIOT.

MINNEAPOLIS, MINN., Jan. 2, 1888.

FRIEND SIAS: Your letter of December 30th received and noted. Thank you for the invitation to attend the annual meeting of your county society. It will be impossible for me to come down, as I have much to do preparatory for the meeting of the State Horticultural Society here the seventeenth of the present month.

I hardly know what to say to you with regard to the formation of a horticultural society, the tendency of which would be to draw away from the old Minnesota State Horticultural Society or divide the working force of that Society. You know as well as I do that we need to encourage the parent society as much as possible, and if possible give it greater efficiency in its broad field of labor. My first impression on reading your letter was that it would not be a benefit to the horticultural interest of the State. Would it not be better to organize these township horticultural societies and let them be auxilliary to the county societies, and the county societies made more efficient and capable of rendering better aid to the State Society, instead of creating a sectional society that will eventually detract from and divide the work of the State Horticultural Society? I may misunderstand the idea of forming another society within our State whose object would be to divide the work, and eventually the support we receive from the State. I think we should not do anything that will divide or cause sectional sentiment to arise to the detriment of our State organization. I have worked always with the idea of some day our State Society becoming a powerful factor in the development and dissemination of horticultural literature among the masses that will give an impetus to our art, and cause every thinking tiller of the soil to have confidence in our work. Then we shall not lack the means whereby to carry on the work successfully. One strong central organization

conducted on a broad and firm foundation will do more effective work than if we divide our interests. Let that be our *State organization*, and let us all rally around it and make it more able to carry on the arduous work before us of bringing into being fruit trees that are capable of withstanding our cold and rigorous climate. Pardon me for writing as I have; I may have misconceived the idea of the formation of the Southern Minnesota Horticultural Society.

We extend to the horticulturists of your section a cordial welcome and free entertainment. Please all come and help make the State Horticultural meeting the best ever held.

Fraternally yours,

WYMAN ELLIOT.

LETTER FROM MR. POND.

KASSON, Jan. 6, 1888.

Mr. Sias and Friends of the Horticultural Society :

Agreeable to request I will give you a short report of the condition of the horticultural field in Dodge county. I say, however, that my experience as a fruit grower has not been very flattering. I have set more apple trees than I have had the privilege of gathering the apples therefrom. This, I have thought, was owing to carelessness on my part, in a great measure, in not taking proper care of the trees.

For two or three years I have been watching the doings of our State Horticultural Society and have concluded that I was not altogether to blame for my trees not bringing forth fruit. I have taken some pains to learn the facts of the fruit interest here. I find there is a better showing than I expected. The Duchess apple is all right and will pay every man ten fold for its space and time given to it. The Wealthy does fairly well and should have a place in every orchard; also the crab family is doing finely and should be in every garden.

Small fruits such as strawberries and raspberries have been raised here for the past ten years in bountiful quantities, though only for home use. The Concord and Janesville grape are becoming quite plenty in their season and of very fine quality. We have now such a fine hardy class of small fruits to select from that there is really no excuse why every one should not have his table well supplied with each kind in their season. Small fruit is a staple article in all of our markets, selling by the carloads. This is as it should be, and anyone owning a half acre lot can have all he wants without price.

The statistics of Dodge county show that we have now growing forty-five hundred apple trees, and only one hundred and thirty-one grape vines. This is a poor showing for a county as well settled as this is; also a fine field for a good, reliable nurseryman to work on. Now, my friends, don't conclude from the above statement that Dodge county farmers are not a fruit loving people, for such is not the case. We have been duped by tree agents often, and still there are many of us ready to try our luck again. I have seven Duchess trees that are now about twenty-five years old. They stand about twenty-two feet high and well proportioned. They look as hardy as oaks. I have probably taken six hundred bushels of apples from them. I have a few Wealthys also that are doing very well. The spring of 1886 I planted out two acres of the Ancient Briton and Snyder blackberry. I lost some of the plants through carelessness of shipping, but the past season they have made a big growth and ripened up the canes, so if there is any show for raising this fruit here I think I stand a good chance of having blackberries to eat and to sell.

Wild plums grow here as fine as any that can be produced anywhere and in large quantities, fully up to the Rollingsstone or any other native plum of the north. We have some seedling apples that have the appearance of being valuable. I am trying to induce the owners of these trees to let our experimental stations have some of the scions, but they appear to be afraid that someone will make some money out of it. I think they can be reached if the right man will undertake it.

If your society has any of the horticultural reports to spare I would like five or six to distribute here. I would be willing to pay my share of the tax to put one of these reports in the hands of every farmer in the entire State.

Yours respectfully,

C. H. POND.

LETTER FROM MR. HARRIS.

LA CRESCENT, MINN., Dec. 21, 1887.

Mr. President and Members of the Olmsted County Horticultural Society:

In looking up statistics on the horticulture of Minnesota, I find that your society was organized some fifteen years since and continues to maintain an active existence; that it is the only living horticultural society in Southern Minnesota proper, and that it is the oldest living county organization of the kind in the State. We have altogether

too few organizations of this character in our State, and the few we do have are too weak in their membership and too restricted in their field of operations. Their membership ought to comprise every intelligent citizen, whether professor, merchant, artisan or farmer, who is within reach of the meetings, and the work ought to cover every settled portion of the county or district within its corporate bounds; and I think it would add very much to the strength and usefulness of these societies if they would each start and maintain an experimental station, where everything new and unknown that is brought to public notice could be tried and tested before nursery agents were allowed to sell them to unsuspecting people. Such station would also be used for originating new varieties from seeds and for improving and ameliorating the wild fruits that are indigenous to this climate. Do not understand that I am finding fault with the work of the past, but that I am advocating new departures for the future.

Our State Horticultural Society is doing a good work, and I believe those of you who attend its meetings or have access to its annual reports will agree with me that there is not a better state society in the Northwest, if in the whole Union. It ought to have 5,000 members. It ought to be upheld and sustained by more liberal appropriations from the State, and its officers ought to be constituted a State board of horticulture, and under it should be placed the direction of the horticultural experiment work of the State station and all sub-stations within the State, and it should have the direction of the use of one-third of the amount given to our State for experimental work by the general government in the Hatch bill, that it may not be diverted from its proper use and may become of some little use to those for whose benefit it is given.

I am of the opinion that the State Society could be greatly strengthened and its sphere of usefulness enlarged through the organization of three or more district societies, regularly incorporated and recognized by State appropriations and a right to seat delegates in the conventions of the State Horticultural and Agricultural society, and a well ordered system of county societies; and I am also of the opinion that this is the opportune moment for starting the work.

Your society is old enough to throw aside swaddling clothes and come out in pants and top boots. The beautiful city of Rochester and the well ordered farms of Olmsted county show the imprint of your work. Why not broaden and enlarge your work so as to take in all Southern Minnesota? I do not mean that you should drop your county organization in order to start a greater one, but that you

should throw more life and vim into it and at the same time start a boom for the organization of a Southern Minnesota horticultural society, second only to the State Society, that may occupy the field before the next session of the State legislature. Such an organization would prove of great benefit to this portion of the State, and would lend new impetus to horticulture and rural adornment. I would have this society to hold annual meetings and exhibitions winter and summer for discussion and the display of the best products of the region. Our State is so large and many of our fruit growers live so remote from the places where meetings are held, that their attendance upon the State Society is out of the question. Many of such could and would attend the meetings of district societies, and would soon get enlisted as active workers in the cause.

At no time have the people stood so much in need of the education and information that is best imparted through association and experiment as at present. Upon the apple question we are badly at sea. Recent great drouths and unfavorable seasons have so broken up our old lists of ironclads that we are compelled to look about for something better to take their place or else throw the whole apple question overboard, and like school children, play that dolls are true babies, and Siberian crabs are apples and monstrous good. The better to put in their place offered in the recently introduced varieties from Russia and some seedlings of our own just coming to notice, are all untested as to quality, hardiness and adaptibility to Minnesota. To test these alone is of sufficient importance to warrant the organization of a score of societies and the expending of thousands in money.

Your fellow worker in horticulture,

JOHN S. HARRIS.



Following is the annual address of President Sias :

ANNUAL ADDRESS.

By A. W. Sias, Rochester.

Members of the Olmsted County Horticultural Society :

The cause of horticulture has no truer friend or trusty counsellor than the man who suggests that now is the time to "start a boom for the organization of a Southern Minnesota Horticultural Society."

That Rochester is also "historic ground," being the birthplace of

a State Society, is true as he tells us. It is also true that this was the first local horticultural society started in the State and the only one that has succeeded in maintaining an existence for any great length of time. Rochester is also historic ground as being the place where the first Farmer's Institute was organized this side of the Mississippi river, and we believe we might safely add this side of Lake Michigan. (I mention this fact because several other points have claimed the honor.) Again, Rochester is historic ground as the birthplace of the Southern Minnesota Fair Association which is far in advance of any other district organization in the State, and by widening our field of labor and drawing help and strength from the unoccupied territory outside of our county, we can greatly assist our fair association here in making far better exhibits of fruit and garden products, and so become mutual co-workers in one of the grandest of all enterprises. These being well attested facts, as regards Rochester's past history, it gives us great confidence in her ability to start the "Southern Minnesota Horticultural Society" on her way rejoicing in such a "God-speed" manner that she will never falter or turn back, and at no distant day become an honor to the place that gave her birth, and a blessing to the State at large.

One object in this new departure is to enable ourselves to render more and better service at our State Society of which we are all so justly proud. Owing to having several years start of local societies in other parts of our State, and perhaps we might add a slight advantage in regard to climatic influence, we should of right become, if we are not already, the most powerful auxiliary of the State Horticultural Society. This new departure should of necessity, providing each member acts well his part, increase the membership and result in more and better papers for the State Society.

The chief magistrate of Rochester possesses more than ordinary "horse sense," and when consulted as to the propriety of holding our annual meeting in the city hall, he most cheerfully approved of the proposition, and said he would have the council room warmed and reserved for our use on the day selected. The kind remarks made by the mayor on this occasion showed him to be a man of foresight sufficiently clear to discern the fact that Rochester could well afford to foster all such industries as the Olmsted County Horticultural Society whenever they see fit to take lodgment in her beautiful city.

The merchant can easily see that an increase of fruit and garden vegetables, both in quantity and quality, means an increase of business with him at the store and a more healthy condition of his family

at home Our noble calling has always been helpful in all the varied walks of life. Even the physicians acknowledge our aid, when we dispense sour crab apples to the little boys in early summer, although he has as little use for us as anybody, owing to the fact that the healthfulness of the country increases in proportion to our success in producing wholesome fruits.

The boot and shoe dealer can afford to speak a kind word for us, and take a ticket for a short excursion and diversion on board our beautiful craft, because he well knows that our traffic causes the young scape goats about town to wear out a large amount of extra shoe leather while stealing apples, plums, grapes and berries from our members, and that he is the only person who reaps much benefit from such malpractice.

The lawyer should have a "warm side" for us, for his services are liable to be called into requisition at any time, while trying to defend our property, which, as is well known, is the most attractive and by its nature the most exposed to the "light-fingered gentry" of any other property known to man.

The wagon maker should also encourage our traffic, for it is going to call a "heap" of wagons into use some day to haul our fruits and vegetables to market. In short, every vocation in Southern Minnesota will be directly benefitted by our occupation and the stimulant given it by your action to-day.

It is a trite saying, and as true to-day as when first spoken, that "in a multitude of counsellors there is safety," hence we have taken the trouble to advise with the leading horticulturists of the State in regard to reorganizing under the name of the Southern Minnesota Horticultural Society. E. H. S. Dartt, vice president of State Society, says: "You can count on me for membership fee and as much work as is consistent with present obligations." Every good enterprise ever yet started by mortal man has been sneered at by selfish and weak-kneed men, and we cannot expect to wholly escape criticism, but the fact that we have kept this society out of debt and in good running order for fifteen years, with all the obstacles that we have had to contend with, shows that we are not easily frightened or discouraged, and is certainly an indication at least that we are capable of occupying a wider field of action and assuming greater responsibilities. If, as someone has remarked, a "pebble when cast into the ocean on one side will create a ripple on the opposite side," then who knows but the new departure taken here to-day may create a ripple in horticultural circles that may be sensibly felt all over the Northwest. Let each member act well his own part, and the thing is done.

As this is my farewell talk to the Olmsted County Horticultural Society, perhaps we might be pardoned for taking a retrospective view, and inquire whether we have succeeded in doing anything commensurate with the time and money spent. In the first place, we claim to have done something to stimulate and encourage fruit-growing in the county. We have exhibited much fine fruit on the five hundred plates owned by us for many years past at the Southern Minnesota Fair; exhibits that have compared very favorably with the State Fair exhibits. We have annually distributed some fifty or more State horticultural reports where we believe they will do the most good, and that they will do much good no sane man for an instant doubts. Trees and flowers, as well as horticultural matters in general, have occupied the time and best thought of our greatest poets and scholars from time immemorial. See Bryant's poems: "The Death of the Flowers," "Planting the Apple Tree," "Blossom Time," by Mary E. Dodge, etc.

In conclusion, please accept my hearty thanks for the unmerited honors bestowed upon me from the organization of our society up to the present time.

INSECTS INJURIOUS TO HORTICULTURE.

By J. S. Harris, La Crescent.

Mr. President and Members of the Olmsted County Horticultural Society:

No one at the present day can expect to make a success of fruit growing without having some considerable knowledge of the numerous insects that prey upon the trees, plants and fruit. His best efforts are liable to bring only failure unless he has knowledge enough to recognize his irrepressible enemy and sagacity enough to devise some method for circumventing or destroying him.

For many years I have endeavored to awaken our people to the importance, yes, necessity of having a State entomologist appointed and paid to make investigations and impart information upon this all important subject, as it is needed by our farmers, but thus far I have not been able to awaken an interest sufficient to create a sentiment that would exert any influence upon our legislature, so they would deign to give the matter any attention. In the squabble for spoils, matters that pertain to the welfare of the producing classes are forgotten, and we are left to work out our difficult problems unaided and alone.

In the papers No. 1 and 2, read at your meeting in 1885 and '86, I have described the Apple-Gouger and Codling Moth and their work upon the fruit, and suggested such remedies as are known to be beneficial. I am not egotistical enough to think that the papers have brought about any great amount of good, but I am happy to be able to report, that at my own place, and in such portions of the State as I have been able to take observations, the depredations of these two insects were much less in the last season than for many years before. I have but little time to devote to these observations and therefore cannot give positive reasons for it. It is a well known fact that when any one species becomes so numerous as to threaten the extinction of the food plants upon which they subsist, nature interferes and sends some enemy or parasite to prey upon them, and restore a balance by reducing their numbers. I will mention these causes that may have combined together to effect the decrease, viz: Drouth, birds and insect parasites. I place drouth first because the evidence proves its being sponsor for the others.

The summer of 1886 was noted for its drouth throughout the greater portion of this State and may have been favorable for the multiplying of the minute parasite insects that are here to a certain extent in all seasons, causing them to become so numerous as to keep down the injurious insects in 1887. 1886 was favorable also for the nesting of birds, but not favorable for plants or grasses in uncultivated lands, or fruits under the same conditions. There being nothing in the forests for insectivorous birds to feed upon, they were driven to the cultivated fields, orchards and gardens, about the abodes of men, and while their destruction of cultivated fruit was very great, they doubtless made up for it in a great measure by clearing our ground of the injurious insects. The summer of 1887 has been equally dry and the birds more plentiful than known before for many years. Therefore I think we may reasonably hope that some of our insect pests may not be as numerous for a year or two.

We have concluded to take for the subject of this paper, the Round Headed Apple Tree Borer, (*Saperda Candida* of *Fabr S. bivittata*, *Say*,) an insect that is injurious to the tree rather than the fruit. There is another of the borers that is found working in our apple tree more or less, the flat headed borer (*Chrysobothris Femorata* *Fabr*) or Apple Buprestis, but I think this first the most injurious one with which the orchardist has to contend. The beetle or perfect insect is not often seen because it flies only at night, but is easily recognized from the following brief description: It is long and narrow, varying from

three-fifths to three-fourths of an inch in length, and the width across the shoulders is about one-fourth of the length. The antennae are nearly as long as the body, slender and tapering, and when at rest are thrown backward and curved outward at the ends. There are two very distinct white stripes running from the head to the tip of the wing cases, between three rather broader cinnamon brown stripes. These stripes are so well marked and distinct that they are sufficient of themselves to distinguish the species.

The beetle makes its appearance in May and June, but remains quiet and hid during the day and therefore is seldom seen except by those who search for it. In this latitude the female deposits her eggs about the last of June and first of July, one in a place upon the bark of the tree, low down on the trunk or near the ground, or sometimes in the axils of the lower limbs. From these eggs hatch in about two weeks a minute footless grub of a whitish color with a yellowish head, which eats its way directly through to the inner bark and newly forming sap-wood. For the first year of their life they feed upon the sap-wood, making paths just the size of the body in the bark and sap-wood which are filled with their sawdust-like castings. Although its operations vary somewhat, and some writers state that it works upward from the place of entrance, what few observations I have been able to make, tend to convince me that during the first season it works downward toward the root of the tree, and that it remains at the bottom of the burrow through the following winter inactive. The following spring it commences to cut a cylindrical passage upward, and when about half grown it commences gnawing through the solid wood, continuing to enlarge the size of its burrow as its body increases in size, and pushing the sawdust so made downward and outward toward the orifice made for entrance, which has been somewhat enlarged. This burrow runs slantingly inward toward the pith of the tree and then outward, terminating at the bark. It does not now continue to mine into the bark, but filling up the burrow at each end and enlarging the cavity it makes for itself a place to undergo its last transformation, and then quietly awaits its change. When fully completed it pushes back the castings into its nest, gnaws a round hole through the bark, and comes forth and prepares to propagate its species.

Our best entomologists differ about the length of time it remains in the larvæ state. Dr. Fitch says they remain in the larvæ state two years, Dr. Harris from two to three years, and Prof. Riley three years. My observations lead me to believe that they remain in the tree about two years and ten months, and inactive about five months of each

year. The larvæ is a footless grub, and when full grown about one inch or a little less in length and something over a quarter of an inch across in the broadest part. They are of a cylindrical form of the second segment, of which there are thirteen, being bulged and somewhat broader than the others. The head is small, of a chestnut brown color polished and horny. The upper jaws are deep black, sloped at their tips which are obtusely rounded. The color of the body is a pale yellowish white and the consistence is soft and fleshy. The final change to the perfect insect occurs in May or June, after which the beetle comes forth from its burrow in the night during which time only it uses its wings in going from tree to tree hunting for companions.

Remedies: A number of remedies have been suggested but none of them have been so thoroughly practised as to make much impression towards their extermination. One writer says: "The great majority of the young larvæ reach the inner bark about the first of September and all have reached it by October 1st." The first half of October is the best time to search for and destroy them. Until that time they have done but little if any damage, and their presence is readily detected by a discoloration of the bark and their excretions on the trunk of the tree. They are readily found and dispatched by shaving off the outer bark with a sharp knife. If the trees have been neglected the first year the worms will be found in their burrows and must be attacked singly. Their presence can now be readily detected by the little holes through the bark out of which fine sawdust like castings will be found adhering. They can now only be destroyed by probing the burrows with a wire or cutting them out with a pointed knife. After the grub is destroyed the wounded place should be covered with grafting wax or a cement of clay and fresh cow dung.

Probably preventives are more effective than remedies. It is said that trees that are trained low so that the branches shade the trunk, and that are healthy, thrifty growers, are less liable to their attacks than those with exposed trunks and feeble growth. Doubtless in thrifty growing trees many of the grubs are drowned out by the sap before they get fairly established in the trees.

A means of preventing the beetle from depositing the eggs would be to clear all rubbish away from the base of the trees in the spring, and in the early summer months, June or July, rub soft soap on the trunks and in the forks of the lower branches, or wrap building paper around the trunks, to remain there during the period for depositing the eggs. It is not known that they are subject to any parasites, and the only aid in the animal kingdom for destroying the larvæ is the

wood-peckers, and the only valuable one among them the Downy wood-pecker (*Picus Pubescens*), which is a winter resident here, and the most valuable bird we have for destroying all kinds of larvæ that work in our trees, and it should be protected and encouraged to frequent the orchard by placing bits of fat meat in the forks of a few of the trees in the coldest weather. I have not been troubled very much with this insect while my trees are cultivated and kept growing thrifty, but as soon as the trees become stunted by growing in grass, injury from sun-scald, or hard winters, or any other cause, they soon fall a prey to them. A single borer in a large tree would not do very much injury, while three or four would girdle and kill it, and a single one would destroy a tree an inch in diameter. There are some nurseries that are infested more or less, and those purchasing trees should make a careful examination of them at the time of planting. The damage done the first year is slight, but the work of the second year together with the shock of transplanting will result in certain death.

The following paper was read by Mr. Deacon:

ORCHARDING IN MINNESOTA.

By Edward Deacon, Rochester.

The attempt to write an essay covering the subject of "Orcharding" seems like the effort of Queen Dido to encompass a kingdom with a bullock's hide, and since I find the essay, as she did the hide, too small for the purpose, am not sure but I shall follow her famous example, and taking but small shreds of thought, tie them together and simply outline or encircle the subject, leaving vast fields unexplored that properly fall within my outline.

Aware of the many controverted points in "orcharding," I shall endeavor not to lay down fixed rules where none as yet exist, but to ground my suggestions on what I believe to be the experience of the majority, as observed during some months of travel in the tree business in different sections of Southern Minnesota.

VARIETIES.

First, as to varieties. Few men find it convenient to buy their trees at the nursery, and thus avail themselves of the nurseryman's advice; but this is not so material, provided cool judgment and common sense are exercised in the choice.

Many Minnesota planters have yet to learn that a Duchess grown at Davenport, Ia., or at Dayton, O., is not so hardy as a Duchess grown at home; that apricots are utterly worthless in this State, and mulberries but little better, and that but few varieties of apples are yet safe to plant extensively in Minnesota. But if the planter will avail himself of such information as may be gleaned from the horticultural reports and farm journals of his State he need not act altogether in the dark when selecting his trees, and need not be wholly at the mercy of the Southern tree agent when he displays his brilliant profusion of colored plates and his magnifying jars of Southern fruit.

As to the question which must go, seedlings or Russians, we should not be so partisan as to cast aside valued and tried varieties of either class. For Southeastern Minnesota nothing as yet excels the Duchess for summer, and what have we yet found for fall and early winter that is safer than the Wealthy? Among the winter varieties the McMahon White is giving great promise of value for general planting. Of the hybrids, the Whitney No. 20 is among the best and safest for fall use. To summarize: If our object is fruit growing, we must plant the old stand-bys and not make experimental stations of all our orchards.

TRANSPLANTING.

But I am dwelling too long on this one point. Having decided upon the varieties, when shall we buy? If possible, have the trees removed from the nursery in the fall. This plan is being adopted more and more widely every year, and for valid reasons. In digging the tree many roots are necessarily cut by the spade. Now if these roots are neatly pared with a sharp knife and the tree buried for the winter, these root ends will heal over during those long months of rest, and be ready for business as soon as transplanted in the spring much sooner than if dug in the spring when the sap is flowing and the buds are swelling. Again, should there be an uncommonly severe winter, the vitality of even our hardiest varieties will be taxed more or less if standing in the nursery; if now in the spring of the year you tear it from its mooring and transplant it, the tree has a double injury to overcome, and will most likely make but a sickly growth during the first summer, whereas the tree from the pit, with all the vitality it had when buried (some say even more), its roots nicely healed, goes to work at once for a good year's growth and is well prepared for the test of its first winter.

As to the best age for transplanting, a three or four year old tree is

to be preferred, as trees of that age, if properly dug and trimmed, have plenty of root for their support.

LOCATION.

A very important item in "orcharding" is the selection of a site. It is now pretty generally conceded that a northern or northeastern slope is to be chosen if possible. This avoids, in a measure the repeated freezing and thawing of early spring which has been so prominent a cause of mortality in most orchards. But if a southern slope must be taken these ill effects may be largely overcome by heavy mulching around the trees before the thawing begins in the spring. Again, choose the highest ground possible. All experience proves that the hills and not the valleys are the best places to raise apples in Minnesota, as the temperature falls much lower in the valleys than on the high grounds.

Concerning the proper soil for apple trees, we cannot yet speak with much assurance. In floriculture it is known, for instance, that the cactus loves the sand, the heliotrope flourishes in a moist black loam, but who has yet ascertained the exact proportions of black loam, of clay, and of sand, the precise amount of moisture and degree of fertility in the soil best suited to the wants of the Wealthy or any other variety? But the soil usually preferred by planters for an orchard of all varieties is, I believe, a rich loam with a liberal proportion of clay. If the soil is already rich it will do as it is for young trees, but if weak fertilizers should be used. If mainly sand a large hole should be dug and filled with soil of a suitable quality in which to plant the tree; this with proper fertilizing will overcome the lightness of the soil.

SETTING.

Before it freezes up in the fall it is well to dig the holes for the trees, as the effect upon the soil of the freezing and thawing and exposure to the air seems beneficial to the young trees. And in digging the holes the question of distance must of course be settled. Many, in planting orchards, stand the trees one rod apart each way, others two rods. But most varieties when given but one square rod of land will in old age overreach their allotted bounds, and interlace their branches with the neighboring trees, thus becoming much more subject to the infectious blight, and dwarfing all the fruit on the lower branches. It is better economy to strike a mien, some of the smaller varieties doing well at twenty feet apart, others needing twenty-four feet, but few, if any, needing as much as thirty-three feet.

As soon as the ground is in good condition in the spring, the trees should be taken from the pit as fast as they can be set in the orchard. With a pailful of water and a rake or hoe, make a puddle of very thick mud in the bottom of the hole in which you are to set the tree; settle the roots into this mud till every root is covered with it. This precaution avoids the danger of leaving open spaces among the roots and secures, in a measure, against the drouth. Over this mud put several inches of dry surface soil and press it down hard. This prevents the ground from cracking as it would if the water were poured upon the surface, and it acts as a mulch to retain the moisture below.

The depth to which a tree should be set must depend on the soil. If in a moist location, one or two inches deeper than it stood in the nursery is sufficient. If in a very dry place, it had better be down four or five inches deeper. The young tree should be leaned a little to the southwest when set for two reasons. First, in order that the trunk of the tree may be shaded by its own leaves and branches to guard against the "sun scald." Some planters take the precaution to drive down a sharpened board on the southwest side of the tree, as this is the direction of the hottest rays, and the practice is to be commended. Again, as our prevailing winds are from the southwest, if the tree is set vertically at first, it will in time, if exposed to the winds, be found leaning to the northeast. If the loss of root in digging has been considerable, the top should be cut back in proportion.

Now, before you call the tree fully set, attend to the mulching. Bring some old rotten hay, straw, chip-dirt or saw-dust, and bring it in liberal quantities. Do not put it against the tree, but leaving a few inches of bare ground around the tree, let the mulching extend back three or four feet in every direction, and make it thick enough to hold the moisture in the ground. A very good and lasting mulch is made of broken bricks or small stones. If the drouth should be long and extreme, it may be well, perhaps, every three or four weeks to put a few pails full of water on the mulching, but water with care, and remember that large numbers of trees are killed every year by over watering, and it has been found by observation to be often the case that the more wheat and corn a man loses by drouth the more trees he will kill with water, being very persistent in his overnursing, till the tree finally gives it up in despair, while his neighbor, who has had no time for such work, can show a vigorous orchard. Don't water too much.

When the trees are planted and mulched, don't sign their death warrant at once by turning in the hogs and calves, but put the ground

to better use, you may thus save yourself and neighbors the discouragement and disgust with "orcharding" that must necessarily follow from watching a nice young orchard grow sickly and die without understanding the cause. While the trees are small use the place as your garden; you can raise your potatoes, onions, and cabbages there with great benefit to young trees and thus suffer no loss of ground. Continue this practice till the trees are too large to allow the vegetables a healthy growth, when the trees themselves will pay for the ground they use—even then they should not become sod-bound, for if we expect the tree to draw several bushels of nice apples every year from the same soil, we should assist nature in the work by enriching that soil. I do not believe there is much danger of forcing too rank a growth upon a bearing tree.

WINDBREAKS.

We must not forget or neglect to shield our orchards from the blizzards and the cyclones by a good and sufficient windbreak. An evergreen windbreak should be secured if possible, on account of its superiority, in winter, over every other kind, and its beauty at all times of the year. And for this purpose we may well place the Norway Spruce at the head of the list, and the White Pine second, and several other varieties are to be preferred before deciduous trees. Where evergreens cannot be obtained the white willow should be used, as its hardiness, its rapid growth, its beauty and strength make it one of the most efficient of deciduous screens. It is a noticeable fact that most planters place the windbreak too near the orchard. It should stand back ten or fifteen rods, in order that the heavy snowdrifts lodged by the windbreak may lie outside of the orchard. This windbreak should stand upon three sides at least, north, west and south. The east is not so material.

How to bury a tree for the winter; how to properly prune; how to keep the bark healthy; how to guard against borers, caterpillars, and other insects; against rabbits and mice. The entire topics of plum and cherry culture are divisions of the subject of "orcharding," upon which I have not touched, but I fear I have already written at too great a length.

One more thought. What means the cry, "We can't raise apples in Minnesota?" Does it mean that all those that utter it have given the matter earnest, thorough and intelligent trial, and speak from experience? I cannot believe it. For, by some travel and inquiry, I have found that most of the trees planted come from southern nurse-

ries directly or indirectly, or else have been killed by the planter's own negligence or his not knowing how to properly handle them. Until, instead of trying to improve his methods, he becomes disgusted with the business and joins the popular cry. It was the cry in Michigan, Wisconsin and in Iowa. But the successful effort of persistent men are silencing the cry there, as they will do ere long in Minnesota.

NOTES ON ONION CULTURE.

By Wayland Stedman, Rochester.

An Irish woman once told me that "it was very poor onion seed I was selling her; I had sold her an ounce of seed, last spring, and never an onion was larger than the smallest egg; and it was the best cultivation she gave them; for she plowed the ground a foot deep and made it as loose and fine as a pile of ashes and raked the seed in with a garden rake, and kept the soil pulverized all summer with a hoe."

Now every onion grower knows that her method of culture would have given a fine crop of potatoes, but was a ruinous one for onions. I have found that many farmers think they cannot raise onions; as I have often asked them to buy a few ounces of seed and sell us onions in the fall, and in many cases the answer was: "O, onions won't grow with me; I tried to raise them some years ago and made a failure of it, and now buy what few we want."

Of course, onions are not so accommodating as wheat and oats. They are like some men, they must have their own way; but, unlike many men, they are not ungrateful, for give them the soil and culture that they require and they will return the kindness by yielding eleven hundred bushels per acre. Every family ought to consume a great many onions, for of all cultivated garden vegetables they are the most nutritious and contain more medicinal properties.

SOIL.

Onions must have a well drained soil. If the soil is heavy and allows water to stand on its surface, the onion roots will all be very close to the top of the ground, and will not penetrate into the soil and collect sufficient plant food to make a good crop. Black soil, with a sandy subsoil, is good. A slough, underdrained, is a number one place for onions.

Experience has taught me the necessity of thorough drainage, and

I will not soon forget it, for some years ago I lost the entire crop by sowing the seed on a rich, black mucky soil. I expected a great crop and kept the ground clean, but I found that after every rain the onions did not grow at all for two or three weeks, and the result was that in September the tops were fresh and green and as far from being matured as they should have been in July. The next year I cross-plowed and made ditches lengthwise and crosswise, and the crop was good, some onions being as large as saucers.

Onions were first grown in Egypt on the fertile banks of the Nile, which were yearly enriched by the overflow of that river. And for that reason good crops of onions cannot be grown on virgin soil without some kind of manure, although I have heard that good crops have been raised on new breaking, the seed being sowed broadcast and dragged in. But that was done a great ways off, and I never saw the man who did it. If done at all, it must have been in a soil on which large quantities of brush and trees had been burned, leaving the ashes on the ground. Ashes containing potash are one of the best onion fertilizers.

MANURE.

Onions need, for a heavy crop, more nitrogen and potash than is to be found in new ground, hence the ground should be manured every year. Animal manure contains both nitrogen and potash. Unless the manure is old the onions are liable to be soft and have large necks and do not keep well. Horse manure is better than cow manure. Greener manure can be used if spread early in the fall and plowed under. If the manure is very fine it will go further if spread after plowing and dragged in.

Long Island onion growers buy horse manure direct from the street car stables of New York city and put one hundred cart loads on an acre. Sometimes they pay as high as sixty-five cents per load. The manure is not mostly straw, like our manure out West, but contains very little litter.

A German farmer not far from Rochester always raises good onions with no other manure than ashes. He throws all of the ashes, the year through, as fast as made, upon the onion bed, scattering them during the growing season upon the rows. Ashes not only furnish plant food but also help to keep the ground moist, which is very important for onions. Thirty or forty loads of well rotted and moist stable manure, spread in the fall and plowed in the spring and dragged in, will give a very large crop of sound and well keeping onions.

PREPARATION OF SOIL.

A suitable onion soil should be selected. Manure heavily during winter or spring with any kind of manure and plow very early and deeply eight or ten inches at least. About the first of June plow again the other way and set out late cabbages. The ground is plowed twice to mix the manure with the soil and to help drain the soil, and it is plowed deeply so that some of the manure at least will be well under the ground where it will collect moisture, and store it up for the use of the onions in the following year. Also, the presence of manure at the depth of six or eight inches will prevent the soil from becoming very hard at that depth. This is important, for the next year the ground is plowed quite shallow.

The ground is set with cabbages because cabbages are easily kept clean, most of the work being done with a cultivator. Not a weed should be allowed to grow to seed. The cabbages should be all pulled up by the roots. In the fall as soon as the cabbages can be taken from the ground, spread on the well rotted manure. This manure, being hauled during the winter or spring before, and put in a pile about six feet high with a flat top, under a roof if possible, has fermented and most of the weed seeds are killed. The ground is then to be plowed about four inches deep and left without being dragged during the winter.

In the spring, as soon as dry enough, the ashes are spread, if at hand, or fine muck or peat marl or land plaster is sometimes used. Then the ground should be dragged until very smooth and quite firm. It is important to have the ground firm, but of course not hard. If there are sticks, stones, roots, etc., on the ground they should be raked off with a steel rake. Then the seed can be sown, and this can be done better and quicker with a seed drill. I use the Planet, Jr. The rows should be twelve or fifteen inches apart. On soil not very rich three pounds of seed are enough for an acre, but on ground prepared as above directed six should be sown. Four or six pounds are usually sown upon an acre.

Onions will sprout in as low a temperature as wheat, while weeds will not. Therefore the importance of preparing the ground in the fall. Any weather that will not injure wheat will not injure onion seed. But new American grown seed I am speaking of, and they will stand more unfavorable weather than imported seed or old seed. In fact most imported seed is not hard and should be sown later. Imported seed produces larger onions, but they are milder, softer, and do

not keep as well as those raised from American seed and are never sown extensively. The bulb of the onion should be on the top of the ground because it does not in anyway feed the plant. That is done by the long white roots which often are from six to eight inches in length. It is also a fact that onions will not bottom unless the soil is firm. If the soil is mellow and loose when the seed is sown, the onions will not form bulbs until the rains have packed the ground. Fall plowing becomes firm sooner than spring plowing, and for this reason we get earlier onions from land fall plowed.

CULTIVATION.

It is almost needless to say that the onion patch should be kept clean. Cultivation should commence as soon as the rows can be seen, even if there are no weeds. It seems impossible to raise onions without hand weeding, as very rich ground will produce a great many weeds. Hand weeding is the great drawback to onion culture, for without it onions could be raised cheaper than potatoes. And the onion grower who keeps his ground clean with the least hand weeding makes the most money. Hence the importance of allowing no weeds to seed the year previous on ground sown to onions and of making the manure heat to kill the seeds it contains. But in spite of all that can be done some weeds will come up. If the rows are very straight a wheel hoe or shovel hoe can be run within a quarter of an inch of the onions when they are small, thus considerably lessening the work of the hand weeder. In dry weather persline grows in great quantities and is looked upon as a great enemy, but I sometimes think it is a friend; for if it is kept hoed up, the surface of the ground will be loose. If the surface of the ground is kept loose to the depth of an inch the soil next under will not dry out as much as if the surface is baked hard. The loose soil on top acts as a mulch.

As soon as the onions are ripe they should be pulled at once, for the fall rains will make them grow again. And if they commence to grow after they are ripe they are nearly worthless. They must be used at once for they will not keep. They will sprout and grow, no matter how dry they are kept.

The best way to pull onions is to use a potato hook or a dull pointed iron rake; raking out one row at a time and raking two rows together. If the onions are sown early they will mature early, and if allowed to lay on the top of the ground for a few days during a dry time, the tops will dry up to almost nothing and can be very rapidly broken off with the fingers when picked up. Cutting off the tops is slow and

expensive, and onions do not keep as well as when the tops are pulled off. After the onions have remained in rows for four or five days and are dry, they should be stored under cover until freezing weather begins, and then put in the cellar, and they will keep perfectly sound until the next June, if they have been perfectly cared for. I have kept white onions without a sprout until spring.

Mr Lory, of Isanti county, by request furnishes a paper on the cranberry.

CRANBERRY CULTURE.

By H. A. Lory, Maple Ridge.

What little information I have gained on the cultivation of cranberries has cost me rather dearly, but is gathered from an experience extending over a number of years. It may not be amiss to mention some of these incidents of this experience, in this branch of fruit raising.

I was brought up in Schohaire county, New York; resided in Wisconsin eleven years, and since November, 1875, in Minnesota. I owned five different marshes in Wisconsin, but none of them proving satisfactory, I spent more or less time during a period of three years in securing a better location for conducting the cranberry business; have traveled thousands of miles, crossing the country by the use of maps and charts, and a surveyor's compass.

In Wisconsin I met an old Indian chief possessed with more than usual intelligence, who in answer to my inquiry, said I should not be discouraged in looking for a desirable marsh, as it would be found by diligent search. It should be stated that while there are good marshes, there are many contingencies that enter into the question of success or failure, such as the character of the soil, climate, stage of development of the marsh, its capacity for the growth and perfection of berries, etc. A marsh may be entirely unsuitable for cultivation, or it may have been well suited for development for thousands of years.

A marsh may have the required elements to mature sound, healthy vines and fruit. But a good marsh may change suddenly altogether, the soil becoming fermented, sour and poisoned from a change of temperature, from dams, ditches, etc., and thus the best stage may have passed by never to return. On the other hand, its best condition

may not have been reached; as to this fact, however, time and experience alone will determine. A period of ten years is none too great, in my opinion, to ascertain fully in regard to this matter.

Some marshes prove to be superior to others and produce fruit almost spontaneously among the mossy roots, rubbish, etc., but when the conditions change and the underlying substratum fails to provide the required nutriment it may result in a necessary abandonment of the marsh.

Many seem to entertain the idea that it is all clear gain in cranberry culture, and there are enormous profits to be realized within a period of three or four years at most. If, however, they engage in the occupation and no results are realized, they become discouraged, without taking into consideration the conditions and methods of success. It should be borne in mind that where one succeeds there are perhaps fifty who make a failure. I do not advise anyone to engage in this business unless he is able to experiment in a thorough and systematic manner, whether successful or not.

I have been told that I was very foolish to stick to this "old cranberry swamp," and to work and expend all the money I could get when I never could make it amount to anything. These theories have not, however, discouraged me from continuing my efforts. I feel confident I have passed the most difficult point, and am more and more encouraged each season.

My marsh is now well subdued, is in good form, occupying about one hundred acres. Have about three inches fall, affording ample means to dispose of surplus water, and, by the use of an upper gate, an ample supply of water when needed.

A marsh may possess nine points of excellence, and one undesirable feature may overbalance them all. Some peat is too soft, some too hard, some too wet, some too dry; again the water may injure the vines. Where a marsh has had only rain water upon it, and it is replaced with mineral water, it may prove disastrous, or the reverse. Much damage may be done by a novice using too much or too little water, as it must be used at proper times and in sufficient quantities for the purposes required. I find the injury when it occurs, increases usually in a ten-fold ratio.

I met a man below St. Francis some years since, who said he drew the water from his vines about June 15th, but could give no reason whatever, as to warmth, drouth, or fertilization.

The season here being of short duration between killing frosts, it requires finer manipulation than where seasons are longer. I have ex-

perienced injury from frost as late as June 20th, and as early as August 13th, and much care is necessary in the management of the marsh, to secure desired results. One must understand the whole situation. The water in the spring must be retained long enough, but not to prevent growth of vines and maturing of crop, at the close of the season. Depth of water is another item, its use depending upon the objects to be secured. In my experience it is not proper to give the bed water before October 15th, and not according to nature. Last season I let on the water November 1st, and drew it off May 1st. My berries matured thirty days earlier than ever before known, and I commenced picking August 15th, and finished on the 24th. The next morning, the 25th, there was a heavy frost. A neighbor who had a few berries, picked but few of them, as they were too green.

I have spent some fifteen years experimenting. When I began I supposed I was a master of the business, and that all there was to do was to gather the fruit. I have found this to be a serious error, and feel that I know very little about it as yet.

My entire crop was estimated at 3,000 bushels, but on account of fire July 2d to 7th and cut worms I only harvested 250 bushels. Was awarded first premium at the State fair last fall and also at the winter meeting of your Society. I would like to see more samples of fruit exhibited at our fairs.

THE PEERLESS APPLE.

By O. F. Brand, Faribault.

At the request of the President of our State Horticultural Society, made at our State Fair in 1886, for the history of this celebrated apple, I will now give it.

In 1857 or 8 Geo. Dorrance, now deceased, of Walcott, Rice county, planted an orchard of several hundred apple trees. It was on the extreme eastern edge of the Big Woods, facing and open to the prairie on the north and northeast. The varieties were Wine Sap, Fall Orange, Fameuse, Red and Green Sweeting, Golden Russet, Talman Sweet, and other popular Eastern varieties, together with six trees of the Duchess. The latter were among the first to bear, and those six trees became celebrated in this part of the State nearly a quarter of a century ago. I first saw the orchard in 1864, and frequently in 1866. In 1867 the orchard bore a large crop, Duchess being heavily loaded. Talman Sweet and Golden Russet stood not far from Duchess, blossomed and bore a little fruit that year. I think it was from the crop of 1867 that G. J. Miller, who then and still resides two and one-half

miles from this orchard, saved a quantity of seeds from Duchess apples from Mr. Dorrance's trees. He planted the seeds on his farm on the prairie and from them raised more than 200 trees. He says he planted seed from no other variety but Duchess. He cultivated these trees up to 1872. That winter, 1872-3, killed the most of them. The best of those that lived he transplanted to his orchard in the spring of 1873, there being about a dozen of them.

I saw these seedlings for the first time in the fall of 1875. Several of them were then bearing, and some of them well loaded with fruit. I did not see the fruit of Peerless at that time, as it bore but three apples that year and someone had stolen them. I was so impressed with the appearance of the tree that I then and there wanted to buy the right to control it for one year, and offered Mr. Miller such a large price that he became alarmed as to its probable value, and as a result I did not get the scions and the tree was not propagated from till the spring of 1887. This explains to the public why there are no trees of it for sale.

The fruit of Peerless and several of the other seedlings was shown at the State Fair in 1878, and also at the winter meeting of this Society in 1883. A half bushel of Peerless apples was sent to New Orleans in 1884. It took the First Premium at our State Fair in 1886 and was there awarded \$5 as the "Best apple for all purposes of Northwestern origin." Being on exhibition at our winter meeting in January, 1887, it was pronounced by vote of this Society "The best seedling apple known."

Of the productiveness of the Peerless I will say, it bore one bushel in 1876, kept increasing in its yield till it bore seven bushels in 1882, nine bushels in 1884, about one bushel in 1885 of extra large fine apples, and more than ten bushels in 1886. Mr. Miller says of the fruit that it averages as large as Wealthy, if not larger; ripens from ten to twenty days later; hangs on the tree in a high wind perfectly; keeps better than Wealthy and is fully its equal in flavor and quality.

Mr. Miller's orchard is on a black loam, prairie soil with clay subsoil, and is on the prairie about two miles from the edge of the Big Woods, and more than ten miles from any lake. The location is a bad one, as is proved by the fact that five-sixths of Duchess and all of Wealthy in the same orchard were killed in 1884. In 1885 the orchard seemed to be the hot-bed of blight, yet Peerless escaped uninjured.

There is not another tree in the known world that has stood or can stand what Peerless has stood for twenty years, and produce the large crops of fine winter apples it has produced. It is rightly named, it has no peer or equal in this dry, cold, windy climate.

NORWAY SPRUCE FOR SHELTER BELTS.

E. H. Ricker, in a recent issue of *The Farmer*, of St. Paul, says:

“Nearly all the thrifty growing evergreens are valuable as a shelter belt where they are hardy, but the tree that has stood the test, and has proved the most valuable as a tree for shelter is the Norway Spruce. It is hardy, is adapted to prairie soil, and where it has been properly handled and well cultivated, has given perfect satisfaction. It is a tree that commends itself, and all that is necessary is for the people to become acquainted with it. As we have had an opportunity to know this tree and see it grow for many years, we feel fully capable of telling your readers its value as a protection. We give a short history of the Norway Spruce in this vicinity:

“Two or three years ago a row of Norway Spruce was planted along a roadway in the Elgin nurseries, by D. C. Scofield, a resident of that city. The farm selected by Mr. Scofield was about one and a half miles west of the city, on the open prairie. Not a sod had ever been turned—it was the virgin prairie. He started the plow, and got a piece of ground in as good condition as possible, in the tough prairie soil. The next year he sent his order to a large nursery firm in Scotland for a quantity of small Norway Spruce seedlings, there not being any nurseries in this country at that time where the Norway Spruce was grown in large quantities. They arrived, after being many weeks on the ocean, and thence by rail from New York to Elgin. Not a tree failed. The plants were two years old at the time of planting. At the expiration of ten years, accurate measurements, made by the Horticultural Society of Illinois, as recorded in their report, showed that many of them were over two feet in circumference, and over twenty feet high. Measurements recently made show many of them to be six feet ten inches in circumference, and seventy-three feet high; and for twenty-two years they have been a protection against the fierce storms of this climate. Although Mr. Scofield was upwards of fifty years of age at the time of planting, he still enjoys the benefits of this magnificent shelter belt. His experience proves that a man past middle age may enjoy many years of pleasure and profit, as a result of his foresight in planting evergreens for protection.

“We recommend Norway Spruce as the best for shelter belts; the next in order are American arbor vitæ, red cedar, and American white spruce. White, Scotch, and Austrian pines are reliable evergreens, but we do not recommend them for shelter belts.”

We give a very good representation of the Norway Spruce, as shown in *The Farmer* :



NORWAY SPRUCE.

Mr. Sias, of Rochester, recommends evergreens highly for shelter belts. He gives the following list :

1st, Norway Spruce (*Abies! Excelsa*); 2d, White Pine (*Pinus Strobus*); 3d, Red Pine (*Pinus Resinosa*); 4th, Hemlock Spruce (*Tsuga Canadensis*); 5th, White Spruce (*Abies Alba*); 6th, Scotch Pine (*Pinus Sylvestris*).

He says: "We head the list with the Norway Spruce, first, because it is capable of resisting a stronger wind than any of the others, unless it is the white spruce; second, it has more fibrous roots, hence less loss in planting; third, it is a fine looking tree. Josiah Hooper says: 'Of all the hardy evergreens this appears to be the most suitable for shelter, dense and compact in its growth, hardy to the utmost degree, and vigorous in almost every soil; it is certainly the perfection of plants for a screen. We must confess to having nothing that will compare with this invaluable tree for all purposes.'"

YELLOW TRANSPARENT APPLE.

Syn.—Yellow Transparent, White Transparent, Red Duck, Charlottenthaler, Grand Sultan, Russian Transparent.

Mr. Gibb, of Abbotsford, thus describes this variety: "No. 334, Yellow Transparent (*Skvosnoi joltni*). This is now widely known. It is earlier than Early Harvest, and much like it in appearance and quality."

Yellow Transparent is one of the seven leading varieties of apples recommended for planting in Wisconsin, by the Horticultural Society of that state.

Mr. Wm. Toole speaks of this variety as observed in the orchard of A. G. Tuttle, of Baraboo, in the following glowing terms: "A clear, waxy, white-skinned apple, of good quality, juicy and very early. It is hardy, a constant and enormous bearer." (See vol. xv, p. 455.)

Geo. P. Peffer, of Pewaukee, at the late annual meeting of the Wisconsin Horticultural Society, reports that "in his search in different orchards in Wisconsin he finds Duchess and Tetofsky the best preserved varieties, although Alexander and Transparent are found to be all right." Of a dozen or more Russian varieties set in his own orchard he says: "Those that are satisfactory are Yellow Transparent, Long Arcade, Hibernial and Longfield."

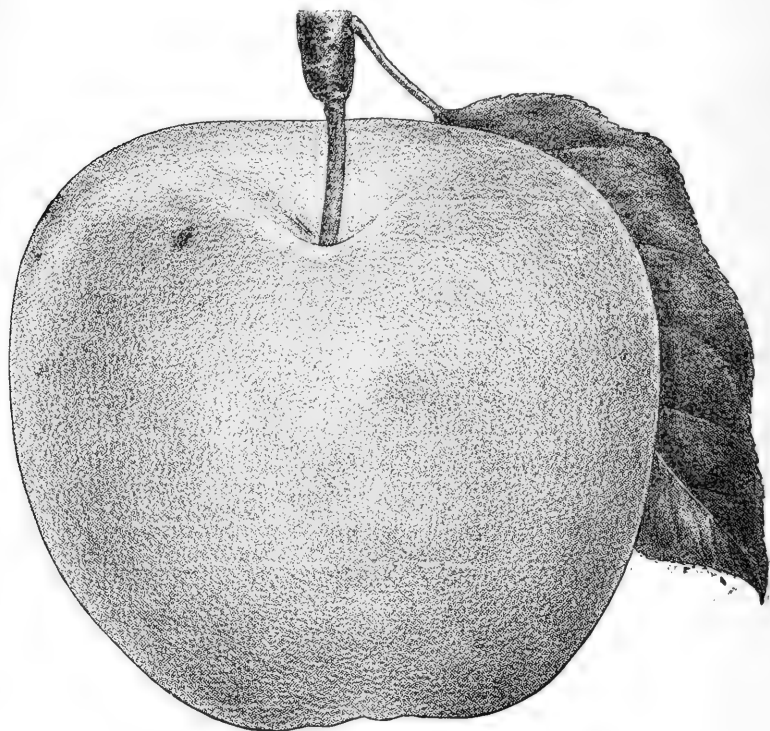
Says *Farm, Stock and Home*: "If the efforts to introduce Russian apples into the Northwest had resulted in but this one acquisition, it would amply repay all trouble and expense. It is the best *very* early apple, pleasanter than the Early Harvest in flavor, ten days at least earlier, better and younger bearer, and much superior, as a keeper, to any early apple. It has that mellow, luscious appearance of the Sweet June, with its minute specks. Undoubtedly it would pay to plant it quite extensively near Minneapolis and St. Paul for the city markets."

J. T. Lovett, of New Jersey, says of it: "The earliest of all apples; handsome and good. Of Russian origin, and like all the Russian apples, of ironclad hardness. It ripens fully ten days in advance of Early Harvest, Primate and other early varieties. Tree a free, upright grower, very prolific, and a remarkably young bearer, frequently producing in the nursery rows the second year from the bud. Fruit growers in New Jersey who have this apple in bearing are realizing immense profits from it."

Dr. Hoskins, of Vermont, says: "The tree is a free and symmetrical grower, upright when young, but spreading as it becomes older

under the loads of fruit. It is a healthy tree, and like most of the Russians, ironclad against cold, enduring forty degrees below zero without injury. It is a heavy bearer annually in rich gardens, but biennially in poorer soils or in sod. The fruit fairly grown, is medium in size, though specimens that would rank as large may often be found on young trees in good soil. In delicate, waxen beauty, the Transparent, when allowed to mature upon the tree, is unequalled among American apples. The fruit is always fair, and its attractive appearance, joined with its very good quality, makes it extremely salable. As an early market apple it has great merits. If gathered just as the seeds begin to color, it bears transportation well, and will keep two weeks or more before showing any signs of deterioration.”

We are under obligations to *Farm, Stock and Home* for use of cut of this New Russian apple.



YELLOW TRANSPARENT APPLE.

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LIBRARY,
NEW YORK
BOTANICAL
GARDEN.



S. A. Robertson

(For Biographical Sketch see page 445.)

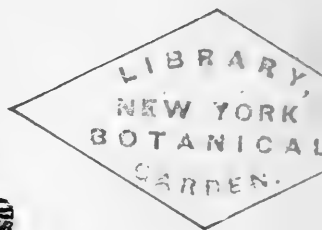
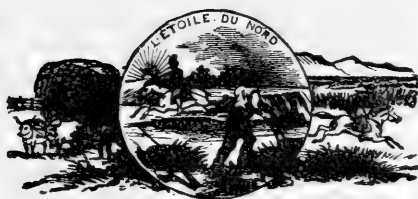
ANNUAL REPORT
OF THE
MINNESOTA STATE
HORTICULTURAL SOCIETY

FOR THE YEAR 1889,

EMBRACING THE

TRANSACTIONS OF THE SOCIETY FROM MARCH 31, 1888, TO MARCH
31, 1889, ALSO PROCEEDINGS OF THE ANNUAL MEETING
OF THE MINNESOTA AMBER CANE ASSOCIATION,
ESSAYS, REPORTS, ETC.

VOL. XVII.



Prepared by the Secretary, S. D. HILLMAN, Minneapolis, Minn.

ST. PAUL, MINN.:
THE PIONEER PRESS COMPANY.
1889.

LETTER OF TRANSMITTAL TO THE GOVERNOR.

OFFICE OF SECRETARY,
MINNEAPOLIS, March 30, 1889. }

To Hon. Wm. R. Merriam, Governor of Minnesota,

SIR: I have the honor to submit herewith, in compliance with legal requisition, the accompanying report for 1889, with supplementary papers.

Respectfully yours,

S. D. HILLMAN,

Secretary Minnesota State Horticultural Society.

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The next annual fair will be held on the State Fair grounds between Minneapolis and St. Paul, Sept. 6 to 14, inclusive, 1889. No effort will be spared to make it the best agricultural and horticultural exposition of the year.

Liberal premiums offered in every department. For further information address the secretary, as above.

CONSTITUTION
OF THE
MINNESOTA HORTICULTURAL SOCIETY.

ARTICLE I.

NAME.

This Society shall be known as the Minnesota State Horticultural Society.

ARTICLE II.

OBJECT OF THE SOCIETY.

The object of this Society shall be to improve the condition of pomology, horticulture and arboriculture, by collecting and disseminating correct information concerning the culture of such fruits, flowers, trees, and other productions in horticulture as are adapted to the soil and climate of Minnesota.

ARTICLE III.

MEMBERSHIP.

Any person may become a member by paying to the secretary or treasurer an annual fee of one dollar, or a life member by the payment of ten dollars, provided that life members may pay the fee of ten dollars in two equal annual payments of five dollars each.

Local or county horticultural societies and kindred organizations may become auxiliary to this Society, and their members

entitled to all the rights and privileges of membership by sending three delegates, furnishing a list of members and a report of the proceedings thereof to this Society at its annual winter meeting.

Honorary members, for a time stated or for life, may be elected at any annual meeting by a two-thirds vote of the Society.

ARTICLE IV.

OFFICERS.

Its officers shall consist of a president and one vice president from each congressional district, a secretary, treasurer, and an executive committee of five, and librarian.

ARTICLE V.

DUTIES OF PRESIDENT AND VICE PRESIDENTS.

The president shall preside at and conduct all meetings of the Society, and deliver an annual address, and in his absence the vice presidents, in their order, shall perform the same duties. They shall also have a general supervision of the horticultural interests in their respective districts, and make a written report to the Society at its annual winter meeting; in consideration of which the Society shall pay their traveling expenses to the same.

ARTICLE VI.

THE SECRETARY.

The secretary shall record all the doings of the Society, collate and prepare all communications, etc., for the public press, and pay over all moneys received from members or otherwise to the treasurer on his receipt; receive and answer all communications addressed to the secretary, establish and maintain correspondence with all local, county, district and state horticultural societies, and secure by exchange their transactions, as far as possible; to aid the president as an executive officer in the dispatch of business relating to the meetings of the Society, notices of horticultural and similar meetings of general interest, and report to the annual meeting of the Society an abstract of the matter that has come into his possession, which, with its approval, shall become part of its transactions of the current year.

ARTICLE VII.

THE TREASURER.

The treasurer shall collect and hold all funds of the Society, and pay out the same only on the order of the president, countersigned by the secretary. He shall make up a report of all the receipts and disbursements of the Society and present the same at the annual winter meeting, or any other time when called upon to do so by the executive committee. He shall give bonds in such sums as the Society may direct, to be approved by the president and secretary, and the bond when so approved shall be filed with the state auditor.

ARTICLE VIII.

ELECTION OF OFFICERS.

The officers shall be elected separately and annually by ballot, and hold their offices until their successors are elected.

ARTICLE IX.

MEETINGS OF THE SOCIETY.

The Society shall hold annual sessions on the third Tuesday of January, and other meetings at such time and place as the Society may direct.

ARTICLE X.

THE LIBRARIAN.

The librarian shall have charge of the library and report its condition at each annual meeting.

ARTICLE XI.

AMENDMENTS.

By-laws and alterations of the constitution for the purpose of meeting the future wants of the Society, may be enacted by a vote of two-thirds of the members present at any regular annual meeting, and on one day's notice of the same being given.

BY-LAWS.

1. The president, at each annual meeting of the Society shall appoint a general fruit committee, consisting of two members from each congressional district in the state, and it shall be the duty of each member to make a written report annually upon the fruit crop, and a limited list of fruits best adapted for general cultivation in their respective districts.

2. The president, secretary and treasurer shall be members *ex-officio* of the executive committee, who shall have charge of all matters pertaining to the interest of the Society.

3. The executive committee may call a meeting of the Society at any time they may deem advisable, giving at least thirty days' notice through the public press.

4. The executive committee shall appoint a committee on seedlings, on nomenclature, on forestry, on fruit blossoms, on Russian apples, on gardening, on small fruits and on floriculture.

5. The five members of the executive committee, not including the president, secretary or treasurer, shall be a committee on finance, and it shall be their duty to audit all bills before they shall be ordered paid by the president and secretary.

6. The executive committee shall see that a program is issued for each meeting of the Society, at least one month before the winter meeting and ten days before the summer meeting.

7. Every member shall be entitled to one copy of the transactions as often as published, on which postage shall be paid; but in distribution of all other copies the party receiving the same shall pay the postage. Where several copies are sent to auxiliary societies it shall be discretionary with the secretary to pay the freight.

8. *Quorum*.—A quorum shall consist of nine members of the Society, or a majority of the executive committee.

MINNESOTA
STATE HORTICULTURAL SOCIETY.

TRANSACTIONS OF 1888-9.

THE SUMMER MEETING, 1888.

NOTE.—The Society will not be held responsible for individual opinions which are found in this report.—*Secretary.*

The following is the circular issued by the Society, announcing the summer meeting, together with premium list:

The summer meeting of the Society will be held on the grounds of the state experimental farm, situated nearly midway between St. Paul and Minneapolis, one mile north of St. Anthony Park and near the state fair grounds, Thursday, June 28th, to be followed (the weather being pleasant) by a horticultural excursion to Lake Minnetonka on the following day.

The meeting at the experimental farm will be on the basket picnic plan, to which all are expected to contribute.

The program will be somewhat informal, although of an interesting nature. The object lessons of the day will be well worth the time and expense incurred to everyone having an interest in the beautifying of the home and its surroundings.

The new buildings recently erected at the farm, by the board of regents of the State University, possess some new and novel features, affording increased facilities for teaching the higher branches of experimental work, the principles of agriculture, horticulture, etc.

A review of the experimental work will be given by the superintendent of the farm, Prof. Edward D. Porter, showing the progress made since we met there two years ago.

Prof. Lugger will give a short address on insects injurious to farmers and horticulturists, illustrated by specimens.

Prof. Green will have something to say of interest to gardeners, florists, and small fruit growers. This will be followed by a brief discussion on topics of interest.

The three-year-old orchard of New Russians will be examined, affording an opportunity for observing the character of trees and their adaptability for withstanding the severity of our trying northwestern climate; also many other features of experimental work conducted at the state experimental station.

Liberal premiums are offered and it is expected that exhibitors will be prompt and place all their exhibits on the tables by ten o'clock A. M., so the judges to be appointed can make awards and report thereon by twelve o'clock. After the awards have been made the strawberries on exhibition will be appropriated for the purposes of the basket picnic, to be served at one o'clock. This will not be the least attractive feature on the program.

It is hoped there may be a full attendance of members as well as others interested in horticulture, agriculture, and in the experimental work now being conducted at the farm. The ladies are very cordially invited to be present and to participate in the exercises of the day. Amateur horticulturists, both young ladies and gentlemen, are also invited.

The location of the farm is convenient to both St. Paul and Minneapolis, frequent trains being run between the cities and St. Anthony Park, over the Manitoba and St. Louis railways. Conveyances will be provided up to eleven o'clock for the transportation of delegates from the station to the farm.

Entertainment will be provided for delegates in attendance from a distance.

EXCURSION TO MINNETONKA.

Arrangements are being made by the local committee for an excursion to Lake Minnetonka on Friday, June 29th, when an opportunity will be afforded for visiting some of the vineyards and nurseries in the vicinity, including a sail upon the beautiful lake.

For further particulars address

S. D. HILLMAN,
Secretary, Minneapolis.

WYMAN ELLIOT,
President, Minneapolis.

PREMIUM LIST.

Prof. E. D. Porter, Superintendent of Exhibits.

STRAWBERRIES.

	First Prem.	Second Prem.
Best general collection of not less than five named varieties, one pint each.....	\$5 00	\$3 00
Best four varieties, one quart each.....	3 00	2 00
Best Minnesota Seedling, not before exhibited.....	3 00	2 00
Best quart Wilson's Albany.....	2 00	1 00
Best quart Countess.....	2 00	1 00
Best quart Charles Downing.....	2 00	1 00
Best quart Crescent Seedling.....	2 00	1 00
Best quart James Vick.....	2 00	1 00
Best quart Manchester.....	2 00	1 00
Best quart Glendale.....	2 00	1 00
Best quart Prince of Berries.....	2 00	1 00
Best quart Sharpless.....	2 00	1 00
Best quart Windsor Chief.....	2 00	1 00
Best quart Seth Boyden.....	2 00	1 00
Best quart Green Prolific.....	2 00	1 00
Best quart Capt. Jack.....	2 00	1 00
Best quart Col. Cheney.....	2 00	1 00
Best quart Daniel Boone.....	2 00	1 00
Best quart Kentucky Seedling.....	2 00	1 00
Best quart Old Ironclad.....	2 00	1 00
Best quart Cumberland Triumph.....	2 00	1 00
Best quart Minnetonka Chief.....	2 00	1 00
Largest fruit of any variety.....	2 00	1 00

The same premiums may be awarded upon other varieties of equal merit.

VEGETABLES.

	First Prem.	Second Prem.
Best collection, not less than six varieties, grown by exhibitor...	\$5 00	\$3 00
Best 3 bunches of asparagus.....	1 00	50
Best 6 beets.....	1 00	50
Best 6 carrots.....	1 00	50
Best 6 onions.....	1 00	50
Best 6 radishes.....	1 00	50
Best 6 turnips.....	1 00	50
Best 6 stalks pieplant.....	1 00	50
Best 6 heads lettuce.....	1 00	50
Best 3 heads of cabbage.....	1 00	50
Best 3 heads of cauliflower.....	1 00	50
Best $\frac{1}{2}$ peck of green peas.....	1 00	50
Best $\frac{1}{2}$ peck string beans.....	1 00	50
Best $\frac{1}{2}$ peck new potatoes.....	1 00	50
Best 6 cucumbers.....	1 00	50
Best 6 summer squash.....	1 00	50

FLOWERS.

	First Prem.	Second Prem.
Best collection cut flowers.....	\$5 00	\$3 00
Best collection roses.....	5 00	3 00
Best collection pansies.....	3 00	2 00
Best hand bouquet.....	2 00	1 00

RULES.

The awarding committee shall close their labor, and report to the Society at twelve o'clock, M. They shall have power to recommend special premiums for seedlings, and articles of special merit, not provided for in the schedule of premiums. They shall not award premiums to contributions unworthy of exhibition, even if there is no competition.

Competition shall be open to all, but the annual membership fee of one dollar will be deducted from premiums awarded to persons who are not members of the Society.

PROCEEDINGS AT THE SUMMER MEETING.

THURSDAY, JUNE 28, 1888.

Pursuant to notice the summer meeting of the State Horticultural Society was held at the state experimental farm, Thursday, June 28, 1888. The day was perfect in every respect, and the attendance of delegates and members of the Society was quite large. The exhibits made of fruits, flowers and vegetables were unusually fine and the premiums awarded were larger than usual.

President Elliot announced the following committees:

On Flowers: Prof. Samuel B. Green, St. Anthony Park; Mrs. H. A. Kellam and Mrs. F. L. Moffett, Hamline.

On Fruits: J. S. Harris, La Crescent; J. W. Boxell, St. Paul, and Isaac Gilpatrick, Minneapolis.

On Vegetables: J. T. Grimes, Minneapolis; J. M. Underwood, Lake City, and F. G. Gould, Excelsior.

The forenoon was spent in arranging exhibits, social intercourse and examining the various object of interest at the experimental farm.

The following award of premiums was made:

AWARD OF PREMIUMS.

FRUITS.

Best general collection of strawberries of not less than five named varieties, Early Princess, Crescent, Capt. Jack, Kramer's No. 2.

	Premium.	Amount.
Foundling, J. C. Kramer, La Crescent.....	First	\$5 00
Best four varieties Jewell, Wilson, Champion, Capt. Jack, J. Allyn, Red Wing	First	3 00
Best four varieties Crescent, Manchester, Wilson, Jessie, N. J. Stubbs, Long Lake.....	Second	2 00

	Premium.	Amount.
Best Minnesota Seedling, not before exhibited, M. Cutler, Sum- ter.....	First	\$3 00
Best quart Wilson, N. J. Stubbs, Long Lake.....	First	2 00
Best quart Wilson, Mrs. Anna B. Underwood, Lake City.....	Second	1 00
Best quart Countess, Mrs. Anna B. Underwood, Lake City.....	First	2 00
Best quart Crescent, J. C. Kramer, La Crescent.....	First	2 00
Best quart Crescent, M. Cutler, Sumter.....	Second	1 00
Best quart James Vick, Mrs. Anna B. Underwood, Lake City...	First	2 00
Best quart Manchester, N. J. Stubbs, Long Lake.....	First	2 00
Best quart Glendale, N. J. Stubbs, Long Lake.....	First	2 00
Best quart Early Princess, J. C. Kramer, La Crescent.....	First	2 00
Best quart Sharpless, Mrs. Anna B. Underwood, Lake City.....	First	2 00
Best quart Windsor Chief, Wm. Lyons, Minneapolis.....	First	2 00
Best quart Windsor Chief, N. J. Stubbs, Long Lake.....	Second	1 00
Best quart Capt. Jack, J. C. Kramer, La Crescent.....	First	2 00
Best quart Capt. Jack, N. J. Stubbs, Long Lake.....	Second	1 00
Best quart Ironclad, N. J. Stubbs, Long Lake.....	First	2 00
Best quart Ironclad, Wm. Lyons, Minneapolis.....	Second	1 00
Best quart Cumberland, C. L. Smith, Minneapolis.....	First	2 00
Best quart Cumberland, Wm. Lyons, Minneapolis.....	Second	1 00
Best quart Jessie, N. J. Stubbs, Long Lake.....	First	2 00
Best quart Jessie, S. R. Spates, Excelsior.....	Second	1 00
Best quart Jewell, S. R. Spates, Excelsior.....	First	2 00
Best quart Jewell, Mrs. Anna B. Underwood, Lake City.....	Second	1 00
Best quart May King, Wm. Lyons, Minneapolis.....	First	2 00
Best quart Lyons' Seedling, Wm. Lyons, Minneapolis.....	First	2 00
Largest berry, Jessie, N. J. Stubbs, Long Lake.....	First	2 00
Largest berry, Early Princess, J. C. Kramer, La Crescent.....	Second	1 00
Currants, Fay's Prolific, J. F. Gilmore, Richfield.....	First	3 00
Currants, Fay's Prolific, W. H. Brimhall, Hamline.....	Second	1 00
Gooseberries, Houghton, J. F. Gilmore, Richfield.....	First	2 00
Gooseberries, Hixon, J. F. Gilmore, Richfield.....	Second	1 00

CUT FLOWERS.

	Premium.	Amount.
Best collection, Miss Julia Lyons, Minneapolis.....	First	\$5 00
Best collection, Mrs. W. G. Hendrickson, Hamline.....	Second	3 00
Best collection of roses, Mrs. M. G. Gould, Excelsior.....	First	5 00
Best collection of roses, Mrs. Anna B. Underwood, Lake City...	Second	3 00
Best collection pansies, J. S. Gray, Minneapolis.....	First	3 00
Best collection pansies, Miss Julia Lyons, Minneapolis.....	Second	2 00
Best hand bouquet, Miss Julia Lyons, Minneapolis.....	First	2 00
Best hand bouquet, Mrs. R. Pearse, Minneapolis.....	Second	1 00

VEGETABLES.

	Premium.	Amount.
Best collection, William Lyons, Minneapolis.....	First	\$5 00
Best collection, J. Allyn, Red Wing.....	Second	3 00
Asparagus, William Lyons, Minneapolis.....	First	1 00

	Premium.	Amount.
Asparagus, William McIntosh, Langdon.....	Second	\$ 50
Beets, J. S. Gray, Minneapolis.....	First	1 00
Beets, J. Allyn, Red Wing.....	Second	50
Onions, J. Allyn, Red Wing.....	First	1 00
Onions, J. S. Gray, Minneapolis.....	Second	50
Radishes, J. S. Gray, Minneapolis.....	First	1 00
Radishes, William Lyons, Minneapolis.....	Second	50
Pieplant, H. F. Busse, Minneapolis.....	First	1 00
Pieplant, William Lyons, Minneapolis.....	Second	50
Lettuce, J. S. Gray, Minneapolis.....	First	1 00
Lettuce, William Lyons, Minneapolis.....	Second	50
Peas, William Lyons, Minneapolis.....	First	1 00
Cucumbers, William Lyons, Minneapolis.....	First	1 00
Cucumbers, J. S. Gray.....	Second	50
Tomatoes (special), J. S. Gray, Minneapolis.....	First	2 00

After the awards were made, a picnic dinner was served, at which more than one hundred persons were present, both of ladies and gentlemen, and of old and young.

After dinner, President Elliot called the meeting to order, and an informal discussion was had with reference to visiting Lake Minnetonka the following day. It was decided to visit the lake.

President Elliot said that Prof. Green had been invited to address the Society briefly on horticultural topics.

REMARKS BY PROF. GREEN.

Members of the Minnesota Horticultural Society,

LADIES AND GENTLEMEN: I am glad of the opportunity of addressing you, because it gives me a chance of expressing my warmest sympathy and admiration for the work which has been and is being done by your Society. And is it to such societies as this, in connection with experiment stations, that the horticulturists of the state must look for their encouragement and profit.

Minnesota can not look to other states for precedents in horticulture. She must have a system of horticulture of her own. It must be developed on her own soil, and be built up by the laborious and practical methods of careful experimenting, trial, observation, and comparison.

As I have traveled over your state (and it is my state now), I have, as would any enthusiastic lover of horticulture, been struck not so much by the lack of development of commercial

horticulture, as by the lack of the cultivation of farm horticulture, among the farmers of the state. Most of the farmers appear to be sadly deficient in this grand practice which conduces in a very great degree to the health, economy and general happiness of the cultivators of the soil.

There is evidently too great a tendency among our farmers generally to specialize their efforts on the wheat crop. I believe heartily in the necessity for a closer cultivation of less land in a better way than is now practiced, and that to a mixed husbandry the farmers of Minnesota must look for success. It would be foolish for me to suggest that every farmer in the state go into commercial horticulture, nor would I have it so; but I would have every farmer, whether he cultivated few acres or many, have a first class, productive garden; and by care and foresight this can be had in any section of the state.

The absence of the garden is often due to a lack of information as to the best methods of procedure, and not knowing how, or when to start. But we may attribute the lack of gardens, principally, to a deficiency in information regarding their usefulness, profit and importance, and to a maximum and exaggerated knowledge of the care, worry and disappointment connected therewith.

And right here I want to speak a good word for the institute work, in which your state is a pioneer. I have had an opportunity of seeing the work in practice, and I believe it is the best work ever undertaken by any state to educate her farmers; and while I do not set up for a prophet, I want to prophesy that in the near future this work will be greatly increased, and as the farmers become better acquainted with its benefits to them, they will demand and have more of these institutes, and enlarged appropriations will be made for their support. These institutes offer the very best means of reaching the people, and impressing upon them the necessity of giving more attention to horticulture, and for disseminating throughout the state information on horticultural topics. I am a thorough believer in the institutes for the farmers, and in the farm school recently established at this station for the farmers' sons.

I am glad of this opportunity of expressing my views as to the relation which I hope the horticultural department of the experiment station will sustain to your Society. I want to make the horticultural department the best department of the station and a representative department; to get close down to the work

and make it practical, earnest and aggressive. I desire that Minnesota shall have the best horticultural department in the country—second to none—and I want you, ladies and gentlemen, and all friends of horticulture, to feel and believe that I am anxious for your earnest co-operation and helpfulness in pushing the good work. This horticultural department is for you, and the horticulturist in charge considers himself your servant, and is desirous of doing all he can to promote your interests. I do not expect to perform miracles; but I do expect by careful working, trying, and comparison of one season with another, to advance methods in the interest of economy, comfort and general usefulness.

As there are scarcely any lands that are alike in all particulars, and as every locality has its special climate and is best adapted for its appropriate line of work, by reason of markets, climate or soil, so to some extent must every progressive horticulturist and farmer be an experimenter and his lands must be experimental lands. I believe this thoroughly and mean to encourage individual experiments. It is evident to those acquainted with the work that much can be done by a central station to direct and stimulate experiments, and also in collecting and arranging information concerning them.

Besides this work I believe that it is the duty of the experiment station to carry on any experiments of general interest to the agricultural community which comes within its province, especially those which, from the expense incident thereto, or from the need of peculiar facilities or training, will not be undertaken by individuals.

I shall be glad to have suggestions made by those interested in horticultural matters as to the best lines of work to pursue for the most useful results, and at any time to have my attention called to any promising novelty, or any new feature in the use of any variety for a special purpose, or to special methods of cultivation.

Dr. Otto Luggger was then called upon for some remarks, and responded briefly.

REMARKS OF DR. LUGGER.

Dr. Luggger said he had but recently returned from a trip in the northern portion of the state, where he had been busy investigating the reported visitation of the grasshoppers; he was

not prepared to make any extended remarks at this time. He might, however, refer to the importance of knowing the proper methods of fighting our enemies, the noxious insects. There were two methods of destroying them, the natural and the artificial.

Insects did not come and spread over very large fields without being favored by certain conditions, such as climatic influences, a lack of enemies, or by the present method of growing as much as possible one kind of food. When, for instance, we cultivate nothing but wheat, the Hessian fly and chinch bug increase beyond measure. If we grow nothing but potatoes the potato beetles increase inordinately. Among the natural remedies were to be included our friends, carnivorous beetles and parasitic wasps, both valuable for the destruction of other insects.

He had noticed near Perham the week before a species of dragon fly that seemed to be making attacks upon the grasshoppers.

Every farmer should study this subject of entomology and be able to recognize his friends at once among the insect species.

Insects could be destroyed by the use of coal oil, Paris green, and other insecticides, but the most important thing, perhaps, was the matter of co-operation; farmers should come together and fight them in a concerted manner.

President Elliot. We have with us another gentleman that has had a great deal of experience in the way of landscape gardening. I refer to Prof. Cleveland, and will ask him to favor us with just a few remarks this afternoon.

REMARKS BY PROF. H. W. S. CLEVELAND.

LADIES AND GENTLEMEN: This is entirely unexpected to me, but I feel that I have some right to speak to a horticultural society by virtue of former occupations.

I was for many years engaged especially in fruit culture in the State of New Jersey. I took a very active part, more than forty years ago, in organizing the New Jersey Horticultural Society, of which I was the secretary for a great many years. I was also a member of the Pennsylvania State Horticultural Society.

It is many years, however, since then, or since I have had much practical experience with horticulture. I have been between thirty and forty years engaged in my profession of landscape gardening. For five years past I have been endeavoring

to do what I might to develop the natural beauties of these two cities of St. Paul and Minneapolis.

I feel that in these two cities there are such opportunities as no other cities in the country possess for the development of beauty and for the making of cities which shall be the fitting abode of a noble race of men and women, and I hope, and it is my wish, that I may be enabled to devote my remaining years to those objects.

I have no wish to enlarge upon my own experience now. What I do wish to speak of is one point in which every practical horticulturist is specially interested in and mutually so. You can not develop an ideal interest in these subjects in the people until you can have these principles hammered into them by repeated and constant urging; and I say, and insist from my own experience, and from what I see, that it is exceedingly difficult to induce any of the papers in these two cities to show any earnest interest in the matter. You seldom see anything more than a mere incidental allusion to such efforts as you are making here, and to such efforts as I am making to develop the natural beauty of the place. But we find in our daily papers column after column devoted to base ball, and recently the paper informs you that there were 3,000 people out to witness a couple of men who were trying to maul each other in the prize ring. (Laughter and applause.)

Now, gentlemen, what I would urge upon you is to have discussions and to insist upon it that they be laid before the public. It can be done if we are interested in the promotion of horticulture and the promotion and development of the beauty of the country, and it is to be accomplished by bringing the subject constantly before the people, and showing them the benefits which are to be derived therefrom, and thus awaken popular interest and enthusiasm, which shall thus lead to the development you may desire.

Now, I might talk all the afternoon on different subjects connected with it, but I would impress upon you the importance of creating this popular interest in this work. And there is no means by which it can be done so readily as by constant discussion in the papers. (Applause.)

President Elliot. I think these remarks are very pertinent and they no doubt express the sentiments of every true horticulturist here present.

Prof. Porter was here invited to address the Society briefly as to the work being conducted at the experiment station.

REMARKS OF PROF. PORTER.

Prof. Porter said he congratulated the Society on the number present at this the summer meeting. It had been two years since they were there last. An opportunity is now afforded to see if any progress has been made.

Hitherto the work has been preparatory—the foundation to be laid, and our aim has been to lay these foundations so broad and deep that they will not be torn down, but a superstructure will be erected upon them that will be a credit to its founders, a benefit to the world and an honor to the state which has fostered it.

During the past five years you have seen at your annual meetings the gradual development of this work. From a farm of sand hills and peat bogs—without buildings, stock, implements, or machinery—you see a farm of two hundred and fifty acres of the finest land in Minnesota for our purposes, with a complete set of farm buildings; models of their kind, with the best specimens of blooded stock in the state; yards and pens, with a full supply of the most improved implements and machinery—with fields in the highest state of cultivation; nurseries and orchards, vineyards and gardens filled with every variety of tree, shrub, flower and fruit which is of value to Minnesota; you see an agricultural experiment station with its full equipment of laboratories, library, office, instruments and scientific men, with its work fully organized and in operation.

From time to time, for three years past, I have outlined to you, my plans for a farmers' school—a school where a farmer boy, coming directly from his home school, may find facilities for acquiring a knowledge of such branches of study as will qualify him for the successful prosecution of his calling as a farmer, or a citizen, and at the same time keep up his association with farm life—preparing him to go back to the farm, instead of going away from it. I have been working persistently for the establishment of this school, and after convincing our authorities of the feasibility of the plan, the next difficulty to be overcome was to find funds to provide the necessary buildings and equipment. This was accomplished last fall, and on the summit of the hill overlooking Minneapolis, St. Paul, Hamline University and Macalester Col-

lege, you will find a most complete building, erected, furnished, and ready for the reception of students this fall, and I predict that before the close of winter every nook and corner of that building will be filled with bright, active, intelligent boys from the farms of Minnesota.

All the above work, the equipment of the farm, the organization of the station, and the development of the School of Agriculture, has been accomplished without a single dollar of direct appropriation from the state—all has been paid for from the sale of our old farm.

I invite you while here to make a careful inspection of our work, and give us your suggestions for the future. We are here as your agents, to do your work, and this work will be either a failure or a success, just in proportion as the farmers and horticulturists of the state take an interest in it.

I take pleasure in introducing to you Prof. Samuel B. Green, the horticulturist of the station, who has outlined to you the work which he has under way, and what he proposes for the future. Thanking you for your presence with us to-day, I hope you will annually favor us with a visit. (Applause.)

CORRESPONDENCE.

The Secretary read the following correspondence :

FERGUS FALLS, MINN., June 22, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: Thanks for your kind invitation to the summer meeting of the horticulturists. I expect to be in St. Paul on a short visit at that time, and shall make it a point, if possible, to get out to the experimental farm on the twenty-eighth and see the crowd. The sentence in the circular about "amateurs" just lets me in, for I'm probably the most amateurist amateur in that line that you'll have present.

I planted a box of celery this spring. It grew rapidly and I tended it with jealous care for six weeks, carrying it back and forth, watering, pulling weeds, etc. At the end of that time a friend who has raised celery looked it over, and cheerfully told me that it was grass with which the box was filled! I had guarded the grass and weeded out the celery as fast as it appeared.

If this is enough to entitle me to admission among the *other* horticulturists, I'll be there probably.

Respectfully,

HARRY M. WHEELOCK.

FROM MICHIGAN.

SOUTH HAVEN, MICH., June 23, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I am doubtless indebted to you for a copy of the program for your summer meeting to occur on Thursday of next week.

Were it not that duties at home render it impracticable, I would gladly be with you and would anticipate great pleasure in repeating my hasty visit with you to the grounds of your state farm, and observing the developments of another year.

The present season here has been very backward, at least two weeks later than usual. We are now not quite at the height of the strawberry shipping season; but the last few days have been moist and very warm, which is rapidly hastening vegetation.

The open weather and constant freezing and thawing of February, March and even April, also, to some extent, have rendered the strawberry crop a light one, but the peach crop (which is our most important one) is very heavy; requiring some thinning. Apples and other fruit crops generally are very promising. In my last season's visit to your state and Iowa, I was so pleased with what I saw of your recent varieties of native (*Americana*) plums that I arranged with Mr. Harris of your state and with Prof. Budd for trees of several of these which I now have growing finely, and I anticipate, with them, that we may be able to escape the ravages of the curculio, at least in part, together with certain other maladies which, for many years past, have rendered the culture of the domestic varieties with us in Southern Michigan unsuccessful, and, in the main, unprofitable.

Trusting that your gathering will prove both interesting and profitable, I am,

Very truly yours,

T. T. LYON.

On motion the meeting then adjourned.

The following description of the meeting and of the trip to the lake the day following, from the pen of President Elliot, is given here:

THE SUMMER MEETING.

The annual summer meeting held June 28th, at the state experiment farm, St. Anthony Park, and the excursion the twenty-ninth, at Lake Minnetonka and its environs, was an occasion worthy of mention in the annals of this Society; one of the mile stones showing the advancement of interest, enterprise and energy manifested at this particularly busy season. To those not there to participate, we can hardly give suitable expression descriptive of the enthusiasm, joy and pleasure manifested by those present. At the experiment farm, the hearty and cordial reception given the members and their friends by Prof. Porter and his able corps of assistants, was by all appreciated. The fruits exhibited were the finest ever shown at a summer meeting; especially so were the strawberries; and particular mention should be made of the new seedlings from the grounds of Messrs. Wm. Lyons, of Richfield, and J. C. Kramer, of La Crescent; kinds that will be of great value to our farmers, gardeners and fruit growers.

Doubtless you have all heard of stories that were considered fishy, but the largest story in this direction is on great yields of strawberries recorded the past season. Mr. Kramer's new seedling, the Princess, which by actual measurement of ground and count of bushels, produced 825 bushels per acre, estimated by the square rod. This, however, is not quite up to the story told by an Eastern amateur horticulturist, of what he has accomplished with the Jessie, 43 quarts picked from 12 plants, or at the rate of 1,845 bushels per acre, the largest berry measuring $9\frac{1}{2}$ inches in circumference!

Awards of premiums being made the ladies present took possession of the fruit and prepared it for the table, which with the Jersey cream and cake contributed, made a very luxurious and

enjoyable repast. After dinner short speeches were made upon various topics by specialists in their particular lines of work. Prof. Porter uttered very enthusiastically the bright prospects of the new farm school which was to be started in October, and the flattering outlook for the future experiment work of the station. Prof. H. W. S. Cleaveland, the veteran landscapist, spoke as a devotee only can of the natural beauties of the country surrounding the twin cities of this great and beautiful state; the many beautiful homes, parks and driveways, that were each year being improved and embellished into graceful beauty and ornamentation, recommending more thought and consideration be given to æsthetic adornment by our citizens, rather than in encouraging prize fights and base ball contests.

Dr. Lugger having just returned from a very successful campaign against the grasshoppers in the northern part of the state gave us a "hopperish" kind of talk that was very amusing; he also outlined some of the prospective work in the entomological department of the station.

Prof. Green having just returned from work with the farmers institute, spoke of the great good that was being accomplished by the instruction that was being given to the farmers of our state; the teaching was very simple and plain and must of necessity bring in the near future grand results. Speeches were made by several prominent visitors and all felt well repaid for the visit, voting the exhibition a grand success; but like the wine spoken of in the Good Book, the best was kept until the second day of the feast.

The excursion to Lake Minnetonka the following day, was a new departure and very entertaining. The ride on the cars was first to Excelsior, where we were met by Bro. Gould. His beaming countenance was all aglow with the kind welcome he was prepared to extend from the citizens of that beautiful lakeside town, in their hospitable entertainment. Everything seemed to have been arranged to make this visit most enjoyable, and in our yearly gatherings to be a bright spot long to be remembered. The splendid field of hybrid, perpetual and June roses of Bro. Gould was a revelation to many of us in floriculture, few knowing that many of the kinds here grown out of doors were hardy enough for this climate. One of the instructive features of this visit was A. W. Latham's finely kept vineyard, where vine and fruit gave evidence of fine cultivation and care, and great promise of a fruitful harvest.

The excursion on the beautiful Lake Minnetonka by steamers to prominent points, was greatly enjoyed. We visited Lake Park Hotel and grounds, the La Fayette, Major George A. Camp's neatly kept fruit and flower garden, George Brackett's villa residence on Starvation Point and by a short walk came to Brother Stubbs' vineyard, orchard, strawberry, raspberry and blackberry patches, where were learned lessons of great interest to us all; and when this day of sight-seeing was closed all wished that it might have many happy returns.

MINNESOTA
STATE HORTICULTURAL SOCIETY.

TWENTY-SECOND ANNUAL MEETING

AT MARKET HALL, MINNEAPOLIS, TUESDAY, WEDNESDAY,
THURSDAY AND FRIDAY, JAN. 15, 16, 17 AND 18,
1889, IN JOINT SESSION WITH STATE
AMBER CANE ASSOCIATION.

Following is the circular sent out announcing the annual winter meeting of the Society:

The twenty-second annual meeting of the Minnesota State Horticultural Society will be held at Minneapolis, on January 15th to 18th inclusive, 1889, the State Amber Cane Association occupying the time of the afternoon of Wednesday for its twelfth annual session.

A cordial invitation is extended to kindred organizations in other states as well as to local societies, to send delegates to the meetings, which are *free* to all. Ladies especially are invited to attend; also, young ladies and gentlemen who desire to become better informed on horticultural topics, and to take part in the exercises and discussions.

Members of the Society, so far as possible, are urged to be present and to come to the meeting prepared to render personal assistance in making the session one of unusual profit and interest to all concerned. Come to the meeting and relate your experience with horticultural products in the past and your

views as to the safest and best methods of care and culture for the future. Give such hints or suggestions as may seem proper, as to methods of culture, character of your soil, protection and care, marketing of garden and farm products, etc., etc.; especially reporting your experience with any new varieties of vegetables, fruits or flowers. Thus by an interchange of ideas we hope to make sure and steady advancement in the really interesting and fascinating study of horticulture in its various branches.

Fewer papers will be read than usual and more time given to discussion of topics of interest which may be brought before the meeting. The question box will be a leading feature. Reports will be expected, however, from members of special and standing committees, either orally or by manuscript; the same to be brief and to the point. This is important as indicating the progress being made in the cause from year to year throughout the state.

Liberal premiums will be given for exhibits of fruits, flowers, vegetables, etc., but not on inferior or unworthy articles, even if there is no competition. It is hoped a large and creditable exhibit may be made.

SPECIAL PREMIUMS FOR ESSAYS.

The Society again offers special prizes for essays by young men and women under twenty-five years of age, as follows: Best essay on "Orcharding in Minnesota," \$25; best essay on "Grape Growing in Minnesota," \$25; best essay on "Strawberries and Raspberries in Minnesota," \$25; best essay on "Blackberries and Dewberries in Minnesota," \$25; best essay on "Currants and Gooseberries in Minnesota," \$25.

Parties should hand in their essays on or before ten o'clock on the morning of the second day in order that the committees on award may have ample time to examine the same carefully and make their report during the meeting. As this may be the last opportunity afforded—at least for some time to come—to obtain a prize of this nature and as it is offered as an incentive to awakened interest in horticulture among amateurs, it is hoped there may be earnest and generous rivalry displayed among our younger members.

It is expected the usual reduction in rates of fare to delegates will be obtained from the various lines of railway in this state. Delegates on purchasing a full fare ticket going should at the

same time secure from the agent a delegate's convention receipt, specifying that such ticket has been purchased, in order that the Secretary may properly indorse the same for the return trip.

Members in attendance from a distance will be provided with entertainment by the local committee on arrangements.

For further particulars, address

S. D. HILLMAN,

Secretary, Minneapolis.

State Horticultural Society.

WYMAN ELLIOT,

President, Minneapolis.

PROF. E. D. PORTER.

Secretary, St. Anthony Park.

State Amber Cane Association.

RUSSELL BLAKELEY,

President, St. Paul.

PROGRAM.

The following order will be subject to change from time to time as the Executive Committee or the Society may deem best.

FIRST DAY.—TUESDAY, JANUARY 15.

10 A. M. Opening Exercises. Arrangement of Exhibits and Reception of members.

Appointment of Committees. Committee on Fruit List; on Award of Premiums; on Prize Essays; on Publication; on Final Resolutions; on Obituary.

AFTERNOON SESSION.

2 P. M. Address of Welcome. Col. J. H. Stevens, Minneapolis.

Response to Address of Welcome. A. W. Sias, Rochester.

Reports from Local Societies. Hennepin county Horticultural Society, Prof. L. Asire, secretary, Minneapolis; Southern Minnesota Horticultural Society, A. W. Sias, president, Rochester; Minnesota Valley Horticultural Society, O. E. Saunders, president, Granite Falls; Lake Side Horticultural Society, S. Y. Gordon, Jr., Browns Valley; McLeod county Horticultural Society, H. I. Corson, secretary, Glencoe; Ramsey County Agricultural and Horticultural Society, E. A. Venzke, secretary, St. Paul; Southwestern Horticultural Society, Edwin Rodgers, secretary, Mankato.

Correspondence, etc.

Discussion.

Question Box.

EVENING SESSION.

7 P. M. President's Annual Address. Wyman Elliot, Minneapolis.

Minnesota Law on Nursery Frauds. M. Cutler, Sumter.

Discussion.

SECOND DAY.—WEDNESDAY, JANUARY 16.

- 9 A. M. Report of Seedling Commission. John S. Harris, La Crescent; G. W. Fuller, Litchfield; A. W. Sias, Rochester.
 Wild Fruit of Minnesota. Col. J. H. Stevens, Minneapolis.
 Report of Committee on Native Fruits. O. M. Lord, Minnesota City.
 Russian Fruits. Prof. J. L. Budd, Ames, Iowa.
 Report of Committee on Russian Apples. Chas. Luedloff, Carver.
 Discussion.
 Winter Gardening J. S. Gray, Minneapolis.

AFTERNOON SESSION.

- 2 P. M. Twelfth Annual Meeting of State Amber Cane Association.

PROGRAM.

- Minutes of Last Meeting.
 Reception of Members.
 Report of Secretary and Treasurer.
 Election of officers.
 Appointment of Committees.
 President's Address. Russell Blakeley, St. Paul.
 Present Condition of the Amber Cane Industry. Seth H. Kenney, Morris-
 town.
 Reports from Growers and Manufacturing of Amber Cane.
 Apiary Culture. William Urie, Minneapolis.
 Discussion.

EVENING SESSION.

- 7 P. M. Question Box.
 Lecture by Dr. Otto Luggler, of State Experiment Station, on Carniverous
 Plants. Illustrated.

THIRD DAY.—THURSDAY, JANUARY 17.

- 9 A. M. Annual Report of Secretary.
 Annual Report of Treasurer.
 Annual Report of Librarian.
 Horticulture in Dakota. Prof. C. A. Keffer, Brookings, Dakota.
 The Culture of Small Fruit. L. H. Wilcox, Hastings.
 Report of Committee on Small Fruits.
 Discussion.
 Culture of Dewberry. J. H. Ludlow, Worthington.
 Five Minute Papers on Vegetables. By Practical Gardeners.
 Early Potatoes. Joshua Allen, Red Wing.
 Report of Finance Committee.

AFTERNOON SESSION.

2 P. M. Ad Interim or District Reports. By vice presidents of the Society. A. W. Sias, Rochester; E. H. S. Dartt, Owatonna; M. Cutler, Sumter; N. J. Stubbs, Long Lake; G. W. Fuller, Litchfield.

Annual Election of Officers. By ballot.

Climatology of Minnesota and the Northwest. Col. D. A. Robertson, St. Paul.

Report of Committee on Evergreens.

Report of Committee on Forestry.

Discussion.

EVENING SESSION.

7 P. M. Education as Related to Horticulture. Prof. S. B. Green, St. Anthony Park.

Ethics of Horticulture. Mrs. Vie H. Campbell, Evansville, Wis.

Report of Committee on Floriculture. Mrs. C. O. Van Cleve, Minneapolis.

Roses. Mrs. Anna B. Underwood, Lake City.

Care and Culture of Bulbs. Frank H. Carleton, Minneapolis.

Entomologist's Report. Prof. O. W. Oestlund, Minneapolis.

Agricultural and Horticultural Education in Minnesota. Prof. W. W. Pendergast, St. Anthony Park.

FOURTH DAY.—FRIDAY, JANUARY 18.

9 A. M. Orchard Protection; Theory and Fact. E. H. S. Dartt, Owatonna.

Reports from Experimental Stations:

PROF. E. D. PORTER, St. Anthony Park.

E. H. S. DARTT, Owatonna.

J. S. HARRIS, La Crescent.

O. M. LORD, Minnesota City.

UNDERWOOD & EMERY, Lake City.

A. W. SIAS, Rochester.

O. F. BRAND, Faribault.

M. PEARSE, Minneapolis.

G. W. FULLER, Litchfield.

R. M. PROBSTFIELD, Moorhead.

ANDREW PETERSON, Waconia.

CHARLES LUEDLOFF, Carver.

B. TAYLOR, Forestville.

FRED VON BAUMBACH, Alexandria.

L. E. DAY, Farmington.

PETER M. GIDEON, Excelsior.

Report of General Fruit Committee:

SIDNEY CORP, Hammond.

D. K. MICHENOR, Etna.

J. C. KRAMER, La Crescent.

O. E. SAUNDERS, Granite Falls.
O. F. NORWOOD, Balaton.
M. C. BUNNELL, Newport.
N. J. STUBBS, Long Lake.
WILLIAM McHENRY, St. Charles.
O. M. LORD, Minnesota City.
CLARENCE WEDGE, Albert Lea.
GEORGE E. CASE, St. Peter.
M. CUTLER, Sumter.
G. W. FULLER, Litchfield.
L. E. DAY, Farmington.
CHARLES LUEDLOFF, Carver.
W. H. BRIMHALL, Hamline.
J. H. LUDLOW, Worthington.

Discussion.

Native Plums. O. M. Lord, Minnesota City.

Report of Special Fruit Committee on Fruit Lists, and Revision of same.

Report of Committee on Award of Premiums.

Report of Committee on Nomenclature.

AFTERNOON SESSION.

2 P. M. Advantage of Forestry. J. O. Barrett, Browns Valley.

Report of Special Committees.

Report of Committee on Legislation. Prof. E. D. Porter, St. Anthony Park.

Report of Committee on Final Resolutions.

Place of Next Meeting.

Miscellaneous Business.

Final Adjournment.

PREMIUM LIST.

W. H. BRIMHALL, HAMLINE, Superintendent of Exhibits.

APPLES.

[All plates to consist of five specimens.]

- Best collection of Minnesota Apples, including hybrids, first premium, \$5; second, \$3; third, \$2.
Best display of Wealthy, first premium, \$3; second, \$2; third, \$1.
Best plate of winter apples, any variety, first premium, \$2; second, \$1.
Best plate winter varieties Russian apples, first premium, \$2; second, \$1.

GRAPES.

- Best display of native grapes, in good condition, first premium, \$5; second, \$3; third, \$2.
Best plate, any variety, first, \$3; second, \$2.
Best display of fruit in glass jars, first premium, \$5; second, \$3.

PLANTS AND FLOWERS.

	1st Prem.	2d Prem.
Best display ornamental and flowering plants.....	\$5 00	\$3 00
Best display of roses in pots.....	2 00	1 00
Best display of geraniums	2 00	1 00
Best display single plant in bloom.....	2 00	1 00
Best display begonias.....	2 00	1 00
Best display carnations.....	2 00	1 00

CUT FLOWERS.

- Best and most artistically arranged design, first premium, \$5; second, \$3.
Best collection of roses, first premium, \$3; second, \$2.
Best hand bouquet, first premium, \$3; second, \$2.
Best cultivated cranberries, provided a history of their cultivation be furnished, first premium, \$5; second, \$3.

VEGETABLES.

Best display.....	\$5 00	\$3 00
Best half peck early potatoes.....	2 00	1 00
Best half peck potatoes for winter and spring.....	2 00	1 00
Best half peck onions.....	2 00	1 00
Best half peck turnips.....	2 00	1 00
Best half peck beets.....	1 00	50
Best half peck parsnips.....	1 00	50
Best half peck carrots.....	1 00	50
Best Hubbard squash.....	1 00	50
Best six bunches celery.....	1 00	50
Best winter cabbage.....	1 00	50
Best winter lettuce.....	1 00	50

PANTRY STORES.

- Best display canned fruits, \$3; second best, \$2.
 Best display of jellies, \$2; second best, \$1.
 Best jar mixed pickles, \$1; second best, 50 cents.
 Best sample home-made vinegar, \$1; second best, 50 cents.
 Best sample comb honey, \$2; second best, \$1.
 Best sample strained honey, \$1; second best, 50 cents.

WORKS OF ART.

- Collection of paintings, fruits and flowers, first premium \$5; second, \$3.
 Best single fruit painting, \$3; second best, \$2.
 Display garden tools and horticultural implements, certificate of honorable mention.

Exhibitors are expected to make their entries the first day. All exhibits must be in place by ten o'clock A. M. the second day.

Competition shall be open to all, but it is expected that the annual membership fee (\$1) will be contributed unless exhibitors are members of the Society. All members are entitled to bound copies of the transactions.

MINNESOTA
STATE HORTICULTURAL SOCIETY.

ANNUAL WINTER MEETING.

HELD AT MARKET HALL, MINNEAPOLIS, TUESDAY, WEDNESDAY, THURSDAY AND FRIDAY, JANUARY 15; 16, 17 AND 18, 1889, IN JOINT SESSION WITH STATE AMBER CANE ASSOCIATION.

The twenty-second annual winter meeting of the State Horticultural Society, held at Market hall, Minneapolis, convened on Tuesday morning, Jan. 15, 1889. The meeting was called to order shortly after ten o'clock, by the President, Wyman Elliot, of Minneapolis.

Prayer was offered by Rev. Frank P. Woodbury, D. D., pastor of the Park Avenue Congregational church.

President Elliot appointed the following committees, to-wit:

Committee on Award of Premiums: J. T. Grimes, Minneapolis; J. S. Harris, La Crescent; Mrs. V. H. Campbell, Evansville, Wis.

Committee on Fruit Lists: E. H. S. Dartt, Owatonna; J. M. Underwood, Lake City; A. W. Sias, Rochester.

Committee on Final Resolutions: J. O. Barrett, Browns Valley; Col. John H. Stevens, Minneapolis; Alfred Terry, Slayton.

Committee on Program: O. F. Brand, Faribault; Prof. W. H. Ragan, Greencastle, Ind.; C. L. Smith, Minneapolis.

Committee on Publication: President Wyman Elliot, Minneapolis; Col. J. H. Stevens, Minneapolis; S. D. Hillman, Minneapolis.

Committees on award for Prize Essays: On Orcharding in Minnesota: J. T. Grimes, Minneapolis; B. Taylor, Forestville; J. M. Underwood, Lake City.

On Grape Growing in Minnesota: J. S. Harris, La Crescent; F. G. Gould, Excelsior; Isaac Gilpatrick, Minneapolis.

On Strawberries and Raspberries in Minnesota: H. W. Stedman, Rochester; Mrs. V. H. Campbell, Evansville, Wis.; M. Cutler, Sumter.

On Blackberries and Dewberries: A. J. Philips, West Salem, Wis.; N. J. Stubbs, Long Lake; L. H. Wilcox, Hastings.

On Currants and Gooseberries: O. F. Brand, Faribault; Elmer Reeves, Waverly, Iowa; C. L. Smith, Minneapolis.

The balance of the forenoon was taken up with the arrangement of exhibits, etc.

The meeting adjourned until two o'clock P. M.

AFTERNOON SESSION.

TUESDAY, JAN. 15, 1889.

The meeting was called to order by President Elliot at two o'clock, P. M.

There was a goodly attendance of delegates and members present at the opening session in the afternoon, and among the number from a distance were, Prof. W. H. Ragan, of Greencastle, Ind., secretary of the American Horticultural Society; Mrs. Vie H. Campbell, Evansville, Wis.; A. J. Philips, West Salem, Wis.; and E. Reeves, Waverly, Iowa.

An unusually fine exhibit of cut flowers and exotic plants was made by the Mendenhall greenhouse. There was a large and fine exhibit of fruit, especially of apples and grapes; also honey, syrup and pantry stores. The exhibit of vegetables was large and made a very creditable display.

ADDRESS OF WELCOME.

Col. John H. Stevens, of Minneapolis, being called upon, came forward and delivered the following address of welcome:

Ladies and Gentlemen of the State Horticultural Society:

In behalf of the citizens of Minneapolis, I bid you a warm, hearty welcome to the city you have honored with your presence. They sympathize with you in your endeavors to forward the interests of Horticulture in this state. They appreciate your efforts in making their homes more pleasant and beautiful with lovely flowers, valuable plants, choice shrubbery and trees for ornamental purposes, and desirable fruits and other necessary articles for their tables; realizing that no fireside can be happy and healthy in their absence. They are patrons of the fruit of your labor. They are fully alive to the importance of the great work you have undertaken. They are desirous of lending you a helping hand in every possible way, so that your efforts may be successful. They feel under deep obligations to you for the selection of this city for the holding of your twenty-second annual meeting. Their doors are opened and their homes are at your disposal during your deliberations. They ask each of you to become their guests while in attendance at this meeting.

 RESPONSE TO THE ADDRESS OF WELCOME.

A. W. Sias, of Rochester, responded on behalf of the Society. He said:

Mr. President, Ladies and Gentlemen:

Permit me, on behalf of the State Horticultural Society, to heartily thank the good people of Minneapolis for this cordial welcome. This Society reminds me very forcibly of Hiawatha, when wooing his dusky bride, in what is now one of the charming suburbs of this city. You will recall to mind the fact, that the great poet, H. W. Longfellow, who immortalized the name of Minnehaha, Laughing Water, informs us that Hiawatha—

“Lingered long about the doorway,
Looking back as he departed.”

And just so it is with this Society; we “linger long about the doorways” of this kind and hospitable people. Let it be understood, however, that we use the term hospitable in a restrictive sense, as we are no longer strangers in this beautiful city, for be it known that the very man who christened it, and gave it such a charming name, “combining the Greek and Indian tongue,” was our second president, Mr. Charles Hoag; and the man who

seconded this move, and backed it up with well chosen words, was none other than the gallant Col. John H. Stevens, who has just given us this cordial speech of welcome. And the man who presides over our deliberations to-day, although not an old man, was also one of the pioneers of this grand metropolis, and one of the original twelve who contributed so generously in 1866 in fanning the breath of life into this Society.

There are several other noble pioneers of this city, who have contributed time and money freely, in furtherance of the good work of this Society. We have no time to dwell upon this pleasant feature of our association, but it suggests to us a conundrum, viz., Why is the beautiful city of Minneapolis like Paradise, or the Garden of Eden? This question has already been answered, viz., Because the first white settlers were distinguished gardeners, or horticulturists; and this accounts for the fact that this Society still continues to linger here, and always looks back when departing.

While this city never ignores the substantials, such as wheat, corn, beef and pork, yet they recognize the fact that a city that goes back on all else is sure to become sour and dyspeptic. You admit that the spice of life, the vegetables, fruits, flowers, poetry, song, romance, object lessons, such as are to be found in parks like Minnehaha, etc., etc., are all indispensable to correct living.

Some cities in the Northwest could hardly be hired to entertain a Society like this, they are perfectly contented with the substantials, and the dyspepsia is the legitimate result of such contentment. It would be fortunate, indeed, if the pioneers of every city in the whole land, like Minneapolis and the Garden of Eden, were horticulturists, and then these missionary societies would be compelled to move around from city to city, as regularly as the heavenly planets in their orbits, or there would be visible disturbance in the constellation.

There was no such city in existence as Minneapolis when we first visited this place, while now we are informed, by parties who ought to know, that if the city continues to grow as rapidly in the future as it has done in the past, that in thirteen years it will contain a population of one million. Now this means business for this Society, and a score of heavy, live branches, who will help us to prepare for the million! We feel that we can count on this city to do more than her share. Again, allow me to thank you for your cordial welcome. (Applause.)

REPORTS FROM LOCAL SOCIETIES.

The Secretary stated that he had written Prof. Asire, secretary of the Hennepin County Horticultural Society, but had received no report as yet from him. He understood no meetings had been held by the society for several months past.

The following report was then read:

SOUTHERN MINNESOTA HORTICULTURAL SOCIETY.

Following is a report of the winter meeting of the Southern Minnesota Horticultural Society, held at Rochester, Jan. 1 and 2, 1889.

President A. W. Sias called the meeting to order and H. W. Stedman, being made secretary *pro tem.*, read the report of the secretary, Edwin Deacon, who was not present. In this report the society was congratulated on account of its success; for starting with seven charter members its membership now numbers fifty-nine, twenty-six different villages being represented.

The society was incorporated in June, 1888; the following members were the incorporators:

A. W. Sias, Edwin Deacon, Wayland Stedman, John Bamber, E. G. Ballard, Rochester; C. H. Pond, Kasson; John S. Harris, La Crescent; S. A. McHenry, St. Charles; E. D. Sias, Rochester; E. H. S. Dartt, Owatonna; J. M. Underwood, Lake City; J. H. Vandervort, B. F. Hotaling, Edward Searing, Mankato; Dewain Cook, Windom; Wm. L. Martin, Smith's Mills; H. W. Mendenhall, Garden City; Albina Larkins, Mankato; Chas. T. Waggoner, Eagle Lake; John Wunder, Winona; O. M. Lord, Minnesota City; Wm. Somerville, Viola; S. Wedge, Rochester.

The summer meeting of the society was held on the fourth of July, at "Bamber's Grove," near the city of Rochester. A goodly number were present, a very creditable exhibit of berries, vegetables and flowers was made and premiums awarded, after which the society listened to some remarks by two of Minnesota's pioneer horticulturists, J. S. Harris and A. W. Sias.

There is certainly much in the present status of our society to give us encouragement, and we ought not to enter our second year of labor with any feeling of discouragement, for this year; if each member does but a part of his duty, the membership may easily be swelled to one hundred or more.

One other topic that might receive mention is our relation to the State Society. This, it seems, should be the most amicable. A large majority of our present membership have never belonged to the State Society.

It is possible that a few may join our society in preference to the State Society in order to get the report at half price, but with its liberal appropriations from the state, that society is not greatly in need of a few paltry membership fees, but is in need of a deeper interest in horticultural matters among the people of the state, and that interest the Southern Minnesota Horticultural Society proposes to do its level best to arouse. We believe the more local and sectional societies we get, the more interesting and profitable the state meetings and state reports will become.

The secretary's report closed with his resignation. As he lives at a place quite remote and has his mind occupied by subjects foreign to horticulture, he believed that some member actively engaged in horticulture should be secretary. His resignation was accepted and a vote of thanks was passed for the ability displayed and the disinterested manner in which he had served the society.

The treasurer's report was read and accepted. This report showed that \$31.40 had been received during the year, and there was a balance of \$9.15 in the treasury.

A paper from S. D. Hillman was read and ordered placed on file for publication. This paper called out considerable discussion.

Mr. Hillman had planted an orchard on his farm in Olmsted county, but had sold the farm before the trees had begun to bear. The man who bought it pulled up the trees and threw them away, saying that he would "raise" his apples from his wheat bin. But time showed that he made more of a failure in wheat raising than did his neighbors in apple raising; and that he might have made money if he had allowed the trees to stand.

It was stated now, beyond all doubt, plenty of apples could be raised in Southern Minnesota. A large crop was gathered the past season. Give the proper soil and a suitable location and good cultivation and a crop of apples is almost a certainty.

The Duchess and Tetofsky will repay liberal manuring. A half load to each tree is not too much.

Mr. Gaylord set out a Duchess by the side of a large manure pile and he got more apples from it than from the best two in his orchard.

A communication from Mr. William Ward was read and ordered placed on file.

J. G. Miller, of Dodge City, Rice county, sent in a report on seedling apples, which was read and ordered placed on file.

The Peerless and Willis seedling apples were raised by him, and were highly spoken of in the discussion.

The meeting then adjourned to meet at 7:30 in the evening. At the evening session the president read his annual address, which was ordered published. It called out considerable discussion, during which Messrs. Gaylord, Harris and Moon made some very interesting remarks.

J. S. Harris read a paper on the "Present Outlook for Apple Culture in Minnesota." It was ordered placed on file for publication.

A paper from D. W. Beadle, of Ontario, Canada, was read, entitled "Evergreens in Ontario."

The meeting then adjourned to meet at 9:30 the next day, Jan. 3, 1889.

The report of the chairman of the fruit committee, Mr. Dewain Cook, was the first paper read.

He considered the Snyder blackberry the best in cultivation, quality considered; while the Windom dewberry was very productive; but those who were at his place and saw Windom dewberry, and tasted the fruit, said that they could not see how any blackberry could be better in quality.

Mr. Gaylord said that, during the past season, at his place plum cuttings had taken root and made quite a growth.

H. W. Stedman said that gooseberries were one of his favorite fruits, and that an agent of L. L. May & Co., of St. Paul, was selling in Rochester a mammoth variety, which he said grew as large as plums. President Sias also leaned favorably toward the gooseberry. One year he had raised and sold in Rochester twelve bushels. He had grown the Mammoth, or English gooseberry, and had found it a shy bearer and liable to mildew. Gooseberries need a rich, moist soil and clean cultivation and frequent pruning.

H. P. Moon, of Spring Valley, said that he grew a number of varieties of gooseberries, and had once, at a high price, bought some English roots; but did not find them to be any better than those he already had.

E. Gaylord then presented the subject of "Sun-scald and Its Prevention." He showed samples of trees that had been killed

by sun-scald. His remarks were very interesting. He was elected an honorary life member of the society.

AFTERNOON SESSION.

The following officers were elected:

President—A. W. Sias, Rochester.

First Vice President—J. S. Harris, La Crescent.

Second Vice President—M. J. Hoag, Rochester.

Secretary and Treasurer—H. W. Stedman, Rochester.

Executive Committee—J. Bamber, S. G. Whiting and L. McLean.

Mr. C. A. Van Campen, secretary of the Southern Minnesota Fair Association, then made a short address.

He hoped that the two Southern Minnesota societies would always be close friends. Both were interested in the prosperity of this section of our state and desired a creditable fair. He knew that the horticultural society had greatly contributed toward making the fair attractive and successful.

A paper on floriculture, by Mrs. A. E. Larkin, of Mankato, was next read. She was given a vote of thanks for presenting such an interesting paper and was made an honorary member for one year. The hope was expressed that she would again favor the society with another article.

H. W. Stedman next read a paper entitled "Smith and Jones; or, how Horticulture Assists Agriculture."

During the discussion, President Sias said that he had known farmers, who, by neglecting horticulture and having neither trees, gardens, fruits nor flowers, had made their farms so unattractive and lonesome that their wives became insane and that their children, when old enough, were glad to leave for the city.

It was stated that many of our native trees and shrubs growing wild in river valleys and on hills were very desirable and beautiful, and that if they were sold by tree agents for high prices, they would be appreciated and planted. Among these are the Wahoo, or burning bush, which, with its bright crimson berries, looks like a tree of fire all winter, and the Bladder Nut, the Dogwood, the Woodbine and the Buffalo berry, and vines such as the Clematis, Bitter-sweet and Virginia Creeper.

J. S. Harris read a paper on "Insects Injurious to the Horticulturist." He described at length the white grub, an insect that feeds on strawberry plants. In the discussion he said that

the skunk is a friend to the gardener. It digs into the ground and destroys worms and grubs that are difficult to reach with poison. He protects them at his place, and whenever he meets one in the evening, he always turns out for it and lets it keep the path.

A paper on "Seedling Apples" was read by E. H. S. Dartt. During the discussion it was said that in Russia, a very cold country, where the thermometer frequently shows sixty degrees below zero, there are plenty of very good apples raised. These apples come from seeds planted there, and it is from seedlings grown from seeds of apples that grow here that we expect hardy apple trees.

Planting apple seeds should be encouraged.

A communication from F. W. Loudon, the originator of the Jessie strawberry, was read.

A committee consisting of J. O. Barrett, Browns Valley; J. S. Harris, La Crescent; E. H. S. Dartt, Owatonna, and A. W. Sias, Rochester, was appointed to petition the legislature for an appropriation of \$1,000 to aid four district horticultural societies, to be known as the Northern, the Southern, the Eastern and the Western Minnesota Horticultural Societies.

Respectfully submitted,

H. W. STEDMAN,

Secretary.

DISCUSSION.

Mr. Harris. Mr. President, I was at the meeting at Rochester, and it was a very successful one in every way but one, and that was the attendance. There was material enough, and talent enough to interest an audience of 1,000 people, including five hundred of the citizens of Olmsted county. Some of the papers were remarkably good, and I hope the committee may find room for their publication in our next volume of transactions. One paper by a Mankato lady, speaks well for the ladies of Minnesota.

Now, I am of the opinion that a district society will not hurt the State Society; that we ought to help all the local societies that can be started in the state. We ought not only to have four district societies, but a hundred county and town societies in the state. In that way the people will be educated up, and will be anxious to take degrees, just as we do in our secret societies; we will commence at the bottom of the ladder and go right up. In fact, at that meeting, I was reported as saying that we

had commenced at the wrong end by commencing first with the organization of a state society; that if we had commenced with these small organizations in towns and counties we might have been able to have a state society with from 2,000 to 5,000 members; and that we ought to use every legitimate means to increase its membership. But, gentlemen, when we were a little band of a dozen members, people abused us; they said "get out of our way, you cranks, what do we want of you." But our numbers steadily increased until we had fifty or sixty members at one of meetings at St. Paul. At one time we invited the legislature and the governor over here to Minneapolis, and it was found best to spare us a little longer. The legislature listened to our plea and gave us a little aid, and published our transactions in 1873. We went to them again and asked for help for an experimental fruit station, for the originating of new varieties. This request was granted and a fruit farm was purchased at Minnetonka, and Peter M. Gideon placed in charge. It was a little rough, but they did not ignore us. A short time after that we wanted \$1,000 a year to aid our Society in distributing its reports, and in employing a secretary to take the minutes. We got it. We have asked for an experiment station between the two cities; we have got it. And we asked for an experiment station at Owatonna, and we have that, with a prominent officer and member of the Society in charge, where we intend to keep him so long as he does his duty.

I trust the members of this Society will remember that we have organized at least one district horticultural society in this state; that there is room for three more, and room for a hundred county and town societies.

President Elliot. I wish to call attention to one thing mentioned in the report and that is in reference to the membership fee of fifty cents, and members of the society being entitled to a copy of our reports. Is that not rather hard on the State Society? By becoming a member of the district society should they be entitled to them without paying one dollar?

Mr. Sias. Mr. President, as a general thing if I undertake to differ with Bro. Harris I make a mistake, and it turns out that he is right and I am wrong; but there was one little point that he made that I was not exactly satisfied with. The most that he said was correct and I agree with him, but in regard to our having made a mistake when we organized a state horticultural society, instead of beginning with township and county societies,

I would like to hear discussed. He claims that we commenced at the top of the ladder and are working down. Now, it looks to me that the state was then new and there wasn't at that time horticulturists enough in the whole state to form what many would call a good society, in order to do business in good shape. Had we started in that way and undertaken to form simply township organizations I believe we would have made just as perfect a failure as we would to undertake to start a sawmill where there was no water power. I think we commenced right.

I might compare our Society with western New York, where I formerly lived. They have had their societies there for some thirty-four years, but I think no state society up to this time. They organized at Rochester, N. Y., a county or district society, which was controlled by the nurserymen there and which has been run in their interest pretty generally since. And now they are agitating the propriety of making it a state society and asking for state aid. I think they have just reached the point where they should have started, as they could have published and distributed their reports much better than they are able to do now. They now see they are behind the western people, although I may say there is no better horticultural district, perhaps, than that of Western New York. But I think Iowa in this matter is ahead of New York State to-day.

Mr. Underwood. What do I understand about their getting our reports for fifty cents?

President Elliot. Any local society making an annual report to this Society is entitled to our reports and a membership for fifty cents, and the question is, whether they should obtain them at a less rate than we charge our own members.

Mr. Underwood. If that is the case I don't know as it is anybody's fault but our own. That matter may need to be changed in some way. I should say that Mr. Sias is certainly correct in his position that our State Society, acting as the head and source of the horticultural interests of the state, can be very much more effective than to commence in the other way with the local organizations. This has been nicely illustrated in our section of the country in the past year, in the workings of farmers institutes. It is hard to get the farmers interested in this subject. They are more taken up with raising wheat, cows, horses, hogs and things of that kind; and in order to interest them in anything we desire we have got to go to them. I believe that the best possible way that we can do it is to lend them assistance as a State Horticultural

tural Society at these farmers institutes, or any similar organization that will go out among the farmers of the state, to the smaller towns of the state, and there give them object lessons, and such information as will encourage them to become interested in the work of this Society. It certainly is the best field and the best direction in which we can work, in my estimation, and I should say most decidedly the members of any society should at least pay our State Society a dollar for a membership and our transactions.

Mr. Sias. Mr. President, I recommended that reduced fee to members of our society at Rochester, for the reason that we have no state appropriation; and after looking at the matter for some time we concluded it was better to make this arrangement until we could get some aid, and to make our membership fees low until we got a start. When we get well started in our work in the course of a few years we may probably change and make it the same as the State Society, one dollar.

Mr. Smith. I don't know as this matter of membership fees amounts to very much anyway. I believe all who are members of the State Horticultural Society are members because they have an interest in the work as an industry, and not so much on account of getting the reports; because we know there are hundreds of copies distributed gratuitously every year to those interested in horticultural pursuits. I think those that have sufficient interest in horticulture desire a membership in the Society and pay their dollar, and those who are not interested do not pay it. So I do not think that amounts to very much.

Horticulture in Minnesota has not yet passed out of the missionary stage. We as a central organization, as a State Society, must carry this work to the farmers, interest them in the work, and it will be time enough to decide in regard to membership fees and the price of the reports when there comes to be a demand for them beyond the supply; but while there is an over supply of reports on our hands, and while it remains a question as to how we can best get the reports into the hands of those who will be benefited by reading them, perhaps we had better not be too particular about the membership fee. Because I believe, so far as I am concerned myself, if there is some poor fellow out on the prairie that really needs one of these reports, who would be benefited by having it, I would rather give him a quarter to take it than ask him to pay a dollar for a copy. That is the work we are doing rather than collecting fees. I can not

see that it materially interferes with the membership of our Society.

I agree with Mr. Sias, that Mr. Harris was mistaken as to the organization of township societies before organizing a state society. It struck me in this way: how much of a show would those "original twelve" have made when spread out over all the towns of Minnesota? If there were only twelve men that could be found who were enough interested in Horticulture in the state to undertake to start a society, there would not have been material enough to start very many township societies.

The way I look upon horticulture in Minnesota is this: It has been a little over twenty years since this Society was organized and the cause is still in a missionary stage. And this is one of the difficulties we found in the farm institute work; there is not that interest in horticulture that there ought to be, and therefore it has been necessary to fight its way there as best it can. I repeat that our work is missionary work. The question is not so much what people shall pay for this information, but how can we best get it before them and attract their attention to it.

Mr. Pearse. Mr. President, I think it has been a custom heretofore to furnish each local society with fifty copies of our reports. I think that is right and proper and they should have them free. In this way our reports are scattered over the state and those interested can obtain them. I think, however, the number sent out to local societies should be limited and should not exceed that amount.

President Elliot. We have gained the point we wished to bring out by calling this matter up. In directing attention to this matter of fees we wanted you to take the view expressed by Mr. Smith, that we are not working for the fees, but our Society is aiming to do missionary work. We do not care so much how this information goes before the people so long as it goes there, and we wanted to get you interested a little in the right direction.

The following report was then read by the Secretary:

MINNESOTA VALLEY HORTICULTURAL SOCIETY.

GRANITE FALLS, MINN., Jan. 9, 1889.

S. D. Hillman, Secretary, etc.:

In compliance with your request I briefly report the condition of the Minnesota Valley Horticultural Society.

We are not in as flourishing condition as we would like, our meetings not having been very well attended of late. Our members are widely scattered and something has prevented a full attendance. We think we have made the mistake of seeking too many as members who were not particularly interested in the matter.

We are arranging for a meeting in the near future and hope to be able to get a goodly gathering, and secure continued interest and support. We try to place the reports of the State Society where they will be profitably used.

Horticulture is receiving more and more attention and we hope to embody the results of this growth in future reports of this society.

The present officers are:

President— J. Cook, Sorliens.

Secretary— A. B. Register, East Granite Falls.

Treasurer— W. R. Rice, East Granite Falls.

Yours truly,

O. E. SAUNDERS.

LAKESIDE HORTICULTURAL SOCIETY.

No report having been received from the secretary of this society, a report was called for from its president, Mr. J. O. Barrett, of Browns Valley.

Mr. Barrett. Mr. President, I wish I could report something that was worthy of emphasis. Last summer, as most of you at least are aware, I was interested somewhat in the horticultural institute work, mention of which was made here, and we had no meeting during that time. In fact we have held no meetings as a society during the past year, or since the last farmers institute was held there, a year ago last November, I believe. That was held under the auspices of the Lakeside Horticultural Society, and it was a grand success.

Our people, those who are particularly interested in horticulture, are very much scattered, and it is almost next to impossible to get them together even sometimes to form a quorum. Their whole work falls upon my poor shoulders. I have labored ardently for it and sacrificed as much as I could. But still, our society is alive; the members would respond to a call when something of importance is pending. We have scattered our reports and given them out to the best advantage, and find they

are appreciated highly. I judge we are in about the same condition as some other local societies in other parts of the state.

Let me be understood; our people are scattered, but they are struggling and battling for a foothold. You who live here under the environment of forests do not know—some of the members who reside in the park region doubtless do—but you have no idea of the conflict we have had to engage in, out on the open prairie. We have had to fight against winds, and blizzards, and dust, and a thousand things which are beating upon us to destroy; and still our people are hopeful.

A large proportion of our population are quite indifferent in regard to horticultural matters. Very little interest obtains as a whole in regard to forestry. Now and then a man is interested; but like every other movement, far-reaching and embracing real results, by the law of evolution, in process of time we trust our people will wake up to the necessity of having forests.

In closing, sir, I wish to ask whether that matter will come up for consideration before the Society?

President Elliot. It will come up again in the discussion.

Mr. Barrett. If it should not, I would like to say something about it.

Mrs. A. A. Kennedy, of Hutchinson, secretary of the McLeod County Horticultural Society, then read the following report:

THE FRUIT-GROWERS.

REPORT OF THE RECENT MEETING OF THE COUNTY HORTICULTURAL SOCIETY.

The McLeod County Horticultural Society held its fourth annual meeting at Hutchison, December 4th, and was called to order by the president. Mr. Benjamin being called to the chair, M. Cutler acted as secretary *pro tem.*, Mr. Corson being absent. Minutes of last meeting were read and accepted. Report of secretary and treasurer read and approved. A bill was presented by M. Cutler for expenses to the amount of two dollars and fifty cents and allowed.

Letters were read from Mr. Green, of state experimental farm and Wyman Elliot, president of the State Horticultural Society, stating their inability to attend. An interesting address was read by Mrs. A. A. Kennedy, giving a lady's experience in fruit

culture. Mr. Benjamin told a story of a lady in Louisiana who cleared seventy-five dollars on one acre of cucumbers, also gave some valuable information of horticultural work in that state. The question was then asked, which kind of strawberries Mrs. Kennedy considered the most productive. Answer, Crescent and Charles Downing. Mr. Cutler and Mrs. Bonniwell thought cornstalks and leaves the best mulching. Quite a discussion then took place concerning raspberry culture.

Moved that a vote of thanks be tendered Mrs. Kennedy for her paper, also that a copy be furnished for publication and a copy sent to the State Horticultural Society, also a vote of thanks to Mr. Stubbs for his paper.

The election of officers then took place, as follows:

President—M. Cutler.

Vice-President—M. T. Ridout.

Secretary—Mrs. A. A. Kennedy.

Treasurer—Mrs. Anna Bonniwell.

EVENING SESSION.

Meeting called to order by the president, who read his annual address. Mr. Ridout asked for information concerning the culture of strawberries. The president gave his ideas of their cultivation. Mr. Ridout offered as an apology for not writing an essay as requested, lack of time. He gave us about two minutes' talk on agriculture. Said he thought if our fairs could be conducted on a different plan they would be of more value to the farmers. For instance, if there could be less horse racing and gambling and less money expended for these purposes and larger premiums offered for farm products, the farmers would take more interest in trying to make them a success; also said he thought there ought to be an experimental farm established in every county, and premiums offered, and then farmers would take some interest in raising fruit. He produced some fine specimens of seedling potatoes from the Beauty of Hebron, which he raised at the rate of six hundred and seventy-two bushels per acre. Also some Golden Ball millet that was pronounced by those present to be far superior to anything of the kind yet introduced. Mr. Cutler exhibited a can of blackberries, that carried us away back to the mountains of the East, where in our childhood we were wont to pick the delicious fruit. Mrs. Bonniwell exhibited a can of red

raspberries that were of such bright, beautiful color as to attract particular attention. Mrs. Kennedy brought in a sample of sorghum syrup which was pronounced very fine. President offered a resolution that the law pertaining to tree peddling remain as it is. It was moved and seconded that the next annual meeting be held at Hutchinson. Motion was made and carried that there should be a summer meeting held at Sumter.

On motion the meeting adjourned *sine die*.

MRS. A. A. KENNEDY,
Secretary.

SOUTHWESTERN MINNESOTA HORTICULTURAL SOCIETY.

The Secretary stated he had written to the president and secretary of the society at Mankato and had received no formal report. He had, however, a letter from the president of that society, Hon. Daniel Buck, which was then read.

LETTER FROM HON. DANIEL BUCK.

MANKATO, MINN., Dec. 22, 1888.

S. D. Hillman, Esq.,

DEAR SIR: Your letter of December 11th came duly to hand, but I have been busy and away from home or would have answered sooner. I have so much to do for the next three weeks that I can not prepare an article on grape culture and even if I had the time I doubt if I could prepare a suitable article.

Although I have had over twenty years' experience and have some thirty-three varieties of grapes, yet when one comes to put his experience on paper it is no easy matter.

Our society flourished for a spell and then the members seemed to be indifferent and I have about made up my mind to let horticulture and agriculture alone and devote my time to other matters except for my own enjoyment and pleasure.

I received your package of books and have been giving them to the proper persons.

Yours truly,

DANIEL BUCK.

DISCUSSION.

President Elliot thought the experience of those who had undertaken to organize a local society at Mankato was similar to that which would be met with elsewhere unless a determined effort was put forth on the part of those who undertake to carry forward this work. Unless it was carried on upon some systematic plan, we would not be overburdened with reports. He hoped the members present would consider this question, and see if some way could not be devised whereby to enlarge their field of usefulness and create a deeper feeling of interest in the cause of horticulture throughout the state.

Mr. Smith said he wished to say a word in regard to those interested in horticulture at Mankato. There were many persons in that vicinity who have taken a lively interest in the subject. He had visited farmers there this last fall who had good orchards and had large numbers of grape vines. He knew of no more promising field for horticultural labor than Mankato. If Mr. Buck was discouraged and didn't want anything more to do with it, it would be well for some of us to push the matter and see that the local organization there is kept up. We should give them whatever encouragement was necessary to keep their society alive; if their people, for any reason, were lacking in unity of purpose or interest in the matter, which was essential to the success of such an organization. By doing this he did not doubt good results would follow in the future in that locality.

Mr. Sias. Mr. President, it seems to me that they made the mistake at Mankato in trying to organize a society that often occurs; they tried to run it without any money. Our president says we must put more enthusiasm into this work; that is correct. And I will add we must put in more money. It is said there is always a reason for everything, and so I wish to show you why we did not make so complete a failure at Rochester as they seem to have made at Mankato.

It is a good place to raise fruit at Mankato; it is quite as large and prosperous a town as Rochester. But we had our members put fifty cents apiece into the treasury of our horticultural society, and so we did not make a complete failure. I am satisfied a horticultural society will not run without money; in fact I have never known one to run successfully very long anywhere without it. They have not only to put in "enthusiasm," but money! And when we can get the money, then we may have

an Eastern, Western, a Northern and a Southern Minnesota horticultural society and such ones as may be successfully run.

Mr. Underwood. Let me clinch what I said awhile ago in regard to our reports. If you have put fifty cents into the cost of a membership in your society and made it a success, while at Mankato with no fee at all they have made a failure, why would it not be better still to charge a dollar and make it still more of a success?

Mr. Harris. I am glad to see Mr. Underwood hit my friend Sias, as he deserves to be hit once in awhile. I wanted the fee made a dollar and to see the Southern Minnesota Society built up so that it might divide the honors with the State Society.

Mr. Terry. Mankato counts herself as being the metropolis of Southwestern Minnesota, and in starting an organization she called it by the name of the Southwestern Horticultural Society. Now, I belong to that portion of the state, have corresponded a great deal with different parties in that section of the state, in Mankato and Blue Earth county, and it is a surprise to me that I have to come to Minneapolis to find out that we have a southwestern horticultural society.

The gentlemen who have spoken on this subject it seems to me are clinching it stronger and stronger. It does take money to carry on this work if it is to be better in the future than in the past. Everything we undertake requires money to carry it on. But, fortunately, this is one of the things that it seems as though a kind Creator had made so natural for us that it should not cost so very much to start in it as in some other things.

If fifty copies of our reports have been sent to Mankato where are those copies now? It does seem as though some of the fruit ought to be seen in every case. Mankato has other counties around it that have added to its prosperity, counties that have large dairy and other interests, and they have held out their hands to support Mankato, but they haven't been asked to lend their support in this enterprise of starting a district society there.

Again, in my own case I had to be introduced to your State Society by a gentleman in Central Illinois. I was in Central Illinois when a gentleman produced a copy of your reports, and I found out for the first time that we had a live and prosperous State Society here in Minnesota, and as I examined its pages I felt encouraged at the instruction received therefrom. I believe I should have often gone astray but for the system that my place shows from following the instruction gained largely from these

reports. And I believe that every member with a judicious use of these reports can succeed. I will say further that I believe if you will use them properly where most needed that you will not get the branches only but trees; for I do not believe you should begin with the branches but should grow the trunk first. (Laughter.) And I believe you have got to let your wood grow in the branches, and you want to take particular notice and so train the wood that you will give every advantage to the fruit buds that you possible can.

I believe it only needs just such energy as Minneapolis people have in order to establish successful horticultural societies in every county, and then this Society will be proud of its fruit. When we remember that our Society is not for the building up of nurserymen, not for the purpose of enabling its members to sell you their goods for a profit, but that the object of this Society is to afford instruction how to grow the products of the garden and the choicest of fruits for the table, that the object is not so much to benefit money making people as it is to assist the hard-working, common people of Minnesota to do that which they can not do without they put forth proper effort, we can then see something of the importance of the task that is laid before us and may take courage to carry forward the worthy cause. (Applause.)

Mr. Harris. I wish to say a word about that society at Mankato. It is not much more than nine months old, as it was organized last March and was the outgrowth of a farmers' institute held at that place, in a rather unfavorable time of the year. The roads were blockaded so that it was difficult for farmers to attend from a distance. I was at that meeting and I distributed about one hundred copies of our reports. We had the most interesting classes in horticulture we had at any of the points I attended, in the institute work. People took a deep interest, not only in grape culture but in every branch of horticulture. At my solicitation they called a meeting to organize a society there and their first meeting was an enthusiastic one. Two or three other good meetings have been held since. With a proper leader there to get out suitable notices I believe the people of Mankato would respond readily and sustain a live society there.

President Elliot. We have with us to-day a noted man from Indiana, Prof. W. H. Ragan, of Greencastle, secretary of the American Horticultural Society. I wish to introduce him to you at this time that you may all become acquainted with him. He is an earnest horticulturist.

REMARKS OF PROF. RAGAN.

Prof. Ragan. I have been quite tempted for the last few minutes, Mr. President, to introduce myself to this audience, and I have felt inclined to say something on this very important subject that you have just been discussing, that of keeping up the interest in such organizations as these. It can not be denied that local societies are legitimate feeders of such societies as this, and how to promote the interest in these local organizations is the question that you seem to be trying to solve. It is one that has interested us in Indiana. And while we have not yet reached a solution of the question fully we have probably thought it over in some different forms from those suggested so far in this discussion. In the first place the matter of a fee is the one important thing; it is really important to hold the interest of the members in the organization. It certainly is important to keep up the necessary work of the organization, for that can not be done without some money.

The plan that we have hit upon in our state — and I can not say that it is working entirely satisfactory, I wish I could — is about like this: We found that we needed more local societies and we needed to bear a close relationship to those societies, and in order to effect that result, some years ago an amendment to our constitution was adopted which provides that any local society, or its members, may become members of the state society on the payment of one-half of the usual fee; that is to say, they come in as members from local societies. They must come through the regular channel, however; that is, the secretary of the local society must report the names, and then they are entitled to membership for one-half the usual fee and the names are published in a separate list, as you may have noticed in our last reports.

So we have in our state quite a number of societies of this character, some of long standing, and others that have been built up since this new arrangement has been entered into. We are still building up new ones and the executive officers of our society feel an interest in building up these local societies, and we have gone out and helped to organize them. When these names come in then they are entitled to full membership, and if the fee in the local society is only fifty cents they can become members of the local and of the state society on the payment of one dollar, which they would have to pay for membership if not.

members of local society. The plan has not worked altogether satisfactorily but it is adding to the interest and distributing our work more equally over the state.

Another innovation of some years' standing—we have six vice presidents in our state. They are located in six imaginary districts laid off for that purpose; and those vice presidents are expected to make reports to the society from their districts. They receive and compile local reports that come to them and present them to the state society in a proper form. For this work they become somewhat distinguished by having their membership free, so that our vice presidents pay no fees for membership for the year they are elected. This arrangement seems to be working satisfactorily.

I am very glad, Mr. President, to be with you on this occasion. It is my first visit so far north and to your state. I have known many of your people by name, some by correspondence and a few by personal acquaintance for years. But it is a great pleasure to be with you on this occasion and to enjoy the privilege of listening to your discussions. At another time during your meeting I may be moved to say something. I thank you for the present.

President Elliot. Our Society is honored to-day by the presence of another delegate who is present here from Evansville, Wisconsin, Mrs. V. H. Campbell, whom I would like to introduce to you at this time.

REMARKS OF MRS. CAMPBELL.

Mr. President, and Members of the Minnesota Convention:

I don't know that I can say anything to you or that I could take up your time with anything that would be of interest. I have long been desiring to become acquainted with the leading horticulturists of your state and to visit your beautiful city of Minneapolis; and now my desire is to be gratified. I shall take a great interest in your convention work. We have a flourishing society in our state. I don't know how many members it comprises, but we now hope to have permanent rooms in the state capital which we have not had before, which will be occupied hereafter by the state society. I will not take your time further.

President Elliot. We have with us also another delegate from Wisconsin, Mr. A. J. Philips, of West Salem, whose face is

familiar to many of us. I have pleasure in introducing him at this time.

REMARKS OF MR. PHILIPS.

Mr. Chairman, and Gentlemen of the State Horticultural Society of Minnesota:

As your President has said I have met with you quite a number of years. I attended your meeting when it was held in the city of Winona some years since, and was a member of your Society for a number of years. I also met with you at Rochester. I will say that I always enjoyed these meetings where I have obtained a great deal of information concerning horticulture in this state. You know I really belong about as much to Minnesota as to Wisconsin, as the part of the state in which I reside is just over the river, with Minnesota on one side of the Mississippi and Wisconsin on the other side. And so anything that pertains to the subject of how to produce hardy fruits that will be of advantage in Minnesota I feel is equally applicable on my side. I will not take your time longer, gentlemen, but will add that I am very glad to have an opportunity of meeting with you.

President Elliot. We have with us a delegate from Iowa, Mr. Elmer Reeves, of Waverly, whom I desire to introduce to you.

REMARKS OF MR. REEVES.

Mr. President, Ladies and Gentlemen:

This is my first visit to a society outside of the state of Iowa. In our state we have a flourishing state society. They are now located permanently in their rooms at the state capital. We also have three local societies, the northern, the eastern and the western, and they are all in a flourishing condition. The plan that they adopted for membership in the local societies is to charge one dollar. That entitles the person to the state report. In this state report is also published the proceedings of the local societies. We find this plan works very well.

President Elliot. We are very glad these delegates have come here. We hope we may be able to gain some information from them and we hope they may be able to carry a favorable report home with them to their societies; we hope you will give them all a hearty welcome. We have another gentleman here who has recently come to the state, who is taking an active part in

the development of our horticultural interests, and who is connected with our state experimental farm; I refer to Prof. Samuel B. Green.

REMARKS OF PROF. GREEN.

Ladies and Gentlemen:

I feel that I have an important work to perform in the department placed under my charge on the state experiment farm, as I am in charge of the horticultural department. So long as I have charge of that department I wish to make it a grand success and to represent all the horticultural interests of Minnesota. And in order that I may do this I shall need all the assistance and kindly advice I can get from the horticulturists of Minnesota and especially of this Society. I am very glad to be at this meeting where I hope much information will be brought out as to best methods to be pursued to achieve the best results in our work for the coming year. I have been preparing a report, but which will not be ready for distribution until some time in February. But you can all receive a copy by sending your names to the station.

I would like to receive kindly criticisms and suggestions concerning my work so that we may be mutually benefited. I shall always be glad to profit from your counsel and advice. I have not come here merely to draw my pay, but I expect to give an equivalent for what I receive. I don't expect to work miracles, but I do, by careful work, by comparison of results, experiment and trial of new varieties, to be able to produce something that may be worthy of your consideration.

CORRESPONDENCE.

FROM CANADA.

CENTRAL EXPERIMENTAL FARM, }
OTTAWA, Dec. 24, 1888. }

S. D. Hillman, Secretary Minnesota State Horticultural Society,

MY DEAR SIR: I thank you for the programme you have sent me of your winter meeting to be held in January next. If you were nearer I should like to be present to join in your discussions.

I hope you will have a very pleasant and profitable time.

Yours very truly,

WM. SAUNDERS,
Director.

FROM MICHIGAN.

SOUTH HAVEN, MICH.

S. D. Hillman, Secretary, etc.

MY DEAR SIR: Your very kind and complimentary letter is at hand. I shall of course be very glad to know that the report you mention proves satisfactory to the fruit planters of the Northwest. Had the work been deferred for a time, it could, beyond doubt, have been rendered more conclusive as to much of its matter.

It would be very pleasant to me to be able to attend your annual meeting, but this is impracticable. I am glad to know that you are finding some useful apples among the new Russians. I have letters from Prof. Budd, saying that he has this year fruited a large number of the more recent introductions from Eastern Russia, and finds his anticipations respecting them largely realized both as to season and quality.

From what I observed while in your state I suspect that possibly your most serious obstacle to apple culture will be blight, unless the discovery of the cause (bacteria?) shall develop also the remedy.

Very truly yours,

T. T. LYON.

FROM IOWA.

AMES, IOWA, Jan. 11, 1889.

S. D. Hillman, Secretary, etc.,

Your favor at hand. I am sorry that my time will not permit me to be with you or to prepare notes on Russian fruits. I am not sorry that I adopted the plan of sending out plants for trial, yet it brings war for two reasons. (1). The ones who receive the trees scold if they do not all grow and do well; and, (2) The nurserymen scold as they assume we are running opposition to them.

But we only propagate in a small way and out of it will come good in the near future, even if I get snowed under.

Yours fraternally,

J. L. BUDD.

FROM DAKOTA.

BROOKINGS, DAKOTA, Jan. 15, 1889.

S. D. Hillman, Secretary, etc.,

MY DEAR SIR: When I promised to prepare a paper for you on the present status of Dakota horticulture, it was with the belief that I had a long vacation before me. The vacation was long enough, but it has been filled with work to quite as great a degree as though school were in session. Hence it has been impossible for me to write for you. Please express to your Society my regrets. Should you desire, I will endeavor to prepare the paper in time for your printed volume.

Yours,

CHAS. A. KEFFER.

RAMSEY, MCCOOK Co., SOUTH DAKOTA, Dec. 25, 1888.

Dear Hillman:

I have received your letter inviting my presence at the annual meeting of the Minnesota State Horticultural Society.

I can not say as yet whether I can be there or not; but if not, will try to make up a report of our Dakota horticultural meeting and add some notes of work and observations of the year in the garden, orchard, field and forest.

With a wish for merry holidays and prosperity for yourself and all the other members of your Society, I am,

Yours truly,

OLIVER GIBBS, JR.

FROM PROF. MCGINNIS.

ST. PAUL, MINN., Dec. 22, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I am in receipt of programme for the next annual meeting of the Society.

I recognize in it the names of many persons and friends familiar to me, and thank you very much for sending it.

Although in the railroad business, a business prosaic in the extreme, I have by no means lost my interest in agricultural and horticultural matters. I have spent much time during the last year in traveling over Montana, and, as you may imagine, have studied with deep interest its horticultural features.

I would like very much to attend your meetings, and would suggest if agreeable to you, and my railroad affiliations are not a bar, I would be very glad indeed to give an informal talk to the Society on the general climatic and horticultural features of that wonderful territory, such as the distribution of the forests, the water supply of the country, and also the gradual thinning out of the different kinds of trees indigenous to the Mississippi River valley, and the gradual commencement of species belonging to the Pacific coast.

I am quite sure I can say something interesting to the association in regard to the forest growth and other peculiarities of that great territory.

Yours truly,

D. R. MCGINNIS.

FROM PROF. OESTLUND, OF THE STATE UNIVERSITY.

MINNEAPOLIS, MINN., Jan. 8, 1889.

S. D. Hillman, Secretary, etc.,

DEAR SIR: Yours of December 24th is at hand. I shall take pleasure to attend at least some of your meetings, and also give you something on the subject of entomology. It would have been my intention to take up the study of some of our more injurious insects that are of special interest to the horticulturist during the past season, but my opportunities have been, as heretofore, too limited to do anything of special value or worthy

of illustrating, as you suggest. My report will, therefore, be of more general character, and I have thought to give you some short review of the progress of entomology of late years, with some special reference to this state.

All along, as your entomologist, I have felt the difficulty of properly fulfilling my duty as such, as most of my time is given to the study of systematic entomology, or no entomology at all, and I have had very few opportunities to give my attention to the economic side of the study, which alone is of much interest to the Society. I would, therefore, now respectfully ask you to state to the Society that I do not wish to be re-elected, but that this office will now go into the hands of Prof. Lugger, who without all question is the proper person, as he is now giving his whole time and energy just to those questions that are of special interest to the Society. Prof. Lugger has my warmest recommendations to the position.

I shall still be pleased to continue with the Society, at least as a member in paying my annual fees, and to take some part in your meetings that I have begun to take much interest in.

I am yours truly,

O. W. OESTLUND.

FROM WASHINGTON.

U. S. DEPARTMENT OF AGRICULTURE, }
 DIVISION OF POMOLOGY, }
 WASHINGTON, D. C., Dec. 29, 1888. }

S. D. Hillman, Secretary, etc.,

DEAR SIR: Your letter of the twenty-fourth instant and the program of your next annual meeting have just been received.

Each year since my appointment to this office it has been my hope to meet with your Society and each time, including the present one, I have been disappointed. But I wish to repeat the expression of my desire and assure the members of your Society that I have not forgotten my promises.

The peculiar conditions of your climate are such as to call for the exercise of all the abilities that the scientist and the practical horticulturist possess. So far as my work is concerned I want you to feel that I am your servant and at your command.

There are certain fruits, among which might be named the apple, that are of doubtful success in Minnesota; although there

are some varieties which do reasonably well there, except during an unusually severe winter now and then. But there are other fruits that succeed better there than farther south, especially among the small fruits. With these it seems to me, lie your strong points and if your people will only take them in hand more vigorously, I see no reason why they may not enjoy the fruits of the earth as well as the residents of milder climes.

The grape, when properly handled, that is, covered during the winter, will yield most abundantly and fruit of the most delicious quality, as I have had repeated opportunities to judge. The cranberry is one of the fruits which seem especially adapted to culture there. Immense tracts of land now given up to the straggling growth of nature may yield an annual revenue of millions of dollars. At the Paris exposition, next year, we hope to in some measure enlighten the people of foreign countries as to the value of this fruit, and open the way for an export trade in which your people ought to participate.

The blueberry which grows wild almost all over Minnesota might be turned to account in a commercial way much more than is now the case. By properly treating the wild plantations they may be made very profitable, as has been done in New England, and the quality of the fruit as well as the quantity per acre greatly increased. This may be done by cutting off the other growths of bushes, trees, etc., and burning over the ground while it is quite wet, and yet the grass dry enough to carry the fire. This will tend to kill everything but the grass and blueberry roots which will grow vigorously, and the second year, yield abundantly. This fruit has not been, and it seems, can not be, successfully transplanted and grown under cultivation.

There are many other wild fruits which may be improved and turned to practical account by your people.

The Russian fruit question is one which interests you intensely and it has been my constant aim to determine their value and give your people the advantage of this information. Bulletin No. 2 is perhaps a step in this direction, and I wish to say that there are a good many copies in my hands yet for distribution which may be had upon application. I send you one hundred copies to hand to those who may wish them at your forthcoming meeting.

Believe me, most sincerely,

H. E. VAN DEMAN.

Pomologist.

DISCUSSION.

Col. Stevens. I wish to inquire if the writer is correct in regard to the statement that he makes in relation to blueberries, whether they can be transplanted and propagated or not. I wish to say I have known of it being done here in Minnesota; I have seen it tried here in Minneapolis, and others may have seen the same thing. Mr. McCumber, on Portland avenue, in coming through the swamps near Eau Claire, in an early day, took up some fifty or seventy-five blueberry bushes and set them in his garden, and they grew. I never have seen any in its wild, native heath that have borne so largely as those. It may be true that the blueberry will not stand transplanting with the professor at Washington, but in this climate I have no doubt in saying it can be.

President Elliot. Here is a field for investigation.

Prof. Green. It has been tried in New England but it was not been very successful. Experiments there would seem to bear out the statement of Mr. Van Deman that it can not be easily propagated.

Mr. Barrett. I tried about a hundred roots, taking special pains to place them in well cultivated ground and to protect with a mulching of hay in the row. I also planted some by the river among the trees; but in spite of every effort all the roots died and they were a failure.

Mr. Pearse. Were they transplanted in the spring or in the fall?

Mr. Barrett. They were dug in the fall and the roots buried.

Col. Stevens. I have known of another instance where the transplanting of the blueberry was done with success, and have seen them frequently when growing. I prepared a communication in regard to them at one time when editing the *Farmers' Union*.

Mr. Underwood. Can you give some idea of their productiveness?

Col. Stevens. They were very productive, and even more so than on their native heath.

Mr. Gould. I have grown them on sandy ground.

Col. Stevens. Mr. McCumber planted them on sand, such as the greater portion of this city is built on, and they were grown about a mile and a quarter from here. The city is now built into almost solid blocks to that place, but at that time it was a sandy

prairie. Of course he took considerable pains, as he was an excellent horticulturist and was very successful in the experiment.

Mr. Underwood. We have no trouble in growing them but in the garden they appear to be shy of bearing. But the birds are so numerous that it may account for that. They blossom profusely.

Prof. Green. Do you transplant in the fall or spring?

Mr. Underwood. We have never paid any particular attention to that. Usually we set the plants in the spring of the year. I don't imagine they are difficult to transplant.

Mr. Smith. I filled an order for the plants from Dakota and they seemed to bear transplanting well enough. I had a few left and I set them in a trench and they all lived.

Mrs. Stager. I set out a few plants two years ago this last spring, and they grew nicely. Last spring they were full of blossoms but they produced no berries. I thought perhaps they needed to be shaded, and so I have dug them up

Col. Stevens. The blueberry is very much like the whortleberry.

Mr. Sias. The blueberry grows wild in Olmsted county, and I got an impression that they transplanted easily. I ran across a patch of about an acre and took up a few plants, and they all grew. I set on a clay loam soil, and as long as I took care of them they continued to bear.

Mr. Pearse. I have a good deal of experience in transplanting shade and forest trees, and find if dug late in the fall and buried, there is no trouble about their growing. If trees are dug in the spring and set out the borers are apt to destroy them, and the trees become diseased.

Col. Stevens. It is not a tree, it is a shrub.

Mr. Pearse. I know what it is. It is so with all roots; it has the same effect with a cottonwood or box elder. The best time to dig them is in the fall.

Mr. Ridout. I would like to inquire whether this is the high or the low bush huckleberry; there are two varieties, I understand. The low bush used to grow in Michigan on high, dry ground, while the other kind always grew in swamps.

Mr. Smith. I presume it is the low bush Col. Stevens refers to.

Mr. Harris. I have never heard of any high bush huckleberries or blueberries growing here.

DEWBERRY CULTURE.

The following letter was read by the Secretary, which was the occasion of considerable discussion:

LETTER FROM MR. LUDLOW.

WORTHINGTON, Jan. 6, 1889.

S. D. Hillman, Secretary, etc.

DEAR SIR: I received your notice some time since that you had booked me for a report on the culture of the dewberry. I am sorry to say I have not a plant on my farm and know nothing of their culture. The only nice field of dewberries I ever saw was in New Jersey a number of years ago on my father's farm on the *back bone* of Stony Hill. When this earth was made I think they must have had more stone than they needed and dumped them there; at any rate there was not a weed nor a bit of grass grew on about three acres. But from somewhere down between the stones the dewberries came up wild and covered the stones, (for there was no earth there to be seen), and hung full of very fine fruit. They were always clean, for no matter how hard it rained there was no mud there. They were only worth from two to three cents a quart, and a long way from market at that, so we used what we could and left bushels to rot.

But I am out of order; I was asked to write on the culture of the dewberry, and we didn't cultivate that field.

Hoping to hear from someone that has had experience with dewberries in this state, I am,

Respectfully yours,

H. J. LUDLOW.

Mr. Urie. In regard to the dewberry I would say that it grows in the South on the poor lands there, but I think it would be a failure to put it on our rich soil, unless we could find a place fit for nothing else and covered with nothing but stone. I don't think it could be raised here successfully. I have picked dewberries in the South by the quart and by the bushel. It is a fine fruit in that country but it could not be cultivated here.

Mr. Dartt. It appears to me there is one idea advanced by the gentleman that will not hold, that because a thing thrives on rough rugged, barren ground, it will not thrive when transplanted to a better soil. If that were true the smart men that come from the rugged hillsides of the East would not thrive as they do in the west. (Laughter.)

Mr. Pearse. Mr. President, I think the gentleman is in error in saying dewberries will not grow on Minnesota soil. I have seen very fine crops of them growing at Minnetonka, both of the Lucretia and the Windom. They will grow here, but I would put them on the poorest land, where they do nicely.

Mr. Urie. They raise a different variety altogether in the South; it is a different berry in every respect. It is no more like the kinds grown here than the raspberry is like the blackberry.

Mr. Sias. I have seen a great many dewberries; have picked them in Indiana and Kentucky. Last year, fourteen miles north of Windom, I saw dewberries on good rich soil that were of better quality than any I had ever seen before, and I did not see any poor or rocky soil there.

Mr. Gould. They were cultivated?

Mr. Sias. Yes; they were known as the Windom Dewberry, or Cook's Hardy Dewberry.

Mr. Smith. Mr. Pearse states he has seen both varieties growing and I would inquire as to their shape, size and color.

Mr. Pearse. The Lucretia was the largest, but the Windom is much more productive. The shape is a little oval. I grew them last year.

Prof. Green. Do you think they would be profitable as a market crop?

Mr. Pearse. I think the Windom will be very profitable indeed. I plant them in rows, with the plants set two or three feet apart in the row; cultivate thoroughly, but carry the runners around in matted rows. The fruit comes out on the top like strawberries. I only put mine out last spring. Those I saw in bearing that I referred to were grown by Mr. Stubbs, of Long lake. I raised a few last year and expect a nice crop another season. I would put them on the poorest ground.

Mr. Dartt. And make it rich?

Mr. Pearse. No, I would not.

Mr. Smith stated he had seen a fine crop of dewberries growing wild in the vicinity of Hamline in the summer of 1884, and had examined in the locality each year since but failed to find

any. He had been to Mr. Cook's place and examined the Windom and it resembled the berry just referred to. He had raised some fruit last year but found it a shy bearer. They might do better if covered until late in the spring.

Mr. Harris. I think the dewberry is a native over every part of Minnesota. There are patches of them in Houston county and have been for thirty-five years; in that time there have been three crops. This past year the crop was immense; they were laden down with fruit. We have two distinct species. Occasionally we find a plant a little different from those of Mr. Cook, but the majority have the same leaf and habit of growth. The Windom does not branch as much as the common, wild variety; Mr. Cook has fruited it every year with one exception. While distinct, it is a variety of the same species as the other. The trouble seems to be there is only an occasional crop produced.

Mr. Pearse. I do not think the Windom is a native, but a foreign variety. It was no doubt brought here by the Mennonites.

Mr. Harris. Mr. Cook tells me the Windom has been grown in Cottonwood county from its earliest settlement and was brought there from Iowa. It has been cultivated so long it is difficult to ascertain its exact origin.

Mr. Sias. The man who introduced it would not state where he got it, but he came to Minnesota from Iowa, and Mr. Cook informed me that it probably came from there. Mr. Cook is among the Mennonites and I am inclined to think it is a Russian variety, it is so different from the wild ones in Minnesota. There are thousands of wild ones on my place but they have never borne any good crops as yet.

Mr. Ridout. Some six years ago a tree peddler came to my place and induced me to believe that dewberries would be a good thing to try in this climate and to buy about a thousand plants. He said they were the best variety to set. I let them grow for two years and got them pretty well scattered, and if I was to take my choice of them or the Canada thistles I would take the latter, for they have taken possession of my garden. (Laughter.)

Mr. Urie. I think I was pretty near correct in my statement, if there has only been three good crops raised here in thirty-five years. The soil here is not adapted to them, nor the climate. It is a southern plant and belongs to the South. There it grows in great profusion. Plant it on a rock and I think you will succeed, but not on good soil.

Mr. Taylor. We have heard about the dewberry bearing regularly. In 1856, when I came to Minnesota, in the section of country where I live, there were no blackberries for eight or ten years. About 1865 in the vicinity of Forestville they were very numerous, and people would come from miles around to gather them. But they have borne none to amount to anything since, either cultivated or any other way; so the dewberry is not an exception in that respect.

Mr. Harris. I think the reason why the crop is a failure in that locality is it is not as favorable as in some others. In our county last year dewberries were so plentiful as to spoil the market for tame berries. They produced so profusely, we could not get rid of our tame ones at living prices.

Mr. Pearse. I think there will be no difficulty in growing the dewberry successfully all over the state.

President Elliot. I think if we have a native variety that will succeed here we do not want to import them.

A communication was received from Dr. S. S. Kilvington, superintendent of the health department of the city of Minneapolis, asking the Society to appoint a committee to confer with the board of health to consider the question of disposing of the city offal.

On motion of Mr. Smith the following committee was named by the chair, to-wit: J. S. Gray, F. G. Gould and Wm. Lyons.

The following letter was then read:

FROM CALIFORNIA.

ESCONDIDO, SAN DIEGO CO., CAL.. Dec. 10, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: Your favor of November 30th reached me in California, where I am located, having removed here the past fall. I do not know that anything that I might say in regard to this part of South California would be of any special interest to those who are laboring so hard to make a success in the cultivation of fruits in that section. I hardly feel that anything that I might say in regard to the cultivation of fruits in Dakota would be of any special benefit, or throw any additional light upon the subject, as much as I desire to see success crown your efforts.

I can but wish that your Society could hold its annual meeting in our beautiful valley of Escondido, which seems to me to be almost a paradise for the horticulturist, and I believe the most perfect climate in the world. As much as I had heard about this favored section, I was not prepared to find so perfect a climate, or such a profusion of fruits and flowers as are grown by, what seems to me, the most careless culture. I can but wish that those who have spent the best portion of their lives in striving to produce the fruits of a temperate climate in that cold and frozen north, might spend the remainder of their days in this land of sunshine, fruits and flowers.

Very truly yours,

E. DEBELL.

Mr. Pearse. Mr. President, those who want to may go to California, but as far as I am concerned I will say that I am perfectly well satisfied that if I will use the intelligence the Almighty has given me, I can raise fruit here without going there, or anywhere else.

Mr. Sias. I am acquainted with Mr. DeBell. He was president of the Dakota Horticultural Society and at the head of that society for some years. During that time he tried to secure an appropriation of \$2,000 to carry on the work of that society, and if he had succeeded he might have staid there and the society would have succeeded. I consider his removal to California a great loss to Dakota.

Mr. Smith. The society is getting along all right yet without him.

Mr. Sias. That may be, but they won't succeed any length of time without they can get an appropriation.

Mr. Harris. I don't know about that; our own Society lived a good many years without an appropriation and we did very good work as a horticultural society. Of course it is always one of the most enjoyable seasons of our lives to get up here and have the sympathy of kind friends who receive us into their elegant homes, and to enjoy eating the bread and butter of the citizens of Minneapolis, and to have their good things placed at our disposal. (Laughter.)

PRIZE ESSAYS.

Mr. Pearse. Mr. President, in regard to the essays offered by the Society, I would suggest that they be read and passed upon by the Society.

Mr. Underwood. Would it not be well after the awards are made for the one that was successful to step up and read his own essay?

Mr. Wilcox. I submit if that would be the proper thing. On receiving the program I had the the matter of offering prize essays announced in our public schools at Hastings, so the boys might become interested in writing on the different subjects. I have five essays with me that were sent to file with the Secretary at the proper time. But if they are to be read by the parties writing them it would be only justice to them that the committees should make their reports so they could get here in time. It would hardly be advisable to compel parties from outside the state, for instance, to come here with the hope and expectation that they might be called upon to read the prize essay that they might have won.

Mr. Dartt. The reading of so many papers, it occurs to me would take too much time and should not be done. This prize is offered for the best writing and not for the best reading. It seems to me the plan pursued last year is good enough for the writers; that is, to have the committees read all the papers and decide as to their value. One on each subject might be read, and that would probably be enough aside from the discussion.

Mr. Pearse. Let the committees read them all and let the best be read; that is all I suggest.

Mr. Gould. I suppose the Society does not take the responsibility of publishing the successful essays in its transactions, but if published it is for whatever merit it may have in any case; the Society only indorse it in a general way. I therefore think it better not to have any criticisms passed upon them in a public manner but let them simply be printed in the report.

Mr. Pearse. I think the committee have power to reject any or all if they see fit.

Mr. Gould. Certainly; but I mean to say after they accept, if they decide to do so.

Mr. Pearse. They report, I presume whether to accept or exclude the essay and the Society decides the matter.

Mr. Wilcox. I do not see in what way the Society can give that construction to the premiums offered, so as to reject all of them; there must be some one of the number handed in that is entitled to the prize the Society has offered. I think the matter is not discretionary, and I say this in justice to the young men who have written essays at my suggestion; the best should receive a premium.

Mr. Harris. We offer these prizes for essays for the purpose of getting the rising generation to become interested in the work of horticulture and to set them to thinking and studying. We expect those who write essays will have to become close observers. And we don't expect to find that boys are perfect in practical horticulture. I was on one or two committees last year and we decided to award premiums in every case, and in the way the offer was made I don't know as there was any way to avoid it.

On motion the meeting adjourned till seven o'clock P. M.

EVENING SESSION.

TUESDAY, JAN. 15, 1889.

The meeting was called to order at seven o'clock P. M. by Vice President Sias, who stated the first in order upon the program for the evening, was the delivery of the President's annual address.

PRESIDENT'S ANNUAL ADDRESS.

Members of The Minnesota Horticultural Society,

LADIES AND GENTLEMEN: Another year has passed and we have come together once more in council, to glean from our diversified experiences such information and instruction as we have developed in our industrious investigations after wisdom and truth; desiring to weave into our historical record such facts, opinions and practical theories as we have been able to eliminate from Nature's great store-house of horticultural treasures, for future generations to re-examine, comment upon and perhaps criticise. We come feeling that we have found out only a few of the many intricate problems and possibilities in our several

special lines of work, but these we should willingly and freely impart to each other.

The dissemination of horticultural instruction and knowledge in the past has nearly all been by individuals or organizations similarly situated as ours; and very largely dependent upon the efforts and exertions of a very few persons, whose love, tastes, desires and interests inclined them to contribute their time, talents and wealth towards its advancement.

The progressive horticulturists of our country have great reason to be thankful for the spirit of interest manifested by the commissioner of agriculture in forming a division of pomology; also we should feel grateful to know our state superintendent of public instruction is trying to formulate some method whereby the children of our common schools shall be taught the first rudiments of this very useful, refining art — horticulture. If we could devise some expeditious method of propagating and increasing the horticultural missionary spirit among our members, by breathing into them greater ardor, and endowing them with greater courage, we should hope for greater immediate success in developing this industry, of so much importance to the future welfare and happiness of ourselves and children.

Our work as a Society thus far has been largely of a missionary character; trying to teach our brother co-workers a few of the simpler principles of success and how to shun some of our individual errors, failures, losses and discouragements; each vying with the other in trying to disseminate some new fact or opinion worthy of remembrance.

When we look back over our past history and note the advancement that has been made in horticulture, we have great reason for congratulation and inward pride in knowing that this time has not all been spent in vain, trying to forward the interests of an industry of so much worth and importance. All of us may not have used our talents or our efforts to the best and wisest end, but have tried to do something in our particular lines of work.

Pardon me for taking a retrospective glance to the colonial days of this great republic, and quoting a few facts from the reports that have not been placed upon any page of our state horticultural transactions :

“The first production of the soil which our forefathers found when they landed on the cheerless shore of Massachusetts Bay, except the leafless forest trees of December, was some seed of

that noble plant, the maize (more modern name, corn), which not only saved their lives, but in all succeeding generations has been a prime factor of their sustenance and of their prosperity. The native fruits they found the year following were the grape, white and black; strawberries, raspberries, blackberries, blueberries, huckleberries, barberries, cranberries, crab apples, plums, nuts and a profusion of roses; but the apple, the pear and the peach were not indigenous to this country, and a civilized hand had not stretched across the wide Atlantic to sow their seeds.

“On the tenth of October, 1639, the first pomological exhibition in the United States was held in the city of Boston, the fruit being brought from Governor’s island in the harbor, there being not one apple or pear tree planted in the whole country but upon that island. It was here, five years after the landing of the Pilgrims that the first free school was established, which together with the church still lives.”

These reminiscences are wonderful reminders of the march of progress that has been wrought in these two hundred and forty-nine years in this fair land, where but a little while ago the governor of the Bay State said: “In 1822 we were utterly destitute of nurseries in New England for fruit trees on an extensive scale; we have no cultivators on whom we can call for a supply of the most common plants of the smaller fruits, such as strawberries, gooseberries and raspberries of the superior kinds; we have no place to which we can go for plants to ornament our grounds; we have not a single salesman who can furnish us with fresh annual seeds on which we can depend and place reliance.” He added, “Shall it be said that from June to September a traveler may traverse in Massachusetts from Boston to Albany, and not be able to procure a plate of fruit except wild strawberries, blackberries and huckleberries, unless from the hospitality of some private gentleman.”

OUR STATE HORTICULTURAL SOCIETY.

The relative relation and attitude of this Society towards all other similar organizations in our state, is a question of great importance at this time for your wise consideration. Our interest and solicitude in the welfare and prosperity of all kindred horticultural organizations, furnishes us good grounds for seeking more friendly relations and intercourse with all societies of

specialists and their members. Our past history, as an incentive, invites us to greater exertions in promoting the development of these interests; and when it is considered what our record has been in the past and the bright prospects in the future, we trust there will be sufficient inducement to our brother co-workers, to come in and join in adding better and greater facilities for spreading knowledge and instruction among our fellow citizens.

This name of ours — State Horticultural Society — would if considered in its broadest sense, seem to imply that its membership should be composed of all those whose thoughts, tastes and desires were inclined towards diligent research for the promotion and development in all the divisions and subdivisions of every kind and nature in the horticultural industry, that depends upon the tillage, cultivation and growing of plants from the soil, either in field, garden or conservatory and should be co-operative. As a general rule this is the case; but I am sorry to say there is a tendency among horticulturists in certain specific lines of work, to devote their time and attention exclusively to their immediate interests and self-culture, and to withhold their counsel and support from every other organization whose investigations do not render special and particular effort to aid or assist them in their especial branch of business. Singleness of purpose and action in an individual is commendable; but would not be expedient or admissible in the guidance or managing of a large body of persons organized for enlarged and combined work.

Each class of industrial education should be distinctive in its application and impart a genial influence upon all mankind, calling out the finest qualities of perception. In the skillful management of the many varied forms of plant life, considered from an æsthetic standpoint, its teachings should be elevating and refining in all its theory and practice, and call for delicate distinguishing qualities in all its manipulations. The mind that guides the hand and actions of the true horticulturist, should be amply furnished and enriched with all the keenest susceptibilities of intelligent research.

Experience is the great teacher of mankind; and he who would attain the greatest perfection in his calling, should seek each and every opportunity for improvement. All classes of horticulture in the state, should become associated together in common sentiment and purpose; all differences of opinion should be overcome and there should be a union of interests for the welfare and

prosperity of each organization. This holding aloof of one branch of industry from another, is not and never can prove of permanent benefit to either society. To illustrate: Suppose the nursery and tree men should wish to pull in one direction; the florists and plant men in another, and the small fruit and vegetable men in still another; what would be the consequence? Each special class would be engaged in their own particular kind of work. Would they accomplish as much good for the benefit of the people and public at large and for themselves, as if they were to support one central organization? The friends in all of these sub-divisions of horticulture can not afford to become exclusive and dwarfed in their ideas, their interests divided, separated, or disunited by pulling in different directions.

There is an erroneous impression which has gone abroad, that this Society is ruled, or governed for promoting and advancing the aspirations of some one man; and guided and directed according to the ideas, desires and dictates of a small class or set of men; for elevating and pushing to the front some one division in horticulture, to the exclusion and detriment of another. But such is not the case. We wish it distinctly understood that we are striving and working for the best, largest and furthest reaching results in all directions. We wish to improve, beautify and adorn our minds, homes and surroundings, with all the taste and elegance possible, rendering to each and every person respectful and refining influence according to their character, worth, and ability. What more than this would you have us do? We leave it with you to choose your path of duty.

INSECT PESTS.

Parasitic and fungoid diseases are still to be contended with and in many portions of the country are on the increase and call for greater activity in preventing their ravages. While they are rough on the unskilled and careless cultivators and cause them to be discouraged and disenheartened in their business, they prove a blessing in disguise to the intelligent, alert and progressive culturist, and enable him to get an increased price for his product.

The call for larger and broader intelligence in all classes and divisions of horticultural work is increasing each year; as the country gets settled up and new sections and fields become scarce for planting, we more and more see the inroads of these little

depredators that seem so insignificant and small, yet give us any amount of trouble and loss. We need to be alarmed, and looking about us, for the enemy is already in our midst.

In referring to the rust and mildew on grapes, the commissioner of agriculture says: "The different kinds of rot — black rot, brown rot, white rot, and bitter rot — are caused by fungi; each form being produced by a special fungus, quite distinct from those under whose action the other forms appear. These fungi are plants like the vines themselves; differing from the latter only in their minute size and in their habits of growth; and there is a much greater difference between the fungus which produces the black rot, and the fungus which causes the bitter rot, than there is between the most widely different grape-vines which you cultivate."

Black rot or going to decay of grapes is purely the result of the attacks of a parasite on fruit and foliage alike. The use of preparations of arsenic poisons sprayed upon the foliage just after the fruit has set, and at different stages of growth, is a preventive for these many kinds of diseases; not only these but the codling moth and other injurious insects are destroyed; in some instances saving seventy per cent of good fruit, where without the aid of these sprays the whole crop would be a total failure. New kinds of liquid and powdered remedies for prevention of plant and fungus diseases are making their appearance each year, and should be sifted by discussion to discover which are the best. We are very apt to take up with new ideas and remedies without investigating their real merits. Our investigations in this line should be thorough and cautious; for already there are many complaints that injury has been done to our plants and vines by using too large an amount of remedy and too little good common sense.

As the country grows older, the losses and damages to all varieties of plant life are certain to be increasingly great. One writer suggests we should not denounce all insects that are injurious to our crops as an ungrateful nuisance and evil. The horticulturist would be a very unenergetic and unambitious being if he had no insects to contend with. "Verily the bug" said he, "is a very useful member of society, whether he is a big or a little bug; he keeps us horticulturists up and a going, and teaches us if we will have what our appetites crave most ardently, and will surround ourselves with abundance, we must work for it; in other words, be honest and industrious."

Our enlarged acreage of vines and other fruits makes it imperative for us to consider well what preventive measures should be adopted against the many forms of noxious diseases that give warning of the encounter we must sooner or later meet in the protection of all kinds and varieties of fruits from being destroyed. Eternal vigilance in guarding against the little foxes that cut the vines, is to be the price by which we are to prosper and save to ourselves a profitable harvest.

LIBRARY.

Your attention is called to the pressing needs for a suitable depository for our horticultural library, which is increasing each year by exchanges and new books added. It has been made more apparent at this time by the receipt of the following note from our librarian, of Sept. 30, 1888:

DEAR SIR: The fire at the agricultural building of the state university makes it necessary that our reports be removed at once, as they are now quite wet.

(Signed) E. A. CUZNER.

On examination we found that none were destroyed by fire, but many were damaged by water, and will need rebinding before they can be of use; thus it becomes imperative that we should determine on some definite action for procuring a repository that will be ample and secure. Our published reports are numbered by the thousand, and each year new accumulations from our own published reports and accessories by way of exchanges with other societies are received; and this question arises, where can they be placed secure from fire and damp air? These agricultural and horticultural books that we have been collecting for the past twenty years are of value to the members of this Society, and are the silent monuments of our work in horticulture, giving the recorded history of our members and Society. To many of us this history is precious, and must be preserved to tell future generations of our life work when we are laid away to our long rest.

In furtherance of this object, I would recommend that a committee of three be appointed to select and report at this meeting a permanent library committee, whose duty shall be the procuring of a suitable place for a library; to gather and arrange such books, periodicals and other property as may now belong to our

Society, and to collect and add to as fast as possible from all available sources.

PREMIUM LISTS AT STATE FAIRS.

From personal observation and experience gained while acting as superintendent of Division G, Fruits and Flowers; Division H, Vegetables; and Division I, Sugar, Syrup, Honey, Bread and Domestic Pantry Stores, I have come to this conclusion, that combining and treating of these three divisions (whose interests are naturally more or less the same) in one building, under the care and guidance of one general superintendent, was a wise and prudent decision. The educational points derived in the management of this department in the last three years, have been many and valuable; and it is said that he is a dull scholar who can not discover some occasion for improvement after repeated exertions for the attainment of any special object. The present relations existing between the officers of the State Agricultural and Horticultural Societies, are very cordial and harmonious, and it is hoped may ever remain so; but from the experience had in conducting the affairs of the Horticultural Society, we are convinced it is not well or conducive to the best interest and prosperity of our Society to always remain in this passive position. We do not wish to censure, find fault with, or cast any reflections on anyone for the manner in which our Society has been dealt with by the state agricultural board in the past. They have been very munificent with us as a society, in adjusting the premiums and prescribing the management of our fall exhibitions. Still there is a feeling among many of our members that we are not receiving that recognition that should be accorded to us for all the endeavors and efforts we are making in trying to advance our interests and secure larger and better facilities for holding more varied and more successful horticultural and domestic exhibitions. Under the dictation of the state agricultural board, without any voice in its counsels, we have not accomplished all we could wish or desire; and never will until this Society has a broadgauge representative member, qualified to vote and take an active part in the management of all its affairs.

I present a few suggestions for your consideration as to the advisability of revising our premium lists, and you can do with them as you choose.

First—That there be a committee of five persons appointed, representing all the diversified interests included in these three divisions (G, H and I), who shall have charge of the revision of the three premium lists for the coming year.

Second—This committee be instructed to correspond with officers of similar organizations and prominent horticulturists in other states, seeking information concerning premium lists, management and the most suitable furniture to be used in conducting horticultural exhibitions.

Third—This committee be instructed to issue a printed circular inviting written suggestions from all former patrons of our exhibitions, and others who are or may be interested in the prosperity of the State Horticultural Society.

Fourth—That the actual expenses of this committee (services of committee not included) be provided for, out of the funds of the society.

Revision of premium lists should be attended to by a competent committee of three persons, one from each of the three divisions, G, H and I. There is manifest dissatisfaction among exhibitors at the way our list now stands; they think there are too many premiums on single varieties and not large enough on collections. From the experience had the past season at several exhibitions where the classes were only divided into five graded premiums, the effect has been most satisfactory; bringing out much larger and finer displays, than by the old method of dividing into small sized amounts; large premiums always bringing forward a larger number of competitors than the old method.

DISTRICT OR COUNTY SOCIETIES.

Local horticultural societies should be encouraged, and their number greatly increased; we should be looking forward to the time when we can aid and assist such organizations; for here is a true missionary field for labor, one that ought to be cultivated most thoroughly in the interests of progressive horticulture. We should have four district and a local society in every county in the state which should be auxiliary to the State Society. How can we do this, unless we have greater facilities placed at our disposal, and an increased appropriation from the state?

The organization of district and local societies is attended with some expense, and at present we can not give such assistance as is needed; only like the "impotent man" I am afraid

we shall have to wait until someone can help us step into the whirlpool, seeking state legislation for aid.

FARMERS' INSTITUTES.

Within the last few years there has arisen a demand among the modern agriculturists and horticulturists of our country, for enlightenment and instruction, that will encourage, improve and fortify their minds in guiding the hand of utility on all characteristic and useful points, governing mechanical and manual employments in all the variable and versatile departments of every day work on the farm and in the garden. To meet these modern ideas and desires, the farmers' institute was created; and through this means there has been opened up to us a new field of opportunity for presenting to our rural population a few of the elementary principles of horticultural art.

Before this institute teaching was inaugurated, we had very inadequate means at our disposal for diffusing intelligible instruction in gardening and fruit raising among our farmers, except through our limited supply of annual reports and a few stray items in the agricultural press; and now we could not accomplish much if it were not for the valuable individual services rendered by a few enthusiasts in horticulture. These have rendered helpful assistance, counsel and instruction, such as they in their wisdom were qualified to present on special subjects pertaining to their occupation.

It is with pleasure that I call your attention to the record of the second year of the institute's work in this state, by our very able and efficient superintendent and his assistants. Through this channel there has undoubtedly opened up a new field for presenting useful horticultural instruction in all its many varied phases to an apprentice farming population. And I would heartily recommend that some action be taken by the members present that will furnish us with means suitable for instructors which will give greater efficiency to our particular portion of the institute work.

AGRICULTURAL EXPERIMENT STATION.

There are several matters of vital importance to the interests of the horticulturists and agriculturists of our state, that follow in the direct line of experimental work, and which should be consid-

ered with sound and cautious judgment by every member in this organization. The central station has been placed under the guidance and direction of the board of regents, who have appointed a director who has during the past year, put it into successful operation. The school of agriculture has been successfully opened and more applications of students for admission have been received than can be comfortably accommodated. None are turned away, but temporary provisions made for all. I understand there are forty students in attendance, with more expected every day.

Our agricultural experiment station is now fully equipped in buildings, instruments and men, for the work which it was designed to accomplish, and every department is in successful operation.

The results of the work so far as completed, have been given out in the quarterly bulletins, four of which have already been issued, and the fifth will be ready for distribution at this meeting to members of the Society. The annual report of the station is now in press, and will be completed at an early day, or about April 1st.

At our last annual meeting there was some discussion in regard to auxiliary stations to be established throughout the state, but no definite plans were indorsed by us, or have been by the board of regents; neither has the director been empowered to put the suggestions which were made at our last meeting of the Society, into practical operation. There were no objections to the plan proposed, excepting the fact of having too much work on hand for the year, pertaining to the organization of the central station, to make it advisable to enlarge the field of operations; but I am more and more convinced that such action will be demanded at an early day, and it will be much better for the university to inaugurate this measure than to have the matter forced upon them by legislative enactment. But from the position of your president, acting only as an advisory officer, under the direction of the board of regents, we can do no more than make suggestions and leave the responsibility to the ruling power.

I think we can aid this matter materially by emphasizing the importance of this work, and asking for a decided expression of opinion upon the part of the Society.

I think it would be within the province of this Society to make inquiry from the director of the state experimental sta-

tion, if a competent corps of persons to govern the county experiment stations have been secured; and if so, should we not have a list of the same for publication in our transactions? If not, it would be well to consider who are the most efficient and the best qualified in each county, to undertake the work in special lines of agriculture and horticulture, to become correspondents and observers for the central experiment station, etc.

PLUMS.

New and improved varieties of plums are each year coming forward for favor; some will prove of value while others will be of little value. Among our native plums are some that are attracting attention from abroad. Charles Gibb, of Abbotsford, Quebec, says: "My special hopes are now turned to the improved varieties of the Northwestern states; I have fruited the De Soto, and found it an advance on any I have tried. I have more hopes of Northwestern plums from my own experience and from what I have seen in the West, than I have of even the Russian plums."

This from so good an authority should give our own fruit growers great encouragement in plum culture. We should make systematic efforts to secure every kind or variety of plum of value and place them in our state experiment grounds, that their relative merits may be made known.

There are many trees growing wild in our thickets that if transplanted and put under thorough cultivation, would yield valuable fruit worthy of general use. There are other native fruits that with the right kind of treatment would develop into varieties of great value to our fruit growers. The blueberry is, we think, susceptible of improvement and should be thoroughly tested at the experiment station. Some varieties of our native cranberries are exceedingly fine in size and color and possess other valuable qualities. We should seek and search every nook and corner of this great Northwest for new and hardy varieties in all classes of fruits and plants that would be of added value to what we now have.

AMERICAN POMOLOGICAL SOCIETY.

The next meeting of this grand old society will take place at Ocala, Florida, Feb. 20-23, 1889.

This Society should be represented by one or more delegates. We need to sustain our friendly relations and fellowship with the organization that has done so much in educational horticultural art, not only in this country, but is quoted as authority all over the world.

NECROLOGY.

Chas. Hoag, one of the original charter members of this Society, died Feb. 2, 1888, in the eightieth year of his age. A full and appropriate account of his honorable services as an agriculturist, horticulturist and respected citizen, is given in our last report, on page 113.

Robert Hale, secretary and treasurer of the Minneapolis board of trade, an honored and useful member of this Society, has also died during the past year. As an amateur horticulturist he was fulfilling the divine law of doing his duty faithfully and well; his memory will always be held dear to the members of this Society, remembering him for his many genial, sterling good qualities as a citizen and horticulturist. Fuller reference will be given to his life and death by the obituary committee.

FOREST TREE CULTURE.

There is a very erroneous impression among young people, and many old ones, that governments ought to do all the planting in forest culture; they thinking that mens' lives are too short for such work; also that the planting of trees, even if successful in growth, is a very uncertain investment to the planter. Life is very uncertain, as statistics inform us; not more so than a great many other things that we do. All prospective operations have clustering around them many uncertainties; but really, in what can a young man invest a few dollars that will give him so much real enjoyment in his old age, as the planting of a goodly number of useful and ornamental trees and shrubs? In your youth plant trees; in middle age plant trees; in old age plant trees, that they may spread their ample shade over your head when silvered with old age.

Intelligent, useful men are trying to solve the problem of reforestation of our continent. The work may not be done in this generation, but it will surely exercise the most thoughtful intellects of this land until it is accomplished. This great scheme has

come to stay with the best free educators of our land. There will be discouragements and dark days for this enterprise, but it will end in either the government or private capital undertaking this great work.

It is hoped that every member of this Society has enlisted in this great cause for life; and will never let go of the idea that forests should be protected, and new plantations made on all unoccupied waste places, to be of benefit to some one; if not to ourselves, to the generations to follow.

Trees like men begin to show age and decay at the top; but men unlike trees, return to their second childhood, and if an active, useful, energetic man in youth, they never lose opportunity for doing or saying something as a source of pure enjoyment; and I would inquire what more impressive scene of unalloyed sacrifice, than this useful employment in planting trees in their declining years for future generations to admire; living monuments that shall long remain for our children to appreciate; silent reminders of thoughtful, industrious usefulness?

I can give no more fitting words perhaps as a closing valediction, than a quotation from a charming fable written two centuries ago, by La Fontaine, from the Montreal reports of 1881; it runs thus:

“An old man of eighty was planting some trees,
 Three lusty young neighbors drew near —
 ‘To build would be odd, but still stranger to plant,
 Our friend has grown foolish we fear!
 In the name of all conscience,’ said they with a smile,
 ‘What harvest for you will these bear?
 Your age of four-score has no future to boast,
 Why cumber it thus with more care?
 ’Tis only for you to repent of the past,
 Throw future designs to the air!’

“The old man looked up and sagely replied:
 ‘You speak of my hopes and your own;
 Life’s enterprise often is left incomplete,
 Though begun on the threshold of youth.
 For fate unrelenting may sport with your hopes,
 As much as it may with my years.
 The chances of life render equal its span,
 Though unequal to youth it appears.
 And which think ye, the last of the four,
 Will behold the bright rays of the sun?
 Does this moment assure you another is yours
 To finish your labors begun?’

" 'The shade of this tree
 Though perchance not for me,
 For others a blessing may shed
 As under its branches they tread.
 Nor would you forbid
 The prudent provide
 For others who follow. Howe'er you deride,
Such fruit of my toil, each day I enjoy,
 As daily for others my strength I employ;
 And who can explore,
 What Fate has in store?
 For old though I be, with regret I may see,
 And mourn over your premature graves.' "

The reading of the President's address was greeted with applause.

On motion of Mr. Cutler a committee of three was named by the Society upon the recommendation of the President, as follows: J. M. Underwood, J. S. Harris and M. Pearse.

The following paper was then read by Mr. Cutler:

MINNESOTA LAW ON NURSERY FRAUDS.

By M. Cutler, Sumter.

Mr. President, Ladies and Gentlemen:

The golden rule is to do to others as we would that they should do to us. If all men obeyed this rule there would be no necessity for the existence of such a law as now graces our statutes in reference to fraud in the sale of nursery stock. But so long as men will allow greed and avarice to cause them to lie, misrepresent, deceive and defraud their fellow citizens so long will such laws be required. I feel thankful there were good and true men enough in this Society, who had the interests of our hard working farmers and laboring men at heart to compile and push to its final passage so good a law as we now have. All honor to our committee and such men as Senator Hoard and Representative Donnelly who assisted in its passage.

While this law is not quite as rigid as some of our rural friends would like to have it and some of its provisions may work in-

justice to our home nurserymen, the spirit and intention of the law is right, and there is abundant proof that its effects have been beneficial. For instance two or three years ago thousands of dollars were paid out in McLeod county for worthless Ohio and York State apple trees, at ten dollars per dozen. This year nearly every farmer has from one to four barrels of apples in his cellar, not from those trees, but from money that without this law might have gone to some rascally tree agent or dealer.

I have been informed by our Secretary that few complaints come to him since the passage of the law, and we believe it has proved quite satisfactory to the majority of the people of our state and the members of this Society. Still according to our last annual report I find that there are a few who think it all wrong and want it repealed and the old condition of things restored.

This law although threatened by a committee of nurserymen in Chicago has not been set aside and whoever violates its provisions I understand is a lawbreaker and subject to prosecution under it.

To properly show the necessity for some such law it becomes necessary for me to refer to the condition of things previous to its passage. During the years of 1885 and 1886 a band of tree agents (working for different tree dealing firms) with more cheek than an army mule and destitute of all principles of manhood and honor, made a raid upon the people of the Northwestern states, selling budded apple trees grown in Ohio, at one dollar each, Gideon apple trees from New York, Arctic plums, gooseberries and strawberry plants at the same style of prices. They also imposed upon our foreign-born citizens who had recently made their homes with us and who were unused to the ways and peculiarities of this country, by selling them peach, plum, prune and pear trees at outrageous prices. Complaints of their depredations not only came from our own state but from Iowa, Dakota, Illinois and Wisconsin.

At our meeting in 1885 an effort was made to get a simple resolution passed by this Society, denouncing their operations, but without success.

During the season of 1886, the cheeky transactions of the agents of L. L. May & Co., caused so many complaints to be made to the President and Secretary of this Society, that these officers, in their address and report, called attention to the necessity of the passage of a law for the prevention of such

wholesale swindling. A lengthy discussion followed which resulted (with little opposition from members) in the appointment of a legislative committee, and the preparation and passage of the present law, which was carefully prepared and passed upon by the attorney general and judiciary committees of the legislature. If there has been any injustice done to honest nurserymen, it was not intentional. Had the nurserymen of the country in their conventions, condemned the actions of the tree dealers and agents, instead of condemning and threatening our law, they would have merited much more of our confidence. If it is their intention to persistently defy and violate the law we now have, we warn them to halt, ere the fate befalls them which, it is reported, has overtaken a man who took fifty or sixty thousand wild orange trees to California, and is now in durance vile. The temper of the people is in no condition to be trifled with. Had justice been done to some of the tree dealers and agents who came into this state, they too would have been behind prison bars.

As our society is partly supported by taxes collected from the people of the state without regard to occupation, it is therefore our duty to manage it for the benefit of all and not for a few tree growers or sellers.

A word to the nurserymen. The men in other occupations who become successful do so by being honorable and upright in their business and if we follow this course people will soon learn who to deal with, and we will have a clear conscience and carry as much filthy lucre to the grave as those who do otherwise.

It has been said that a man can not send out of the state for a few Jessie strawberry plants for his customers without violating the law. This may seem rather hard and may be wrong, still observation has convinced me that few of those who buy new kinds of strawberry plants at two dollars per dozen and new grape vines at two dollars each ever make them live or get any profit from them.

In conclusion, fellow members, let us treat this subject carefully and with a just regard for the interests of all our citizens.

DISCUSSION.

Mr. Barrett. Mr. President, I would like to inquire in your judgment whether there should be any effort made in the present legislature to repeal the law to which the writer alluded

in his address? There are parties outside of our state, no doubt, who are deeply interested in the repeal of our law, and there may be parties within the state who will seek for its repeal. It seems to me there should be some officer or some committee of the Society appointed to look after this matter in case such an attempt should be made. I wish to add that in my section of the country, in Traverse county and round about, there have been no agents who have been there and practiced their deceptions upon the people of the community to my knowledge since the enactment of that law, and the people have really got their eyes open. There have been heretofore practiced upon the yoemanry there a great many deceptions, schemes and frauds, and the result is people have become shy and very circumspect under the protection of that law. Possibly there may be some defects that may need to be remedied. But if anyone should undertake to test the constitutionality of it it seems to me it becomes us to be on the alert, in order to maintain the law and protect the people of the state.

Mr. Harris. Mr. President, wherever I have been around in the state, the general verdict of Minnesota tree planters is that the law has been doing good. One disadvantage, perhaps, where trees are wanted that are grown outside of the state is to get them, but where trees or plants are wanted in small quantities, orders are sent direct to the grower for them. If the farmers of Minnesota would make a practice of getting a catalogue and making their own selections of stock, there would not be any need of agents.

I should be in favor of retaining the law. Perhaps in the course of time there should be some features of it amended; I think as a whole it has worked a great good. For two years in Houston county, where I live, we have been free from those agents who come through selling trees from Ohio and other points, who make people think that they have found a new kind of prune, or something of that kind, that came from Russia. They don't tell them that it came from the southern part of Illinois, or take orders any more at such high prices as they used to do. The law has had the wholesome effect to keep out that class of dealers and the agents have commenced doing a legitimate business.

Mr. Gray. The gentleman who read the paper tells us something about not being able to get Jessie strawberries outside of the state. What does that mean? If there is a law in this state

that has the effect to deprive us of getting a new thing I think it is about time we were rid of it. If we haven't got sense enough to look out for ourselves and find out the good things that may be produced in other states, I make a great mistake in the people of Minnesota. I should like to know for information if we have a law that is so contrary to our own interests as that. I do not know anything about what it contains for I never read it.

Mr. Harris. The law does not prevent a man buying just where he pleases.

Mr. Sias. I think Bro. Harris is correct. I think the agitation of this question has resulted in much good.

Mr. Cutler. The point made in regard to sending out of the state for plants is this: Under the present law, if the dealer sends out of the state for plants and re-sells them he has to take out a license, as I understand it; that is, go to the secretary of state and give bonds in the amount of \$2,000, I believe, and take out a license. Some think this is a hardship to the home dealers to require them to take out a license in order to do this. So far as individual planters are concerned they can buy direct from the grower as many plants as they may wish for their own use.

Mr. Terry. Mr. President, I would say the way my orchard stands I have very little to boast of; I bought my apple trees when I knew very little about our nurserymen, and got southern trees. I found out afterward it would have been better for me to buy them further north. I supposed my trees came from Sioux City but what was my disgust upon making inquiries, to find they came from Kansas. And now as a Minnesotian I ask for protection. I think this association has done well in this direction. You have not obtained a perfect law, but at the same time I believe that all the members of the State Horticultural Society should support the efforts that are being made in this direction and accord their confidence in those who have been active in this direction, for their good intentions. I am only one out of hundreds that take this same position.

Mr. Pearse. Mr. President, I have a copy of the law before me and the essence of the law is in the title, which is merely this: "An act to prevent the practice of fraud by tree peddlers and commission men in the sale of nursery stock." That is all there is of it. That doesn't touch a nurseryman in Minnesota.

President Elliot. Not if he is honest.

Mr. Pearse. I went to a lawyer I consider the best in the state. I showed him the law; he said it didn't touch a nurseryman in Minnesota. There is the law in the title and that is the whole of it. That is the way it stands.

Mr. Underwood. I don't think the nurserymen are finding any fault with the law at all, either in Minnesota or anywhere else, except as it may be a little more difficult for foreign nurserymen to come in here to sell their stock; that is to say, they must give bonds for good behavior. They may come just the same, if they want to. I really think it may be an advantage, as it may help people to know what they are buying. I think it would be a good thing to have a law passed to protect men in horse trades. Every time I trade horses I get swindled (laughter); and I have got to get my eye teeth cut to know how to take care of my side of the bargain; but when I know as much about trading horses as I do about trees, why I won't get swindled so much. But unless they do pass some law to protect me on this horse-trading business, why I must go to work and learn how to do it myself.

President Elliot. We have had this tree law up in all phases. Last year we devoted seventeen pages in our reports to its discussion and I don't think it amounted to very much. The law seems to be working first rate. We all know there are some defects in it; but it is the best thing we could get at the time. If we attempt to tinker with it this year, or if an attempt is made to repeal it, our legislative committee must be on the alert and look after it to see that they don't deprive us of all we have accomplished in this direction. The question arises whether we will continue the present law or try to make some improvement in it.

Mr. Cutler. In order to bring this subject to a termination I will move that a committee be appointed to look after this matter.

Mr. Harris moved, as an amendment to the motion, that it was the sense of the State Horticultural Society that the present tree law should be retained on the statute book and that the legislative committee be instructed to see that no action is taken for its repeal.

Secretary Hillman stated that he had recently conferred with Mr. Mattson, secretary of state, with reference to the workings of this law and had been informed that it appeared to give very good satisfaction. Mr. Mattson stated that he had taken it upon

himself, at the request of parties interested, in one or two instances where complaints had been made as to sales of nursery stock, to obtain the facts as to the alleged grievances; that in each case the nurserymen in question had made satisfactory arrangements with the parties when his decision had been made in the matter. He had stated further that he thought it better instead of placing the responsibility with the secretary of state for the administration of the law, to place the whole matter in the hands of this Society, through its officers, as they were more thoroughly conversant with such matters than the secretary of state could be, in connection with his other numerous duties.

He said there was a law passed in Kansas nearly three years ago, for the prevention of fraud in the sale of fruit trees and nursery stock. The act declares any person who shall violate its provisions shall be guilty of a misdemeanor, and shall be liable in a fine or imprisonment, and treble damages to the party injured.

Mr. Gray called for the reading of the Minnesota law of 1887.

The motion of Mr. Harris was then adopted unanimously.

METEOROLOGY AND FORESTRY.

Prof. W. H. Ragan, of Indiana, was here called upon to present some remarks and to illustrate, by means of charts, the course of the great storm of January, 1886.

Prof. Ragan. I would say, Mr. President, I have an axe to grind.

President Elliot. Did you ever know anyone to come to a horticultural meeting that hadn't?

Prof. Ragan. I want to say something to you gentlemen on the subject of a remarkable blizzard, and how it effected the territory over which it passed.

Mr. Cutler. Do you mean to say that you are going to inform us here in Minnesota about the effects of blizzards?

Prof. Ragan. I have a request to make on behalf of the people in my section of the country, that since you have the gate-way through which these blizzards are to pass that you shall look to the closing of the gate, so to speak; in other words, that the forestry question will figure somewhat in that which I have to say,

for I have no doubt that you are competent by tree planting to effect our climate favorably. It will not be done by this generation, probably, but by the good old man, that your President has referred to in his address, who in his dotage plants the trees of which future generations will reap the reward.

The effects of climate on organic and inorganic matter is fully recognized, especially by the horticulturist, for who is more concerned than he? The natural causes that produce the most violent climatic changes, and therefore, have the greatest effect upon animate and inanimate matter, are not well understood. If our continent were a level unbroken plain, from the tropics to the arctic regions, a given parallel of latitude would more nearly represent the character of the climate belonging thereto. As it is, when we trace the isotherms, or lines of mean temperature, across our continent, we find them very eccentric in their courses, apparently having but little respect for latitude. This fact is most forcibly illustrated by the movements of such storms as we now have under consideration and for the designation of which a seemingly appropriate word, blizzard, has been coined, and awaits adoption in the next edition of Webster.

The atmospheric conditions that precede a blizzard, indeed constitute the preliminary features of it, are a low barometer, centered well south and moving northeasterly. As a rule, we have from 8 to 15 low pressure movements during a month. Almost without exception these pass out of the territory of the United States through the lower St. Lawrence valley. Just why this is so need not now be considered. Usually these centres of low pressure arise in the Rocky mountain regions of the United States, or enter our territory from Manitoba, and, passing through or near the great lakes, follow the St. Lawrence to the northeast. Conditions of this kind may bring us, in the Central Mississippi Valley, thunder storms, heavy rains or snow, wind, and even tornadoes; but will not give us a genuine blizzard in all its fury with a resultant temperature of from 15° to 30°. If, however, an area of low barometer enters the territory of the United States from the Gulf of Mexico and passes northeasterly toward the mouth of the St. Lawrence, and if this be during the winter months, we may have a severe cold wave extending far into the south, and borne to us in the latitude of Indiana and southeasterly, by winds from the west or even the southwest.

In some particulars the storm under consideration has excelled any on record. This is especially true in regard to its extent and

unusual severity in the extreme south. When we refer to the records of the signal service we ascertain the causes of this unusual distribution. As stated above, certain barometric conditions are the prelude to such storms. In this case (and this is but the type of all such storms), a low pressure of unusual energy came within the range of observation near Los Animos, Col., at 3 o'clock, P. M., Washington time, on Jan. 6, 1886, from which point it moved southward into the Gulf of Mexico, where it was central at 3 o'clock, P. M., of the seventh; from here it was deflected to the left, being noted eight hours later over the mouth of the Mississippi river, and thence it passed northeasterly, following the gulf and the Atlantic coasts, reaching the mouth of the St. Lawrence at 7 A. M. of the tenth.

An area of low barometer may be illustrated by, if not compared to, a vigorous blaze in a burning building, which creates a rarified condition of the atmosphere and a consequent rush of surrounding atmosphere to fill the void. In the northwestern portion of our continent, in the elevated regions of the Rocky mountain chain, we have a comparatively constant high barometer. When a low starts up, a corresponding high, from this region of constant high, flows in to fill the vacuum.

Farther north, in the arctic region, may be found as a constant or passive element, a low temperature. Without a disturbing cause, this condition of low temperature will hover about its proper latitude. When, however, a low barometer, which is always accompanied by high temperature arises, a high barometer moves into its wake, thus producing currents of cold air from the arctic region, with a resultant lower temperature. If this low barometer passes through the central or northern portions of the United States it is easy to understand why it should not draw a volume of cold air into the southern portion of the country. But when the reverse is the case, as was true of the storm under consideration and especially if the low has unusual energy and force, we may certainly expect the whole country to be overspread by a sheet of cold.

There are natural causes which direct and control the movements of such storms, when once inaugurated. If not, their movements would be direct and they would sweep down upon us of the Central Mississippi Valley, from the north rather than from the west or southwest. Hudson Bay and the lakes, to the north of us, with their stored summer heat, ward off these storms, pushing them, as it were, to the westward and against the

Rockies, where they follow in the lee of the mountains, which turn upward and beyond the reach of interference the warm currents from the Pacific, and, facilitated in their movements by the great treeless plains, until they reach the track of the preceding low barometer. As the low invariably moves to the northwest, the high, with its cold, naturally follows. Thus, we have the phenomenon of cold weather coming to us from the west or southwest.

You will readily see, from the facts I present you, how you, in common with the people of Dakota hold the gateway through which these storms must enter the territory of the United States, and how, by the suggestion already made, you may greatly ameliorate the climatic conditions of the whole country, for I have no possible doubt, but that through the reforestation of the great western plains, a very perceptible influence for the better may be wrought, upon our climate.

I will now hurriedly illustrate, by the use of a set of tridaily signal service charts, the movements of the storm under consideration. As already stated, you will notice the ink-spot on the chart in eastern Colorado, which marks the centre of the low barometer at 3 P. M. of January 6th. The dark wavy line across the upper portion of the chart, indicates the line of zero temperature, at that hour. The almost unchanged position of the zero line, in the lake region, during the prevalence of this storm will illustrate the beneficial influence they exert upon the climate, a fact which gives to Michigan and the surrounding territory, its just renown as a superior fruit growing section.

Turning to our next chart, which represents a period eight hours later, we find that the centre of the low area is now near Fort Sill in the Indian Territory, and that the zero line has dropped down, from Fort Custer to Denver, while all the Gulf region is basking in a temperature much above the frost point.

The next chart, which is for 7 A. M. of the 7th, represents, as you will see, the centre of the low barometer as near Indianola, Texas, and the zero line at Santa Fe and Fort Elliott, but almost unchanged as to the Lake region. The temperature of the Gulf coast is 40° and upwards.

This chart, which is for 3 P. M., shows the centre to be in the Gulf of Mexico immediately south of Indianola and off the mouth of the Rio Grande. The zero line has also dropped down, and that too against the tempering influence of the sun, from Fort Elliott to Fort Sill, while the temperature of the Gulf coast,

responding to the combined influence of the afternoon sun and the presence of the low barometer, which you have already learned invariably brings higher temperature, has arisen to 60° and even 70° . The orange orchardists of Florida were yet unconscious, unless warned through the signal service, of their impending doom.

At 11 P. M. of the 7th we find the low area covering the mouth of the Mississippi, and that the zero line has spread eastward to Fort Smith, Arkansas, from which point it extends due northward to St. Paul and the St. Louis river, where it turns eastward through Lake Superior into Ontario. The temperature has fallen in Texas to 30° at Indianola and Galveston, but is still 60° in Florida.

The chart for the morning of the 8th presents the low centre at Montgomery, Alabama, and the zero line extending from the Rio Grande below El Paso, Texas, by way of Palestine, Little Rock, Keokuk and Lake Superior. Temperature of Florida from 50° to 70° , while all of Texas is below 20° .

Eight hours later (the heat of the day) the low is in eastern Georgia, while zero has extended westward to the Mississippi river, but is receding in western Texas. The orange orchards are still unharmed in Florida, but are suffering in Louisiana. At 11 P. M. the low has reached the mouth of Chesapeake bay, and the zero line now takes in Memphis and northern Mississippi. The Gulf coast from Pensacola westward has a temperature of 20° and lower, but east and south Florida are above 50° .

The morning chart of the ninth shows the low area on the New Jersey coast, and zero extending from Santa Fe via Denison, Vicksburg, Chattanooga and thence northward to Cincinnati, Chicago and Lake Superior. Jacksonville and Cedar Keys have a temperature of 30° while Sanford and Punta Rasa have 40° and 50° respectively. At this observation we note the greatest thermometrical gradient that occurred during the storm, the readings being, at the centre of the low, in New Jersey, 28.8 inches, while on the northern border of your state it was 30.8 inches. The disparity of readings were unusual, which gave the storm its peculiar force.

The 3 p. m. chart shows the low on the coast of New Hampshire, with the zero line comparatively unchanged. The night observation of the ninth shows the low area in Central Maine with zero extending still more to the eastward. The temperature is rising rapidly in Texas and the southwest, but

still falling in Florida, having now reached 30° in the central part of the peninsula.

Our next chart represents the storm at its maximum. This is the morning of the tenth. The low barometer has now reached the mouth of the St. Lawrence, and the zero line extends from Utah, through New Mexico, Texas, Arkansas, Mississippi, Alabama, Georgia, North Carolina, and Virginia, and the line of 30° crosses Florida as far south as Punta Rassa.

The disastrous results of this storm, in the extreme south especially, are fresh in your memories. It is said that no such cold has occurred in Florida, as demonstrated by its effect on tender vegetation, since 1835, when they unquestionably had similar atmospheric conditions as the predisposing cause.

But the unusual character of this storm was manifested solely by its severity in the South. It has frequently been colder here, or even where I live, in the last half century, than on this occasion. Indeed, only two weeks later we were warned to "hoist cold wave flag," and notified that you were having several degrees lower temperature here than you had during the previous storm, but we did not realize its increased severity, while in Florida they were scarcely disturbed, the change from nominal temperature being hardly noticeable. On consulting the charts for this second storm, we discovered that the low barometer, the disturbing cause, had originated very near the location of the preceding storm, viz., in Colorado, but, instead of the unusual route taken by the first, had followed the nominal cause, in an almost direct route toward the Gulf of St. Lawrence, and hence the high barometer and cold wave were only invited as far south as the line of the preceding low area.

Mr. Pearse. I would like to inquire if cyclones are not liable to occur in certain locations; that is in valleys and among hills, as they usually commence, I understand, on high land?

Prof. Ragan. You have reference to tornadoes. They are supposed to be engendered by countercurrents; virtually because of the effects of heat. We do not know exactly what causes them, unless they are due to this difference in the atmospheric pressure.

Mr. Pearse. My friend Sias lives in a town where they have had several tornadoes. I lived there for many years, and I studied this subject carefully. Rochester is situated in a low valley, surrounded by a number of hills. The valleys come together, and I have noticed they come down through those

valleys. They are very severe; in some instances, have driven boards through the trunks of trees.

Prof. Ragan. There is no question as to the energy of the tornado; but I am not able to give the cause. They occur in some localities more frequently than others. They occur more frequently in the South; for instance in Alabama and Georgia, and are more energetic than some experienced here.

Mr. Pearse. In some localities, I don't think we ever had any. Where I live, near lake Minnetonka, there is no record that there has ever been a tornado there.

A vote of thanks was given Prof. Ragan for his very instructive lecture.

On motion the meeting adjourned till nine o'clock Wednesday morning.

MORNING SESSION.

SECOND DAY, WEDNESDAY, JAN. 16, 1889.

The meeting was called to order at nine o'clock, by President Elliot.

MEMORIAL RESOLUTIONS.

Mr. Underwood offered the following resolutions:

WHEREAS, The Treasurer of our Society, Mr. Ditus Day, has recently been called upon to experience a deep bereavement in the death of his beloved wife; be it therefore

Resolved, That we the members of the Minnesota State Horticultural Society hereby tender our friend and coworker, the warmest sympathies of our hearts, together with the hope that looking forward to that new life into which she has been but transplanted, he may find sufficient consolation and peace.

Resolved, That our Secretary be instructed to send him a copy of these resolutions and also spread the same upon the records of our meeting.

Mr. Kenney said that Mr. Day had been for a numbers of years past a member and officer of the State Amber Cane Association, and he had had the pleasure of an intimate acquaintance with him for many years. Mr. Day and his wife had visited his family at his home in Morristown, and he had always held them in very high esteem. It was fitting that this action should be

taken for all would sympathise with Mr. Day in this time of his affliction and sorrow.

On motion of Mr. Brand the resolutions were unanimously adopted.

Mr. Brand, from committee on program, recommended that the report of the seedling committee be deferred till Thursday morning.

LETTER FROM MR. BUSHNELL.

ST. PAUL, MINN., Jan. 16, 1889.

Wyman Elliot, President Horticultural Society,

MY DEAR SIR: The Minnesota State Agricultural Society extends to the State Horticultural Society its cordial greeting, and the earnest wish that you may be very successful in your grand work the present year. I shall try and visit your meeting, if possible.

Yours truly,

WM. M. BUSHNELL,

President Minnesota State Agricultural Society.

The following paper was then read:

WILD FRUITS OF MINNESOTA.

By Col. J. H. Stevens, Minneapolis.

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

The part of the exercises assigned me at this annual meeting is in relation to the early wild fruits of Minnesota.

When we consider that the tiny wild Siberian crab is the parent of the common apple, the sloe, the original parent of the improved plum, and that the many delicious fruits of the day — large and small — which are so abundant and derived from the humble parentage of their wild ancestors, of the forest and field, the mountain and valley, we must acknowledge that the world is greatly indebted for this wild product — the handiwork of dame Nature. It is highly proper then, that their merits should be briefly considered.

I will merely mention that the present products of the orchards, gardens and plantations, are the wonderful results of a proper system of hybridizing — the transmitting the pollen of the blossom from one kindred to another, the budding and grafting of one variety with another variety. The educated hand of man has accomplished all of these things, but we should always remember that the primitive wild fruits of the different parts of the globe, is the fountain head from which the luxuries of the orchards of the present day abound; nor should we forget the fact that the wild fruit of Minnesota had, and has to this day great merit. In the absence of the tame varieties, the wild to the emigration of colonial times was indispensable. In many instances the native plum was scarcely inferior to the most favored sorts; the strawberry of the prairie — small, but strongly impregnated with the peculiar pleasing flavor incident to that fruit. It was full of saccharine matter — more so perhaps, than the most favored variety of to-day. The raspberry that skirted the brush lands and also found on the margins and in the openings of the wood lands was of delicious flavor fit for the table of the gods; the blackberry of the deep green forest scarcely inferior in flavor to the Lawton; the cranberry of the marsh and the high bush of the wood land, the former abundant in central Minnesota; the blueberry of the numerous swamps in the more northerly parts of the territory with all the characteristics of the whortleberry and huckleberry of the Middle and Eastern states; the gooseberry so abundant in the big woods; the black currant which had not imparted all of its value to the Naples. There were also several varieties of wild cherries but of no especial merit. True some of our early vendors of poor whisky used to gather the common black cherries in great quantities and deposit them in their fiery liquids to improve their flavor.

Originally Minnesota had not only a variety of native fruits, but it had also a rich flora, as well as numerous plants of medical value. It could not be otherwise when a thorough knowledge of her climate and soil was understood. On the shores of her rivers, on the borders of her lakes, where the sun of summer shines for fifteen or sixteen hours a day with a heat equal to the tropics, large numbers of fruits and plants peculiar to the South abound. In her dense forests, in an early day, when the soil was a deep vegetable mould, many of the native varieties of fruits and plants peculiar to the Middle States were also found; and so in a measure to-day, but not as numerous as in

the primitive days of the territory, before the clearing off of the heavy timber; the tall oak has given way to wheat fields and clover lands, and as a matter of course the plow in constant use for more than a score of years has blotted out the native plant of the forest, and the flora of those early days existed under the same wonderful climatic influence.

In 1849 many of the different parts of the world were represented in the vegetable kingdom. The climate and soil appeared to be adapted to each variety of the beautiful flower. Botanists declared that scarcely a portion of the Union had a more numerous representation of the different order of plants. Many of these indigenous species have been cultivated for fruit and food, as well as for purposes of art and ornament. Some are grown for their medical value. Dr. J. S. Elliot, for many years one of our most skillful physicians, with a large practice, informed me while editor of the *Farmers Union*, that he was utterly surprised to find Minnesota so full of native plants so useful to mankind. Such, too, was the testimony of Dr. C. L. Anderson, so widely known as a scientist and a botanist.

But, to return to the wild fruit. Altogether we had some twenty sorts, though only two or three for commercial purposes, which consisted of the cranberry, the blueberry and the plum. The latter, while of great moment for immediate use, would not, on account of its perishable nature, bear transportation to any great distance. Our raspberries, blackberries and strawberries, together with the plum, were gathered in sufficient quantities to meet the then small demand in the local markets, but the families of the pioneer were generally supplied with an abundance — especially with the plum.

The cranberry was the most extensively exported. They were mostly gathered by the Indians, and sold to their traders. The latter shipped them down the Mississippi to their correspondents. I saw over two hundred barrels in the fall of 1849 sent down from Fort Snelling, in one shipment. Some of this fruit reached the New Orleans markets. The wild plum was in the reach of most every family. There were groves of them on the prairies where the gophers had previously broken sod; there were thickets in the bush lands; they were found in the big woods, and abounded on the margins of the sloughs and swamps; on the banks of the rivers and brooks, and in every other place where a foothold could possibly be found in the mellow soil, and here came in the part taken by nature to improve the fruit

growing on trees that were such near neighbors — apparently almost on one root. Through the agency of the wind and the honey bee, or from some other unknown source, a single tree, but undoubtedly that its ancestor, while in bloom, had been impregnated with the pollen of a better variety, would bear a large delicious plum, while its nearest neighbor, perhaps fifteen or twenty of them, would produce a pungent, bitter, sour, and as repulsive to the taste as a green persimmon; again, in other groves where the trees were so near to each other that a person could hardly pass through them, there would be found extra choice, good, fairly good, medium, worthless, repulsive, pungent, bitter and detestable specimens. The product would also vary in size. The largest plum, as a general rule, would be much the best in flavor; the smallest the most worthless, but this was not always so, as once in a while very small specimens were found that equaled in delicious flavor those of the largest size. By a proper system of cultivation it was discovered that the size of the native plum could be increased. The fruit would mature earlier also than where it remained in its native heath.

Perhaps aside from the cranberry and the plum, the most prolific bearer of our native fruits was the blackberry of the big woods. At the proper season of the year I have seen — as many of you doubtless have — the steamer *Antelope*, Capt. Geo. Houghton's daily packet that traversed the two rivers between St. Paul and Carver, filled with large boxes and tubs full of this fruit. The upper, the middle, the lower decks — the cabins and every available space on the boat occupied with this fruit. It had been gathered by the early settlers and sent to the markets of the twin cities.

As I am to be followed during this session of the Society by an honored exponent, John S. Harris, with a paper in regard to the wild fruit of the Northwest, who will speak of their merits far abler than I am capable of doing, I do not deem it necessary to refer to other varieties that existed here in an early day.

Mr. Sias. Is there such a thing as a thornless gooseberry in Minnesota?

Col. Stevens. Yes, there is.

DISCUSSION ON PLUMS.

Mr. Barret. I have been a good deal interested in regard to this subject of raising plums. In the locality where I live, on the western borders of the state, where farmers are poor and struggling hard for a living, they depend almost exclusively on the wild plum as a fruit. A few are able to buy apples. But very many persons go to the shores of the river and gather large quantities of plums, can them and use them in various ways and thus manage to economize during the entire winter.

About a year ago I thought I would inspect the territory where I lived in reference to the best qualities of wild plums, and was not a little surprised at some things I discovered. I visited the shores of Lake Traverse, also passed along the banks of the Minnesota river, which flows through the coteaus not far from Brown's Valley. I was surprised at the number of excellent specimens I found at different localities; one in particular struck me very forcibly. It appeared to me that the character of the soil had much to do with the quality of the fruit.

In one locality I inspected, the water gushed out from under a shelf of rock, or bluff, and appeared to be mixed with hydrogen and soda, which was very nauseating to the smell; one would imagine it to be from a sewer. In fact the atmosphere was very much like the atmosphere of a sewer. I found there an inferior plum, which had a crisp, somewhat bitter and forbidding taste. I passed further on and came to higher ground where the soil was excellent, and there I found a variety of wild plum which was of excellent quality. I was so highly pleased with the variety that I afterwards transplanted some of them to my garden. I found they were a superior plum. I therefore conclude the soil has much to do with the quality of fruit produced. I think we may take a plum that is considered below par, put it in good soil, cultivate it and it will be greatly improved.

I transplanted from the shores of the Minnesota quite a large plum tree, perhaps three inches in diameter, and succeeded in making it grow in my garden. I was told by those familiar with the fruit that it grew as large as an ordinary peach, and that the flavor and quality of the fruit was excellent. Mrs. Buchanan, a lady very tasty in domestic matters, informs me that she peels and cans them in the same manner as she does peaches. I expect it will prove to be a very superior plum, and if so I shall be very glad to report the fact.

My nursery ground extends to the river. I have a deep alluvial soil and then beyond there is a lower plain. Growing on this lower stratum I found a tree that filled my eye; to appearance it was very symmetrical, and I thought it was valuable and I transplanted it to my nursery grounds, and this last year it bore very prolific. The fruit is of ordinary size, but very juicy and sweet, and largely destitute of that peculiar pucker of the wild plum. I think it will be classed with the first quality.

I wish others to talk upon this subject, as I want to get some information in regard to it. This is my own experience. I was much surprised in the different qualities of plums. I wish my friend had alluded to the buffalo berry. I think it was not included in the list of wild fruits of Minnesota.

Col. Stevens. The buffalo berry is not a native of Minnesota. It is found in the Upper Missouri Valley. But while it does well it is not a native here.

Mr. Barrett. I wish to say it grows on the shores of the upper Minnesota river, where I live and I have seen the trees fifteen to twenty feet high. It grows in places as a shrub owing to the character of the soil.

Col. Stevens. I traveled along the Minnesota river forty years ago from its source to the outlet and they were not there then. But I think it is possible within the past twenty years they may have been brought there. They grow very readily not only from the berry but from the root.

Mr. Kenney. Speaking about the quantity of berries that were grown in early times I would say that for a few years back I haven't seen a good crop of blackberries in this state; and I would like to inquire whether it is due to climatic influences, or what is the reason they are not bearing now as they used to do? I know thirty years ago, when I came here, I used to find very nice bushes that were loaded down with berries; while in the same places that are still uncleared we find the bushes, but they do not bear well.

President Elliot. Perhaps friend Kenney's tastes have been raised up since he has commenced with Amber cane so that the things of his youth are not the same now; his taste has changed, perhaps.

I want to call attention to one thing that was referred to as to the plum. I don't want it to go on record that you can take a poor plum and change it to a better soil and make a better plum of it; that has been tried. You can not change the quality.

The only way to change that is by hybridization and propagating a new generation.

Col. Stevens. You can improve the size by cultivation.

President Elliot. Not very much.

Col. Stevens. You can make them two weeks earlier.

Mr. Harris. Mr. Lord has some plums that he claims he has improved, making them somewhat larger and the flesh firmer.

Mr. Underwood. Mr. Taylor has had some experience with plums and I should like to hear from him.

Mr. Taylor. I am always interested when I hear the subject of wild plums discussed. We come here for the purpose of searching for the truth; that kind of truth that will be of some profit to us and that we can use, after we return, to our benefit. Perhaps I can not do better than to give you my own experience.

In 1864 or 1865 I became possessed with the idea that by making the cultivation and improving of wild plums a specialty I could do good in the community and also make it profitable. I presented my ideas to Dr. Jewell, who was an experienced horticulturist at the time, and he cordially approved of the idea that I should concentrate my efforts in that fruit line. Well, I proceeded in this way. I did not make any effort to improve varieties by hybridization, but went to searching for superior varieties. I selected and crossed more than one hundred and fifty varieties of the wild plum that I fruited. I collected varieties from every state in the United States, where they grew. But about the time that I was very enthusiastic on the subject I met a gentleman, a horticulturist from Michigan, at Lime Springs, Ia., and when he found what I was doing he told me to go home and not to waste any labor in this direction at all; that in Michigan where he lived wild plums were very abundant, but that as civilization advanced they disappeared. He said the same would be the result here.

I got many superior varieties of course and had plenty of trees to practice upon. I top-grafted a good deal. But I will say here I didn't waste much time with them and I have no faith in the wild plum. In my neighborhood there were hundreds of varieties of very superior fruit down to as bad as those Col. Stevens has depicted, which were very abundant. But the most of them have disappeared; you can't find a peck of wild plums worth anything, and yet years ago they were abundant.

I had some trees taken away by a cyclone, but the most of my trees have failed as well as the fruit. I had cultivated trees in nursery rows and sold many hundreds from them and have planted hundreds of trees and fruited some of them; but they have all disappeared. We don't try in my neighborhood to waste a bit of effort any more in this direction.

Now, that is my experience. These very best kinds that we set so much store upon and raised trees from the nursery and fruited in the orchard, after they bore a crop or two the fruit declined in quality the same as with the trees procured from the forest and become worthless. Trees also would degenerate. After spending more than twenty years at this work I have come to the conclusion that it would not be my duty to waste time on the wild plum.

Mr. Brand. Did you ever try cutting off the old trees?

Mr. Taylor. I would say I have tried the plan of cutting the trees, clear to the ground. A gentleman told me once that I should give my trees rich culture and cut them off close to the ground, and I have tried that.

Mr. Reeves. It has been our experience that the best plums are grown on young trees. In the forests they only bear well on young trees. If we want good plums we must plant trees every few years, so as to have plenty of fruit from young trees, and cut away the old trees. I think our only chance of growing plums is from native sorts. That is our experience in Iowa. In Minnesota, conditions are different, but we must remember that the plum tree as a native is a short-lived tree.

Mr. Harris. I am sorry that my friend Taylor has gone back on the wild plum, for I have a good deal of faith in it. I think there are three or four varieties that have been brought into cultivation that are giving good satisfaction. The De Soto, which originated thirty or forty miles below where I live, is a good variety. Recently there have been some wild varieties found in Houston county that resemble it very closely. The plum bears cultivation well. It can be brought into bearing when three or four years old and it has borne immense crops. Old trees in the vicinity where it was first found may still be seen. I have seen a load of plums brought to La Crosse this last season, and I know those trees still bear fine crops of fruit. Some of the trees are ten inches in diameter.

Mr. Lord found plum trees growing near his place at Minnesota City, that are seven or eight inches in diameter and that

bear a very fair crop of fruit which sells readily in the market. He has never been called upon to take less than two dollars a bushel for the fruit.

There is another plum that is cultivated in one or two places. I have exhibited specimens of it, and it is a good canning fruit. It responds well to cultivation. I know of trees that have furnished an abundance of fruit for some eighteen years past. It is the largest of all plums I know of that have been brought into cultivation. I refer to the Cheney. At our last meeting it was pronounced the best canning plum grown. I believe there are other varieties of great value. I don't expect we can take up everything and improve it.

Col. Stevens. I wish to say I have a De Soto plum tree in my garden in this city, twenty-two years old, and it bears better every year. All other varieties which I had are dead. This is one which I bought of Mr. Hall when he first introduced them here.

Mrs. Kennedy. I heard of a gentleman who drove a lot of old rusty nails into the trunks of his trees and he said it seemed to invigorate them with new life and the trees bore abundantly afterward. He had considerable experience in raising both apples and plums in this state.

Mr. Allyn. Mr. President, I would like to say a word on the wild plum question, and would hate to see it run down. We have native trees that are over thirty years old and they bear well every year. Perhaps down at Lake City they have better varieties, but as the native is a very sensitive tree perhaps it has stepped out and given civilization a chance to come in. I have raised the wild varieties very successfully. We have abundance of them and think a great deal of them; and we never failed to get two dollars a bushel for them; we found them growing on the Cannon river some thirty years ago. I would like to hear from others upon this subject. I hope we may be able to keep the plum until we find something better.

Mrs. Stager. When I first came here about nine years ago I found quite a clump of plum trees as I could tell by the blossoms. When they fruited I found that they were quite large. I tied strings upon some of the trees that bore the finest fruit and the next spring I had them taken up and set out on our grounds. They have fruited the past two years. I found one very fine plum that was as large as the Weaver which was exhibited at St. Cloud, and they have no bitter taste. I use them for canning.

I have three large trees and about fifty small ones grown from planting the pits. I have heard said that one could fruit them quicker from the seed than from setting small trees. Many trees in the vicinity of Sauk Rapids, were blighted, and out of shape, but mine were free from blight and bore very freely of those large and pleasant-tasting plums.

Mr. Harris. I want to give an invitation to those who may have fine varieties of plums to send specimens to at least four places for testing; I refer to the state experiment station, under the charge of Prof. Porter, the station at Owatonna, under the charge of Mr. Dartt, to Mr. Lord, at Minnesota City, and to Harris. At each one of those places the variety will be given a fair and impartial trial, and if it proves to be of value the one sending the trees will get the credit for the same, and this will aid in making experiments by crossings, etc.

Col. Stevens. Just a word in answer to the lady that spoke of growing plums from the seed. That will not do. It is possible you may get a better variety but the probability is that it will degenerate into a great deal worse variety. I planted seeds of plums of a very superior quality and the product was perfectly worthless. It is like it is with planting apple seeds; you can not depend upon them to produce the same fruit as that from which the seed is taken.

Mr. Dartt. We can depend on getting perhaps one tree in twenty or thirty that will be equal to the original tree, but we might not get one in fifty.

President Elliot. Say three hundred.

Mr. Dartt. Well, we will get it if we plant enough of them.

Mr. Harris. Mr. Kramer exhibited a valuable variety of plums at the state fair.

Mr. Barrett. I would inquire of Col. Stevens, suppose there was no other variety of plums near by to fertilize a certain variety, would not the product of the seeds if planted all have the same characteristics?

Col. Stevens. Most assuredly not; there is perhaps one chance in three hundred of their being the same.

Mr. Pearse. The better way is to grow the trees from young sprouts instead of propagating from seeds.

Mr. Harris. What we want is to get better varieties.

Col. Stevens. That can be done by cross-fertilization.

Mr. Pearse. Plum trees can be grown from the roots by the thousand.

Mrs. Stager. Those plums I speak of are very shy in producing runners.

Mr. Pearse. Cut the roots and I will guarantee the young shoots will come up.

President Elliot. The advice of Mr. Pearse is sound. The best way with ordinary planters is to grow the trees from sprouts of the roots. Let our experimental stations experiment with seedlings as much as they like, but let us not waste time ourselves in growing new seedlings. I think that is the province of the experimental stations, to do that class of work.

Mr. Underwood. At our place we have been experimenting with seedling plums considerably; but the location seems to be against them. We haven't met with very good success. We have planted them by the thousand, but they don't fruit well. If a person has been unsuccessful in one locality I don't think it need to discourage everyone else. That is a point I wished to bring out. I knew my friend Taylor was discouraged, was doing some bad talking, and that was the reason I wanted to bring out this discussion. While thousands of trees may be cut down and put on the brush pile in one locality, others may be more successful.

Mr. Taylor. I would not become discouraged, but I live in the very paradise of the wild plum. When the country was first settled you could gather them there by the wagon load. I don't attribute anything to location. A neighbor of mine planted a lot of seed from a superior plum, and planted in a nursery more than five hundred kinds and fruited them; he got some good fruit, and there was some quite equal to the seed planted; but the same result referred to follows with his now. In a few years they ceased to bear and they seemed to blight. Some of my finest varieties failed. There appeared a sort of oak balls on them and the trees were covered with black knot. Our wild plums, whether cultivated or not, are disappearing in the neighborhood; those of good quality are going first. Where there were thousands of acres formerly producing well, to-day the same plum grove shows the meanest and lowest kind of fruit; and if I am discouraged now I am going to state so.

I may illustrate my feelings upon this subject by relating this incident. Mr. Ingersoll, of St. Paul, some time ago sent me some money with an order for plum trees, which he had been induced to do by State Auditor Braden, who knew what fine variety of plums I used to raise in such abundance, and which

were the admiration of the whole country. But I wrote back to Mr. Ingersoll advising him not to buy them.

Mr. Sias. Mr. President, I am afraid that something will go on the record that won't look well, and I would like to inquire of Mr. Taylor if he didn't get discouraged about plums about the time I did about apples? I have understood that a tornado, or some sort of wind storm went through your place and took pretty much all the plum trees?

Mr. Taylor. I had two large trees when that tornado came that were very large, and there was room for four span of horses under the shade in the middle of the trees. The tornado took them. We get enough fruit generally from other trees for family use. My son-in-law, Mr. Morgan, is growing some nice, thrifty trees, but they don't appear to bear fruit to amount to anything.

Mr. Dartt. I would suggest that some of these fruit men have been talking in a very discouraging way in regard to fruit growing in our state. In some of our emergencies it has been thought best to send a delegate to Iowa where they hold their meetings at the same time we do ours. And it came into my mind that perhaps this Mr. Taylor might be acceptable as a delegate. (Laughter.)

Mr. Taylor. I am not discouraged as to fruit growing; understand I have faith, but I want some good reason for it and want the public to know that there will be.

Mr. Reeves. If you will send Mr. Taylor down to Iowa we will try and convert him on the plum question. (Laughter.)

Mr. Sias. Mr. Taylor will be all right as soon as he gets over the effects of that tornado.

Mr. Dartt. I wish to add that if Mr. Taylor went to Iowa I know he would be materially benefited, as well as we afterwards, for I have seen so much of the good works of the horticulturists in Iowa and so much of success following their methods that I think the more of Iowa that we get into our Society the better.

The following report was then read by the Secretary:

REPORT OF COMMITTEE ON NATIVE FRUITS.

Little can be added to the report of last year, as applicable to this part of the state.

There are no native fruits in this vicinity of great commercial importance like the cranberry. Though some attempts were

made a few years ago to cultivate them, they were not successful, and Southeastern Minnesota has very little soil adapted to them.

In Winona, Houston and Wabasha counties along the Mississippi, the dewberry flourished the last year in great profusion. The fruit was of large size and good quality, and so plenty as to interfere, locally, with the blackberry market. The bushes have been growing here since the first settlement, but very little fruit is usually seen. If it could be grown to bear every year, it would largely take the place of blackberries, being so much easier to protect in the winter, and very tenacious of life.

Wild plums are the most marketable and valuable native fruit we have here. A very small expenditure of money, time, or labor, would secure an abundance of this fine fruit to every family in the land, many now regarding it as a rare luxury. While apples will always occupy the first place in fruit work, it is believed the Horticultural Society can largely add to its usefulness by inviting increased attention to our native plums.

O. M. LORD.

The following paper was read by the Secretary :

NATIVE PLUMS.

By O. M. Lord, Minnesota City.

Native plums have not received from fruit cultivators as much attention as their merits warrant. Some of the objections will be considered, and when their good qualities are placed in contrast, they will far outweigh all the difficulties or prejudices of cultivation.

The natural habit of the tree is not symmetrical, which has made it unpopular with the nurserymen. The general character of the fruit is soft, skin tough and acrid, especially when cooked. Its softness and non-keeping qualities unfit it for general market, and its intense acidity when cooked makes it undesirable for family use. It also frequently refuses to bear when cultivated, and is sometimes affected with black knot and curculio, and the fruit is very liable to rot on the tree before maturing.

While the straggling habit of the tree makes it hard for the nurseries to handle, when they are once planted in orchard form

their habits of growth may be materially changed by careful pruning, or if they are allowed to develop naturally it will not detract from their value in the production of fruit.

In regard to the general character of the fruit, which has been indicated, it is not commonly known that a few varieties are so distinct and superior in quality as to lead to the supposition on the part of many persons that they have either been greatly improved by cultivation or that they are mixed with the European kinds. Both suppositions are errors, so far as the quality goes.

The fruit can be increased in size by thinning and pruning, and by cultivating the ground. The quality of the fruit varies somewhat with the seasons; a better quality is found in a wet or moist season than in a dry one, but it is doubtful if any kinds have been made sweeter, more palatable, or better adapted to cooking by cultivation than when found in a natural state. Therefore when good fruit is desired it is very poor policy to make an indiscriminate selection from the woods. A better way is to get from some reliable nurseryman trees that are known to bear fruit of good quality.

No mistake will be made in buying the De Soto, whether only a few were wanted for family use, or a more extensive planting for market. The fruit is of large size, fine color, and excellent to cook. The tree bears when quite young, and abundantly, and is more reliable in unfavorable seasons than most others.

The same may be said of the Cheney, though it is distinct in character. The tree has a more vigorous, upright growth, and the fruit is larger in size, and from ten days to two weeks earlier in ripening. The appearance of the blossom would indicate something of the European origin in it, but it is without doubt a true native, as the skin and pulp correspond so nearly to the general character of all the wild plums.

Among other kinds that can be relied upon when cultivated is the Weaver, a free stone, with firm pulp, fair quality, and good for cooking. The Forest Garden has also given satisfaction in some localities. The Rollingstone has not been so generally tested, but as it originated here it will probably be as well adapted to different soils as any of those mentioned. The tree shows the marked character of the true native, though specialists have pronounced it as differing so much from any known variety that it is easily identified. The fruit, more than any other wild plum, resembles the Green Gage family. As a dessert

fruit it is superior to those above mentioned; it also keeps longer after ripening, and being much firmer is a better market variety. In season a week or more earlier than De Soto or Weaver.

These kinds have been grown in Minnesota so successfully that no doubt is entertained of their entire hardiness and reliability in all parts of the state. Northern Iowa has also produced some excellent varieties that are recommended with great confidence for our state. Among these are the Spear, the Rockford, the Wolf and some others.

As to the subject of non-bearing, it may be well to suggest that the best practical remedy is, in planting, to mix different kinds, and to plant closely together, from four to six feet one way and twelve the other. The claim is also made that this system of planting effectually defeats the ravages of curculio. The rot can be obviated only by carefully thinning the fruit; but it is believed that the varieties above named are peculiarly free from it.

PROPAGATING FROM SEED AND GRAFTS.

As plum trees are rarely sold at the nurseries at less than half a dollar, the price has been an obstacle to large planting. A few hints in regard to propagating, where natural thickets are not available, may be useful to some who have no experience. The seed, to be reliable, should be placed in moist sand and slightly covered as soon as possible after the fruit is ripened, where it will be exposed to freezing, and then planted as soon as the ground is open in the spring. If seed is planted from natural trees that are entirely isolated, the fruit will bear a strong resemblance to the parent. But if other varieties are near the parent when blossoming the character of the fruit can not be predicted. From the success in some experiments in hand fertilizing we are led to hope that all the best qualities now known can be combined to produce plums not inferior to the best Europeans.

As with grapes and strawberries, plums and other fruit, the natural or chance process of cross fertilization is not known to produce a superior variety once in ten thousand times. Seedlings may be successfully top grafted, but the trees will not be so long lived nor any more productive than sprouts transplanted from bearing trees. The grafts, however, will be more vigorous in growth and more symmetrical in form. Sprouts will

always produce fruit true to kind, while grafts are sometimes modified.

Much has been said to prove the theory that proper fertilization is the main thing necessary to produce abundant fruit, and the claim has been made that some kinds are better adapted to fertilize than others from the larger amount of pollen they produce or from their inherent prepotency. A careful examination of the blossoms at the proper time will show very little difference in the amount of pollen in any of the varieties.

As to prepotency, there is a wide field for observation and experiment before definite conclusions can be made. The De Soto, Rollingstone, Weaver and some others will fertilize themselves, whether planted singly or in groups, and the blossoms of these will show that the style-bearing stigmas are much shorter than the pollen bearing anthers, the petals being cup-shaped and corrugated, while of other kinds the stigmas protrude one-third their length, or more, beyond the pollen. The petals being larger and entirely flat or smooth, it is possible that the form of the blossom, giving it the power to withstand more severe cold, is what enables these trees to mature fruit when others can not do so. For these reasons, and many others that might be given, much more stress is placed upon planting these varieties than upon the particular soil or manner of cultivation.

The following paper was read by Mr. Harris:

NATIVE FRUITS IN MINNESOTA.

By J. S. Harris, La Crescent.

How many of the edible fruits now growing wild in Minnesota and other portions of the Northwest have grown there from time immemorial, I have no means of knowing. The first white men who settled in this region found the American crab apple (*Pyrus coronaria*), Canada plum (*Prunus Canadensis*), red and black raspberries, high bush blackberry and trailing or dewberry, strawberries, grapes, currants, gooseberry, June or service berry, cranberry, and some others flourishing in a great variety of locations. The first settler not only found them here, but he found some of them of a better quality than the same species were

when growing wild in the old states. Especially is this the case with the native plum, the strawberry and blackcap raspberry. While so far as has come under my observation our native blackberries are inferior to the natives of states further east and south.

I think I am able to speak advisably on the comparative quality of these fruits, as my residence in this Northwest covers a period of thirty-eight years, and my acquaintance with the native fruits of the East and South was in my boyhood days when the appetite was keen and the taste uncultivated.

There are doubtless varieties among these wild fruits which, with skillful cultivation and scientific propagation, will develop peculiar merits that shall yet cause them to occupy prominent places in the pomology of North America. Among them there is no one class so inviting for the experimentalist as our wild plums. They are quite universally distributed, and the trees are found growing in clumps and groves in our lowest valleys, on our highest hills, and in every locality wherever the annual prairie fires have not destroyed everything of the tree kind. They are always perfectly hardy and generally fruitful.

While botanists claim that there is but one species of them, they appear at some period to have broken into a number of quite distinct varieties, producing fruit of similar characteristics, yet differing widely in size, color, quality and seasons of ripening. The colors are almost white, yellow, orange, salmon, pink, deep red and purple. They also exhibit a wide difference in foliage, the leaves of some being long, others nearly round, pinate, serate, double serate, and nearly smooth. The varieties also differ in size and habits of growth of the trees; some are of straight trim growth fifteen to twenty feet high, others with large branching heads, and others mere scraggy shrubs, but all are more or less thorny. The size of the fruit varies from one-half inch to one and one-fourth inch and over in diameter, and from round to oblong in shape. In their wild state nearly all have a pleasant tasting pulp, but the larger portion of them have a thick, acrid skin, which in cooking has a tendency to dry up and toughen. They also have an acrid taste about the seed that often imparts an unpleasant flavor to the sauce. There are, however, here and there found a choice variety apparently several removes from the average. A few varieties are found with skin thin and tasteless, that disappears in cooking, and with a more meaty flesh and a comparative freedom from acidity about the pit. In some of them the flesh parts readily and clean from the stone.

Through a process of grouping together such varieties as possess the most desirable points, giving good cultivation, or using tame stocks to graft upon, and planting the seeds from fruits so produced, I believe they will soon break from the original type and give us new forms, and after the first positive variation is secured the field of operation for improvement will be limited only by the intelligence and prescience used in its occupation. With the cultivation of seedlings from selections of the best, we hope to secure firmness of flesh and shipping qualities that will place them beside prunes and apricots, and that they may even lead these as a fruit of commerce. I also believe that by hybridizing with some varieties of the domestic plum, we would quickly secure a valuable fruit.

Those who seek to bring about improvements should work towards certain points, and never lose sight of them in their manipulations and crossings. The most desirable points are to increase the size of fruit and solidity of flesh; lengthen the keeping qualities; eradicate acidity or unpleasant after-tastes and retain high and distinct colors. A few varieties have already gained more than a local reputation for their good qualities and are proving worthy of a general cultivation. Of such are the De Soto, Weaver, Forest Garden, Rollingsstone, and, best of all, the Cheney; but I believe there are some yet to be found in their native haunts that may surpass even the best of these. They can not be looked after too soon. In the older parts of this state the clearing up of thickets and the pasturage of fields has proved so destructive that some of the best varieties of thirty years ago are extinct.

A report from the Committee on Evergreens being called for, Mr. Brand read the following paper:

EVERGREENS.

By O. F. Brand, Faribault.

Next to the growing of fruit, and among farmers we might say, as a requisite of, and inseparably connected with fruit growing, is the growing of evergreens. A lengthy article might be written about the value of evergreens and especially of pines as regards the amelioration of climate, by rendering the atmosphere more healthful and the earth's surface more suitable for the home

of man. But in this busy age few would stop to read a lengthy article, and the utility of evergreens for health, ornament and protection, none will dispute. The most important question in connection with the subject is how to induce people to plant and care for them. One trouble is the almost universal desire to get hold of the almighty dollar sometime between the first of April and December of each year.

In growing evergreens the money value does not begin to be realized quick enough to satisfy the great multitude who from choice or otherwise are obliged to occupy and till the soil, as it is not possible to obtain much protection until six or eight years after planting, where small trees are used, and large trees are not possible to the most of the few whom a kind providence has blessed with a disposition to become public benefactors in this direction. Life is short. The ownership of land is surrounded with so many uncertainties which, together with the quick-coming-dollar objection occasions the planting of evergreens to be left to the very few—whose æsthetic taste for the beautiful as well as the useful in nature exceed their avarice.

How can we get the trees planted and cared for? We are satisfied that for the reasons mentioned individual effort will never accomplish much in this field. The severity of our winters and increasing dryness of our summers admonish us that some systematic move for the growing of evergreens should be undertaken by our state and general government without delay.

A recent investigation which I have made in our "Big Woods" region of our state leads me to the conclusion that there is not more than fifteen per cent of our original deciduous timber now standing in that region; and to a great extent the best timber has been culled from that which remains. Through all that once beautiful forest there is scarcely more than enough left for a fair farm supply.

There is one part of this subject that appeals directly to the individual, and that is the increased value that is given to farm lands by a liberal use of evergreens in the decoration of the grounds around the home and in forming shelter belts for the protection of stock, buildings, garden, and orchard. For this purpose there is nothing so valuable as evergreens. They should be planted mostly to the northwest and south of the residence. A belt all around a yard for cattle should be found on every farm. They increase the temperature of the surrounding atmosphere. Their millions of pointed needles check and repel the bleak

north or west winds, and the difference between standing on the windward or leeward side of an evergreen belt in a cold wind is as great as between January and June. To shut out all the wind the width of the belt necessary will depend on the variety used.

A single row of White Spruce will stop more wind than a single row of any other variety. A slow grower until two feet high after which it makes an annual growth of not less than two feet. Its habit of forming a dense growth below, together with its ability to grow on any soil, wet or dry, and flourish in dry seasons as well as wet, make it the most desirable of all for a single row.

For a large belt of evergreens the common White Pine is undoubtedly the most valuable of all. If a few rows only are desired for a quick growing shelter belt the Scotch Pine is the best.

In the southeast part of the state on clay subsoil the Norway Spruce may be used. They make a more rapid growth than the White Spruce but are not so reliable over a large portion of the state.

Three rows of White Spruce set five feet apart in the row, with ten feet between the rows will make the best possible windbreak for the amount of ground occupied. The White Cedar is also valuable for a windbreak and a timber of great value both for posts, ties and telegraph poles. It grows reasonably fast on good soil and should find a place around every farm home, utilized for a hedge, windbreak, screen or as single specimens.

The Balsam Fir makes one of the finest ornamental trees. Its tall, graceful form and dark green foliage renders it one of the most conspicuous. On heavy soil it makes a good windbreak for from fifteen to twenty years, and still longer as a shelter from high winds, but as it grows tall and begins to get old the lower limbs die.

A grove of White Pine, or Scotch Pine, set four feet apart in the row, with the rows eight feet apart, will need to be trimmed to eight feet apart each way in the course of ten years. At that time the Scotch Pine will make the most fuel. It makes very good summer wood and a rotund chunk of it eight or nine inches in diameter put in a heating stove at night will show more live coals in the morning than a chunk of maple of the same size. After the thinning out the White Pine will grow the fastest, making an annual girdle of wood of about three-fourths of an inch in thickness, and will gain from two to three feet in height

each year. It is safe to say that in the next 25 years they would gain 65 feet in height and stand at that time not less than 80 feet high. At that time an acre containing 680 trees would be worth \$5 for each tree, or the snug little fortune of \$3,400.

Thirty years from now there will be left but little of our native pine, and it is reasonable to conclude that lumber will then be worth not less than \$25 per thousand feet. A tree 40 years old will give at least 300 feet of first-class lumber, which would require two logs, one 16 feet long and 18 inches across at the small end, and one 14 feet long with a diameter of 15 inches at the small end.

The success of evergreens depends on the care they receive. There is nothing that can be killed any easier; with reasonable care they are about as certain to grow and do well as any other tree.

For ornamental purposes set trees from two to four feet high. As they are usually set in grass land, remove the sod from a hole six feet across, take out the soil from a hole a little wider than the roots of the intended tree will fill when in their proper shape. See that there is a sufficient quantity of fine rich soil to fill the hole. Place the tree in so it will stand about two inches deeper after it is settled than it stood in the nursery. Straighten the roots in proper shape and after the hole is two-thirds full of earth pour in three or four pails of water — enough so the soil in the hole will be thoroughly saturated. A fork gently used will aid in letting the water settle all through the soil. Fill the hole with earth and pour on more water, which will settle the earth around every fibre of the roots. After that has settled away a little, dry soil may be put on top, which should not be wet or stamped or it will bake and dry out, and crack open in a dry time. Cultivation once in ten days should follow, that is, a stirring of the soil to a depth of four or five inches, a foot distant from the tree, and about two or three inches deep close up to the tree; nothing should grow within three feet of the tree. If it is not desirable to cultivate, the ground should be covered with mulch from four to six inches deep and left till the next spring, when the soil should be stirred and the mulch replaced. Continue in this way for four years and other things being right the long life of the tree is assured.

In planting for windbreaks or for timber and shelter belts, trees under two feet and over one foot, will be found to be best if the cost is within the means of the person planting. If cheap

trees or none must be had, trees grown in the sun one or two years will do. Generally such trees as can be bought for ten dollars per thousand. See that the trees are bought from a person who can show that he has been eminently successful in handling evergreens, for a little carelessness, a little exposure of the roots to the air, and the ability to grow is gone. It is of first importance to keep the roots moist all the time from the time the spade first touches the roots till they are safely in the ground. The least exposure of the roots to the sun or wind will dry them; keep them damp or wet. Prepare the soil as for a garden, except that it needs no manure. Lay off the rows four feet apart one way by eight the other, planting a row of corn between the rows one way for two or three years. Now, with the roots of the trees wet and covered up and a few in a large pail with the roots in water, proceed to plant one at a time. Plant them a little deeper than they grew in the nursery, spreading the roots out in all directions and covering with fine mellow soil, being careful that no straw, stubble, lumps or other rubbish gets in around the roots, for all such things dry out quickly and do not hold the moisture like earth. They also keep the soil from coming in close contact with the roots. If the soil is at all dry use a little water to each tree but put none onto the ground after the tree is planted. The place for water when planting trees is in the ground on the roots and not on top. Press the soil firmly around the roots and put loose soil on top; within a week or ten days cultivate thoroughly, stirring the surface of the ground and killing all the weeds. Continue the cultivation until the first of July; then it would be well to pull a little earth toward each tree, hilling up a couple of inches. At this time if mulching is put around each tree four inches deep and out two feet each way it will need no more care till the next year, when good cultivation should be given again and continued each year till the tops of the trees shade the ground. Stock must be kept away from evergreens or they will break them down or destroy the lower limbs.

There can be no labor put upon the soil that will make so grand a showing in ten years as that devoted to the care of evergreens—and there can be no monument to one's memory and good deeds erected on the soil by the person whose name it is desired to perpetuate than a fine grove of well grown evergreens.

THEIR VALUE AMONG APPLE TREES.

The influence of evergreens upon fruit trees has been found to be very beneficial. In numerous instances I have used them to protect apple trees from the sunscald in winter. Of three rows of Tetofsky apple trees, one row of which was planted with an evergreen near to each tree on the south and the other two rows without such protection, the row protected is in fair condition, while but few trees remain in the other two rows. Another block of Duchess of four rows—having a windbreak of one row of pines, fir and spruce along the west end of the rows—bears the most fruit on that part of the block which stands nearest to the evergreens and very much less as the distance from the evergreens increases. The evergreens were set about two years after the apple trees but are now fifteen to twenty feet high. The rows of apple trees run east and west and the slope is a little to the southwest.

On the eighth of January, 1886, I was at Orlando, Fla. The day being very warm I concluded to start north to Jacksonville.

Going to the depot and looking on the bulletin board of signal service I read as follows: "Cold wave approaching. Look out for killing frost as far south as Tampa. (Signed) HAZEN." With a temperature at that time of 84° in the shade the general conclusion was that Hazen was a little "off" his base. I went to Jacksonville and on the eleventh or twelfth saw ice four inches thick—with a temperature of 17° above. Later on going back to the south part of the state I passed through the largest orange grove in Florida and found that in that grove when the native live oak had been left and the orange trees were interspersed among them there was comparatively little loss or damage done by the freeze, but wherever the groves were not well protected the fruit was an entire loss and in numerous instances the trees were killed.

The destruction of the pine in all the gulf states to the north and west of Florida for the past twenty years, undoubtedly opened the way for that cold wave to reach as far south as it did. My opinion is that if the western part of our state and all of Dakota was crossed with continuous unbroken rows of evergreens running east and west, two or three rows together, and these belts one or two miles apart, that the course of the cold wave and blizzard would be broken up and the damage which they

occasion be greatly lessened. In fact the genuine blizzard would scarcely exist at all for it would be impossible for it to be created as the conditions favorable for origin would not exist.

DISCUSSION.

Mr. Pearse said he had good success transplanting trees without the use of water. He never used any water in setting evergreens. He transplanted 4,000 trees three years old without any loss. Evergreens were cheap and could be had for seven dollars a thousand and were the cheapest trees to buy. These trees in a short time would be valuable and if generally planted by the farmers of Minnesota it would have a marked effect upon the climate. They should be set by the millions. No subject is worthy of being advocated by the society more than the planting of evergreens. He advised setting White Pine, Scotch Pine, Balsam of Fir and the Norway Spruce.

Mr. Urie said he had set a good many evergreens and agreed with Mr. Pearse as to the importance of planting them generally. He would advocate setting Scotch Pine; it was a beautiful tree, a rapid grower and a hardy tree. He had trees that were forty-five feet high that had been set some twenty years, and some of them were ten inches in diameter. Farmers would do well to plant them in rows around their farms, and across the farm; there was no danger of planting too many.

Mr. Brand thought it best to use water in setting, as it was always best to be on the safe side. In case of drought the water would give the trees a start.

Mr. Pearse. One thing I wish to explain. I always mulch large evergreens and find it better for the earth to absorb the moisture from the mulching than from water poured on at time of setting. I am no advocate of pouring water in a hole to pack the dirt, when with mulching I can get a better result.

Mr. Brand. I contend that we need water to settle the earth around the roots of the tree. They will settle in a better condition than to put in the soil and secure it with the foot. Water settles around every fibre.

Mr. Harris. I do not think water is beneficial if the ground is in the right condition for planting; it is better without water than with it. But give the mulching immediately after the trees are planted; also select an hour of the day when the wilting process is not going on freely. There are more evergreens killed by exposure than by the want of water.

Mr. Underwood. The whole secret in setting evergreens is in "firming" the roots. Whether water is applied or not the ground must be firm around the roots. Then the rootlets will start out and have something to work in; and if set firm, that is the whole secret of success. I puddle the roots well and set them firm. As a nurseryman planting more or less trees I have never had any trouble in following these rules.

Mr. Sias, from the committee on Russian Apples, presented the following:

REPORT ON RUSSIAN APPLES.

By A. W. Sias, Rochester.

Mr. President, Ladies and Gentlemen:

We have been crowding the Russian apple too far south. Make its southern limit, latitude 42° and the northern 60° , and we will have as the centre of the Russian apple belt, latitude 51° . The southern limit would be on the northern line of the State of Pennsylvania, running west near Chicago and Cedar Rapids, Iowa. The centre would be a little south of Veronesh, Koursks, and Warsaw, Russia; Winchester, England; passing through lakes Winnipeg and Manitoba in the British possessions. Confine the Russian apple to this belt, and you can maintain its good reputation much better.

The most convincing opponents of the Russian apple are to be found south of this parallel. Minnesota planters will find room for about a dozen varieties from the hardiest and best of the Russians, for some time yet, while the seedling growers are "proving up" on their rich claims. Had you taken all of the Russians from the tables at the state fair last fall, the exhibit would have been meagre indeed.

At Nora Springs, Ia., last month, there was a call from the convention for a committee of six to make out a list of about twelve varieties of the most popular Russians. Prof. J. L. Budd was made chairman of the committee, while the balance was composed of some of the best posted men in the state. Your humble servant had the honor of a place on the committee also. We had no trouble in making up a list of twelve that we were all agreed on as being as hardy, or more so, than the Duchess. Prof.

Budd says he has a hundred varieties that are more hardy than the Duchess. Aside from the Hybrids and Wealthy, there were but very few apples in our district this past season outside of the Russian list.

I will close this paper by submitting a list of what I consider the twelve best varieties, after getting all the information possible on the subject, viz.: Autumn Streaked, Gen. Greig, White Russet, Lieby, Golden White, Hibernial, Garden Apple, Antonovka, Plikanoff Small, Titovka, Red Anis, Yellow Anis.

The following report was also made :

REPORT ON RUSSIAN APPLES.

By Andrew Peterson, Waconia.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I have received your letter and the premium list and program of the annual meeting of the Society. As I can't come to the annual meeting, I will give a short report on fruit of my orchard this year.

The apple crop was heavier this year than it ever was before. The oldest tree of the Lieby bore two barrels of apples. Some trees eight years old of the Lieby also bore a heavy crop. Charlamoff and Christmas apples bore well, also Plikanoff; and six varieties that I received from Prof. Budd, five year-old trees, had some fruit, but am sorry to say that the blight was worse than any year before.

I think if I had had my trees mulched they would not have been affected so bad; this fall I mulched all my trees with second crop dew grass. In such a long, dry season as we are sure to have I expect it will hurt the trees in orchards somewhat.

Of grapes, Concord, Delaware, Isabella, Eumelian, Lindley and Hartford Prolific, all these varieties bore a heavy crop.

Also raspberries and strawberries bore a good crop.

Mr. O. F. Brand is mistaken concerning the hardiness in trees of the Duchess and Lieby at my orchard. Duchess will never equal the Lieby in hardiness. My oldest Duchess and Lieby trees are of the same age, about fifteen years old. The Duchess trees are more than half dead and some of those remaining are nearly

dead, but the Lieby is yet sound, except it blighted more than the Duchess this summer. If the Lieby gets sunscalded, which is very seldom the case, I notice that it heals over pretty quick, or within two or three years, but the Duchess never heals. So I would rather plant Lieby than Duchess. As an eating apple the Duchess apple is more of value but its season is too short for keeping. Lieby is very good for cooking and we use them in our family as well as eat them from the hand. It will keep until February.

Last year when Mr. Brand was over to my place the Lieby apples were cracked and did not look very nice, but they seldom do so.

The Christmas apple seems to me just as hardy as Duchess. It had a heavy crop this year with very nice fruit; and I have some of them yet which are just as fresh as when I picked them; so I think they will keep until February. The tree was entirely free from blight.

Number 4 M., Ostrokoffs Glass, top killed some in the severe winter of 1886, but I had a Duchess tree of the same age, that was top killed just as much; so I think we will have to get along here in Minnesota with Lieby, Duchess, Christmas and No. 4 M. until we get hardier seedlings.

The Red Cheeked, as I have said before, is the hardiest tree we have got in Minnesota. But it does not bear much fruit; perhaps it will bear better when it gets older.

DISCUSSION.

Mr. Reeves. Mr. President, as a member of the Northern Horticultural Society of Iowa, I would say that the Russian varieties that were recommended by that society at their last annual meeting, were not recommended for general planting but for trial. We may change this list at our next meeting and drop out some of the twelve varieties mentioned.

Mr. Brand. I would ask Mr. Reeves how many of those varieties are in bearing, how long they have been bearing and how many apples any particular tree has borne in a single year?

Mr. Reeves. There are one or two varieties that are very fine; Gen. Greig produces fruit resembling Fameuse, about the same season and quality; it seems to show less blight than any other kind among the Russians.

Mr. Brand. How long has it been in bearing and how much fruit has it borne in a single year?

Mr. Reeves. It has been in bearing four or five years. It has only gone far enough to recommend it for trial. We wish to emphasize that they are still on trial and not to be recommended for general trial.

Mr. Brand. How far south of this is that where you have seen them grow?

Mr. Reeves. Forty to sixty miles south of the state line of this state. It is north of the line that is understood to be the south line of the region that is adapted to growing Russian fruits.

Mr. Philips. Mr. Chairman, one word in regard to that list of Russian varieties. I have been on a committee in our state for the past three years that have been looking up the Russians. I would say that I have come to the conclusion, as well as some others, that the Golden White and the White Russet are the same thing.

Mr. Brand. While many of these Russian varieties show very good colored wood I have a sample of Russian wood here that is comparatively perfect. This is taken from a lot of root-grafts set in 1874; the trees have never been transplanted. The tree is perfect to all appearance and looks better than Whitney in the same row. But this tree has never produced half a bushel of apples. I don't know its name, but it is a Russian and does not blight. I had sixty-five varieties. They are mostly gone now. I have here a sample of wood from Duchess, standing in another row some forty feet distant from the first specimen. Its wood is badly discolored, but it has borne many bushels of fruit and bids fair to produce many bushels more.

I wish to make this point that while many Russians show good wood and look all right they are good for nothing to bear apples.

Mr. Sias. Perhaps I ought to state in deference to Prof. Budd that this list of apples that I have made out has no reference to the list presented at the meeting at Nora Springs, at which meeting I was present. This is a list made out from my own standpoint, independent of that, although there are several varieties named that can be found on his list.

Mr. Moody. I visited the Russian orchard of Mr. Moulton last September. There was some one hundred and twenty Russian varieties at one time in bearing, but there are only about a dozen varieties left now. I was greatly surprised when I examined those trees. They had been top-worked on Transcendent. This orchard is some two miles north of this city. The orchard seems to have been rather overlooked by this Society.

Col. Stevens. The boot is on the other foot; the orchard has not been overlooked by the Society, but the owner has overlooked the Society.

Mr. Moody. I am speaking of the results since it has been a nursery.

Secretary Hillman. It is found by experience that the practice of top-working Russians on the Transcendent is usually a failure.

Mrs. Campbell. Mr. President, I notice the gentleman in speaking of Russians speaks of the Duchess; do you not consider it a Russian?

President Elliot. We do.

Mr. Brand. Mr. President, not by all the authorities; Col. D. A. Robertson is the only man that I know of who is willing to admit that he has carefully traced its origin, and he says the Duchess originated in Sweden.

Col. Stevens. Does not Prof. Budd say that he saw it in Russia?

Mr. Brand. Prof. Budd stated that when he was at Kazan, in writing from there, that he had doubts about Duchess being a true Russian, he says that he saw varieties that resembled it very much. When he got on the Volga at Zimbursk he writes: "I do not find the true Duchess here."

Mr. Sias. I understand Prof. Budd claims now the Duchess to be of Russian origin. I saw something to that effect in a late report.

Mr. Reeves. Prof. Budd only assumed, in the article referred to, Duchess to be Russian, but admits he could not find the proof of it. He states that he found an apple at one time in Russia that he and Mr. Gibb both pronounced to be Duchess, but on tasting it found it to be a sweet apple, which was the closest he came to finding the Duchess in Russia.

The following paper was then read by Mr. Harris:

RUSSIAN APPLES.

By J. S. Harris, La Crescent.

I am frequently asked the question what do you think of the New Russian apples?

The species of apples successfully cultivated in the older settled

portions of the United States are native born descendants of European varieties brought over in the early days of its settlement, and without doubt in my mind some difficulty attended the early efforts to adapt them to culture in our own climate and soil. With the single exception of Duchess of Oldenburg there is not, I think, a variety of European origin in general cultivation over any broad area of the country. What has become of the apples of our grandfathers? They have all given place to the young seedling generations to the manor born. They were from England, France and Germany, and were very suitable progenitors of a race adapted to our Eastern and Middle States, but now civilization has advanced beyond the borders, and the great Northwest is filling with a people who have even a keener relish and better taste for fruit than had their fathers. The Northwest has clearer skies, brighter suns and drier atmosphere than those lands our fathers first trod.

Russian apples were long since adapted to conditions similar to ours. I expect that we will meet with difficulties in transferring them across an ocean and a continent. They will likely be homesick and shorten their lives in pining for the land of their birth; but will not their seedling posterity inherit their native hardihood and vigor and an affinity for their new home and its surroundings? I do not expect that they will survive forever or many of them prove worth naturalizing, but there will be a survival of the fittest until some bright, vigorous seedling descendant of each type roots them out and usurps their place. I do not suppose that thirty years hence a half score of them will be allowed a place in the Northwestern nurseryman's catalogue, but I predict that just as certain as that the descendants of the fruits of West Europe have become adapted to the more favored portions of our country, just so certain will the descendants of the fruits of the Steppes and valleys of Russia find a congenial home in Minnesota and upon the prairies of the Northwest. And now you have in a nutshell what I think of the Russian apples.

It is to be hoped the Russians will be tested as soon as possible in all localities in the cold north, and thoroughly purged of all that are worthless. I can not close without urging all cultivators to raise seedlings from the best, and those who can to cross the hardiest and best Russians with the most juicy and best of other classes, and to raise seedlings.

Mr. Wilcox gave notice of a proposed amendment of the constitution with regard to fees of members of local societies.

Prof. Porter suggested that a committee be appointed upon amendments of the constitution, and the president appointed as such committee Messrs. Wilcox, Dartt and Underwood.

The following report was presented by Mr. Harris:

HORTICULTURE AT THE STATE FAIR.

By J. S. Harris, La Crescent.

The display of fruit at the state fair (held Sept. 10-15, 1888) was one of the largest ever made in the state and in some departments the finest and most instructive, comprising over a thousand plates.

One of the chief centres of attraction of the fruit exhibit was found in the display of New Russians, comprising about eighty varieties, and filling one hundred plates, by A. G. Tuttle of Baraboo, Wis. The larger portion of these were of larger size and of more pleasing appearance than are usually found in an equally large collection of American varieties grown and exhibited by any one individual. The flavor and quality of such as were in season compared favorably with such American varieties as were in season.

Next to Mr. Tuttle in the display of Russians came Wm. Somerville, of Viola, Minn. His display included fifteen to twenty Russian varieties besides Duchess and Tetofsky, Wealthy, and some of the Rollins seedlings, and about eighteen varieties of Siberians and hybrids. Many of his Russians were of remarkably fine appearance. He has had a long experience in fruit culture in this state and is noted as a careful cultivator and close observer. He has expressed the opinion that some of the newer Russians will prove as hardy and well adapted to growing in this state as has the Duchess.

C. H. Greenman, of Chatfield, had the next largest exhibit of Russians, comprising twelve to fifteen varieties, three or four of them very good. His was followed very closely by Andrew Peterson's of Waconia, who is one of the most intelligent experimentalists in Minnesota and one of the first to fruit varieties of the earlier importations. Sidney Corp, of Wabasha county, also showed several varieties of Russians in connection with others.

E. H. S. Dartt, of Owatonna, had a large and select exhibit of the varieties most commonly grown in this state, including a few Russians. J. S. Harris, Charles Hawkins, Ditus Day, M. Pearse, J. T. Grimes, and several others made good exhibits.

The largest exhibit of Minnesota grown apples, exclusive of Siberians, was made by J. S. Harris, and second largest, by Wm. Somerville.

Duchess and Wealthy apples were prominent in nearly every exhibit, showing conclusively that they are more widely grown than any other varieties and most certain of producing crops. The largest specimens were in Mr. Dartt's collection; the finest in Mr. Kramer's and Klein's, of Houston county.

H. J. Ludlow was on hand with a large display of his new seedling, the Okabena, which was originated in Nobles county, and is one of the most beautiful and best flavored seedling apples ever produced in this state. The Jewell Nursery Company took the display in charge and showed some of the trees in connection with it. Other Minnesota seedlings were shown by Mr. Kramer, Klein, Richardson, Ostman and two or three others, but nothing new besides the Okabena and Klein's that gave promise of great value on account of superior quality.

The Jewell Nursery Company had charge of a display of seedlings that were originated and grown by J. S. B. Thompson, Grundy Centre, Iowa, comprising about seventy-five varieties that, for size, beauty of appearance and quality, surpassed, in our opinion, any like number of seedlings ever produced in the annals of American horticulture. It was the fruit of theory reduced to practice, and it does seem that if the same skill and perseverance were given to growing seedlings of the varieties of the far North, we should soon have upon our catalogues an ample list adapted to growing in Minnesota. We trust that it was an object lesson that will encourage thousands of our people to plant seeds of our best fruit with the sanguine expectation that some of them will produce trees and fruit adapted to this clime.

It is a matter of regret that we did not have with it the large and instructive display that could have been made by Peter M. Gideon as a finishing feature of the apple exhibit. Mr. Tuttle had an excellent exhibition of cranberries, showing their improvement under cultivation.

The exhibit of native plums was quite extensive, but nothing new was brought out that promised to be of any greater merit than the De Soto, and some other varieties heretofore exhibited. The season was not considered favorable for this fruit.

The display of grapes was as large and included as many varieties as have ever been shown in the state. The size of bunch and berry, and the compactness of the clusters have never been excelled. But unfortunately from several causes the season had proved unfavorable for their early maturity and generally they imperfectly colored up, unripe and sour. Only a few Moore's Early, Lady, Worden and Delawares were in an eatable condition. Perhaps it would have been better if no exhibit of this fruit had been made. The leading exhibitors were A. W. Latham, Excelsior; R. Knapheide, St. Paul; N. J. Stubbs, Long Lake; M. Pearse, Norwood; and G. R. Robinson, Minneapolis.

The display of strawberries, raspberries and currants in bottles by Wm. Lyons, C. L. Smith and others, was a pleasing and instructive feature of the fair. J. C. Kramer, of La Crescent, showed immense specimens and clusters of his new seedling, the Princess, a variety if not misrepresented destined to create a sensation if it does not revolutionize the business of growing this popular berry and place it within the reach of all classes.

In the floral department the competitors were not as many as at some preceding fairs, but the variety, quality and beauty of the plants as they were arrayed in profuse bloom, and with their fragrance greeted thousands who passed to take in their beauty, could not well be excelled in any land. The principal professional exhibitors were R. J. Mendenhall, Minneapolis; L. L. May & Co., St. Paul, and J. Vasatka, Minneapolis, in the professional department; and Miss Julia Lyons, amateur. Miss Lyons is a daughter of Wm. Lyons, a prominent small fruit grower and member of our Society. The plants and flowers were propagated and grown in a most skillful manner by herself as a recreation, showing knowledge and a refined taste. They reflect honor to the grower and were an object lesson of what may be accomplished by a busy woman when prompted by a love of the beautiful. The growing of flowers for market is as easy, pleasant and lucrative as almost any of the employments pursued by women who have to earn their own support. Why do not more of them engage in it?

Mr. Harris, from the committee on Fruit Blossoms, presented the following:

REPORT ON FRUIT BLOSSOMS.

By J. S. Harris, La Crescent.

Mr. President and Members of State Horticultural Society:

I have no doubt but that valuable results may follow from the careful record of the dates of fruit blossoms and the conditions of the weather, temperature, direction of winds, etc., for a term of years — and if the managers of the experimental stations designated by and under the direction of this Society were receiving any remuneration whatever I would recommend that it be made one of the duties of such managers to keep a careful record of the dates of the blooming of the various fruit trees and plants in their various localities and note the causes that tended to full crops, to partial or total failures. To facilitate this work and insure accuracy it might be expedient to furnish the reporters with blanks and printed forms.

I have during the season borne in mind that I was a member of this committee, and have made some notes and records which I respectfully submit to you, commencing with April 15th. This day for the first time I observe a few fully expanded blossoms upon wild strawberry plants. No frost this morning.

May 19th. The color is showing on the blossom buds of the June or Shadberry.

May 21st. Blossoms have opened out on the Juneberry; color is showing on the buds of Morella cherry and Cheney plum. Weather warm and rather pleasant.

May 22d. This morning blossoms on Morella cherry and Cheney plum commence to open and at evening they are in full bloom. The Rollington, Le Duc's Favorite and some other varieties are beginning to show some color. The day has been clear and very warm for the season.

May 23d. The Rollingstone, Le Duc and other native plums are beginning to expand their flowers and the Cheney are a perfect bank of bloom. The flowers of this variety are larger and differ from any other variety that has come to my notice; the stamens are apparently well supplied with pollen. Weather warm and showery.

May 24th. De Soto plums are opening their bloom a little this afternoon; an occasional blossom is beginning to open upon the Transcendent, Gen. Grant and a few others of the Siberian hybrid. Cloudy and quite warm.

May 25th. All plums are in full bloom and promising for a full crop of fruit. Duchess, Tetofsky and Whitney No. 20 crab are showing some bloom. Cloudy most of the day.

May 26th. Open bloom is fast increasing upon Duchess, Tetofsky and the Siberians, and bloom is showing a little upon the Wealthy and some New Russians, and have commenced to fade upon the Cheney plum. Up to this time have not noticed any bees and but very few insects working upon the bloom. Forenoon clear. Afternoon cloudy, with light rain.

May 27th. The bloom is falling off the Cheney plum and some flowers are open upon the Haas and other varieties of apples. Has rained steadily until noon since day before yesterday.

May 28th. The Duchess and Tetofsky and Siberian apples are about in the fullest bloom and the petals are fast falling from all plums. The ground is white with them.

May 29th. McMahan White apples and choke cherries are coming into bloom. Weather fair, but colder.

May 30th. The bloom of the apple trees is now at its fullest and petals from the earliest flowers are beginning to fall. Have rain in the forenoon and the thermometer indicates freezing.

June 2d. Frost this morning and colder. Apple bloom is holding on well.

June 4th. Warm and fair. The bloom has pretty much fallen from the fruit trees. There are some bees and multitudes of small flies and other insects swarming about the remaining flowers.

June 8th. Very warm, mostly clear day. The Windom dewberries are showing some bloom. Examination shows that the plum crop will be pretty much a failure. The fertilization has apparently been imperfect and the fruit that has set does not have a healthy appearance.

June 11th. Snyder blackberries are showing some bloom, also blackcap raspberries.

Plums are presenting a singular appearance. Some varieties have the appearance of being loaded with fruit nearly full grown; an examination shows them to be like green puff balls. Cheney, Le Duc, and Rollingstone appear to be the worst affected; some of the poorest wild varieties and latest bloomers the least. What is the cause of it? Some say the frost of June 2d.

June 13th. Blackberries are in full bloom.

June 15th. Wild grapes are in bloom. Some wild strawberries are ripe. Warm, growing weather.

June 19th. Concord grapes are just commencing to bloom. Pick first ripe strawberries.

June 20th. Some flowers are open on the Delaware grapes, other varieties are coming on rapidly. Weather continues warm and the ground is wet so that vegetation is pushing rapidly.

July 20th. Blackcap raspberries are getting ripe.

August 27th. Worden and Moore's early grapes are commencing to color.

August 29th. Concord and Delaware grapes are beginning to color a little upon some hills.

September 10th. The Moore's early and Worden grapes are so nearly ripe that a portion of them could be gathered for market. The first ripening of the Concord and Delaware will be but two or three days later, but the weight of the crop is so far from ripe that we have but little hopes of saving it.

September 15th. Sent first picking of Worden grapes to market.

September 19th. Commence marketing Concord and Delaware grapes.

In comparing the season of blooming with 1887, I find that in 1888 the time in blooming of Juneberry, plums and cherries will average about 20 days later, Transcendent crab, Duchess, Tetofsky, and Wealthy apples from 19 to 21 days later, blackberries and blackcap raspberries 27 days later, and Concord grapes 25 days later. I have no statistics to show the difference in the period but think that it did not vary much from the difference in time of blooming.

RESULTS.

Fruit of the plums and Siberian crabs did not appear to set as well as usual; berries of all kinds, grapes, Duchess, Wealthy, and Tetofsky apples better than usual. On low, undrained grounds the apples dropped badly during the latter part of June, but on elevated and dry grounds there was generally a good crop of the Duchess, Wealthy, and Tetofsky apples. Siberians and McMahan White were a light crop. Strawberries, raspberries, and blackberries were a good crop. Grapes were an immense crop, but in most instances failed to fully ripen. But very few plums came to maturity. The De Soto did the best. The season was noted for its cold and backward spring, excessive wet summer and dry fall. All fruits retained their bloom considerable longer than last year.

Mr. Allyn. There is a good deal of work we are hurrying over. A part of you know where I belong; that is in the cabbage patch. This vegetable department is a mommoth concern; it covers every thing. We are taking up a great deal of time with fruits and flowers, shade trees and shrubbery. That is very well but some of us that came to Minnesota to make it our home and have had to contend with the elements and insects of all descriptions, would like to be heard as to what we are doing. These are important subjects to be considered by gardeners if not by those interested in fruit growing.

President Elliot said Mr. Allyn would be afforded a chance to talk upon the vegetable topics in due time, but it was necessary to follow the program as closely as possible.

On motion of Col. Stevens the meeting adjourned till two o'clock P. M.

MINNESOTA
STATE AMBER CANE ASSOCIATION.

TWELFTH ANNUAL SESSION,

HELD AT MINNEAPOLIS, WEDNESDAY, JAN. 16, 1889.

The twelfth annual session of the Minnesota Amber Cane Association was held at Market Hall, Minneapolis, on Wednesday afternoon, Jan. 16, 1889.

The Association met at 2 o'clock P. M., and was called to order by the President, Capt. Russell Blakeley of St. Paul.

The minutes of the last annual meeting were read and approved.

Prof. Porter, the Secretary of the Association, stated that a full report of the proceedings, with the discussions and papers read, would be found in the last annual report of the Horticultural Society.

The report of the Treasurer was read, showing a balance of funds on hand of fifty-seven dollars and fifty cents.

Mr. Seth H. Kenney was called upon for some remarks. He said:

REMARKS OF MR. KENNEY.

Mr. President, and Gentlemen:

I can think back to the time when there was so much interest taken in the Amber Cane industry that this room would hardly hold the persons that were present and wanted to know about it. I have worked along in Minnesota for thirty years, and I think

I can now say it has passed the experimental stage. From what I can see and what others can taste, it may be considered an industry that is well defined, and the machinery for making it is a perfect success. Two hundred gallons of syrup, worth at wholesale forty-five cents a gallon, is not an uncommon thing with men that have the latest and most improved machinery. You all know that the product of the cane grown here in Minnesota is something you never need to be afraid of. The stocks of syrups kept on hand by our dealers have been glucosed to death, if I may say so. They are pronounced by the state board of health as unhealthy, and although beautiful in appearance, are unfit to use on our tables.

I am looking for and expect to see a great revival in the Amber Cane industry. It has been tried for a good many years; people have worked along with no experience and without anyone to guide them; the business has had to be worked up, and I have brought up samples from year to year, and have worked at it right along for thirty years, and I have more confidence to-day in the industry than I ever had before, especially for Minnesota. I find after inquiries among cane growers from various sections of the country, that a man can make syrup here and give away one-half of it for making, and still have twenty more gallons to the acre than they can in states further south. Eighty gallons to the acre as a rule is an average yield for Mississippi, Louisiana, North and South Carolina and Arkansas. I saw representative men from those states at New Orleans, and they gave as an estimate eighty gallons to the acre as an average yield; while we frequently get two hundred. I got last year from two acres and a half of ground, five hundred gallons of syrup that weighed eleven and three-quarter pounds to the gallon.

I consider Porter's steam evaporator ahead of any vacuum pan that costs thousands of dollars. This reduces the juice by means of steam. A great many people are using steam from the boilers of their threshing machines to boil their syrups. Porter and Densmore make machines of all sizes, and are well able to fit out us farmers. They also have the tools for clarifying and making the syrup.

I don't know what you think, but I think it is a perfect shame that the states below us should send up their grain in the shape they do, in syrups mixed with acids and unhealthy things, when we can raise two hundred gallons of beautiful syrup to the acre. In the farmer's occupation there seems to be so much

competition that everything seems to be overdone but the Amber cane, and there is a field for supplying this whole Northwest. I will say that I am surprised that the farmers of Minnesota should neglect such an opportunity, and it is because they don't know what they can do. It is a simple matter, and the machinery is also so simplified for making that it isn't what it used to be on the Cook evaporator, that we couldn't take our eyes off hardly for a minute without burning its contents. Now with a steady steam pressure we can make a syrup of the best quality at the rate of a gallon of syrup a minute. I can boil ten gallons of juice a minute and produce a gallon of syrup that will weigh eleven and three-quarters pounds to the gallon.

I hope to see a revival of the sugar cane industry in Minnesota. I know there is money in it; I find and am more and more convinced there is nothing that pays as well. The fact that there is no opposition and not many in the business, shows that this is a field for young men that ought to be explored. There have been several young men at my works this year and some of them staid a day or two to take in the whole details of the business. A man going into this business of course ought to have some previous experience. Probably many of the men here that have some experience, if they knew a little more of the present system of working, would make a success of it.

I have brought up samples of my syrup, and if anyone wishes to examine it to know what can be made from Amber cane he can do so. It is pronounced by good judges to be almost equal to maple and the best syrup on the market.

Out of a crop of 7,000 gallons that I have made the past season it is nearly gone already, and I won't have nearly enough to supply my customers through the year.

As long as this state of things exists there is an unoccupied field that should have the attention of the young men of Minnesota. I know that the business is a perfect success, and if there is one that doubts it let him come to my place when the machinery can be operated, and it won't take but an hour to convince him that there is a field here in Minnesota that is unoccupied.

I have been asking Prof. Porter to take hold of this question and have its principles taught at the state experiment station. I think it is something the state should attend to. My idea has been that if the legislature should give us a bounty of five cents on a gallon for a marketable article of syrup, when they are bringing in the glucose syrup by the thousands of barrels, that

costs twenty-five cents, my idea is that the state could pay this five cents to those who would engage in the manufacture and save the twenty cents that is now sent out of the state to the glucose companies. In a year the state would save that money. It is sent out for syrups that are injurious to health and it would be a little bit of inducement to farmers to take hold of this new industry.

Now, we have the Early Amber sugar cane that seems to be adapted to this climate. We plant about the time we plant corn. We plant the same distance as corn and plow both ways, and attend it very much the same, and if the ground is well worked, it is a very easy matter to take care of it. If the ground is full of pigeon grass the cane looks so much like the pigeon grass it is necessary to take a garden rake and rake over the hill. I think the best way is to cultivate well and keep the pigeon grass out of the land. On most any soil in Minnesota the Amber cane flourishes beautifully.

I can say one thing, that I shouldn't have stuck to it for thirty years if I hadn't made it pay. I have built up a business that has cost money, but it would cost one-half less with men that understand making the machinery. It can be had of Messrs. Densmore Bros., of Red Wing. I say this although I have no interest in the machinery except for the farmers. I repeat that here is an unoccupied field in this great State of Minnesota for farmers that would return them thousands and thousands of dollars, that might be kept here at home instead of being sent away to purchase goods that are inferior and unpalatable.

President Blakeley then addressed the Association and said:

ADDRESS OF PRESIDENT BLAKELEY.

The Amber Cane industry is virtually on trial whether to exist or die in the future. as an industry among us. I have now, as I have always, had undoubted confidence in its success of this eventually, but it requires that men should have that undoubted confidence in it that they will be willing to put their hands to it and make it go: The industry may be said to have gone through a great many different kinds of experience since it was first commenced; and the most critical, too, in almost every locality,

simply because people had to learn everything of value to them in regard to the subject. The peculiarities of handling, how it is grown, the proper time and methods for cultivation, are all matters of experience; they are to be learned by men who follow this industry. The details can not be told you by any writer; it must be tried by the chemist until he knows just how it ought to be worked.

As to how the product of the cane should be worked is still a serious question, and is one that the government has expended a great deal of money upon and is still experimenting with; and we are gratified to know that they are making, under the circumstances, very good success. As one of the original parties in the matter I should have been delighted if our friend Prof. Collier had always been the chemist of the agricultural department of the United States. He was one of the men who believed in this industry and always had his heart and soul in it. Unfortunately we got a commissioner, after our friend Prof. Wm. Le Duc, of Hastings, went out of the office, who did not believe in sorghum and who was determined that there should not be anything done in regard to it while he was in the department. And yet the appropriation was made and the industry was maintained in spite of all he could do.

Under the administration of our present worthy commissioner, the Hon. N. J. Colman, we have had a man who has had the sugar cane industry at heart. A good deal of money has been expended, largely at Ft. Scott, Kas., where a very successful work has been done in making sugar, and syrup as well.

At Rio Grande, my favorite station in the United States, this industry has been continued; but the large plant, which cost two hundred odd thousand dollars, was finally condemned as a working plant and was sold to go to Florida; and my friend Mr. Hughes, the chemist of that institution and its sugar expert, has devised a style of machinery under the aid and supervision of the experimental station of New Jersey, Prof. Cook in charge; and the report was made in March, 1888.

We are always unfortunate in our knowledge as to what is being done in this industry by our neighbors and we hold our meeting a little before their reports are printed. But I hope before we have our report printed we will have information from them giving assurance of success, and I may be able to give some of the results of this season's work when our report is printed.

I wish to say to the members of the convention that I may

desire to avail myself of the information that I may obtain from Mr. Hughes, or Prof. Cook. I understand it cost about \$12,000 to put up the machinery necessary to work the diffusion process. I would say the machinery for diffusion and evaporation were improperly proportioned, and they were hindered in that respect from making a very large amount of sugars. They had obtained the information necessary to make this process a success, if they can get four cents per pound for sugar, twenty cents for syrup, and forty cents a bushel for cane seed. They depend largely there on cane seed; they know what it is worth, and what it is for. They have a market for all they can grow; they have sold thousands of bushels. I hold in my hand a little illustration, if any of the friends want to see what is the process adopted by Mr. Hughes.

ADULTERATION OF FOOD.

I now desire to allude to what is becoming fashionable in these days. I am gratified that I have lived long enough to see that people are taking a little care of what they eat. It only required that the most stupendous frauds should be practiced upon us to bring us finally to fairly face this subject of the adulteration of food. We are new in it but it is not a new thing. I have at home a large French work, that is of the sixth edition, in regard to the subject of the adulteration of food, drugs, drink and meat. And it gives the component parts of almost everything that is used. It is an authoritative work on this subject and is printed by authority of the French government. Everything has its accurate description that is condemned as forbidden.

Thank the Lord we have got into the conviction in this state that oleomargarine is not butter, and the legislature of our state has appointed a commissioner, who has during the past year done a very good work in trying to have good milk and good butter sold in the state for the consumption of our people.

I was at the meeting of the dairymen's association at Fari-bault a few weeks ago, and also at the meeting of the state agricultural society last week, and the statements there heard as to the products of the dairy in this state were perfectly marvelous. It is certainly an immense interest that is challenging this attention.

The law provides that any oleomargarine sold in the state shall be sold as such, and only on a license. To sell without

complying with the law subjects the article to confiscation, and the party to punishment for a penal offense, in the payment of heavy fines.

It also reaches the question of milk. Very many experiments are made to see whether it is good or bad. There are a good many prosecutions. They do not come to the notice of everyone, but they are still prosecuted with a good deal of earnestness. It has been proposed that the state shall establish a universal inspection bureau to examine all the foods that are sold in the state. I hope that purpose may be accomplished; there is certainly great opportunity for it. Such legislation has been had in other states some time ago in this direction.

The State of Michigan, in 1881, enacted a stringent law in regard to the adulteration of foods, from which I read the following:

SEC. 4. No person shall mix any glucose or grape sugar with syrup, honey or sugar intended for human food, or any oleomargarine, suine, beef fat, lard, or any other foreign substance, with any other butter or cheese intended for human food, or shall mix or mingle any glucose or grape sugar or oleomargarine with any article of food, without distinctly marking, stamping, or labeling the article, or the package containing the same, with the true and appropriate name of such article, and the percentage in which glucose or grape sugar, oleomargarine or suine, enter into its composition; nor shall any person sell, or offer for sale, or order, or permit to be sold, or offer for sale, any food into the composition of which glucose, or grape sugar, or oleomargarine, or suine has entered, without at the same time informing the buyer of the fact, and the proportion in which such glucose or grape sugar, oleomargarine or suine has entered into its composition.

SEC. 5. Any person convicted of violating any provision of any of the foregoing sections of this act shall be fined not more than fifty dollars or imprisoned in the county jail not exceeding three months.

SEC. 6. It is hereby made the duty of the prosecuting attorneys of this state to appear for the people and to attend to the prosecution of all complaints under this act in all the courts in their respective counties.

When we shall have accomplished the same thing in this state, Amber cane syrups will be a common article of commerce in this country, and will be as profitable as any other article being produced.

I have gone through the experience. I have made the best Amber cane or sugar cane syrup that was ever offered in any country, when engaged in this business. I had all the appliances for making the best refined syrup of the same character made years ago by the old sugar establishments; and when a sample of it was sent to Prof. Moore, the chemist of a large sugar refin-

ing establishment in New York, he said: "We don't make that kind of syrup now." Said he "that is the best I have ever seen; it is as good as ever was made by any of the old sugar houses."

In Amber cane there is a larger proportion of what is called grape sugar than there is in sugar cane; hence, we shall have a larger proportion of syrup. And it will be of very great importance to the country. The amount of glucose brought to this country at the present time is almost beyond computation. We hardly know or realize the immense demand. Really there is no pure syrup except what little my friend Kenney and these other makers of Amber cane syrup make at home.

To make glucose a large steam vat is used; it is partly filled with water and say 6,000 pounds of corn and about one hundred and fifty pounds of sulphuric and nitric acids, which is boiled with the corn and forms the starch, or glucose substance that is made. Glucose may be chrysalized and may be mixed with sugar. It is very white when chrysalized, but it is largely sold as syrup. It is used in a great many ways, largely however in fruits. The persons who have been engaged in selling this product as a food for years past have been devising all sorts of means to take out or to destroy the effects of the sulphuric and nitric acids; they are giving their attention to it. And that is commendable, of course, because a man that has a conscience ought to be able to do something if he is going to sell an article to be dealt out to the family; he ought to be able to convince himself that he has not sold them an adulterated substance for food. The law in Michigan provides that it shall be examined; that the purchaser shall know whether it is adulterated or not.

When we get a law of this kind, glucose will cost a good deal more than it does now. Amber cane will have an opportunity to seek its own place in the market when it shall be necessary to make glucose a perfectly pure article. With a careful chemical process there is no doubt it can be. But when you are running through a thousand bushels of corn, the concern that does the handling may be instructed to put in so much material to take up the sulphuric acid, or some other agent; possibly they do put it in and possibly they do not. If they do they may take up a larger proportion of the deleterious substance used in the process of manufacture; but if they don't you get it if you buy the syrups, and your children have the benefit of it during their natural life; for it is not to be supposed that sulphuric acid is fit for food.

There is a bill that has been introduced in Congress — I think it is on the table in the house — which proposes to organize a chemical department which shall have most thorough control of this matter, all through the country, in regard to the adulteration of foods. I hope we may succeed in having something of that kind done. When we do we may rest assured we shall not only make our own syrups, but grow abundantly and profitably, and they will be a healthful article of consumption.

There is no difficulty at all in making these cane syrups as free from adulteration as anything can possibly be made. There is no use in manufacturing Amber cane syrups deleterious to anyone, and it will come, surely enough, when it is necessary to use nothing which will have any other but a beneficial effect when manufactured.

PROCESS OF MANUFACTURE.

One word in regard to the Amber cane sugar and syrup manufacture. I may say I spent considerable money in endeavoring to make it a success. But I became convinced years ago that the process followed was not the right one; that the diffusion process was the proper one. I may be able to tell you more about it hereafter than I am able to do now. The work of the chemist is very nice, and there must be great care to make it a success and get the benefit of the work, and get the sugar that will crystalize. It needs to be handled properly.

Beets make a good syrup for use, but the syrup is not practically a syrup to be put upon the table. But I think we have beets in this country that can be used for making sugar, and in the future the industry may be established among us.

My confidence for the future of this industry is that it shall be a success; that it is to continue in this country a firmly established industry.

I don't know that there is anything that I could say in regard to the process to indicate to you the best method of manufacturing what would be worth your while to take your time now. But I want to reiterate the statement made by Mr. Hughes, who was the chemist in a refinery in the city of Philadelphia. They had a very nice plant; many of the men there have been engaged in the industry during their lives, and thoroughly understand it.

Amber cane in Minnesota is yet ahead of all the different kinds of cane that have been grown; it maintains its place, and

virtually it was originated, as we believe, with our friends Kenney and Miller, of this state. I may not live to see the cane syrups the universal consumption of the state, but I firmly believe that many of you will live to see it. And not only that you will have your syrups grown at home, but the glucose, if you choose to make it, from the Amber cane or the early orange cane made in the future.

I am very much obliged for your kind attention.

Prof. Porter then addressed the Association. He said:

REMARKS BY PROF. PORTER.

Mr. Chairman: As was remarked by Mr. Kenney, the father of the Amber cane industry in the Northwest, this industry has passed beyond the experimental stage. Seven years ago there was not a room in this city which could be secured, that was large enough to accommodate all the people and farmers of the state who were interested in this subject,—this Amber Cane industry. In 1864 I met with a convention of sorghum growers from all parts of the United States, at Washington, and the delegates present numbered about four hundred of as intelligent and enthusiastic set of men as I have ever seen brought together. And now why is it, when we call for memberships in this Association we have only three names handed in? Is it because this industry has been proved to be a failure? By no means; it has, I say, passed beyond the experimental stage.

Many years ago it was proved that this was one of the most profitable industries that the farmer could engage in, in American agriculture. That was found out long years ago. It was at that time only prosecuted for the sprup. The question of sugar making had not at that time assumed any prominence. But the sugar question has long since been solved.

I remember at the meeting held here seven years ago, at just about this time in the month, at a hall just across the street, that Mr. John F. Porter, of Red Wing, a gentleman who had never seen a single pound of sugar swung out in his life, was present; he had never made a pound of sugar at that time. He was a tanner by trade; that was his business. But he became interested in the Amber cane business. And after that in a single

season he made fifteen barrels of as handsome brown sugar as was ever brought up for exhibition, or as you ever saw. And a barrel of that sugar was sent to Gen. Grant with the compliments of the Minnesota Amber Cane Association.

It has been proved to be a success so far as the manufacture of sugar is concerned. The process by which this result is accomplished, and the methods to be carried out by which it may be secured, are within the reach of any farmer's boy in Minnesota.

There is a demand for this product. We are sending out of our country every year a hundred millions of gold dollars to other portions of the world to bring back the sweets that ought to be manufactured here at home—paying this heavy tax to support others, when we have a soil just as suitable for the production of cane and sugar, and not only in the cane but in the sugar beet, as any portion of the globe. And why is it that this industry is languishing?

Permit me to call your attention to two things. In the first place there is the cheap labor of Europe employed in the beet fields there. That is one cause.

Another cause which is one of the principal hindrances to the manufacture of sugars and syrups here is the manufacture of glucose and its use for the adulteration of all the sweets we have in this country, which has reduced the price at which the syrup can be sold and the cost of the manufacture of it to such an extent that we can not compete with the glucose factories.

We know just exactly what we can do with Amber cane in Minnesota, and when we have overcome these two things it will be then a profitable industry in many portions of this country.

The Sterling Works at Ft. Scott, Kansas, this year have made 500,000 pounds of sugar from the cane. They have made about 1,000,000 gallons of syrup. They have done this at a profit of about \$7.50 an acre, but out of that should come about \$2 which the state pays as a bounty, leaving a net profit to the grower, not counting the seed, of about \$5 an acre.

Now, the industry itself is well established, but there are certain guards we have to throw around it. And the first is to prevent the adulteration of this article. Why, gentlemen, you have no conception of the amount of adulteration that is carried on in food products. From the hat you wear on your head to the shoes on your feet this practice is carried on. Your shoes are soled with paper and your hat is covered with shoddy and your clothing is filled with it. And the moment you come to

anything you eat you find there is scarcely anything that is pure but salt; and I don't know but they will attempt to adulterate that with sand pretty soon. (Laughter.) You can scarcely buy a single ounce of unadulterated spices, or anything else you eat today. A few years ago I went into one of the largest spice factories in the country and was permitted to go through the establishment and see the process followed there of making spices. I happened to be in the rear where I saw perhaps a car load of cocoanut shells. And I asked the proprietor "what under heavens are you going to do with cocoanut shells?" "There are the shells and there are the spices, and of course the machinery unites the two!"

I won't take up your time with this question of the adulteration of foods by any extended remarks. I take it for granted that the State Amber Cane Association and the State Dairymen's Association have no interest to subserve except to stand up as beacon lights to protect the interests of the body politic. We of course meet together for the purpose of receiving mutual benefit; and we also meet for the purpose of giving the public the benefit of the facts and experiences; that is, we meet for a mutual interchange of views and sentiments.

Aside from any private interest that we would subserve or any individual benefit that we would desire to receive, growing out of these associations we have a duty to perform; and in the discharge of that duty we are to have in view our obligations to the state. I say, gentlemen, there is nothing more important for this society to do, than for its members to put themselves upon record and most vigorously upon record, in favor of the establishment of a commission in our state, looking to the prevention of food adulteration of every nature and form, and by every means that can be employed to protect the interests of the body politic. A resolution in favor of this project if carried to St. Paul and laid before the legislature with the public sentiment there is in favor of it, would have a marked effect, and in time we may hope to get suitable legislation upon this subject.

Now, when that is done the Amber cane industry as one of many others will receive the benefit, and why? Because we have this product from our own soil and its profits are returned to our own people; then, instead of coming in competition with poisonous material, when those articles are branded and put upon the market upon their own merits, our products will not have to fight for a market. Instead of forty cents a gallon the

market price would be up to the value of about seventy cents, the price of the best New Orleans. It would drive out these cheap and adulterated articles.

About ninety-nine out of every hundred will take a cheaper article because it is a little cheaper without regard to the quality. They don't know what they are getting, whether the best New Orleans honey drips, or whether it is more than half glucose. They are after molasses and anything that is sweet answers the purpose. When the dealer can sell a syrup at 25 to 30 cents and make a larger profit than on Amber cane syrup at 45 cents, he is going to keep the lower priced article. But the moment you put the brand of "poison" on the glucose just that moment Mrs. Jones and Mrs. Brown says she is not going to buy that even if it is a little cheaper. She takes the adulterated article now and don't know the difference.

I say it is to the advantage of this Amber Cane Association to strike the note of warning so as to protect as far as possible the innocent consumer.

Now while I am on the floor I may take a few moments to speak about some phases of the Amber cane industry in the state and I refer to the experimental department now. It becomes necessary to develop new varieties. We had no sugar made from the varieties of sorghum cane first introduced in this country; a few years ago Mr. Kenney and Mr. Miller discovered a variety of cane that matured much earlier and decidedly sweeter than was the common sorghum. And from that accidental discovery came the Amber cane. And if they could find a single head in a field that was of such great value, why may we not be able to originate other varieties still sweeter and earlier than Amber cane? There are some drawbacks to the cultivation of this cane. The first is the uncertainty of the seasons here. But there is no more uncertainty in the cultivation of Amber cane, than in that of corn, or potatoes. It is no more liable to suffer from this drawback than any other industry we have.

Now, it becomes necessary for our experiment stations to solve this problem of hybridization, and this last year we have been testing a number of new varieties; forty-two have been under cultivation. We were unfortunate in having a late spring and early frosts; we could not get the seed in very early, so we could not get the best results from early planting, but among the forty-two varieties we found one as much earlier than the Early Am-

ber as it is earlier than the old Chinese Sorgho, and very rich in saccharine matter. We propose to carry on these investigations until we can develop varieties adapted to all localities in the state.

I tell you, gentlemen, we have accomplished more here in the past thirty-five years in this industry in this country than was accomplished in a hundred years in Europe in the development of the sugar beet, and in a few years more no doubt most of these causes of discouragement will be swept away. In a few years, instead of importing one hundred millions of dollars worth of sweets to supply the people of this country, we will be exporting it by the hundreds of millions of dollars worth to the people of other countries.

Mr. Ridout. I would inquire as to the cost of making syrup?

Mr. Kenney. I work the farmers' cane separate and they pay in a share of the syrup. There is one thing I would like to speak of. I do not strip my cane any more. I wait till the leaves are partly wilted and I run the cane through with the leaves and without extracting the bitter taste. I save the labor of stripping. The cane is cut up and allowed to stand till the leaves show a shrunken appearance. Then they can be run through the mill, and we use one-fourth less lime in clarifying than if we work it up with the leaves stripped. It seems to draw out the impurities if left in the shock, and we make the syrup with less lime and consequently of a lighter color. I think that is the finest kind of syrup I can make that is made when the leaves are well wilted.

This industry I consider is away past the experimental stage. It can be made very profitable, and when you can make a good article of syrup there is a market for it. I would like to see many others take hold of this industry and carry it along. I don't intend to leave it myself.

Capt. Blakeley. Mr. Hughes gives an illustration of the machinery used in the establishment I have referred to. He uses the diffusion process. He had thirty-three acres of cane to work through the mill. He found he could not work up the cane successfully with the machinery he had. In that process the cane is cut into two-inch pieces and passed through a series of fans and the leaves are all blown away. In this way he gets rid of leaves and shives which carry a good deal of gum and extraneous substance, troublesome in manufacture. His diffusion battery cost \$3,000, and the process he has employed works very satisfactory and complete.

Mr. Hughes states that he has succeeded by this process, which is largely his own invention, in extracting ninety per cent of the sucrose in the cane. He has not reached perfection yet, but hopes to get everything to work satisfactorily this year.

Prof. Porter. I would suggest, after a few bills are paid, that perhaps the best use we could make of the fifty dollars we have in the treasury of this Association would be to authorize someone to prepare a pamphlet setting forth the benefits of the Amber cane industry to the agriculturists of Minnesota, and scatter it broadcast through the state to see if an interest can not be aroused in this industry during the ensuing year. Can we make a better use of the funds that are lying idle in our treasury?

Col. Stevens. I don't understand that the Amber cane industry is confined to one or two growers in this state. My experience is, in traveling through the different parts of Minnesota, that in many neighborhoods, and in some communities, some portion of every farm they are raising patches of Amber cane, and many farmers are making their own syrups. They make enough for all saccharine purposes of the family; they do not buy New Orleans molasses any more. It seems to me the better way would be to make the attempt at least to have all the small farmers take some interest in this industry and to plant at least a half acre of cane for their own use, as many farmers are now doing in McLeod, Carver, Le Sueur, and many other counties of this state. It is attended with very little expense. It don't cost any more than to raise half an acre of corn, and \$75 will buy the little mill and pans to manufacture with. It don't require any \$12,000 or \$15,000 for the purpose. I think there must be 75,000 or 80,000 gallons of syrup manufactured in Minnesota every year. One year there was reported to be 127,000 gallons. I found on investigating this matter that I was mistaken in supposing the industry was confined to the operations of Mr. Kenney, Mr. Porter, and two or three others.

Capt. Blakeley. There has been a good deal of manufacturing done in the state in a small way, which amounts to considerable in the aggregate.

Sorghum manufacturing commenced with the use of the Cook evaporator and it is still in use by some of our people. As in times past there are those who are making syrup in a small way for themselves and their neighbors. It is being sold to some extent in the stores and small towns. But that is not exactly such an industry as the people of the state ought to have. There are

large sums of money to be made out of this industry, and this can be brought about easily when there is an opportunity afforded for the cane product to fight its own way. The reason why I have had to surrender my business was, because when I went into the market to sell twenty or thirty barrels, for instance, the merchant would say to me, "that is the nicest syrup I have ever seen, but I can't make as much money from selling that syrup as in selling glucose syrup." The difficulty was to compete with the cheap syrups. The adulterated syrups were in the market at lower figures than the pure article could be sold for, and those who did not know the difference bought the cheaper article.

Mr. Kenney. In Le Sueur county there are men that have produced 3,000 or 4,000 gallons, and have found a ready sale for it. In Rice county, and all through the southern portion of the state, the Amber cane product is made and largely used. Of course it is not made in as scientific a way as with the new machinery that is now being brought into use.

I think we ought to have a committee appointed to look after this adulteration of food, and to present our wishes to the state legislature, and see if we cannot have something accomplished. I would move that our executive committee be authorized to take such action in regard to the matter of adulteration of food products as may be deemed advisable.

The motion of Mr. Kenney was adopted.

Capt. Blakeley suggested that the matter of using the funds of the Association be left to the executive committee.

Prof. Porter. I understand a circular is being prepared by Densmore Bros., of Red Wing, in regard to the sugar cane industry, which will perhaps cover the ground.

We had the promise of some remarks on Apiary Culture from Mr. Urie.

Mr. Urie then came forward and addressed the Association.

APIARY CULTURE.

By Wm. Urie, Minneapolis.

Mr. President, Ladies and Gentlemen:

I feel inadequate to undertake the task of doing justice to so great a subject as that of apiary culture. It is a subject that to me seems of great importance. It is a subject that I have studied for over forty years. I see in this hall to-day another gentleman that has also made it a study for some forty years, and in making a few remarks here I feel that my time is limited. I could occupy one hour easily and not exhaust the subject. But I will endeavor to be brief and take as little of your valuable time as possible.

In the management of bees the first thing to be considered is a location. A great many men lay great stress, and perhaps too much, on location. What I mean by location is this: At the time you are first engaging in the business you should ascertain the varieties of flowers that secrete honey, and the time of the year when those flowers come into bloom. In order to get a crop of honey from those flowers you must have the bees at the proper time to gather the honey. The flowers only *secrete* honey while the bees *gather* it.

In order to get the right condition they have to be properly managed during the winter and spring. I claim there is as much in bringing them through the winter and spring—or more, in fact—than in all other management put together. It is of the greatest importance to have a large body of bees when the flow of honey comes on.

In this country, at least in some portions, and where I am located, the largest flow of honey usually comes from the white clover. The flowers commence blooming from the first to the middle of June. Some years it commences at the first and in others not until the middle. And yet you scarcely find any honey in the clover until in bloom about eight or ten days. It lasts generally until the tenth or fifteenth of July, making a comparatively short space of time in which the bees must collect their store of honey. But if your colony is in the right condition and has a large body of bees, there will be no trouble to get the honey, if they are rightly managed.

Therefore to get the bees, and to get them at the proper time, you must have them properly wintered and brought through the spring. On the wintering of bees a great many articles have been written, as well as upon the swarming of bees; and a great deal has been said upon the subject by experienced apiarists, and yet the subject is not thoroughly understood. A great many men meet with good success while others make failures.

I claim that if a swarm of bees is housed in the fall of the year in good condition, with plenty of good, ripe honey, well sealed over, in a proper place, the swarm is almost as certain to winter as a horse or a cow. But how many swarms of bees are put into winter quarters in this condition? A great many men don't know really when they are in this condition. At times the honey is poor—is not of the proper thickness. If that is the case, the air or breath of the bees that arises from them passes up the sides of the hive and sours the honey. You will frequently find the honey soured in the hive. If that is the case you will usually find them in bad condition, and in the spring you will find what is called dysentery among the bees. And if they get this disease they are very sure to dwindle away rapidly in the spring. The consequence is you have lost the value of your bees.

As the queen is the mother of the whole colony, laying from 3,000 to 4,000 eggs in twenty-four hours, it is the imperative duty of the bee-keeper to place the surroundings of the hive so that the queen can lay those eggs and get the bees on hand when this flow of honey takes place. This is the point that every bee-keeper wants to learn.

It takes twenty-one days from the time the egg is laid until it becomes a bee. When first hatched it is not a full bee; it is a baby bee. The older bees take honey, partly digest it and feed these baby bees four or five times a day. About the fifth or sixth day they take their first flight. They return again to the hive and are then prepared to go to work as nurses or to build comb. It is the young bees that almost entirely build the comb and those that do the nursing.

Take an old swarm that is forty or forty-five days old and you get little comb from them. Place them in a hive and feed them sugar without comb and they will not build comb half as fast as do younger bees. Therefore, as it takes twenty-one days to raise your bees after the eggs are deposited, and five or six days more are required before the young bees are old enough to leave the hive, it will take in all about thirty-five days after you com-

mence operations before the swarm is prepared to gather honey. Therefore you want to commence as early as the first of May to get the bees in condition, to get the queen to lay to her full capacity, so the bees will be on hand and ready for this honey flow.

A good many men perhaps disagree with me on feeding, but I am a firm believer in stimulating the bees by the use of proper food. I can take a swarm of bees and if it is properly managed — bear in mind that it must be managed right — and I can set a queen that is only laying 300 or 400 eggs a day to laying from 3,000 to 4,000 eggs a day. I can tell the number of eggs that are deposited by counting the cells — so many to the square inch.

I see a good many bee-keepers here, and let me say to you, busy yourselves in that matter so that you can stimulate your queens at the proper time.

After this flow of honey is over, have the queen do as little laying as possible. Why? Because the bees raised at that time are useless, only honey consumers. Where Mr. Taylor is located, in Fillmore county, they have a flow of honey in the fall; we don't have it here. I have been here six years. The first fall we had no honey to amount to anything. There may be a better flow of honey in the fall in places, than in the summer, but the honey is of a darker color.

This past season there was very little pure white clover honey. There is a sample case on the table; I only had a few cases taken off. You may inquire what has colored the white clover honey this year; it is the golden rod; there is a large amount of pollen in it. The bees get it all over their bodies, and they leave it upon the comb, casting that yellow shade upon it. It does not hurt the quality of the honey, but it hurts it in looks.

In feeding in the spring of the year I differ a good deal from many other people. I have managed bees in such a way that I can feed promiscuously, and yet in my articles in the "*Farm, Stock and Home*" I advised new beginners not to do it. There is danger of setting the bees to fighting, and if they do it is hard to break them of the habit. As far as I am concerned I have no difficulty in keeping them from fighting. I put one or two pailfuls of feed where they can get it, and take it to their hives; but if you are to find no symptoms of fighting, it has to be done just right. When one gets a large apiary of bees to fighting it is hard work to break it up. My advice is to feed under the cap at night, although the best way is to let them gather it naturally.

If you can get a swarm that comes through properly in the spring, if a full swarm, it will have from 40,000 to 60,000 by the tenth of June and you will then have your colony all ready for a heavy season's work. But how many times do you find them in that condition? In many instances you will find them with their brood in only one or two sheets and bees in three or four, when the hive should be full.

This last year was one of the worst seasons I have ever seen for bees; it was so cold. The bees had to cluster together, and it was almost impossible to induce the queen to lay vigorously. But by the the twentieth of June I had my queens in very good condition — ten days later than it should have been.

I might here make a great many remarks upon this bee question; it is an important one. It is a question very little understood by the mass of people throughout the United States. Had you seen some of the letters received by me this last summer you would have been surprised at the ignorance of some people upon the subject of the honey bee. I am often surprised by the ignorance displayed in some of the questions asked me.

As I stated here last year, there is nothing that is like the honey bee. You may talk of your amber cane products; that is all very good. But, gentlemen, if the people would take hold of this bee question, and take hold of it intelligently, as they would any other kind of business and treat it properly, they needn't go to raising amber cane syrup; they can have plenty of sweets and of a quality that, in my estimation, is far better than all the amber cane in existence. And they can have it cheaper than they can produce amber cane syrup, every time. But the subject is yet comparatively new and there is little interest taken in it. The business is in its infancy, especially in some of the states. In some of the Eastern states they hold their bee conventions and there are many engaged in the business.

Here is Mr. Taylor who has prospered in the business, and others. There are some new beginners in the state that are taking an interest in it. I believe in twenty years from now where we have one ton of honey produced, there will be hundreds of tons and it will become a common article of food.

Most of us American people do not know how to use honey. When it can be had for ten and twelve cents a pound it is cheaper than butter, and it is a much healthier article as well as cheaper. I will say this and I can prove it, that you will not find an instance where a man has a family using honey freely, where

there has been a case of diphtheria or sore throat. There is no mistake about it but that it is a cure for diphtheria. Not that I am advocating the use of honey as a medicine. I have always raised it and sold it as food, and there is nothing better than honey. Excuse me for talking so long.

Mr. Ridout. I would like to ask this gentleman some questions. What time do you put your bees in the cellar and when do you take them out, and do you cover the hives with anything in the cellar; how do you manage them; at what temperature would you advise a cellar to be kept?

Mr. Urie. I have no cellar. I have a building of which you will find a description in the September number of "*Farm, Stock and Home*." If you will build one on the same plan I guarantee you will have a perfect place to winter bees. It is necessary to have a dry place with pure air and it should be above the ground. If wintered under ground, in damp cellars, the combs will become mouldy, the honey sour and thin, and the bees liable to disease, often causing the loss of the colony.

A building 12x24 and eight feet high is large enough for one hundred and twenty-five colonies, and for an ante-chamber in the front part. I choose a good dry place, near the centre of the the apiary, putting the building on a wall six inches above ground; sills 6x10 will answer; I leave a ventilator open on each side to keep the floors dry in summer; I close them in winter and bank the sides to keep out frost; use 2x2 for studs, using dry lumber, and board on outside with drop siding and on the inside with matched stuff; use a shingled roof; put in a window on each side and use double doors. I use ventilators to keep the temperature as near as possible from 45° to 50°. This winter it is too warm as it is ranging from 50° to 55°. I don't need a thermometer as I can tell the temperature by the action of the bees. When you go in and find the bees buzzing it is too warm; but with right temperature they will be perfectly quiet and in a dormant condition. If too hot or too cold they will roar, and if it gets too warm I leave the doors open at night.

Col. Stevens. How is it with the wild bees in the woods; do they have the proper amount of ventilation when found in trees?

Mr. Urie. When you find a bee tree in the woods you find rotten wood, and the perspiration passes into the rotten wood; in the hive we have nothing of the kind.

Mrs. Kennedy. Mr. President, I don't hardly agree with the gentleman in his statement that there is more money in keeping

bees than in growing sorghum. He speaks about going into bee raising "intelligently;" I know of a good many in our section of country that must have gone into the business intelligently, because they have had books and studied it up. They made a success of it for awhile, but there is some doubt and uncertainty about it, for in the spring now and then they will lose two-thirds of the bees.

Now, we have been in the sorghum business a number of years and we have never lost a crop, never! There has been no uncertainty about it, and this last year from one acre and a half of ground we raised four hundred and forty gallons of nice sorghum. I have a specimen of it here. This is home made, by using an open pan, with nothing to clarify it—except a skimmer. I think it a very nice specimen. It is not made by steam although we get up considerable *steam* in working it. (Laughter.)

Mr. Kenney. That is the finest crude syrup I ever put eyes on.

Prof. Porter. It was the woman in it!

Mrs. Kennedy. There has never been a failure since we began; and when we are making the sorghum customers come after it, and we can sell it at sixty cents a gallon; and when shipped to a distance it brings forty cents, and they pay for the barrel. Just the day I came down here we had an order from Big Stone county, from a large firm there, and they stated they would take all our crop. And it seems to me this is better than raising bees. Just as soon as we get nicely started something happens to take our bees off. Perhaps we are not "intelligent," but it doesn't take so much intelligence to make syrup, so I think we are just a little ahead. (Laughter.)

Mr. Gilpatrick. And you don't get stung either.

Mrs. Kennedy. Another thing I would like to say is this; one trouble with the people in our part of the country who engaged in the sorghum business was, so many went into it in the first place that we found that everybody was "raising cane." (Renewed laughter.) They didn't go at it in an intelligent sort of way, and they made stuff just as much worse than New Orleans black-strap as you could imagine, and of course everybody was disgusted. But we are now making a success of it, using our small pans; and if you will give us a little time we will prove to you that sorghum is a success in Minnesota. (Applause.)

Mr. Ridout. The outfit used by this lady only cost about two hundred and fifty dollars.

Mrs. Kennedy. We make from eighty-five to a hundred gallons a day. We don't run it in the evening. By getting up early we can make a hundred gallons in a day, easily.

Mr. Wilcox. It is perhaps a proper time to make a comparison. I would like to call upon Mr. Danforth to tell us the results of "cultivating" and caring for his bees.

Mrs. Kennedy. I would like to make one further remark. I heard a gentleman say that he didn't think Amber cane and horticulture would run very smooth together. But I want to tell you that a mulching made from the cane is the nicest mulch in the world, and I think it just fits in nicely. (Laughter.)

Mr. Kenney. I remember that I set out some Wealthy apple trees and mulched them thoroughly with the Amber cane and I got a bushel of apples from some of those trees, without any further attention.

Col. Stevens. Do you mean by using the begasse as a mulching?

Mr. Kenney. Yes; when I set out the young trees. The begasse from the Amber cane was put around the trees to mulch the ground. I guess the trees bore themselves to death for I haven't had any apples since. (Laughter.)

REMARKS OF MR. DANFORTH.

Mr. Danforth. I am sorry to be called upon to speak upon the bee question because I am an amateur. I am not entirely in the bee business; I am in the civil engineering; for since I came to Minnesota I see so many chances for people to make money that I like to dabble in everything. I have too many other things perhaps. I spoke here last year but I haven't been at home but six days to call it being at home since. I depend upon my wife to take care of the bees and some Swede help.

Last spring we took out 35 or 36 colonies of bees. I said if anybody wanted them at \$6 a swarm they should have them as I wanted to reduce my stock to 15 or 20 swarms. We sold some and put the rest to work.

To make a long story short I will give you some of the results; that is what everybody wants to know. I have tried a little sorghum. We have tried to raise a few raspberries; we have some dewberries too. But they are not very profitable any of them except these thirty-six colonies of bees. I have different hives; I have the Simplicity, the Langstroth, and a good many

other kinds. I have some eight kinds of hives, but have settled down to the Langstroth.

I winter my bees in the same manner as Mr. Urie. I raise the hives and allow a space for the bees to drop down and have never lost a swarm where I followed that plan. I make a frame an inch and a half to two inches high and set the hive upon that. I give good ventilation.

The result of the summer's work is this; we have averaged ninety pounds of honey to the hive. Some of it is very nice. My experience in bee culture has extended over about twelve years. The lady over there speaks of bad results; that is we sometimes lose our bees. Whenever I lose a swarm I think it is my own fault, through negligence or ignorance. During the past two years when so many complained of losses I did not lose a colony. But I calculate to know their exact condition. In this way I make my bees pay me from eight to twelve dollars a colony. I calculate anyone can make two hundred per cent upon their investment; that is my idea of the bee story. But I am not a bee man as my business is mainly in something else.

One needs to study and learn the habits of bees in order to succeed. People may get a dozen or twenty colonies and then become discouraged because they don't understand how to take care of them.

We ought to have a bee-keepers association, so the bee men could meet together and have a sort of experience meeting and relate their successes and failures. We need something of the kind to keep up our courage. My father was a pretty good bee-keeper and I recollect a good many things I learned when I was ten to fifteen years of age.

Mr. Taylor said he would favor the organization of a bee-keepers association. There were a good many bee men present, and they ought to organize such a society before the delegates returned to their homes.

Mr. Wilcox. Mr. President, I wish to say that Minnesota is very favorably situated for the production of honey. In the month of September last, in many localities, especially along the river bottoms, the flow of honey was remarkably good, while the product from the white clover was the lowest in importance. At my apiary, at Hastings, my bees make more honey during that month than in any other, and it is of great value. From my back door I can see hundreds of acres of wild flowers at that season of the year. Here is where they get their great flow of

honey. They won't look at the best sorghum that may be placed in their way. As to results I would say that my apiary has averaged about one hundred pounds to the swarm, besides doubling the number of colonies, the past season. I never allow the bees to swarm naturally. I try to treat them intelligently, and that is the result of the season's work. This is largely extracted honey. During eight days in September I extracted twenty-five pounds to the hive on an average. I took some comb honey, but I run mostly to the extracted article.

Mr. J. G. Bass, of Hamline, was called out on the question under consideration.

REMARKS OF MR. BASS.

Mr. Bass. I have been in the habit of keeping bees since the spring of 1855. I commenced with one swarm, and I have continued in the bee business ever since. I find it about as profitable a branch of industry as I have ever struck. I have tried the sugar cane industry and don't succeed very well. I find it takes more help to produce the amber cane syrup than it does to produce pure honey. A great many seasons I have made a large amount of honey.

In my former location in Scott county, where there was a large amount of basswood timber, our largest flow of honey came from the blows of basswood trees. Our finest goods came from that source although the white clover is very good. Since I have moved to Ramsey county we have nothing but the clover for the bees. Therefore the honey season is short.

Many years I have sold hundreds and hundreds of dollars worth of honey with but very little effort. I have never, with one exception, swarmed artificially. I tried it one year and didn't succeed well and I prefer to let them take their own course, watch and hive them. It commonly takes two or three weeks, most of the time during the swarming season, when of course you have to be at home to attend to them; even on Sundays. If you go to church you are liable to lose two or three swarms.

I recollect one year there was something of an excitement going on at Minnetonka and the rest of my folks went out there on the Fourth of July. I said I would stay at home and take care of the bees; I did so and when they came back I had five nice swarms; and I thought I was very well paid.

I will say this, that it is not every man that will succeed in

keeping bees. There might be a dozen in the room who have had some experience with bees. One man will get along all right while another may fail entirely. The trouble is that many undertake the business without paying attention to it or being schooled in it; we have to learn all these things before we know them. You cannot tell the movements of the honey bee unless you observe them, and know how to manage them under different circumstances. Those who do understand their habits and who care for them properly will succeed. I think it is the easiest money that is ever made which comes from the little bee.

The Association then proceeded to the annual election of officers for the ensuing year.

ELECTION OF OFFICERS.

On motion of Mr. Kenney, the present list of officers was elected, viz.:

President—Russell Blakeley, St. Paul.

Vice President—Ditus Day, Farmington.

Secretary and Treasurer—Prof. Edward D. Porter, State Experiment Farm, St. Anthony Park.

Executive Committee—Russell Blakeley, Ditus Day, Prof. E. D. Porter, Seth H. Kenney, J. F. Porter.

On motion the Association then adjourned.

AFTERNOON SESSION.

WEDNESDAY, JAN. 16, 1889.

President Elliot, upon the adjournment of the Amber Cane Association, stated there was time for a short session of the Society. They would now be favored with some remarks from Prof. Ragan, of Indiana, who had something of interest for the class of young students present, from the new farm school. He therefore took much pleasure in introducing Prof. Ragan, secretary of the American Horticultural Society.

Prof. Ragan then came forward and addressed the Society.

HORTICULTURE FOR BEGINNERS.

By Prof. W. H. Ragan, Greencastle, Ind.

Mr. President, Ladies and Gentlemen:

During the few hours that I have so pleasantly and profitably spent with you, yesterday and today, I have heard from a number of gentlemen and ladies upon their experience in the culture of various crops, all of which has been interesting; but I now propose to give you, somewhat briefly, a little of my experience in the culture of a crop of young horticulturists that for a time were submitted to my care. This is really a most important crop, and the most important, Mr. President, by all odds that we can consistently embrace under the very general term of horticulture.

Some years ago the leading literary university of our state, prompted by a very liberal bequest it had just received, added several new departments to its already numerous schools and colleges. Among these was a school of horticulture. Your humble servant was called to the head of this new department. With no experience as a class room instructor, and, indeed, without preliminary education fitting me for such a position, and in a school where no industrial arts had yet been taught, I frankly confess that I was put to my wit's ends to devise "ways and means" for overcoming the dilemma in which I was placed. I must proceed without text books or curriculum, and by assuming that the student was somewhat familiar with the related sciences — botany, geology, chemistry, meteorology, zoology, etc., or that he was to receive such instruction from the proper teacher, I only proposed to give him practical hints which might enable him to apply his scientific knowledge to the every-day affairs of after life.

I will give you a hasty outline of the numerous topics presented in my lectures to the class, merely hinting at the various methods resorted to in order to hold the attention of the student and to enable him to make the application of the lesson, in case he should ever engage in horticulture either as an amateur or as a professional.

Horticulture is an art, not a science. It is a branch of agriculture and includes pomology, vegetable gardening, landscape gardening, floriculture, the propagation of trees and plants, or the nursery, forestry, etc.

The botanist studies the structure and habits of plants with a view to their classification and scientific arrangement. For this purpose he prefers the natural plant—the one which best represents its species and not the cultivated plant. In this particular he differs from the horticulturist, whose greatest delight is in causing nature to succumb to the influence of his arts.

The botanist pursues his highest scientific investigations through a study of Nature's production; perhaps the wild rose with its simple flower of five petals, and, as a scientist, fails to admire the gaudy queen of the garden, while the horticulturist finds his greatest delight in producing the widest deviations from nature's ways.

Our handsome flowers and luscious fruits are the products of the "art which does mend Nature." In the language of an intelligent horticulturist of a neighboring state, "Man plants and prunes, cultivates and grafts, and (may I say without irreverence) creates new fruits and flowers. A pippin is at least a manufactured article."

Varieties are the result of domestication. The apple of the forests of Europe, from which our numerous varieties have sprung, was scarcely an edible fruit; and had it remained uninterrupted in its natural forests unto this day it would have continued to reproduce its species (*pyrus malus*) with the same and almost definite character of its offspring as characterizes our maples and beeches of the wild woods.

But the liberal hand which has so bounteously blessed us with the luscious fruits and beautiful flowers of our gardens, wisely designed that we should learn, to some extent, through acquired skill and knowledge gained by experience and observation, an influence over these wild species, which should enable us to so modify and change their natures as to better please and satisfy us. So man sought a better fruit than he found wild about him when he transplanted the crab into his garden; and from repeated propagation and careful culture, husbanding with jealous care every advance, he has slowly but surely led the captive far away from its original type, until we, in the happy possession of our pippins and pearmains, have almost forgotten their lowly origin and the patient labors of those who have, through their intelligence, wrought these changes.

This we term an art—the art of horticulture. First we have a simple species; from this we develop the distinct variety.

If we plant a seed of an apple we expect, as a result, an apple

tree. It may be, as to quality of fruit and other desirable characteristics, a great improvement upon its immediate progenitors; yet it is an apple, nevertheless.

We call this a variety. Varieties of a marked character result, as shown above, from the ameliorating tendencies of what we call domestication.

If, therefore, we plant seeds, we multiply varieties of the species to which the seeds belong.

These new varieties do not all prove to be better in the desirable qualities than were the parents. Indeed, with all our arts and skill, it is only the rare exception that rewards our labors with satisfaction, while the "ninety and nine" may show decided tendencies to degeneracy, for nature is ever struggling against us.

It will be seen, therefore, how uncertain, even after securing a valuable variety, are we in its possession, as with the growth or decay of the original tree or plant would come the certain loss of our favorite variety. But here again art comes to the rescue; as with the slow but steady advance of knowledge and skill in the production of desirable varieties comes also our skill in their perpetuation and multiplication either by natural or artificial propagation, for while we can only propagate a species by planting the seeds, we propagate a variety by other and often purely artificial means.

There are classes of fruits and plants which we cultivate and admire that, when established in a distinct or desirable variety, are self-propagating. To this class belong the strawberry and raspberry: the one through its runners or off-shoots, the other by tips and suckers. These and many others propagate in this way, and rapidly, without artificial means, while the gooseberry and currant, and many other of our small fruits, shrubs, etc., are self-propagating, but, unaided by art, are less rapid in their multiplication. With some we practice layering as a means of extension; others we propagate by cuttings, and there are yet others with which we must resort to even more difficult and strictly artificial methods, such as budding and grafting, if we would enjoy a continuation of a desirable variety; and there are still others which require even greater skill and ingenuity, with appliances and fixtures rendering their propagation critical and expensive.

But Nature has placed bounds and limits, beyond which we cannot go. While we may materially change the habits of a

species in the production of varieties and in their subsequent extension by propagation, we must follow the line of affinities in the selection of stocks on which to propagate. No human skill will ever succeed in causing a peach tree to grow on an apple stock.

Nearly related species of a genus, as the pear, apple, quince, or hawthorn, or, as the peach, plum, apricot, and other stone fruits, can be used as stock—the one for the other—but far better results may always be expected from the pear on pear, apple on apple, peach on peach.

With the propagation of varieties comes the care and culture of the young and tender plants. This is the work of the nurseryman. His skill consists in the care, culture and training of the plant or tree to that age and strength of constitution fitting it for transplanting into the orchard, the garden, the forest or the pleasure ground.

After the propagation of one tree or plant, comes the most dangerous and critical period through which our favorite is destined to pass, the transplanting of it from the nursery to the permanent grounds. Great skill and an intelligent understanding of the wants and habits of the tree or plant are here required if we would obtain satisfactory results. But our cares do not end here. Much will depend upon our judgment and wisdom in the selection and preparation of our grounds, and in the after-care and attention bestowed both upon the soil and its occupants.

The related sciences, always valuable auxiliaries, will now be most potent aids, for a practical knowledge of geology and botany will aid us in laying a good foundation—the one in the selection of soils, the other in determining the species adapted. A study of meteorology and zoology will guide us in providing against the vicissitudes of our climate, and in warding off the attacks of insects and other animal pests. Some scientific as well as practical knowledge of vegetable physiology and the laws of plant growth, will enable us to prune and train intelligently. Pruning should be disciplinary or curative, disciplinary in guiding the young tree or plant in the way it should go; curative in removing dead, maimed or diseased parts. In either case, as with the skillful surgeon, the highest aim should be the shedding of the least possible blood. Quack horticulturists and quack surgeons often make serious work by the too free use of the knife.

In esthetic horticulture the reward of our labors is in the pleasurable enjoyment we feel in its results. Our pleasure is proportioned to the degree of culture we enjoy. We designate those who follow horticultural pursuits from this standpoint as amateurs.

Economic horticulture offers a more substantial reward in her golden fruits. While those who have a natural adaptability to the calling will usually succeed best, there are many who follow horticulture for the living they find therein. These we call professional horticulturists.

In either case, to best husband the result of our toils, we must know how and when to harvest our crops and what disposition to make of them afterwards in order to reach the highest fruition of our labors.

I have now briefly outlined the course of study which I have followed as a teacher of horticulture.

Each process, in the progress of the course, was illustrated as fully as it was possible to do by a practical application of the lessons taught; yet we have labored under the great difficulties, which might naturally be expected, in inaugurating a new department in an institution of the character of the one I had the honor of representing.

It is quite probable that but few of the students whom I have taught, will follow horticulture as a pursuit, yet I tried to impress them with the thought that, in the years to come, they may look back to the simple lessons they now receive with pleasure, if not with absolute profit; for, after all, we recognize and admire the person as fulfilling, to the highest degree, our ideas of a useful and well developed man or woman who has a practical knowledge of what we term every-day affairs.

The remarks of Prof. Ragan were greeted with applause.

Prof. Porter extended an invitation to the Society to visit the experimental station and the new school of agriculture on Friday morning, stating that teams would be in waiting at St. Anthony Park to convey the visitors to the farm.

The following paper was read by Mr. Gray:

ONIONS FROM SETS.

By J. S. Gray, Minneapolis.

The onion, ranking as it does next in importance to the potato as a market vegetable by reason of its value as a muscle producer, is destined in the future as in the past to be a staple article of food so long as men earn their living by honest toil. This fact, coupled with the records of this Society for several years showing the same persons to have received the award at your summer meeting on onions, induces us at this time to state to you in a few words the exact manner of the cultivation of set onions. We are not going to say to you just what quality of soil you must have, just what depth it must be, or any of a number of conditions that are often enumerated for the purpose of making a simple operation complex and scaring off timid cultivators.

Land should be manured in the fall at the rate of seventy-five tons of cow manure to the acre. Now the feed of the cows from which we obtain the manure is largely nitrogenous, being bran, shorts and ground cockle from the flour mills. In growing a crop requiring so much nitrogen as does the onion the manure from the cows fed as above stated has always given good results. We prefer to plow in the fall if convenient; if not, as soon as possible in the spring. In spreading the manure should be well broken up. We sometimes do this with a harrow and roller, going over several times if necessary, so that when plowed and harrowed the manure will be in fine particles and well mixed up with the soil, which, you will readily see, is in fine condition for furnishing plant food to the crop just as soon as rootlets are formed. The land being plowed, harrowed and planked down, we mark with a twelve inch marker and stick the sets three inches apart and down a little beneath the surface. After planting we tread the rows with our feet, heel to toe, right on top of the sets; the pressure firms the sets and breaks up any little clods of soil that otherwise might in a dry time cause a drying out at the roots. The planting being done, in a few days we take a steel rake and rake lightly over the whole patch, which can easily be done without disturbing any of the sets if the work thus far has been done as before advised. This raking makes an even, mellow surface and destroys all surface sprouting

weeds, which in onion culture is of the greatest importance. When the sets have become well rooted we apply a top-dressing of dry wood ashes or of wood ashes and bones, the ashes and bones having been previously packed in barrels and sufficiently moistened with water to reduce the bones to small particles as fine as if ground. The rains will leach the ashes and set loose such an amount of plant food from the manure that the crop will now be seen to grow exceedingly rapid. Wheel-hoeing and weeding will now be in order until such time as the crop is large enough to market. The pulling, cleaning, tying and marketing will cost five cents per dozen bunches, and we are satisfied that with every convenience for doing this work it can not be done for less. The sets will cost at \$5.50 per bushel, ten bushels per acre, \$55.

We have been asked a great many times as to what varieties to plant. The market gardener must raise such varieties as his market demands. The Minneapolis market demands a white onion, therefore we grow almost exclusively the White Portugal with a small quantity of Yellow Strasburg, to come in a few days earlier.

The sets which we prefer to all others are those grown on the Landreth Jersey farm. The soil there is poor and light manured, if we may call it manure, with Philadelphia coal ashes. The ashes, we presume, are used more for their chemical effect than as a manure. The Cincinnati sets we consider the next best. The sets grown here do fairly well but the Landreth sets invariably produce fewer seed stems and the finest bulb. By the seventeenth of July the crop is generally all marketed. If there should be any probability of not selling the whole crop in the green state we go between the rows with a cultivator and throw a little soil up into the bulbs. This is done as a protection from the hot sun, and if not done the bulbs would quite likely turn green and their market value be very much reduced.

The onion crop being now cleared off the ground is plowed and prepared for a second crop, which may consist of celery, celeriac, thyme, sage, winter radishes and white turnips. Sometimes we have raised an excellent crop of early horn carrots.

Mr. Terry. I find that sage is the most profitable crop of anything I have grown. I have no trouble in selling it at seventy-five cents a pound. That is for the pure leaf, with none of the stalk in it. I have had some experience with onion sets and with strawberries, but they don't compare with sage raising.

Attention was called to the letter of greeting from Mr. Bushnell, president of the State Agricultural Society. (See page 107).

On motion of Mr. Grimes the compliments of the Society were returned by a unanimous vote.

President Elliot said the relations existing between the two societies had been very harmonious in the past and he hoped would still remain so in the future. He hoped Mr. Bushnell would be able to be present before the close of the meeting.

Mr. Underwood, from the Committee on the President's Annual Address, presented the following report:

The Committee on President's Address recommend that President Elliot, Col. Stevens and Mr. Hillman be a committee to secure a room for holding our annual meetings and a place for our library. Also, that a committee of five be appointed by the president to revise premium list of divisions G, H and I for our next state fair, and to secure representation on the state agricultural board, and that the second, third and fourth recommendations of the President on this subject be included in the duties of that committee. Your committee would also recommend that this Society indorse the work done by our state farmers institute and recommend that the state legislature appropriate \$10,000 per annum for its maintenance. We would also urge that our representative in the board of directors should see that horticultural interests be fully and ably represented in the work.

Your committee would further recommend that the matter of local societies be referred to our executive committee.

In the matter of representative at the American Pomological Society in Ocala, Fla., we would recommend that if the finances of our Society will admit, that our President be instructed to attend or secure a substitute.

J. M. UNDERWOOD,

M. PEARSE,

J. S. HARRIS,

Committee.

The report of the committee was adopted.

Mr. Underwood, from the Committee on Revision of Fruit List, presented a report which with some slight changes was adopted as follows:

REVISED FRUIT LIST.

APPLES.

For general cultivation — Duchess, Hibernial, Autumn Streak.

RUSSIAN VARIETIES.

For trial — White Russet, Garden, Lieby, General Greig, Red Anis, Yellow Anis, Antonovka, Titovka.

SEEDLINGS.

For trial — Okabena, Peerless, Victor, Unknown, McMahon, Duchess No. 3.

HYBRIDS.

For general cultivation — Whitney, Beech's Sweet, Early Strawberry, Orange, Martha, Transcendent, Florence, Powers, Sweet Russet.

For trial — Dartt, Greenwood, Tonka, Euranda.

GRAPES.

Moore's Early, Concord, Delaware, Worden, Brighton, Wilder, Janesville.

For trial — Niagara, Woodruff Red, Early Victor, Bachus, Wyoming Red.

STRAWBERRIES.

For general cultivation — Crescent, Sharpless, Windsor Chief.

For trial — Jessie, Kramer's No. 2, Martha, Bubach, Jewell.

RASPBERRIES.

Blackcaps; for general planting — Ohio, Souhegan, Doolittle, Gregg.

Reds — Cuthbert, Turner, Brandywine, Marlboro, Shaffer.

Yellow, for trial — Caroline.

BLACKBERRIES.

Ancient Briton, Snyder, Stone's Hardy.

DEWBERRIES.

For Trial—Windom, Lucretia.

CURRANTS.

Red—Red Dutch, Victoria, Round Bunch Holland, Stewart.
White—White Grape.

GOOSEBERRIES.

Downing, Houghton Seedling.

NATIVE PLUMS.

De Soto, Weaver, Forest Garden, Rollingstone.
For Trial—Cheney, Rockford, Speer, Hawkeye.

Pending the adoption of the foregoing report, some discussion arose, and, on motion, each class of varieties was considered separately.

Mr. Wilcox moved to add Shaffer's Colossal to the list of raspberries.

Mr. Cutler said there were some objections to it on account of small berries, but those he had seen might not have been true to name.

Mr. Reeves thought Shaffer was of great value while Marlboro was worthless.

Mr. Harris said Marlboro had not been a paying berry with him.

Mr. Wilcox. Marlboro is one of these particular things which have never succeeded outside of the hands of its originator.

Mr. Stubbs. I have found Marlboro the most profitable berry I have ever raised. It has been very prolific. My neighbors had Shaffer and it was a good bearer but of poor color for market purposes.

Prof. Green. It is grown at the station and I know the history of Marlboro. While an excellent red raspberry it extends over too great a period in ripening its crop. It is nearly as early as Turner and continues until after the season of Cuthbert. Shaffer in New England, where I have known it, was diseased and the fruit did not keep well. It is worthy of trial. Marlboro is growing in favor in Ohio and should be recommended.

After the final adoption of the foregoing list, on motion, the meeting adjourned till seven o'clock P. M.

EVENING SESSION.

WEDNESDAY, JAN. 16, 1889.

The meeting was called to order by President Elliot.

President Elliot. We have with us a representative of the Dominion of Canada who has come a distance of several hundred miles to attend this meeting, and we should be glad to hear a few words from him. I take pleasure in introducing to you Mr. Thos. Frankland.

REMARKS OF MR. FRANKLAND.

Mr. President, Ladies and Gentlemen:

I cannot say that I feel very much of a stranger among you. Some thirty years ago, down in the state of Ohio, I was stopping at a hotel there and a gentleman addressed me with the words, "I perceive you are a foreigner." My perceptions were quick enough to see that I was. But I feel that my welcome here tonight by the Horticultural Society very plainly indicates that imaginary boundary lines can't separate sympathizing, kindred hearts.

Manitoba; I think you haven't done full justice to it in the reports. Perhaps you are not aware that you had Manitoba air. Some of the gentlemen, I notice, mention the "blasting effects of the cold north wind," which they have been kind enough to call the wind "from Manitoba." (Laughter.) Well, if you have] the benefit of the Manitoba breeze in winter, perhaps we have been quite as much annoyed in summer when we have had

one of those searching, scorching winds coming from the south and west, and when we have thought that some of your winds were cooking and drying up our leaves and the wind was fairly tearing up our vegetables out of the earth, we may have felt very much like returning the compliment.

As perhaps many of you are aware, Manitoba is to a certain extent, so far as the cultivated fruits are concerned, a fruitless country. We have the wild plum; we have the raspberry; and in speaking of this I am reminded that Prof. Saunders, of Ottawa, was up to my place this last autumn and picked some raspberries from a cane that was growing in the edge of my garden, and said he thought I was wasting my time in trying to cultivate tame varieties when I could grow such excellent wild ones right out in the woods. Unfortunately, however, those wild ones don't bear as well as we want them to, hence we have to plant the Turner and the Philadelphia—although I believe you have ruled that variety out, and perhaps I had better not say anything about that—and the Cuthbert and some others; and I have been trying them on a small scale.

Strawberries have been a partial failure, but have only been tried to a limited extent. They have planted a few in gardens in Winnipeg, but the soil there and all about Winnipeg is of a nature that if you happen to get off the sidewalk on a street that has not been well taken care of in very muddy weather, unless your boots stick very well to your feet you will be apt to lose something in that sticky mud that prevails at such times in Winnipeg. I think practical fruit growers look upon that heavy soil as being unsuitable for growing fruit until there has been thorough drainage. However, all the soil of Manitoba isn't like that. In the part of the country where I live, some twenty miles north of Winnipeg, we have a sandy loam upon a limestone foundation. Located eighteen miles southwest of Lake Winnipeg and eighteen miles southeast of Lake Manitoba, we think we are favorably situated upon a sort of water-shed, which has considerable influence so far as regards the growing of fruits.

In addressing you I speak feelingly, for the reason that although separated by international boundary lines, I feel the right hand of fellowship has been extended by honorable members of your Society in helping to introduce fruits into Manitoba more than by my own country people.

I heard something said here this morning about the mulberries which reminded me of a conversation with the premier on

last Monday morning. I was asking him if the Mennonites in Southern Manitoba had imported any fruits from Russia. He said he was not aware of anything they had brought with them except the mulberry which he had known to succeed well there for the past five or six years. The honorable gentleman promised me that on the first opportunity he would make arrangements whereby I should receive some of those particular mulberries. If it succeeds in Manitoba, as I find by the reports of your Society it kills down (I have been a member for the past three years), if these Russians of Manitoba shall succeed with it, I shall be most happy to repay some of the courtesies that have been extended to me by members of your Society.

In regard to apples, that is a vexed question. I am not a seedling man or a Russian. I believe Russian fruits will grow in Manitoba, although you may regard me as a little "cranky" in this particular. After being in correspondence with some of the growers of Russian fruits for the past three years, I claim we have a more equable atmosphere than you have here. (Laughter.) Perhaps that may not go down very well; but I suppose the mercury will freeze if it goes to 40° below zero. We cannot tell how much further it goes down. While at times the temperature goes down to that point, I am reminded of a little slap as to that fact. I am not going to expose any gentleman here, but he will forgive me; he knows he is guilty in the matter. But, sir, I saw a report of the temperature in Southern Minnesota, where it was 42° below, while at Winnipeg, at the same hour, the glass showed only 38° . That may be accounted for by certain modifying influences, and it is altogether likely the next time we examined the mercury was frozen at Winnipeg and it was only 40° below in Southern Minnesota.

I have some forty or fifty varieties of the Russians, some of which come from Prof. Budd. You may think I am a crank in supposing I can grow apples there, but I am going to make the venture.

By the kindness of some of your members I have thirty or forty kinds of plums. I have also tried several varieties of cherries. (Laughter.) Don't laugh; I have got two pears! They came out the cleanest of anything and after our last winter's severe freezing they started from the terminal bud. They stood some ten feet to the north of my dwelling which may have had a good effect in protecting them from the south sun, and I am hopeful they may soon come into bearing.

Before I sit down I have a request to make, as I am always on the beg—the most inveterate beggar in this particular, as Messrs. Sias, Dartt and Peffer can testify, if you want an affidavit to this effect. However, I was going to say I have a request to make; if the exhibitors would kindly—in the interest of horticulture—give me a few samples of the very beautiful specimens of apples exhibited that have been raised in Minnesota, the first time I get to parliament I will certainly move on the floor of the house to have them properly rewarded as honorable members of the Minnesota Horticultural Society. (Applause.)

President Elliot. I presume you are looking for seeds?

Mr. Frankland. That is the idea. I don't care about the apples; you can eat the apples if you will give me the seeds.

The following paper was then read by Mrs. Hays:

SCIENCE IN THE HOUSEHOLD.

By Clara S. Hays, St. Anthony Park.

In this age of rapid advancement and liberal culture, the education of woman should be both broad and practical. If the pen is mighty in her brother's hand it is no less so in hers. If a thorough education is necessary to prepare man for his work it is also necessary for woman. What intellectual giants we would beto-day if the mothers in all the past ages had been as well educated as were the fathers.

Is woman's work so important as to warrant all this preparation? There is none other more important. To her is entrusted the home, the workings of which she must understand even to the most minute details, whether or not she performs the work, or any part of it, with her own hands. If she understands perfectly the needs of the several members of the household, also the means of supplying these wants, and is thorough, regular, punctual and systematic, she is well fitted for her work. Upon her depends in a great measure the physical well being of husband or father and brothers. To her is entrusted the upbuilding of the physical bodies of children. It is an undisputed fact that the activity, vigor and keenness of the mind is almost wholly de-

pendent upon the condition of the body. Nor is the mind more dependent on this than are the morals. It is truly claimed that most intemperance is caused by unsystematic housekeeping and improperly cooked food. Healthful, pure, active, energetic homes insure national prosperity.

Then educate your daughters equally with your sons. If you are able assist them in getting a practical college education, but do not have your daughter take what is termed the "ladies course," nor insist that she drum on the piano, not thinking whether she has any musical talent or not. The time when woman was either merely a drudge or a useless doll-like ornament is now past. Future generations will not be telling what an immense amount of wealth and silver and great number of servants their grandmother had, but rather what noble deeds she performed and what wonderful inventions she made. Truly, as regards woman "one decade of this nineteenth century is worth a century of yonder sterile time."

If upon woman depends to so great an extent our physical, mental, moral, social and national well being, she must have broad, thorough, scientific training. Science is now being applied in every department of work; in agriculture, horticulture, dairying, manufacturing, etc. Why not apply it also in our homes, wherein lie our fondest hopes and which are the foundations upon which we inevitably build our success or our failure, both national and individual. The opportunity to prepare herself for work is now offered to woman, and there are varied occupations from which she may choose; her sphere of usefulness is continually widening, but no woman should consider her education finished until she has mastered the principles underlying homemaking. There is at present no work in which exists a greater demand for teachers than in that of housework and cookery. Not as heretofore to merely teach the wealthy how to cook their fancy and costly dishes, and to prepare their many-course dinners, requiring hours for serving, but to teach the masses, the poor, the families of moderate means, and the well to do, to select their food materials intelligently so that all the elements required by the system are present in nearly the proper proportion, and to cook and prepare them in the best possible manner. Knowledge in cookery undoubtedly means improved health and economy of money.

But, says one, is not this housework and cooking a kind of drudgery requiring no mental effort? There is no work more

worthy of thought, more interesting or that gives greater returns for study. Many subjects connected with cookery have been quite clearly worked out. In making bread, for example, we no longer endeavor to follow mother's method. Improvements have been made in milling, giving us better flour; yeast is differently prepared. Our methods must be adapted to our materials. In bread making many interesting questions present themselves such as: What is the nature of yeast? Are any of the laws governing plant life applicable to yeast? How does the growth of the yeast make the bread light, or porous? What five things are accomplished by the heat in baking? Why use wheat flour? Why not use oat flour, or corn flour for fermented bread? Why make this porous bread, is it any more palatable or digestible? So many interesting questions cause us to lose sight of the little labor necessary for mixing, kneading and baking. There is need of further research and experiment in connection with bread making in our homes, for until recently nearly all investigation of fermentation has been for the furtherance of the making of liquors.

In cooking fruits there is opportunity for and need of much interesting thought. Fresh fruits should be cooked with boiling water. As sugar is rendered no more soluble, palatable, digestible, or nutritious by cooking and is, in the presence of some acids, changed to glucose by heat, and consequently is much less sweet, it should be added only long enough to dissolve nicely, before removing the fruit from the fire. Dried fruit should be washed and then soaked in cold water until no longer wrinkled in appearance, but until it has imbibed sufficient water to give the original rounded form and then cooked slowly in the water in which it was soaked. If cooked rapidly in boiling water without first being soaked, the cells are hardened by the heat and lose the power of imbibing water and the fruit comes to the table unsightly, unpalatable and indigestible.

If we want a nice juicy roast, instead of taking the meat, rubbing well with salt, and putting in a pan containing water, and "basting" frequently while roasting — which process invariably gives a delicious gravy but a very unsavory roast — we have but to find some method of imprisoning the juices. This is very easily done by searing the cut sides on a smoking hot pan, then cooking by placing in an oven hot enough to keep the meat frying and "sputtering," but not hot enough to emit any smoke on opening the door.

So it is in every department of housework; study first how to obtain perfect results; second how to obtain these with the least time and labor possible.

It is very necessary that our food be properly cooked, but it is no less important that we understand what food elements and what proportion of these elements are essential to health. Governments have employed men and furnished the funds to enable them to experiment and determine what foods are best adapted to each class of animals, construct digestion tables, feeding ratios, determine the comparative feeding value of grains, roots, grasses, coarse fodders, etc.; in like manner the conditions best adapted to the growth of plants, fruits and trees of all kinds. Appetite is man's only criterion. Appetite is a poor guide to follow thus blindly. If you sit down to a meal consisting almost entirely of carbonaceous food, appetite does not disclose this error, but causes you to eat twice or thrice the customary amount in vain endeavor to obtain sufficient nitrogenous material. The carbonaceous foods—fats, starch, sugar, etc.—cannot take the place of the nitrates although the nitrates can take the place of the carbonates. But this is not economical, since, for instance, it takes more than three pounds of lean meat to equal one pound of starch as a producer of heat, and the cost of the meat is much the greater per pound. The most common mistake, however, is in serving foods that contain too great a percent of carbonates. The consumer in order to obtain the necessary five ounces of nitrates, which is the proper daily amount, must eat not twenty ounces of carbonates, which is sufficient, but twice or thrice this amount. This is not only a waste but a positive detriment to the system.

There is a class of people who are starving themselves by eating food that does not contain all the elements required by the system.

They are troubled by indigestion and begin dieting, omitting one kind of food after another, thinking that they can in this way remedy the evil. Less than a year ago I met a gentleman who had followed this plan until his food consisted of a cup of coffee with a little cream, and an almost incredible amount of toast. He ate only two meals a day. The bread he termed "bran bread." It was made of flour and bran, about one measure of bran to five of flour. He said: "After eating all that great plate of toast I become hungry within an hour. I have no strength. I have a very disagreeable feeling in my stomach,

which at times is quite painful. I am afraid that coffee disagrees with me; and I am beginning to fear that I have cancer of the stomach or some such disease." I told him I thought he was starving himself. The coffee furnished no nutriment, the cream and butter were carbonaceous, the bran in the bread indigestible, the flour in bread contained carbonaceous, nitrogenous and mineral elements; but taking the cream, butter and bread, the per cent of nitrogenous food was entirely too small. To remedy this the toast was moistened with milk, and he was induced to eat a small piece of meat or a soft boiled or poached egg, a little fruit, and a small amount of some vegetable at each meal. He no longer had the painful sensations and ate much smaller amounts of food.

This subject of the necessary constituents of food is important, and should be considered in making the bills of fare for each day. The starch, sugar or fats are readily obtained. Nitrogenous foods are supplied by lean meats, milk, eggs, the cereals, peas and beans. It is very important that we have vegetables and fruits on our tables daily. Fruits should be used both cooked and uncooked. There is nothing more healthful or appetizing for breakfast than some perfectly ripe delicious uncooked fruits. Bread, meat, cereals, starch, sugar, peas and beans form too concentrated a diet. The vegetables and fruits give more bulk to our food besides furnishing the various mineral constituents often partially lacking in some other foods.

Most of our knowledge of the chemistry and physics of foods and cookery for the human family has been given by men who have experimented with animals. Our numerous experiment stations are now experimenting with stock, various kinds of field crops, also fruits and vegetables are studied and tested as regards producing them for the market, but these experimenters are almost silent as to their importance and relative values as food for people and the best and most scientific methods of cooking them. The questions which they are solving are of special interest to only certain classes. Nicely adjusted food rations for the dairy cow interest only one class; the preparation of foods for the table involves questions of interest to all classes. Chemists, botanists, and other scientists will cheerfully experiment in this line when there is sufficient demand for such knowledge.

The following paper was read by Mrs. Gregg:

PANTRY STORES.

OR THE PROCESS OF PICKLING, PRESERVING, AND CANNING.

By Mrs. O. C. Gregg, Minneapolis.

Short, spicy, tart and sweet my paper must be, for I am to treat of pickles that are spicy and sour; preserves that are pleasant and sweet, and say it all in five minutes time. May I not claim your indulgent attention.

The time allotted me suggests the propriety of treating my subject in a general way, avoiding all detail, which I shall do. In introducing the subject, I would like to say that the domestic preparation of such pantry stores is, after all, the most satisfactory if well done; for it is in obedience to the old adage, "he must serve himself who would be well served."

1st. *Pickling.*—The chief requisite of good pickling is good cider vinegar; if one wishes the acidity of the vinegar softened, more or less sugar added will meet the demand. Another requisite—a porcelain kettle. Many fruits and vegetables only need the vinegar scalded and poured over them; while others need cooking to be tender. This should be done in water, or, in some cases, in vinegar and water. Vinegar should only be brought to the boiling point, then poured on the fruit, as heat weakens it. A little bag of spices put in the middle of the jar of pickles is necessary to give them a fine flavor. Pickles should be kept from the air, well submerged in vinegar and stand in a dry, cool cellar.

2d. *Preserves.*—Preserves to be faultless require much care. Pay particular attention to the selection of perfect fruit. Peel peaches, pears, quinces, and apples and throw them into cold water to keep them from turning dark; if convenient steam such fruits; if not, cook but a small quantity at a time, for it is difficult to watch a large quantity and insure success. The old rule is, a pound of sugar to a pound of fruit; but since we have come to use cans, three-quarters of a pound or less is sufficient, since preserves may be less sweet with no risk of fermentation if sealed, and at the same time retain more of the natural flavor. Quinces, pears, citrons, water melon rinds, and many of the smaller fruits, such as cherries and currants, harden if put at first into

syrup made of the full amount of sugar to be used. To prevent this they should be cooked in water or in a *thin* syrup, adding the remains of the sugar to the syrup after the fruit is cooked. In preserving fruits which are likely to become too soft, it is well to strew a part of the sugar over them and let them stand a few hours or over night; by this process the juice is extracted and the fruit hardened. Use loaf or granulated sugar. A good syrup is made by using a half pint of water to a pound of sugar. To clarify it stir in the white of an egg beaten lightly with two table-spoonfuls of water, just before it boils, and as it boils remove the scum with care. Boil till no more scum arises and then add the fruit. Preserves should boil gently to avoid danger of burning and to permit the sugar to penetrate the fruit. Take out each piece with a skimmer or silver spoon and let the syrup remain until it "ropes" or "hairs" from the spoon, when it may be poured over the fruit.

Marmalades, or the different butters, will be smoother and better flavored if the fruit is well cooked and mashed before adding either sugar or cider. It is important to stir constantly with an apple butter stirrer.

In making jellies, as well as preserves and marmalades, use a porcelain kettle, also loaf or granulated sugar, and do not have the fruit overripe. Do not make jelly immediately after a rain — especially currant jelly — if firmness or clearness is desired. Use a wooden or silver spoon to stir and an earthen cup to dip with. Currants and berries should be made up as soon as picked. Do not make over two or three pints at a time, as larger quantities require longer boiling. To extract the juice put fruit in kettle with just water enough to keep them from burning and stir frequently, letting it remain till thoroughly scalded; then strain a little at a time, through a strong coarse flannel or cotton bag, wrung out of hot water. As a rule allow equal measures of juice and sugar. Boil juice rapidly ten minutes from the first moment of boiling; skim, add sugar and boil ten minutes longer. To test jelly, drop a little in a glass of very cold water, and if it immediately falls to the bottom it is done; or, drop in a saucer and set on ice or in a cool place, and if it does not spread, but remains rounded, it is done. In filling the glasses, tip them to one side and let the hot liquor fall first upon the side of the glass; after which it may be filled without danger of breaking. When ready to put away cover with pieces of tissue or writing paper cut to fit, and press closely upon the jelly and put on the lid; or

cover with writing paper, brushed over on the inside with the white of an egg and tie or paste down on the outside.

3d. *Canned Fruits.*—Cleanse cans thoroughly and test to see if any leak or are cracked. Never use defective glass cans, but keep them for storing things in the pantry. The fruit should be carefully selected. Most fruits are in best condition for canning when not fully ripe, and should be canned immediately after picking. Use a half pound of sugar to a pound of fruit. In canning for pies omit the sugar. When ready to can, place the jars in a large pan of warm water on the back of the stove. Make ready the syrup, add the fruit, and by the time it is done the water in the pan will be hot and the cans ready for use. Take the cans out of the water and set them on a hot platter, which will serve the double purpose of preventing their coming in contact with any cold surface and saving any fruit that may be spilled. Fill as full as possible and set them on a folded towel wrung out of hot water. After standing the fruit will have shrunk away a little; fill up with syrup, or, if you have none, boiling water will do, and seal up. Cans should be examined two or three days after filling, and the covers tightened. Keep cans in a cool, dark place.

In domestic cooking, as in everything else, let us remember that nothing comes by chance; for you know Emerson says "shallow men believe in luck; strong men believe in cause and effect." The following table gives the time required for cooking fruits and the quantity of sugar for the various kinds:

	Time for boiling fruit.	Quantity sugar to quart.
Cherries.....	6 minutes.	6 ounces.
Raspberries.....	6 minutes.	4 ounces.
Blackberries.....	6 minutes.	6 ounces.
Strawberries.....	8 minutes.	8 ounces.
Plums.....	10 minutes.	10 ounces.
Whortleberries.....	5 minutes.	8 ounces.
Pieplant.....	10 minutes.	8 ounces.
Bartlett pears.....	20 minutes.	6 ounces.
Peaches.....	8 minutes.	4 ounces.
Pineapples.....	15 minutes.	6 ounces.
Siberian crabs.....	25 minutes.	6 ounces.
Ripe currants.....	6 minutes.	8 ounces.
Wild grapes.....	10 minutes.	8 ounces.
Tomatoes.....	20 minutes.	none.
Gooseberries.....	8 minutes.	8 ounces.
Quinces.....	15 minutes.	10 ounces.

Prof. Luggier, of the state experiment station, was introduced and proceeded to deliver an interesting lecture upon carnivorous plants, illustrating the same by means of large maps or drawings.

FLESH-CONSUMING PLANTS.

By Prof. Otto Luggier, St. Anthony Park.

Ladies and Gentlemen:

When asked by the President and Secretary of your Society to give a lecture upon some subject of interest to horticulturists, I was greatly puzzled what to select. Having been but a short time in this great and prosperous State of Minnesota, I am as yet unacquainted with the insects and plants which are here injurious or beneficial to your loved pets—the fruit and fruit trees. Recollecting, however, that I occupy a twofold position, that of entomologist and botanist, I thought it well to express this by treating of a subject in which both insects and plants are concerned. Their relationship in this case is, however, not the usual one, so well or rather too well known to you. “The lamb has become the tiger,” so to speak, and instead of insects eating plants the action is reversed, and plants eat insects.

A great deal has been written about this subject ever since Darwin started the discussion, and many facts are no doubt familiar to you. Still, as other and more recent observations may be new to most of you, I hope to be able to add my mite in entertaining the Society. The facts here related are mainly based upon those published in Austria by Dr. Kerner.

Quite a number of plants have peculiar arrangements for catching and retaining small animals, and it has been proven that the majority of plants thus equipped utilize them as one source of food. As insects are most frequently caught, such plants have received the popular name insectivorous plants; carnivorous plants is another name used. Better still is the name *flesh-consuming plants*, as the most important function of some of them consists in the assimilation of organic combinations from the animals captured. But, as will be shown, one term would never suffice to cover all the various phenomena taking place in such plants.

About five hundred species of plants are now known which catch and utilize animals as food. In this small number the different methods employed to catch and use them as food is so great, that we have to arrange these plants in several classes.

One class is composed of plants which possess cavities into which animals can enter, but which they can not leave again. (See Figs. 1, 4, 5, 6, 8 and 9). No organs to catch and digest are visible, and the plants are thus separated from the second class, in which movements take place as soon as an animal comes in contact with certain parts of the plant, and which serve the purpose of covering the prey with a digestive fluid. (See Figs. 10, 11, 12, 13.) In a third class we have neither cavities, nor any movements performed, but the leaves and other parts of the plant are covered with a glue to hold the animals for digestion. (See Fig. 14.)

In the first group of the first class we have the plants of the genus *Utricularia* or Bladder-wort (Figs. 1 and 2). The traps (Fig. 2) are formed by little bladders, whose mouth is closed by a valve, which allows an entrance, but not an exit of the prisoner. Bladder-worts are plants without roots, which float under water, high or low, according to the seasons. With approach of winter, and the consequent lack of food, the leaves of these plants form upon the end of the floating stem globular winter buds; the older parts of the plant die, the bladders fill with water, and thus becoming heavy sink the plants to the bottom of the pool or pond. Toward spring the buds grow, separate from the older stems, and ascend to the upper layers of the water, where the animal life is already in full activity. Here they soon expand and produce branches, either uniformly covered with leaves, or only in part with leaves and bladders. The ellipsoidal bladders (Fig. 2) are fastened upon stems; their size varies in the different species from two to five millimetres. They are always pale green, translucent, compressed from the sides, with a strongly arched back and less strongly arched bottom. The opening or mouth, which leads to the interior, is always surrounded with peculiar stiff and pointed bristles; it is edged by lips, of which the lower one is considerably thickened. From the upper lip starts a thin, transparent, slanting valve, looking like a curtain; this valve is quite elastic, and can be readily pushed inward from the outside, so that an animal pressing against it has not the slightest difficulty in entering the interior. But as soon as it has entered, and the pressure against the valve has ceased, it is a prisoner for life, as the valve, closed by its elasticity as by a spring, can not be opened from the inside. Animals caught make many efforts to escape, but in vain; they die in a short time, mostly within twenty-four hours, though a few can endure their captivity as long as from

three to five days. But all must perish by starvation; they decay, and the soluble remains are absorbed by certain sucking organs inside the cavity. These cells are shown in Fig. 2; they clothe the whole inner wall of the bladder or trap. Every four of them are united by a common stem into a cross. The organic substances of the decaying victims are thus absorbed, enter through the stem uniting the four cells into the cell of the inner wall, and from there from cell to cell through the whole plant.

Most captives belong to the crustaceans, and are chiefly recruited from the young and adult specimens of *Cypris*, *Daphnia* and *Cyclops*; small infusoria and worms also enter. Even the larvæ of flies manage to crowd in, and it is a very pleasing sight to see the energy displayed by the larvæ of our mosquitos to be eaten up. The number of the enclosed animals is quite large, and as many as twenty-four crustaceans have been counted in a single bladder.

But what induces these animals to enter the traps? We might conclude that food could be found in this cavity, or that it afforded a shelter against enemies. This latter affords a good explanation, as the entrance to the mouth is so well protected against larger animals, as seen in the illustration (Fig. 2.) Only very small animals are to be admitted; larger ones must be kept away, or they would injure the whole structure. It seems therefore plausible, that the smaller animals, chased by larger ones, are induced by the plant to enter—to escape the frying pan and fall into the fire. Species of *Utricularia* are found in Europe, North and South America. One species, common in Brazil, is found growing in the water collected by the leaves of some plants related to the pine apple. Usually but one specimen of the Bladder-wort is found in each cistern; if the water in that becomes too low, the plant has the wonderful power of growing and directing a branch towards and into the adjoining cistern.

Strange to say, species of *Utricularia* are known, which do not live in water at all, but among mosses. But notwithstanding this very different habitat, they contain bladders quite able to catch food. They grow in large numbers below the surface of the soil, are perfectly transparent, and filled with clear water; their mouths are carefully hidden, and usually roofed over to prevent the soil from filling them.

The second group of the first class, containing carnivorous plants, whose leaves are transformed into pitchers or tubes, prevent the escape of prisoners by means of variously formed spines

upon their inner walls; these spines are always directed downward (Fig. 3). The shape of these traps is very different, and we know some that look like trumpets, tubes, bags, funnels, pitchers, bottles, and urns; others again are straight, bent or spiral. But all start from that part of the stem, which joins the surface of the leaf. This latter is always comparatively small, frequently only forming a scale, or it appears simply as an annex to the large and excavated stem. In some the leaf forms a cover over the mouth of the cavity, as in some species of *Nepenthes* (Figs. 5 and 8); in others it forms a non-political platform, resting for insects, which are, however, as often caught by it as some bipeds.

In every trap of this kind we can distinguish three things: something to invite insects to come; something to prevent those that have entered the trap from escaping; and something to decompose the dead prisoners, and change them to products that can be absorbed. The invitation given to insects is similar to that given by flowers. Either honey is secreted, or bright colors are displayed, which indicate to flying insects that a table has been spread for them. The escape of a prisoner is made impossible by pointed spines and hairs directed downward, or by other similar arrangements, as shown in Fig. 3. The decomposition of the dead insects is produced by certain liquids, secreted by peculiar cells in the bottom of the cavity.

Although all plants belonging to this group are rather uniformly equipped to fulfill these three conditions, the equipment itself is very different, and many curious things can be seen in these murderous dens, making it worthwhile to investigate them a little more in detail.

We first mention the genus *Genlisea*, closely allied to the *Utricularia*. About a dozen species are known, which grow in water or in swampy places in tropical Africa, Brazil and the West Indies. Besides leaves formed as usual most of the species of *Genlisea* possess also others transformed into traps. Each trap consists of a narrow, long, cylindrical bag, widened at the closed end, and furnished with a narrow opening at the other. The opening is encircled with very small hooked teeth, bending inwards, and the whole inner wall is clothed with innumerable small bristles, which start from projecting rows of cells, and point downwards [Fig. 3, (1)]. Besides the organs mentioned we find below and between the bristles scattering, wart-like glands, composed of four to eight cells. The base of the bag is without

pointed bristles, and contains only glands arranged in rows. Small worms, mites and other articulates, which enter the mouth, can easily penetrate to the base of the bag, but can not return on account of this army of lances pointing towards them. They are prisoners, die, and the remains of their disintegration are absorbed by the glands inside the bag.

As types for a second series of plants organized in this manner we may mention a plant from British Guiana, the *Heliamphora nutans* and our common Trumpet plant, the *Sarracenia purpurea* (Fig. 4), which is found in swamps from Hudson's Bay to Florida. In both the leaves, transformed into bags, are arranged like a rosette or star, and their bases rest upon the moist soil; from there they bend upwards, are inflated near the middle, contract again near the opening, and end in a rather small leaf. This leaf is striped with red lines, has the form of a shell, and presents its concave side towards the falling rain. In the *Sarracenia* this arrangement serves the purpose of collecting and conducting the rain into the bags, which are more or less filled with water, and from where it can not readily evaporate. The spike-like bristles which clothe the inside of the bag of *Heliamphora* are arranged like the scales upon the back of a pike [Fig. 3 (2)]; they point downwards and grow longer and more pointed towards the base of the bag. The shell-shaped leaf in *Heliamphora* above the opening bears glandular hairs, which secrete honey, so that the lips of the mouth are covered with a thin film of this attractive material. Numerous small insects are thus attracted, both winged and unwinged ones; the latter utilize a peculiar projection upon the concave side of the bag to reach the honey. If they enter they are lost, as they can not crawl over the slippery scales, armed with spikes, and eventually perish in the water collected below. The remains of their decaying bodies are absorbed by cells in the inner walls. The number of corpses is frequently so great that the plants can be discovered by the unpleasant odor arising from them. Some birds, gaining knowledge from experience, frequent such plants to pick dead insects from the bags.

Whether the fluid contained in these traps is simply water, or whether the gland-like cells occurring, for instance, in the leaf of the Trumpet plant, secrete other fluids, is doubtful. A centipede, about four centimetres long, which had during the night entered the trumpet of a *Sarracenia purpurea*, would indicate the presence of another fluid than water. One half of the centipede

was above the water, the other beneath; the immersed part had changed to a white color, and showed changes not seen in specimens simply immersed for the same length of time in rain water.

Very different from the trumpets of *Sarracenia purpurea* (Fig. 4) are those of *Sarracenia variolaris* [Fig. 5 (1)], which grow in the swamps of Alabama, Carolina and Florida, and those of *Darlingtonia californica* [Fig. 5 (2)], which grow in similar localities in Oregon and California. In both the acid fluid within is produced by cells in the cavity, and it is impossible that a single drop of rain could reach the interior. This tubular cavity in both widens but little toward the opening, and is covered by the under surface of the leaf, which projects as a hood or roof over it [Fig. 5 (1)]. The mouth or entrance is therefore hidden, and forms a slit or hole beneath the roof. The lower part of the trumpet is uniformly green, but the upper part, and chiefly the roof, is veined with red and carmine; the spaces between the veins are thin, transparent, pale green or white, and produce the effect of small windows in red or green frames. This impression is heightened by looking through the mouth against the light. All these various bright colors give the leaves the appearance of flowers.

No doubt insects are deceived by these colors, and fly to the traps, which, moreover, really secrete honey at their mouth and inside the roof, thus inducing them to enter. *Sarracenia variolaris* further invites wingless insects, chiefly ants, by having upon it a flange forming a highway from the soil to the trap, with glands to secrete honey as well [see Fig. 5 (1.)]. This highway leads to a sure death; following the honeyed invitation, insects soon reach the mouth, where more honey is stored for the poor victims. Once inside, they are certainly forced to the bottom, as the whole interior wall is covered with bristles pointing downward (Fig. 3). Winged insects, which have entered the mouth, try to save themselves by flying, but they never find the darkened entrance, and mistaking the windows for real openings, they fly against them until exhausted. As soon as the victims come in contact with the enclosed fluid, they become stupefied, and die sooner or later. This fluid must not, however, be called a poison, as some insects can live in it for at least two days; it is simply a fluid which accelerates decomposition of the victims. The number of captured insects is quite large, and deposits as thick as fifteen centimetres have been observed. Why the leaves of

the *Darlingtonia* [Fig. 5 (2)] should grow in a spiral direction, it is difficult to say, but it may be to make an escape still more difficult, because if the winged captives try to escape by means of their wings, they will still more certainly come in contact with the walls clothed with bristles, and they will be stunned in a short time. We must here mention that two insects brave all the dangers of the murderous traps of these plants. One is a fly, a common blow-fly (*Sarcophaga Sarraceniæ*), which not alone escapes all dangers, but even utilizes the stored-up food for the raising of its own larvæ. These larvæ thrive in this putrid matter, and leave, when fully grown, by self-made holes in the sides of the trumpets, to transform in the surrounding soil. Prof. C. V. Riley also described a beautiful moth, black and yellow, the *Xanthoptera semioceæ*, which escapes unhurt; its larvæ utilize the green walls of the prison itself for food. Both insects are, however, well adapted to frequent such dangerous places. The fly has peculiar organs upon its feet, composed of very broad soles and long hooks, which latter can be compared with the iron points used by workmen to ascend telegraph poles. The moth possesses similar long spikes upon the legs; its larvæ escape by spinning a carpet of silk upon the inner wall of the trap, and by never moving beyond it.

The fluid contained in the traps is not secreted to digest, otherwise the maggots of the fly (*Sarcophaga*) would also be digested. It is well known, that if living larvæ enter the stomach of carnivorous animals, they are at once killed and digested. Here it is different, and the fluid is simply secreted to accelerate decay, and to form liquid manure, which is absorbed by the plants by cells located upon the inner epidermis in the lower parts of the traps.

Another series of similar plants comprises forms, whose leaf-stalks are symmetrically excavated, with the mouths upwards, and covered by the leaf as a lid. Most frequently these traps have the shape of cans, urns, funnels and pitchers, and the lids are arranged over the mouth in such a manner as to prevent the rain from entering, but not the insects. Several species of *Sarracenia* [Fig. 5 (3)] belong to this series, also the Australian *Cephalotus* (Fig. 6), and the numerous species of the true Pitcher plants (*Nepenthes*) [Fig. 5 (4), 8 and 7 (young)].

We will only consider the two latter genera of plants. *Cephalotus follicularis*, related to the currant bush, grows upon the moors of eastern New Holland. This plant has two forms of

leaves, which grow as a rosette or star around the base of the flower stem. Only the lower leaves are transformed into traps, chiefly to catch wingless insects crawling upon the earth. All the pitcher-like traps rest upon the moist soil, and possess leafy projections, upon which crawling animals can approach the openings or traps. Of course flying insects are not excluded, but are also invited by bright colors to sip honey. The half opened lid, with white spots and bright vermilion red veins, is easily mistaken for a flower. Both winged and unwinged animals and insects, which are lured by the honey to enter the mouth, soon lose their foothold upon the very smooth inner walls, and drop into the fluid, which fills nearly one-half of the cavity. Even if they should not be drowned, the prisoners have to surmount three different kinds of obstacles in their road to liberty. First, a rim projecting inwards; second, a piece of wall densely covered with stiff and sharp bristles pointing downward; third, a row of hook-like teeth near the mouth. The numerous corpses found in such traps clearly show how well adapted this prison is to retain its victims. Ants form the staple of their food. Their dead bodies are not changed, however, into liquid manure, but they are dissolved by a clear acid fluid secreted by glands in the inside of the traps. This process is similar to that taking place in the traps of the true Pitcher plants or *Nepenthes* (Fig. 8). Of this latter species we know about thirty-six species; they are all tropical plants, and all grow in swampy soil near ponds; the young plants have a great resemblance to the *Sarracenia*, as seen in Fig. 7; when mature they look like real lianas growing in the crowns of medium sized trees. The pitchers [Fig. 5, (4)] must be considered as an excavated portion of the leaf-stem, and the piece acting as the lid is the real leaf. Such pitchers vary greatly in size in different species; the largest is *Nepenthes rajah*, which is large enough to snugly shelter a pigeon. The younger pitchers are still closed with their lids; their color varies greatly, from rusty brown, golden, powdered with white, to snow-white, and all are very hairy. When full grown the lid is lifted, the outer covering of hair disappears, and a yellowish-green color prevails, enlivened by vermilion spots and veins, or by other bright colors. The lid is equally brightly colored, and the whole pitcher—or a leaf—resembles very closely the flower of certain species of *Aristolochia*, and strange to say the genera *Nepenthes* and *Aristolochia* are also closely related.

Insects, and perhaps other flying animals, are attracted to this

flower-like leaf, which produces also considerable honey, so that we may well say: they possess sweet lips and a honey mouth. But the poor animals kiss once too often; entering the interior of the pitcher, whose rim is made so slippery by a bluish coat of wax that the unwary insect is unable to crawl up again, it is drowned in the fluid below. Most captives die at once, others try in vain to save themselves by crawling upwards. Upon the larger pitchers the bulging rim of the mouth is closed with sharp teeth, pointing downwards [Fig. 3 (5)]. In many species these sets of teeth looks like those of carnivorous beasts, and in the species shown in Fig. 5 (4) occurs even a double row of teeth, making an escape an impossibility. The large amount of fluid in these cans will soon drown the victim. This liquid is produced by glands located upon the inner walls, and consists mainly of water, showing but little acidity as long as no animals have been caught. But as soon as a victim has entered and reached the bottom of the pit, more fluid is secreted, which is distinctively of an acid nature, and possesses the property of dissolving albumen, flesh and blood.

This fluid possesses not alone the properties, but also the composition of gastric juice. Besides the organic acids, such as apple acid, citric acid, formic acid, a pepsine-like ferment has been discovered, and organic bodies containing nitrogenous matter have been artificially dissolved in it. If we pour upon a small piece of meat, in a glass vessel, some of the fluid contained in a pitcher, which has, as yet, not caught any food, the meat is but slightly changed; but if a few drops of formic acid are added, then it is dissolved, and the same changes take place in it as if it had entered the stomach of an animal. True digestion, therefore, may be said to take place in the pitchers, and the digested parts of the animal food are absorbed by peculiar cells situated in the bottom and lower parts of the walls.

A third group of carnivorous plants belonging to our first class, consists in plants whose scale-like leaves possess peculiar cavities, into which but very minute animals can enter, as the entrances to them are very small. Arrangements to prevent the animals from escaping are lacking, and the living food is simply arrested and sucked empty by protoplasma-threads protruded from peculiar cells found in the cavities [Fig. 9 (5)]. One of the most peculiar plants of this group is the *Lathraea squamaria* [Fig. 9 (1-5)], a plant without chlorophyll, and a subterranean parasite upon the roots of other plants. The subterranean

whitish stems look fleshy and fat; their whole length is covered by scale-like, overlapping leaves [Fig. 9 (1)]. These pale leaves are broadly heart-shaped and appear to be fastened with their entire base to the stem. Such is, however, not the case, and if we separate a leaf from the stem, we see at once that the apparent base is a part of the upper surface rolled back; in reality, we can distinguish the following parts: first, the rather short connection with the stem; next, that part which looks like the entire surface of the leaf, but which is only a part of it, forming a slanting shield sharply edged; the other part, bent at a sharp angle from the shield, might be mistaken for the lower surface, but belongs in reality also to the upper one; next, the free end of the leaf, forming the rolled-up margin. By this rolling up of the margin, a long cavity is formed right under the base of each leaf, as readily seen in the illustrations. In this cavity enter, by means of five to thirteen small holes, about ten apartments, excavated in the thick leaves themselves. They are, at least in this form, an unicum in the whole vegetable kingdom.

To learn how the plant uses these apartments, we must look at them a little closer. They are arranged side by side, but do not connect with each other; all are higher than broad, with irregular wavy walls [Fig. 9 (3)]. Inside these walls we notice two kinds of organs, which are a little elevated over the epidermis, and project into the cavity. One kind is present in large numbers, and is formed by a pair of cells united into a button, borne upon a short cylindrical foot; the others, still more numerous, are formed by large round or elliptical cells. The walls of such cells are rather thick, and the protoplast living inside of one extends, when excited, fine threads through the openings in the wall [Fig. 9, (5)]. If small animals enter these labyrinths, and touch one of these organs, the protoplasma-threads at once surround the intruder. Only very minute animals are thus held; larger ones are only impeded in their further movements, and are made prisoners. No secretion of any kind has been observed. But as we find after a while only the hard substances of the victims, such as claws, parts of legs, etc., in the cavity, whilst flesh and blood have disappeared, we must conclude, that the food derived from the decaying animals must have been absorbed by coming in contact with the threads of protoplasma. It is possible that the higher button-like glands upon stalks may simply hold the food, and that the flat ones absorb it; this would also explain the larger numbers of the former. Other arrangements in the cavity

also point in this direction. As the openings leading to the apartments in the leaves are quite small only minute animals can enter. But what induces them to enter is difficult to say; they may, perhaps, simply enter to escape to them more apparent dangers.

It has been mentioned that *Lathræa* is a parasite. Although such plants will not be discussed as this time we must understand, that the principal food of the plant is obtained by sucking-cells fastened upon the roots of other plants. The *Lathræa* grows only in regions with a long winter, the sucking-cells die during the autumn and are not removed until spring. The food thus obtained is not very different from that obtained by its host, being composed of water with a solution of slight amounts of salts — a fluid we may call “raw food.” Since the plant is a subterranean one, lacking chlorophyll, and thus not able to obtain from the air carbon-dioxyd, it is of great importance to it to obtain the necessary nitrogenous substances from dead animals. The supply from its victims, although small, is not so insignificant, because it can be obtained summer and winter, since at the depth in which these plants grow, infusoria and other animals are always active and consequently accessible.

If it is strange, that a subterranean vegetable parasite without chlorophyll can absorb both the raw food from its host, and also self-caught animal food, it is still more strange to find plants, which are enabled to obtain additional food directly from the soil. Such a plant is *Bartsia alpina* [Fig. 9, (6-8)]. As it would take too long to mention the details of the traps, sections of them are simply illustrated; upon one side of the canals there shown similar glands may be seen as were found in the apartments of the *Lathræa*, and we can not doubt, that the whole arrangement is used to catch infusoria.

CARNIVOROUS PLANTS WHICH PERFORM MOVEMENTS IN CATCHING FOOD.

The *Lathræa* and *Bartsia* have been mentioned as belonging to the first class of carnivorous plants, which perform no movements to catch and digest the animal food caught by them. But both species form the connecting link between those plants which perform movements of the organs used to catch and digest as soon as these come in contact with the bodies of animals. These various movements depend upon the manner in which the

food is digested. In *Lathraea* and *Bartsia* it is only the protoplasma of the button-like cells in the interior of the cavities, which sends out mobile threads to hold the prey. Of course other plants may be yet detected, that will upset all our artificial classifications, which do not occur in nature, but are simply made to enable us to study more systematically.

The first group of carnivorous plants which perform movements for catching living food, is composed of the species of *Pinguicula*, of which about forty are known, and which resemble each other so closely, that no one except a botanist could at sight distinguish between *Pinguicula calyptrata* from the mountains of New Granada and the *P. vulgaris* growing in the Hartz mountains. The localities in which these plants grow are also quite similar. Both in the old and new world they grow in moist places, upon the margins of creeks, upon moors and in swamps. Farther south they exchange the cool regions for higher altitudes. Very rich in species are the high mountains of Mexico. Each species in a southern region is quite local, whilst those growing in the arctic and subarctic regions have a very wide distribution. The best known species is *P. vulgaris*, extending from North America, north of Mackenzie, to Labrador, Greenland, Island to Siberia, and from the Baikal mountains through Europe to the Balkan, Alps and Pyrenees.

The delicate looking plant possesses violet-blue flowers, borne by slender stems, starting from a star of leaves resting upon the soil. The leaves are elongated-oval or tongue-shaped, and of a yellowish-green color; their edges are turned up, transforming each leaf into a broad channel or groove, with a flat bottom [Fig. 9 (9-11)]. This groove is covered with a sticky, colorless slime, secreted by numerous glands upon the upper surface of the leaf. There are two kinds of glands; one looking like a button upon a stem, can be seen with the naked eye, and resembles a small mushroom [Fig. 9 (9)], and is composed of eight to sixteen radiating cells supported by a single tubular one as a stem. The second kind of gland is composed of eight cells, grouped together in a wart-like body, projecting but a little above the surface of the leaf. One square centimetre of a leaf contains about 25,000 slime-secreting glands, so that the whole plant, usually composed of nine leaves, carries about half a million of such glands. If these glands are simply touched for a short time, perhaps by drops of rain, no change is produced, but a continuous pressure by any solid substance, for instance by in-

soluble grains of sand, excites the glands to secrete more slime, but by no means forces them to secrete an acid fluid. But as soon as organic substances containing nitrogenous matter come in lasting contact, not alone slime, but also an acid fluid is secreted, which is able to digest flesh, milk, the white of an egg, even softer bones. Experiments have proven that small pieces of this latter material have been almost entirely dissolved in about forty-eight hours; after eighty-two hours they were in a fluid condition; the whole secretion was then re-absorbed, and the glands had become dry again. Small insects landing upon such a leaf are glued to it, and are digested, leaving only their hardest parts undissolved behind. The acid fluid is thick, and can be secreted in quantities large enough to fill the whole groove. If an insect should be caught near the margin of the leaf, the latter is able to bend and roll up, thus pushing the victim more towards the middle of the leaf, where it comes in contact with more secretions. This rolling up is done very slowly, and it takes several hours before the insect caught is pushed to the middle of the groove. After dissolution and absorption of the food the leaf gradually assumes its former position. Small parts of plants, such as pollen carried by the air, are treated in the same way as small animals.

The effect of the acid fluid upon bodies containing albumen is identical with that produced by the gastric juice of an animal, and we can conclude that this vegetal secretion contains, also, besides a free acid, a ferment like pepsine. Since everything soluble is absorbed by the leaf of *Pinguicula*, we need not hesitate to state that this process is true digestion. Whether the two kinds of glands perform different work is difficult to say, but very likely a division of labor takes place. The similarity between this leaf and the stomach of an animal was long known, even before an explanation was offered by botanists. It was not alone long known, but also practically employed, that these leaves had—like the stomach of calves—the property of producing certain changes in milk. If fresh milk, still warm, is poured over such leaves, it is transformed into a treacle-like substance, the Tåtmiölk or Såtmiölk of the Laplanders, a favorite dish of the people in northern Skandinavia, already mentioned by Linnæus one hundred and fifty years ago. It is, moreover, very peculiar that a small quantity of this Tåtmiölk will again change large quantities of fresh milk into that substance, proving that the substance obtained from the leaves of *Pinguicula* acts as other ferments.

This rolling inwards or backwards of the margin is slow, and consequently not easily perceived. But we have other plants, which act more rapidly, forming the second group of the carnivorous plants under consideration.

Best known are the species of Sundew or *Drosera* (Fig. 10), which grow upon a similar soil as the *Pinguicula*, and frequently side by side. About forty species of Sundew are known; all are recognizable by the soft, reddish and club-shaped tentacles of their leaves, usually glistening with a drop of moisture. These tentacles start from the upper surface of the leaf, the lower one being smooth, usually resting upon the surface of the soil. All the leaves of this little plant surround the base of the flower-stem, and this similarity of growth with other insectivorous plants, such as *Pinguicula*, *Sarracenia*, *Heliamphora*, *Cephalotus*, *Dionæa*, etc., is very peculiar. A leaf of the Sundew looks like an oval cushion with pins stuck into it. The tentacles are of unequal length, those standing erect in the middle are shortest, largest those near the margin (Fig. 10). About two hundred tentacles are found upon each leaf, and their knob-like ends are glands. Each gland secretes a clear and sticky fluid, which glistens in the sun like a drop of dew, giving the popular name "Sundew" to the plants. Vibrations by wind or rain do not produce any change of position in these tentacles; if we purposely put pieces of soil, grains of sand, glass, coal, gum, sugar, starch, tea, or other substances free of nitrogenous matter upon the leaf, more fluid is secreted, which also becomes acid, but no secretion of pepsine takes place, nor any change in the direction of the tentacles. But as soon as a small insect, mistaking the glistening pearl for a drop of honey or water, settles upon the leaf and thus touches the glands, or if we purposely drop upon it bits of meat, or the white of an egg, a liberal secretion of acid and pepsine takes place at once. The insect, glued to the plant, is soon covered with the secretion, and dies by suffocation as soon as its stigmata are closed with it. We see that both *Pinguicula* and *Drosera* act exactly alike, but the latter plant is distinguished by the movements which the tentacles perform. These are best seen near the margin of the leaf. Soon after an insect has touched some of the tentacles they become excited. The first tentacle coming in contact with the insect bends inwards, making a movement like the hands of a clock; it moves in two to three minutes through an arc of 45° , in ten minutes of 90° . About ten minutes later the neighboring tentacles move like-

wise, and so forth until all the tentacles cover the victim. It is not always the middle of the leaf upon which the tentacles meet. Frequently, if two insects have lodged upon the same leaf, the two hundred tentacles form into two groups, each trying to cover one of the captured insects. If the insect is large even the margins of a leaf curve over the food, and thus the surface of the leaf resembles a hollow hand filled with a large amount of digestive fluid.

These movements vary for every case, but they are always adapted to be of the greatest benefit to the plant, and always succeed in covering the victim with a secretion to dissolve and absorb it. If an insect should be glued to one of the tentacles near the margin, not enough of the secretion could reach it, and therefore the tentacle bends inward to bring it in contact with the other glands, and it is soon digested. According to the size of the insect captured, it takes from two to three days to digest it; if completed, the original position is resumed, the secretion is all withdrawn, and the remaining dry parts of the insects are carried away by the wind. The leaf is now ready to catch more victims. Little flies form the staple food for these plants, but other insects, if not too large, are also captured. Even dragon flies have been caught, but in this case three neighboring leaves acted in unison.

How important the movement of these tentacles are, not alone for the plant but for botanical and other sciences, can be imagined if we remember that this movement did not alone take place in the excited cell, but that this excitement was communicated to the second, third, tenth and one hundredth protoplast, and that the rate at which the excitement traveled can be measured. (By protoplast we understand the individual protoplasm inhabiting a single cell). The movements, moreover, are always directed to carry out a certain work, a work to the best of the whole community of protoplasts, and such movements must be considered as at least instinctive ones.

Investigations have given the following results: a piece of a woman's hair two-tenths of a millimetre in length, and weighing .000822 milligrams, laid upon a tentacle of the *Drosera*, produced a slight movement, a bending of the excited gland. Such a minute body laid upon the tongue of a human being is not recognized at all, and the protoplast in the gland of this plant is consequently more sensitive than the nerve endings in our tongue, which is considered our most sensitive organ. One four-thousandth part of a

milligram of carbonate of ammonia, and one 30,000 milligram of phosphate of ammonia were sufficient to produce a motion. All the experiments showed that fluid substances excited more than solid ones, and that bending of the tentacles took place more or less rapidly, in the same proportion, as the substance laid upon them contained more or less nutriment for the plant.

The communication of an excitement through the protoplasts in a community as that of a plant of Sundew can be compared with the transmission of an excitement by the nerves towards the brain, or with the transmission of a will to the muscles. The transmission is a progressive movement in the smallest parts of nerves, similar to that of sound, of light, of electricity; but it has never been possible to make such transmission visible. Therefore it is so much more interesting to observe, with unaided eyes, the material changes which occur in the excited protoplasm of the Sundew, and in the protoplast transmitting this excitement.

In each cell we can see the protoplast, forming a thick layer close to the wall, and in a constant flowing motion. It contains in its interior an uniformly colored purple fluid. If a small piece of meat is laid upon such a cell, the content of that cell is at once excited, and the uniformly colored purple fluid is dissolved and transformed into dark, round, club-shaped or worm-like pieces, into cloud-shaped balls, and into an almost colorless fluid. This change spreads from the excited gland downward, from cell to cell, through the tentacle, and so forth in all direction and at the same time with these visible signs of a transmission all those tentacles bend in which the purple-colored fluid underwent a change as just described. If the piece of meat is dissolved and digested, or if the tentacles regain their former position, we see the dark pieces or ball disappearing into the body of the protoplast, and the uniform purple color, found previous to an excitement, is restored in their place.

The species of Sundew in the family *Droseraceæ* occur over the whole world. Others of this family belong to the genera *Dionæa*, *Aldrovandia*, *Byblis*, *Roridula* and *Drosophyllum*. Each of these genera contains but one or two species, and each species is very local. But all — like the Sundew — catch insects, and possess the property of dissolving and digesting them. The most peculiar species are, however, *Dionæa* and *Aldrovandia*, which form our third group of carnivorous plants of this class. Their organs for digesting and catching are the most peculiar ones in the vegetable kingdom.

The Venus fly-trap (*Dionaea muscipula*) grows in a very limited region in eastern United States, usually near swamps (Fig. 11). Its leaves are also arranged in the form of a rosette around the base of the flower stem, and lie more or less flat upon the surface of the soil. Each leaf [Fig. 12 (1)] is composed of a spatula-shaped flat stem, which in front is suddenly contracted to almost nothing, and thence expands again into a round leaf. This latter is divided by a rib into two equal halves, which have the position to each other as the leaves of a half open book. The margin of each leaf carries twelve to twenty long and pointed teeth, which possess, however, neither glands nor other remarkable organs. In the central space of each half are three very stiff and pointed spines, which are always shorter than the marginal teeth, and which do not point straight upward. These spines are composed of elongated cells [Fig. 12 (3)], whose protoplasm is in a constant and rather rapid motion. At the base of these spines we find a very short cylindrical bolster composed of small cells, which allow a bending of the spines. The individual spines are rather stiff, and can not bend, but can be pressed upon the surface of the leaf, the bolster forming a sort of joint. Besides the bristles we find the whole surface covered with glands [Fig. 12 (6)], each composed of twenty-eight small cells; they have a carmine color and can secrete a slimy fluid. Pressure, the shaking of the entire plant or of a leaf by winds or falling drops of rain, even injuries upon the stems or upon the under side of the leaf produce no visible changes, but as soon as the upper surface is touched, then the halves of the leaf approach each other, until the pointed teeth of their margins cross, and the insect producing this sensation is held a prisoner [Fig. 12 (2)]. If the insect only touched the glands this folding together is carried out quite slowly, but if one of the six spines has been touched ever so slightly, the folding takes place at once, in ten to thirty seconds, and may be aptly compared with the sudden closing of an open book. The marginal teeth interlace like the fingers of our two hands; the formerly flat upper surfaces of the leaf are made a little concave, so that they inclose a hollow space.

The now following changes depend upon the duration of the excitement, and whether the enclosed substance contains food or not. If the excitement is of a short duration, or if the captive is not suitable for food, the leaf soon assumes its normal position. Otherwise the halves press tightly together; all the glands, dry before, secrete now a slimy, colorless, very acid fluid,

even those not in actual contact with the prisoner. This fluid is quite abundant, looking like drops, if the closed halves are forcibly separated. It surrounds the enclosed object and soon dissolves the same. If finished, the secretion is absorbed, and with it the digested food; the glands become dry, and the halves of the leaf open again for another victim. Of the caught object everything that could be consumed has disappeared. The six bristles, which in the closed cavity were bent like the blades of a knife, again assume their former position.

The length of time needed for digestion varies according to the size of the victim. Usually the halves remain closed from eight to fourteen, even twenty days. Larger articulates, such as centipedes, can escape, if their whole body is not enclosed, by mere strength, since the margins and teeth of the halves are somewhat flexible; smaller animals are always lost, and they soon suffocate in the fluid covering them.

The whole trap, although similar to that of the Sundew, is quite an improvement of it, and the division of labor is much more pronounced, as the six spikes are not used both as organs of sensation and digestion, but only for the former purpose. The outer long and pointed teeth are also free from glands, and simply serve to enclose the victims more securely. We have therefore in the traps of the *Dionaea* organs for three distinct functions: to excite, to catch and to digest, whilst in the *Drosera* the same functions are performed by organs of one kind. The transmission of an excitement is also much more rapid in our Venus fly-trap.

We have already compared this transmission with the similar one in the organism of animals. But strange to say even electrical currents have been observed in the Venus fly-trap, which prove that it has the greatest analogy with muscles and nerves even in this respect. A current of positive electricity flows from the base to the extreme end of the trap, another negative one can be observed in the leaf stem, and as seat of the source of this electricity the upper layers of cells of the surface of the trap and the middle rib have been ascertained. Every excitement of the leaf changes at once the intensity of the electric current, and as this change produces a movement of the halves comprising the trap we may assume that the electric current regulates the opening and closing of the whole trap.

The allied *Aldrovandia* (Fig. 13)—allied as far as the structure of the trap is concerned—is an aquatic plant, found in



Fig. 1. Bladderwort (*Utricularia spec.*)

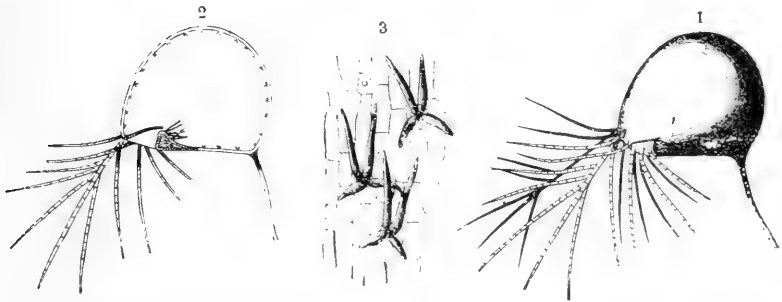


Fig. 2. Traps of *Utricularia*: 1. Trap enlarged 4 times. 2. Section through trap. 3. Sucking-cells upon the interior walls, enlarged 250 times.

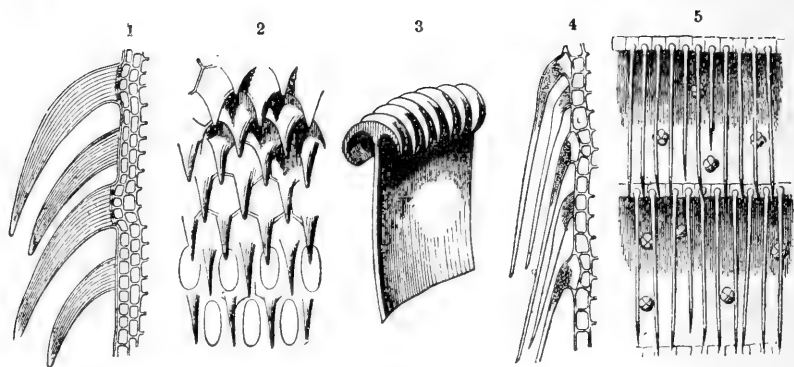


Fig. 3. Spines, etc., in traps: 1. *Genlisea*; inside of a piece of tube. 2. *Heliamphora*; spines upon interior walls of trap. 3. *Sarracenia purpurea*; a piece of the mouth of trap. 4. *Sarracenia purpurea*; section through inside wall of lower part of trap. 5. *Nepenthes*; spines of interior wall near mouth of trap. Greatly enlarged.

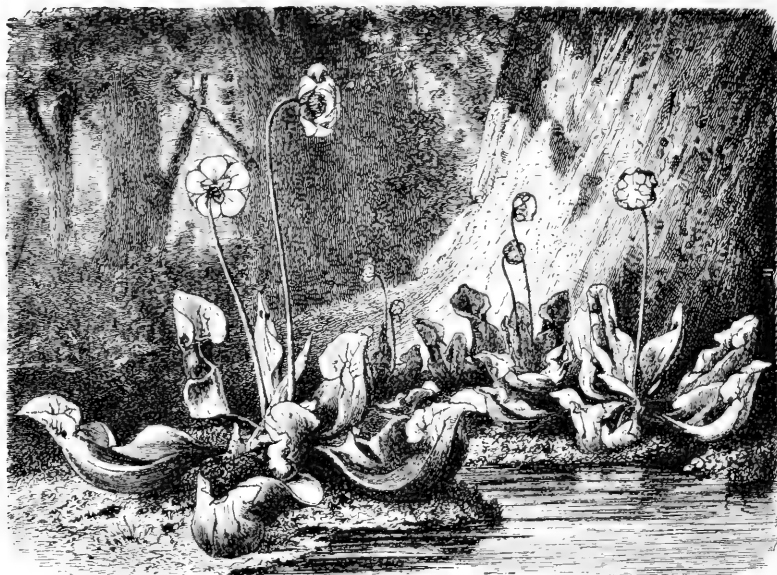


Fig. 4. *Sarracenia purpurea*.

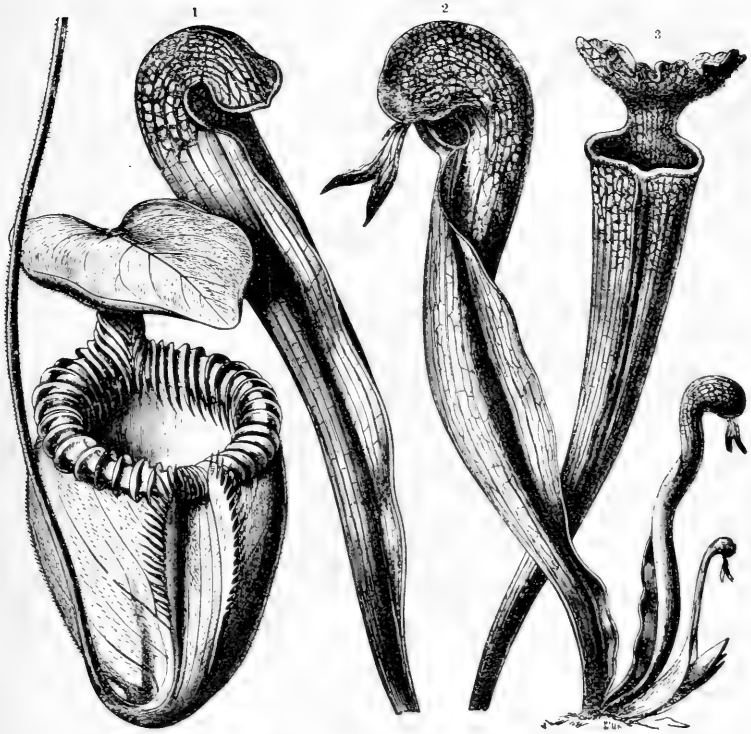


Fig. 5. Trumpet and Pitcher Plants: 1. *Sarracenia variolaris*. 2. *Darlingtonia californica*. 3. *Sarracenia laciniata*. 4. Pitcher of *Nepenthes*. Reduced.



Fig. 6. *Cephalotus follicularis*.

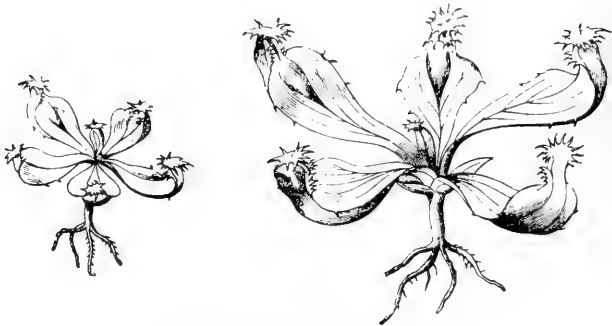


Fig. 7. Young plants of *Nepenthes*.

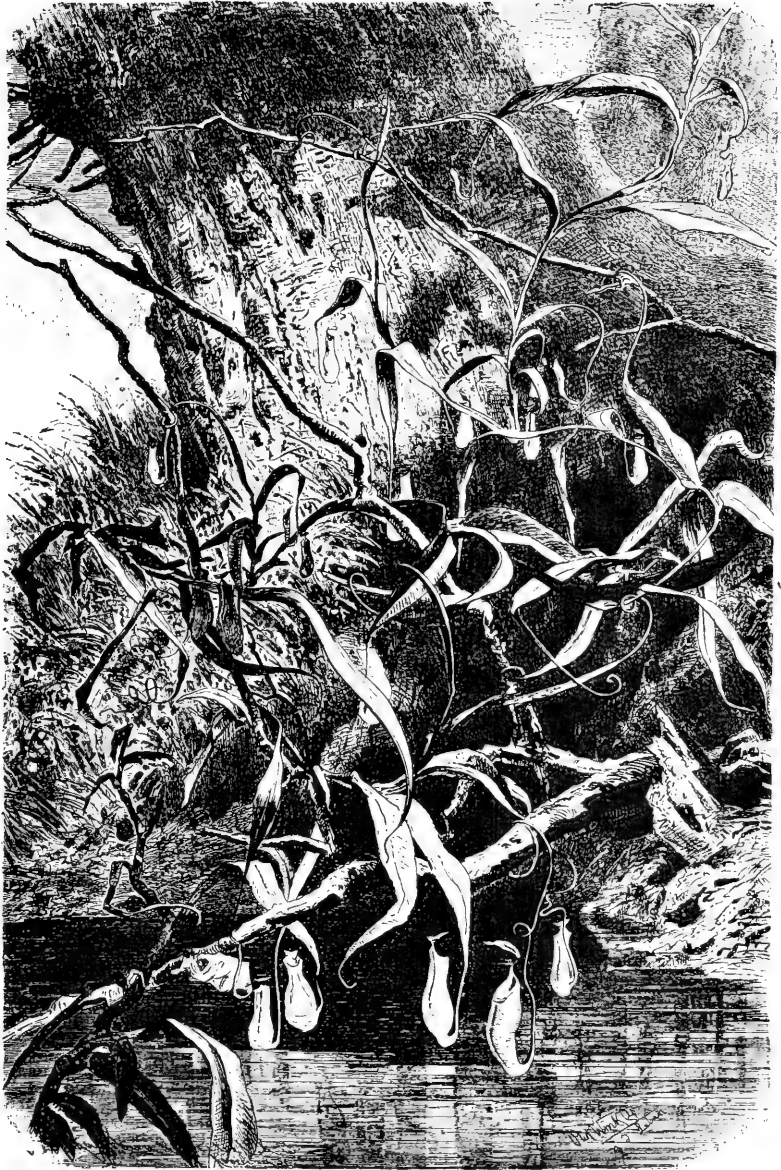


Fig. 8. *Nepenthes distillatoria*.

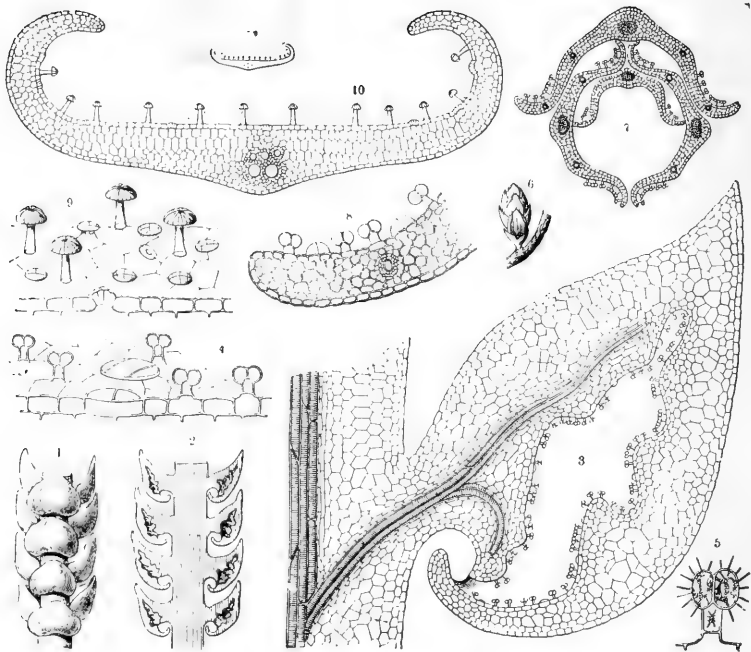


Fig. 9. Traps of *Lathraea*, *Bartsia* and *Pinguicula*: 1. Piece of subterranean stem with leaves of *Lathraea*. 2. Longitudinal section through the same. 3. Longitudinal section through leaf. 4. Piece of interior wall. 5. Plasma-threads extended to feed. 6. Subterranean bud of *Bartsia*. 7. Cross section through it. 8. Wall of cavities. 9. Piece of surface of leaf of a *Pinguicula*. 10. Cross section through the same. 11. Cross section through leaf, a little reduced.

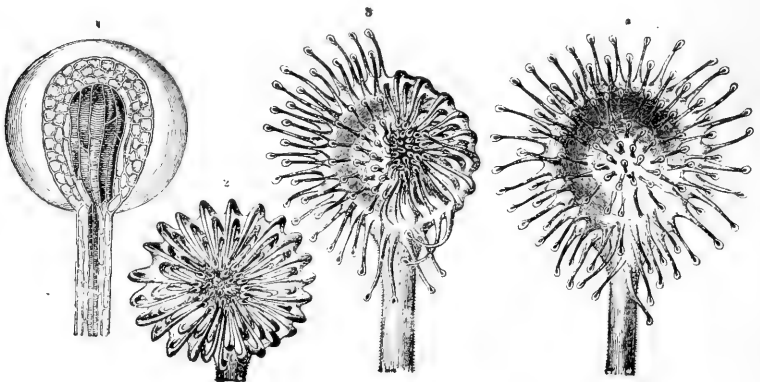


Fig. 10. Tentacles of Sundew: 1. Terminal gland, greatly enlarged. 2. Tentacles of a leaf bending toward centre. 3. Half of the tentacles holding an insect. 4. All tentacles extended.

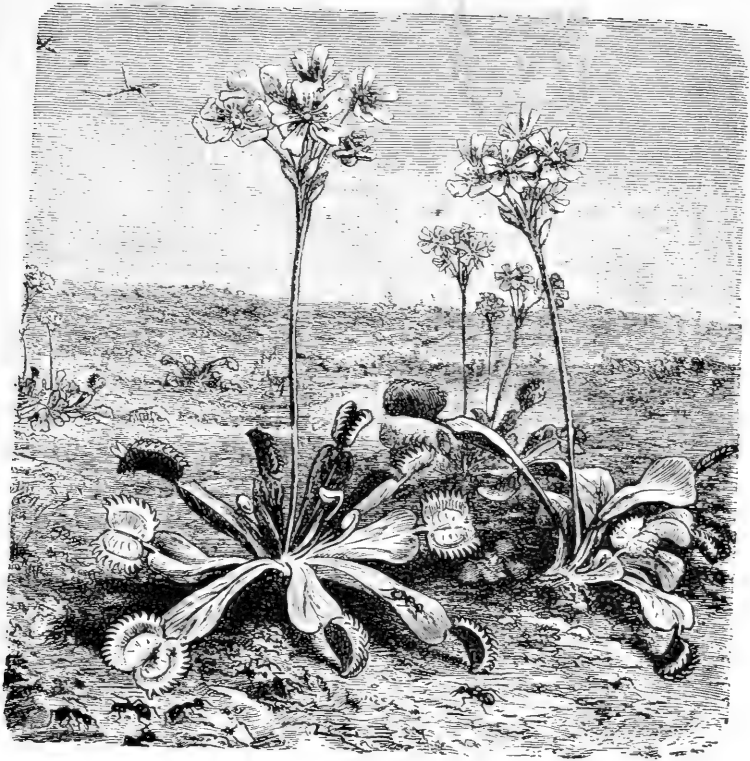


Fig. 11. Venus Fly Trap (*Dionaea muscipula*)

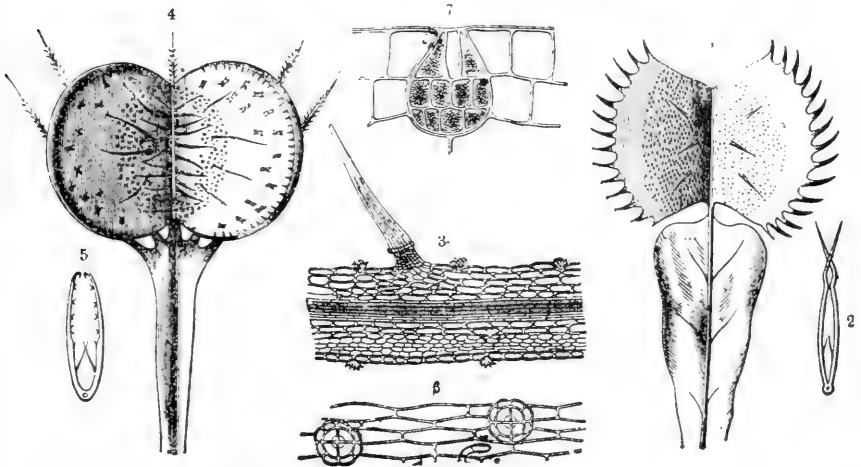


Fig. 12. Traps of *Aldrovandia* and *Dionaea*: 1. Extended leaf with trap of *Dionaea*. 2. Section through a folded trap. 3. One of the sensitive spines. 4. Extended leaf of *Aldrovandia*. 5. Glands upon trap. 6. Glands in the wall of a trap of *Sarracenia*.



Fig. 13. *Aldrovandia vesiculosa*.

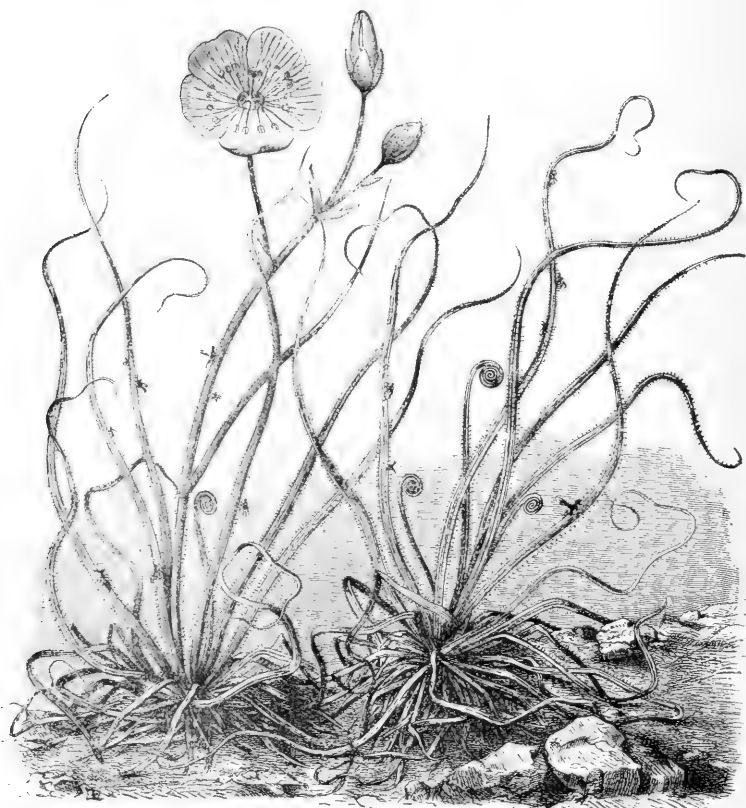


Fig. 14. Dew-Plant (*Drosophyllum lusitanicum*).

Southern Europe in shallow ditches and small ponds with very clear water. The plant looks like an *Utricularia*, has no roots, but floats freely in the surrounding medium. Its trap is also shown in Fig. 12 (4-6), and it is not necessary to describe its action, which is very similar to the one described in the Venus fly-trap. The plant consumes small crustaceans, but not as rapidly as the *Dionæa*.

CARNIVOROUS PLANTS CATCHING INSECTS BY MEANS OF STICKY GLANDS.

Forms which are contained in the third class of carnivorous plants show no movements produced by contact with food, but their leaves are covered with glands, which secrete a sticky fluid to catch animals. They also secrete fluids to digest, or which are able to absorb the albumen obtained from the victims. The most peculiar and best known representative of this class is the Dew plant (*Drosophyllum lusitanicum*), a native of Portugal and Morocco (Fig. 14.) This plant differs greatly from the other carnivorous plants thus far mentioned by growing, not in wet places but upon sandy soils or dry hills. The leaves, which occur in large numbers, are linear, ending in slender, thread-like points. Each leaf contains in its middle, upon the upper surface, a longitudinal groove. All the leaves are covered with pearls of fluid, which makes them appear as if covered with dew. These sparkling drops are secreted by glands resembling those of *Pinguicula* and *Drosera*. They agree with the latter in their red color, with the former in their hat or mushroom shaped form. Besides these glands, visible with the naked eye, we find others, without stems, which are colorless and secrete an acid fluid able to digest animal tissues. If an insect flies against a leaf its motion is not arrested but simply retarded. In trying to crawl away it comes in contact with more drops, which soon enclose it entirely, thus preventing escape. It is now absorbed by the flat glands, and only its harder substances are left behind. The secretion of this fluid is a very copious one, and we find in consequence numerous victims in all stages of digestion fastened to the leaves. The number of these victims is so great, that a plant covered with them attracts the attention of every passer by. The farmers near Oporto utilize these plants to catch the tormenting house flies in their dwelling places.

Numerous other plants are enabled by a similar construction to catch insects, for instance: *Primula viscosa*, *P. villosa*, *P. hirsuta*,

Saxifraga luteo-viridis, *S. bulbifera*, *Sempervivum montanum*, *Saponaria viscosa*, and others; also some plants growing near water possess this faculty, as *Sedum villosum*. But it would be wrong to suppose that all plants possessing sticky surfaces upon leaves or stems could also absorb the insects caught upon them. In many cases such sticky surfaces are simply protections of the flowers against unwelcome visitors. Glands which secrete such a sticky fluid may be of a two-fold benefit to the plant possessing them: They may protect against certain insects, and they may also derive benefit from those killed by this glue.

Many plants possess upon the upper surface of their leaves peculiar organs, looking like glands, but which do not secrete. These organs are there to absorb water, and are of great importance is the economy of plants. They can but seldom absorb chemically pure water, and nitric acid and ammonia is almost always obtained with rain from the air. This is very important for plants not able to obtain by means of their roots a sufficiently large amount of these substances. Many leaves show peculiar depressions in which rain is retained for a long time. Dust, small dead animals, pollen, etc., is carried there by the wind, and the water in these depressions soon becomes discolored and contains soluble nitrogenous substances, which are absorbed by sucking cells found in the bottom of these receptacles. They are, therefore, similar to the traps of insectivorous plants, but lack arrangements to invite insects, nor do they prevent their escape; still they form the connecting links with real traps.

Venus fly-trap, the best and longest known of carnivorous plants, has recently started quite an animated discussion in scientific papers. Gardeners claimed that the eating of animal food was of no benefit to the plants, but was on the contrary quite injurious. They found that such plants would thrive without animal food at least as well as with it. Moreover, if fed repeatedly, the leaves would turn yellow and die. If cheese was used as a food the leaf would hold and dissolve it, but would die in consequence. (The kind of cheese was not stated.) But we must recollect that plants in their native home are not apt to overfeed themselves. Larger insects can escape, as we have seen. If we deduct all the hard and insoluble material of the food left behind we perceive that but little albuminous food was really absorbed from their victims. Larger pieces of meat, cheese, white of eggs and other substances used for experimentation are not to be had by a plant in its native home. At all events plants

growing outside of a green-house never show discolored leaves. That they succeed well in captivity without animal food is owing to the better soil in which they grow. If sufficient nitrogen can be obtained from the soil these plants are not forced to catch animal food, but can live very well without it. It is a well-known fact that all carnivorous plants are only found growing in places where the soil is deficient in nitrogenous substances, and their being able to catch insects must be considered as a great advantage to them.

Ladies and gentlemen, I thank you for your kind attention to this rather lengthy paper.

President Elliot said the Society was under obligations to Prof. Luggar for his able and very interesting lecture.

Miss Lizzie R. Smith then favored the Society with a recitation, which was well rendered, entitled "Asleep at the Switch."

On motion of Mr. Harris the meeting adjourned till Thursday morning.

MORNING SESSION.

THIRD DAY, THURSDAY, JAN. 17, 1889.

The meeting was called to order at 9 o'clock by President Elliot.

The report of the seedling commission which was deferred was called for and the following reports made:

REPORT ON SEEDLING FRUITS.

By J. S. Harris, La Crescent.

Mr. President and Members of the State Horticultural Society:

During the past year the greater part of the work of the Seedling Fruit Commission has been performed by my colleagues, Mr. Sias and Mr. Fuller, who will submit reports at the meeting, hence my report will be brief.

In the month of March I paid a visit to a seedling orchard in the eastern part of Martin county, formerly owned by a Mr. Rowe and containing some forty or fifty varieties that were twenty or more years old. About ten of the varieties were in

very good condition, showing marks of great hardiness, but some of them are subject to blight; do not think the fruit of more than three or four of them will be of sufficient value to warrant their propagation. I have arranged with S. D. Richardson & Son, of Winnebago City, to look after them and to give them a trial.

After the adjournment of the summer meeting of our Society, in company with President Elliot I visited the grounds of Wm. Lyons, near Minneapolis, for the purpose of examining a seedling strawberry which he has since named Martha. The plants of this variety are strong growers, with healthy foliage and upon his grounds, very fruitful. The fruit is somewhat larger than Wilson or Crescent, of a bright deep red color, which extends through the berry. The berry is of uniform and pleasing shape, sprightly flavor, firm flesh and will probably keep longer and ship much better than most other varieties. As the plants appeared to be carrying full as many berries and were of considerably larger size than the Crescent, I should estimate the yield to be considerably above that popular variety and that in picking it would have twenty per cent in its favor. The flower is pistillate or imperfectly staminate and most seasons would require the presence of a strong staminate variety near by. It is a week or more later than the Crescent; Glendale and May King are probably the best varieties to use as a fertilizer. It is the only variety Mr. Lyons considered worth retaining out of a batch of seedlings from some twenty cases of berries that spoiled on his hands a number of years since.

I have kept close watch of a new seedling strawberry originated by Mr. Kramer, of La Crescent, known as Early Princess. As grown by him it is the most wonderful variety that has ever come under my observation. The plants last year were strong and vigorous, and the foliage remarkably free from rust and blight. In productiveness it also surpassed every other variety heretofore known. The fruit runs from large to very large. The color is clear, deep red; shape round and very uniform. The fruiting stems are long and strong, and carry the fruit well up until near maturity, when the enormous weight of the berries bears them down. The quality is as good as any of the productive varieties, and I think will suit the taste of the million on account of lack of acidity. At the summer meeting of the Southern Minnesota Horticultural Society, this variety was awarded first premium for single quart of largest berries, over the Jessie

and Bubach. The largest berry measured six inches in circumference. The actual measurement from three pickings from a square rod of ground was five bushels and two quarts in addition to a few specimens that had been selected at different times for exhibition. I did not see the variety until it was out of bloom, but think it is a pistilate. It is growing upon a dry, loam soil. The roots of the plants are strong, and Mr. Kramer says that it withstood the drought of 1887 better than any other variety upon his place. If it should do as well in future years and in other hands as it has with Mr. Kramer it will revolutionize strawberry culture for home use if not for market. The berry is not as firm as the Jessie, but this wet season held up better than the Crescent.

I visited Klein's Seedling apple tree in Houston county some time in August.

The history of the tree is found on page 138 of transactions for 1887. It is now 32 years old and apparently as sound as Duchess upon Mr. Klein's place. It was carrying a liberal crop of fruit of good size and appearance, specimens of which were exhibited at the state fair of 1888; some specimens I carried home kept very well until January 1st. Ordinarily it is considered a fall apple. Owing to its pedigree it may prove valuable as a variety for crossing with the Russians for growing seedlings. I have not seen the Okabena, or Daisy trees this season; but Mr. Ludlow reports they endured last winter without injury.

LAYERING.

On Dec. 24, 1888, I visited the apple orchard of a Mr. Disbrow at Alden, Ill. He has a variety of apples that originated from the seed of a large variety of apples procured in Ohio, some forty years since (probably Bailey sweet). Only one tree from the seed proved hardy and good enough to warrant saving; that one he has propagated by suckers or rootlets, and now has nearly twenty trees in his orchard, ranging from fifteen to twenty-five years old, all upon their own roots. He claims that he has never lost a tree from any cause whatever. The trees are all looking thrifty and sound while every other variety in the orchard shows disease, or decay. It is a regular and good bearer; fruit medium in size, handsome in appearance; delicious, sweet in flavor, keeps well all winter. Has the tree been kept hardy by method of propagating or is it more hardy than what are usually termed "iron-clads?"

REPORT ON SEEDLING FRUITS.

By A. W. Sias, Rochester.

Mr. President, Ladies and Gentlemen:

Pursuant to a call from our chairman, Mr. John S. Harris, G. W. Fuller met us at Rochester, Sept. 25, 1888, and, after spending a part of the day looking about for new varieties, we left for Kasson the same day.

September 26th, visited the Houston seedlings; found some good specimens yet on the trees. The fruit is of good size and quality, and the tree still looking well. We took the train in the evening for Owatonna, where we stopped over with E. H. S. Dartt. Mr. Dartt has many things to interest and instruct a fruit man. We went over his extensive orchards and were surprised to find apple trees of several varieties in full bearing, where the Ash Leaved Maple was said to be failing. This must be pretty conclusive evidence that he has some extremely hardy sorts. Dartt's Hybrid is flourishing finely. Mr. Dartt took us to see the state school for indigent children, near which is located his experimental station. He has only fairly commenced his good work here, yet he has a large variety of plants considering the short time that he has been in charge of the grounds. We were highly pleased with the progress made. Perhaps it might be said that he is making a speciality of seedlings, yet he is not so one-sided but that he can test any foreign variety that comes well recommended. Was glad to note that he had a keen appetite for evergreens, especially for the Rocky Mountain conifers, and other recently introduced varieties.

September 27th, in company with Mr. Dartt, we visited J. G. Miller, of Rice county. Think he said the Peerless apple tree bore some two bushels this season. The other seedlings bore considerable fruit but the crop was not large in any part of the orchard; we found one very promising seedling that Mr. Miller says is five years old — a seedling from the Wealthy and the fruit resembles it; will perhaps keep as well. It only bore three apples this season. Tree appears to be as hardy as a crab, but Mr. Dartt reminded me that we could not judge of the hardiness of a variety at that "tender age." As I have reported on this orchard once before, I shall depend on my partner, Mr. Fuller, to give you a fuller report.

October 9th, I visited Mr. H. S. Hayes, one of the pioneers of Fillmore county, and a distant relative of ex-President Hayes. He has a fine stock farm and the finest herd of red polled cattle I ever saw. You can find his name in the herd book. One reason why his stock always looks so fat and contented is because they have a large fine native grove to range in, in which flows a fine babbling brook of pure spring water. His stock yards and buildings are also well protected by native trees, and others of his own planting. October 10th Mr. Hayes accompanied me to the little village of Washington, on brook Kidron, near where we found the little clump of native white spruce in 1859, of which we made mention in our last year's report. The owner of these trees claimed that one of them was one hundred feet high when we visited there about a year ago, and Mr. Hayes and myself went there this time prepared to measure them, but the owner had stolen the march on us and had cut them down, and used them for the frame work of a new building that he had recently erected. But as we started out to measure a tree, we concluded to look further, and as we both knew where the first tree was that left that wild clump on the Kidron thirty-four years ago, we left for that place. The farm is now owned by Albert Lyon of Rochester, and the tree measures fifty-one feet and seven inches high and six and one-half feet in circumference one foot above the surface; four feet above the surface it measures five and one-half feet.

This is perhaps the most beautiful specimen of the white spruce that I ever saw. Foliage of a deep blue, and all the branches on the main limbs droop as gracefully as upon the finest specimens of the weeping Norways. Mr. Hayes gave me an introduction to Henry P. Moon, a prominent small fruit grower of his neighborhood — Sumner township. Mr. Moon is making a success with the blackberry, raspberry and strawberry; and he tells us that he also made a success with his apple orchard in Winona county before he moved to Fillmore county. Mr. Hayes showed us a Transcendent crab tree eighteen inches in diameter and some thirty years old that has yielded twenty bushels in a single year. The Beech's Sweet is fine here, and Mr. Hayes says it comes in nice and handy in making that old fashioned New England dish that he is so fond of, viz., sweet apple pudding.

October 11th, visited D. K. Michenor, Forestville, who has twelve acres in orchard, and one of the best in the state. He has some fifteen or twenty varieties, but Duchess and Wealthy

are the best. He has four or five winter sorts. Mr. Michenor speaks hopefully of apple culture in Minnesota, and considers his Duchess trees as valuable as so many cows. Mr. Michenor has a wild grape vine that covers nine large Cottonwood trees on one side of his garden, and furnishes five or six bushels of fruit per year. They sell for one dollar per bushel on the vine. Mr. Michenor has some winter seedling apples that may prove valuable.

Mr. Parkinson of Fillmore county has seedlings from the honey locust, now about twenty-five feet high, straight, handsome as a dollar and apparently perfectly hardy; the most of them were entirely thornless, and I brought away a seed pod from one of them, that measured twelve inches in length.

We inspected an apple tree on the farm of J. S. Ottman, some fourteen miles northwest of Rochester that appears to be a cross between the Hyslop crab and some larger apple. The tree resembles the Hyslop; fruit same color and nearly as large again. We kept it till about January 1st, and with proper care it can be kept longer.

SEEDLING STRAWBERRIES.

We have a seedling of the Jessie, that germinated a year ago last July, now among our house plants, with six berries on it, nearly half grown. Another with a leaf four inches long, and the same in breadth. If the best of foliage is any criterion for judging fruit, then look out for something rich at our next summer meeting.

REPORT ON SEEDLING FRUITS.

By G. W. Fuller, Litchfield.

I visited the Jewell Nursery at Lake City to learn what I could in regard to seedlings they are growing. Mr. Emery, one of the proprietors, gave me every facility for seeing their trees. The three year old Okabena seedlings are fine trees and with few exceptions appeared healthy. I said to Mr. Emery: "These trees look just like the Wealthy." The answer was: "They are probably a cross between the Wealthy and Duchess." I did not see the fruit, but a plate of the apple was shown me, which seemed to me like the Wealthy.

The question was asked: "What evidence have you that this tree is any hardier than the Wealthy?" The answer was: "It is something new."

Some of the Thompson, Iowa, seedlings were looking well, but others were evident failures.

I visited Mr. Sias, at Rochester. His orchard has evidently never recovered from the effects of the tornado which swept over it a few years ago. His orchard is in fine feed as far as grass is concerned, but in addition he is now trying the virtue of a good dressing of manure around each tree. He still holds strongly to some of the Russians and also to the Wealthies of three years' growth, from the roots of trees whose tops had been killed. This is an experiment perhaps worth trying. Some of his Russians are holding on their way, bravely trying to make a success of it.

Mr. Sias and myself visited Mr. Pond, near Kasson, and were pleased to find him successfully entering upon the work of growing small fruits, especially the blackberry and raspberry. He has a yellow raspberry which I think he calls the Golden Queen, which he regards as perfectly hardy, bearing well, without any covering during the winter.

Mr. Pond evidently believes in manure for fruit trees and he showed us some very large, fine Duchess, which bore well the past season, which speak well for his belief. The ground all around under the wide-spreading branches was deeply covered with well rotted manure.

In company with Mr. Pond we visited one of his neighbors, Alex. Houston, and examined a seedling which has been growing on his place for some years. It is rather crowded among other trees and has not had a very good chance to develop itself. The fruit is of fair size and quality, and a pretty good keeper. But we could discover no indications that it was any hardier than the Duchess surrounding it. It will be well, however, to test it by grafting.

We had a pleasant visit with Mr. Dartt at Owatonna and carefully looked through his large orchards. He has met with some success, but we noticed that his wood pile was largely made up from his orchard.

We noticed with interest the neat and orderly beginnings of his experimental fruit and forest tree seedling station and we trust valuable results will be attained. It is located on the state farm near the State Institution for Destitute Children, and should be made of some advantage to the children there educated.

Accompanied by Mr. Dartt, we went some fifteen miles to Dodge City, Rice county, to visit J. G. Miller, the owner of the Peerless seedling. As soon as we stated our errand, Mr. Miller, with a good deal of feeling, said: "The tree is in bad condition," and expressed his regret that so much prominence had been given it. He had no idea that the tree was not perfectly sound until a short time before our visit; someone in climbing the tree to cut scions, if we remember rightly, broke off a limb near the centre of the top which revealed the tree as blackhearted, and a close examination revealed the fact that some of the central limbs were already beginning to die. To say the least the tree was in no better condition than Duchess near by it. The tree is in a very favorable locality, being on high ground, with high willows on the south and west sides. Mr. Miller has one or two seedling hybrids which should be tested and may prove of value.

There is nothing new in regard to the two seedlings before reported in Meeker county. The apple tree of Mr. Mills, in Greenleaf, is dead, having been partly broken down by the wind two years ago. The trees grown from scions from this tree are looking well. They are only two years old. The tree of the hybrids of Mr. Baldion, in Cedar Mills, is still apparently sound and bore a full crop of apples the past season. But the grafts are not very promising, the trees growing rather short and scrubby. This is not, perhaps, anything against hardiness or value of the tree as a fruit bearer. The original tree is fifteen years old and rather small of its age; but it has not been cultivated or manured.

I have thus tried to state the facts in regard to these seedlings and I think we can from them come to but one conclusion, and that is, that we know of no seedling in our state that has shown sufficient evidence of hardiness to warrant a recommendation for cultivation outside of experiment stations or of individuals who wish to experiment; or that will warrant any man to sell them as hardy in our state, especially at fancy prices.

While forced to this conclusion, we still urge experiments to be continued on this same line, for we may unexpectedly find the hardy tree, bearing the long keeping apple we need in Minnesota. But let us be sure we have it before we say much about it.

Mr. Brand said Mr. Fuller had not given a fair and full report as to the Peerless. If the tree was blackhearted it was due to cutting too many scions. Two years ago the tree bore some eleven bushels of apples and a number of limbs were broken down. He had been informed by Mr. Miller that the tree had borne in all over sixty bushels of fruit and would be twenty-one years old this next spring.

Mr. Fuller said he had presented things as he saw them and as they were, but had said nothing as to causes producing them.

Mr. Dartt suggested that Mr. Fuller had already "been to Iowa." But his claims might be considered with those of his friend Mr. Taylor.

Mr. Taylor said there was usually two sides to a question, but if it was a fact that the tree had borne sixty bushels of good apples it was a very good recommendation.

Mr. Pearse had found by experience that cutting too many scions from young trees would cause them to become black-hearted.

Mr. Gould said he did not doubt Mr. Fuller had given a candid report. He had known Duchess trees, in an orchard near Bloomington, Ill., to be nearly destroyed by cutting scions from them every year.

President Elliot. There is one point I want to emphasize that was referred to in the report of Mr. Harris. It is with reference to layers from new seedlings that are just coming into bearing. When the Wealthy, that grand old tree of Mr. Gideon's, was first brought to our attention, Mr. Harkness and I went out there to his place to examine it. We found he had layered some of the limbs and they were rooted nicely. We purchased what layers he had that spring. To-day the only trees on my place of Wealthy that are alive, are from those layers. If it wasn't for the boys I could show you fruit from them every year; they blossom nicely and are the hardiest Wealthies I know of. I hope horticulturists will experiment more in this direction.

The following paper was read by Mr. Dartt:

SEEDLING APPLE TREES.

By E. H. S. Dartt, Owatonna.

If we have planted the seed of the apple, reared the trees and eaten the fruit thereof, and have grown old in this kind of labor, we certainly know something about seedling apple trees. But if what we know is compared with what we do not know then our ignorance must greatly predominate, for wherever life exists there the mysteries of life creep in. We are told that the sins of the parent shall be visited upon the children down to the third and fourth generation, and we do not know how much further the evil may extend. It seems that the same principle exists in regard to the apple tree—that there are certain defects or taints that have crept all along up from the most insignificant crab of the remotest period to the present time. These defects, some of which may have laid dormant for hundreds of years, are so likely to crop out that artificial hybridization becomes very uncertain in its results and many believe that planting the best seeds and judicious selection will soonest secure that adaptation we are all looking for and perhaps restore the apple to the perfect condition it may have been in when Adam's transgression caused the ruin we read of in the Garden of Eden.

In the planting of seeds we naturally expect the best results from planting seeds of our hardiest Minnesota apples. And though that may be true as a rule, yet I will mention one or two exceptions.

Over thirty years ago a Mr. Bixby, in the south part of Steele county, purchased a barrel of apples in the market and planted some of the seeds. One tree proved remarkably hardy and bore heavy crops of good winter apples for many years. It passed through all the hard winters without much injury till about 1885 and died a year or two later from the effects of climatic influences and old age. About 1870, S. N. Yearly, one mile southeast of Owatonna, had a seedling tree in bearing which had come with trees from an eastern nursery. It also bore a good winter apple, seemed perfectly hardy and for many years produced remunerative crops. Scions of this tree were obtained and root grafted and grown three or four years in nursery and transplanted to orchard. They had but just commenced bearing when they were entirely killed by one or two severe winters. From these instances we may conclude:

First—That very hardy trees may sometimes be grown from seeds brought from a warmer climate, or that a tree produced in a warm climate may possess so much inherent hardiness as to adapt it to a climate much more severe.

Second—That a seedling apple tree, though sufficiently hardy to stand in its original position and be very profitable, may prove of little value when subjected to our methods of propagation and change of location.

We have strong hopes that of the large number of promising seedlings now being tried in the Northwest, some will be found that shall stand this additional test and reassure our doubting people that good apples can be profitably grown in Minnesota. Let us continue to plant our best seed with a view of breeding up to the highest standard attainable.

SECRETARY'S ANNUAL REPORT.

Mr. President and Fellow Members:

We have the honor to submit herewith our fourth annual report. In so doing we are forcibly reminded of the common saying "Time flies." Little did we think five years ago this present month, when called upon to assume the duties and responsibilities of this position, that you would bear with us this length of time. Fortunately, we have had the sympathy and kind cooperation of officers and members of the Society in the performance of duties that have devolved upon us, and though at times we felt misgivings, yet with your kind indulgence and generous assistance we have been enabled to measure up to the success attained. And it may not be inappropriate here to say that in the suggestions offered at this time we shall not aim to teach, since you are so much better fitted by practical experience to give instruction were any needed to be given.

THEORY AND PRACTICE.

Horticulture is not like mathematics, an exact science. It is true we may reason from cause to effect with some degree of certainty. We may study the laws of plant development and growth, observe results that have been reached by close adherence to certain elementary principles, or methods of procedure; but we can neither sow nor plant with full assurance that the desired results will be attained in each and every case. Our field of labor is rather one of observation and experiment. We read the future in a measure by our experience in the past. And, hence, before proceeding in our investigations we find it profitable at times to take a short review.

RETROSPECTIVE.

Permit, Mr. President, a moment's retrospection, for in looking back upon the history of horticulture in Minnesota, we shall observe a fruitful field for study and reflection, and may find cause, forsooth, for some encouragement for the future, on horticultural lines.

We may at times review the history of the past with profit to ourselves, by turning lessons learned to practical account. But in making this digression you will please to pardon any seeming personal suggestions.

In 1867, we remember very well, on coming to Minnesota, at that period of our history as a state, there was abundant evidence of progress being made in horticulture.

It is not necessary here to mention all the numerous facts that might be shown in proof of the foregoing statement. We need not here refer you to the many fine exhibits made at different times, of fruits of various kinds, reported in our own transactions, or elsewhere so creditable indeed to all those sturdy pioneers, who grew and placed the same on exhibition.

OUR NATIVE FRUITS.

Our first impressions are usually most lasting and often seem intuitive. For instance, we remember very well how pleasing, if not really surprising, in fact, was the effect from casual inspections made concerning all the natural and material resources of the state; especially with reference to our native fruits, indigenous to the soil, found scattered here and there throughout our fertile valleys, rolling prairies and sunny hillsides. It is hardly necessary to add it was to us an interesting sight indeed to witness in the early spring time the beautiful and sweet-scented blossoms of the wild or native crab, which, although worthless as a fruit, appeared in such profusion in our groves and thickets here and there, so that its fragrance was ever pleasing to the passer-by; to see, also, the trees of wild cherry, the numerous groves of wild, or native plum, all covered with their snowy mantle, concealing every sign of bud or leaf; to see in patches now and then, the delicate, snow-white blossoms of the wild strawberry, and, passing later still, to find the ground besprinkled with its crimson-hued and tempting fruit, already ripe and pleasing to the taste.

Such sights as these one readily recalls, which were sufficient to enkindle in the mind of any average horticulturist—especially if he chanced to be an enthusiastic lover of fruit—an admiration for the natural resources and advantages of the state, made more emphatic, too, by seeing all the varied and multitudinous productions of our wondrously fertile soil; and this gave some foundation to the belief in its adaptability to the production of tame varieties of fruit in rich abundance as well as of the finest quality.

We often heard it said, to the disparagement of Minnesota, that apples could not be successfully and profitably grown; and this was urged as argument against its future settlement; that while a few small fruits of various kinds might be depended on, perhaps, it was no fitting place to grow the larger fruits. However, to our mind, this seemed a mere assumption, and the experiment was well worth trying.

We found as we have said, in Minnesota, a soil of unsurpassed fertility. Some of the early settlers said the climate, too, was unexcelled for healthfulness and equability; and, that, although severe at times, it was delightfully agreeable. And so, in spite of some misgivings, we very naturally indulged the hope that we should be enabled soon to grow fine fruits abundantly, of almost every character and kind.

In 1873 we tried our hand at raising fruit. We set five acres out to orchard, and also planted out a lot of native plums. The apple trees were thrifty two-year olds, and though there were too many of the tender sorts among the list selected, we do not doubt that we should have been reasonably rewarded for all our labor and expense had we remained upon the farm and cultivated with the proper care.

EARLY EFFORTS.

You will call to mind that many of our early settlers planted freely of orchard fruits of various kinds, and how their efforts, in spite of want of care in their selection of varieties, were signally rewarded with bounteous crops of fruit. For several years our orchards did not suffer serious injury, and there were many instances of gratifying yields of fruit. Some 30,000 bushels of apples were said to be produced in Minnesota in the year 1872, and as a natural result the average orchardist began to count on paying yields from that time forward. It was not strange, of course that careless methods should obtain, both as to the selec-

tion of varieties and as to methods of cultivation. But the succeeding winter upset these reckless practices; our older orchards were swept away, and nearly every tree was fitted for the brush-pile, and orchards theretofore so promising became a total loss in many instances. And hence it was not strange that those most sanguine in the past should now seem most disheartened or discouraged, for a time at least, regarding brighter prospects in the future.

SMALL FRUITS.

Wild fruits, as we have said, were seen in great abundance in many places, and always found a ready sale; they proved to be at least a temporary substitute for better fruits grown at a distance, in other states. They were, however, inferior in quality to cultivated sorts that were imported, or even those that were produced at home. It was but natural that here and there enthusiastic growers should be found who very soon began experimenting in small fruit culture. Some were successful in a marked degree, and not unfrequently a good supply of fruit was raised at moderate cost. It may not be without some passing interest to call to mind some of the efforts made by these early planters.

STRAWBERRIES.

Experiments have been conducted by quite a number of growers of the strawberry, that prince of berries, by propagating from the seed. In certain instances flattering results have been obtained. The process to any but a persevering person, would seem a tedious one, perhaps, but it has been continued here for many years.

Of those who have pursued this method of seeking to originate choice and hardy seedlings, we mention Geo. B. Wright and Wm. Lyons, of Hennepin county, the latter being one of our leading small fruit growers at the present time, and one who has originated quite a number of promising varieties.

Another of the early pioneers of fruit growing in Minnesota, and also an earnest horticulturist, was Mr. John Hart, of Winona county, who was the originator of "Hart's Minnesota Seedling," a variety which he considered quite superior to Willson's Albany. The berry has found many warm admirers, not only in this state but elsewhere.

J. C. Kramer, of La Crescent, has met with marked success in propagating seedlings. He is the originator of a promising berry known as "Early Princess." The variety was named by

a committee appointed for the purpose, at our summer meeting, in 1886. Specimens of its fruit were also placed on exhibition at our last summer meeting, and certainly were very large, of fine appearance, and said to be of excellent quality. The stories told of its productiveness on Mr. Kramer's grounds, would seem extravagant if true—at the rate of about eight hundred bushels to the acre. He has another seedling of nearly equal merit called "Kramer's Seedling No. 2." He has experimented over twenty years, and has at last succeeded in bringing out these candidates for public favor.

SEEDLING GRAPES.

Some of our enterprising grape growers have met with good results in their experiments with new varieties. By careful tests, conducted in some instances for many years, they have originated quite a list, a few of which seem worthy of propagation, or at least of general trial.

Among those who have been engaged most actively in this enterprise we mention Chas. Luedloff, of Carver, and R. Knapheide, of Ramsey county.

Messrs. Latham, Gould and Stubbs, of Hennepin county, J. Norquist, of Red Wing, Messrs. Harris, Schaller and Kluss, of Houston county, and many others that might be named, have each and all demonstrated very thoroughly that grape growing is an industry that may be prosecuted quite successfully in Minnesota and with a fair amount of profit.

That fine varieties of grapes are annually produced is certain, and numerous awards have been secured at different times which indicate superior merit, as at the Exposition at New Orleans, and elsewhere. It is most gratifying, too, to note that the industry is rapidly upon the increase throughout the state.

OUR NATIVE PLUMS.

Of what has been accomplished in the propagation of seedling strawberries and grapes, may be asserted with equal force concerning native plums; that is to say, that in their cultivation there has been gratifying progress made.

O. M. Lord, of Minnesota City, is quite a specialist in this direction, and justly is regarded as good authority on the subject. He has experimented largely and made the question one of thought and study, and has upon his grounds many leading kinds of seedlings as well as cultivated sorts, that have become

well known throughout the Western states. He claims the Roll-
ingstone, originated in Winona county, is, everything consid-
ered, as good a native plum as can be found in Minnesota. In
his experiments of late he has been carefully investigating con-
cerning best methods of cross-fertilization, the character of the
pollen in the blossoms of different sorts, etc.

SEEDLING APPLES.

When we consider what is being done in the direction of
originating new varieties of seedling apples, we have a pretty
large field. The apple is perhaps the most important of the
larger fruits. There is nothing to exceed it in popular favor,
everything considered. It will at once take rank, at least in
the estimation of most lovers of fine fruits, with the delicate
peach, the juicy plum, the luscious pear and the sprightly
orange.

There are not a few who have steadily maintained that choice
and hardy varieties would be obtained in proper time in Minne-
sota. Hence, quite a number of our more enthusiastic experi-
menters have planted seeds and have endeavored to originate a
new variety that should possess sufficient hardiness, and show an
excellence in quality that should at once commend it to the favor
of the average farmer and fruit grower.

Peter M. Gideon, of Excelsior, has, perhaps, been as active
as anyone in the state in his endeavors to originate new varieties.
He has experimented largely with hybrids, crossing them with
native sorts. His methods have been heretofore described by
him and need not be repeated here.

We do not propose at this time, to enter into any discussion
of the merits of the numerous varieties originated and recom-
mended by Mr. Gideon. His Wealthy has obtained a world-
wide reputation. Its hardiness of tree, its showy fruit, its size,
its excellent flavor and good keeping qualities, are some of its
points of excellence.

As to the work accomplished in this experimental field, we
simply make this passing note, but call attention more particu-
larly to the elaborate reports upon this subject, prepared for this
Society by our able seedling commission.

HYBRID VARIETIES.

The Siberian crab and the hybrid varieties endure extremes of
temperature of summer and winter, succeeding well in nearly

every portion of the state. The fruit is of a sprightly flavor, pleasant and palatable, and is well adapted for culinary purposes. There is a large and growing list of these varieties. They have their earnest friends who claim the fruit is useful, and that it serves the purpose of a substitute for standard fruit. The trees are usually very vigorous of growth but badly predisposed to blight.

RUSSIAN APPLES.

Much has been said and written upon the subject of growing new Russian fruits. The question has been argued pro and con at length. We think their merits as a rule have not been over-estimated, especially in Minnesota, or in localities that have a very trying climate. We find that those who have experimented with them largely are most outspoken in their favor, with some exceptions to this rule. It has been claimed in fact there are some kinds among the Russian apples much hardier than Duchess or even than the native oak. The trees in orchard are vigorous and thrifty, and in some instances at least yield handsome crops of fruit from year to year.

Mr. Charles Gibb, of Abbotsford, who is regarded as perhaps one of our best authorities on this subject, in a paper on Russian apples, read before the annual meeting of the Montreal Horticultural Society about one year ago, says: "The uncertainty of these fruits of Western Europe in the colder parts of this continent, both in the Eastern states and on the Western prairies, directed attention to the colder districts of Eastern Europe." Speaking of a personal visit made to Russia, in company with Prof. J. L. Budd, of Iowa, he continues: "We found St. Petersburg and Moscow not specially favorable to orcharding, but four hundred and thirty miles to the east of Moscow, in latitude 54° , six hundred miles nearer the north pole than Quebec, we found apple growing the great commercial industry of the people. Here the winter temperature for the winter months is 9° above zero, which is the mean for the winter quarter for a period of no less than fifty-nine years. That is nearly 7° colder than at the city of Quebec." He further states that the climate there is milder than at Kazan, in Russia, by 3° .

Continuing, he says: "Let me comfort you then with the fact that in no part of the Province of Quebec where we are likely to grow apples, is it colder than in the extensive orchard regions of Kazan. You have great diversity of site in this province. Choose your hillsides, not your bottom lands, unless near large bodies of

water, thus avoiding late spring and early autumn frosts. As you go north your difficulties will increase, yet you have no such difficulties to cope with as they have on the western prairies."

He recommends for colder climates a short list of varieties, and in doing so says: "I give this with a good deal of hesitation, from unripe experience, but give it in part from their behavior in my own orchard, and in part from trees I have seen in fruiting in Wisconsin and elsewhere in the United States; in order of ripening, either Yellow Transparent, or Thaler; raspberry, Titovka, Golden White, Longfield and Arabka."

Hon. H. E. Van Deman, chief of the division of pomology in the United States Department of Agriculture, has kindly forwarded for distribution at this meeting, a number of his bulletins, No. 2, being a report on "The adaptation of Russian and other fruits to the extreme northern portion of the United States." It contains much interesting and valuable information upon this subject, which is therein exhaustively considered. This pamphlet was, we understand, mainly prepared by T. T. Lyon, of Michigan, who is no doubt one of the ablest living pomologists of the land, and we bespeak for it a careful perusal. Mr. Lyon is of the opinion that "these Russian fruits have been brought to an adaption to a climate not originally inherent in the species, and their introduction to the trying climate of our central prairie region affords an advanced starting point from which desirable results may be soon reached." And as to Russian apples, he believes that "actual trial" will alone demonstrate their merits and value.

INTENSIVE HORTICULTURE.

Prof. Taft, now in the chair of horticulture in the Michigan Agricultural College, in a recent paper on this subject, says: "We may liken horticulture to a broad field, at one side of which the various flowers, fruits and vegetables are growing in almost their wild condition, with slight care and training. As we pass along we notice that more attention has been given to the selection of soil and varieties, to training, pruning and cultivating, and these evidences of care increase until, at the farther side, we find that every method known to benefit or render the development of the crops more perfect, has been employed."

It will not be disputed that horticultural science within the past ten years has made most wonderful advancement. Intensive methods are steadily gaining ground in public estimation. All

the conditions necessary to success are now brought into requisition and utilized. It would appear to us more real progress is being made now in a single decade than formerly was to be noticed in a hundred years.

The principles pertaining to this industry are taught more thoroughly than heretofore. Our agricultural and horticultural press is taking higher rank, and seems to occupy a broader field for usefulness than formerly. Our editors now-a-days, we must admit, are as a rule intelligent, discriminating and wide-awake — alive to everything which augurs for the public good. Whenever any new device, or better process is discovered, they gladly spread the facts before the public and favor the selection of the best.

If you will pardon the suggestion, Mr. President, without intention at flattery, or overstatement, we venture the assertion that horticulturists as a class are public benefactors. We find them always laboring unselfishly for others' good; their plans and methods are an "open book." They patiently investigate for years and carefully experiment, in order to discover methods sure to meet the highest measure of success, and after toilsomely attaining useful knowledge of the art, they quietly proceed forthwith "to give it all away!" Where else do we meet such generous magnanimity?

HORTICULTURAL EDUCATION.

Among the many indications of progress being made along these lines, it is most gratifying indeed to note the fact that education and scientific methods are being brought in requisition; the chemist's laboratory is opening up an interesting field for study and discovery. New facts are daily brought to light, eliciting information which perhaps our fathers never even dreamed about. As evidence of this we see in vegetable pathology investigations being made to learn the cause of plant disease, of fungus growths, and the like, the various remedial agents being tried to ascertain what are the most effective remedies; the laws of plant development and growth are being thoughtfully and patiently considered; attention is being given to principles pertaining to the germination of seeds and bulbs; the laws of reproduction, cross-fertilization and hybridization; methods of destroying noxious insects, or how to check their ravages by the use of poisonous substances or insecticides; and last, perhaps, but not the

least important, most advantageous means for gathering, storing and marketing the various products raised. All these are hopeful indications of steady progress being made along this line.

EXPERIMENTAL STATIONS.

No doubt much good will be accomplished by the investigations being carried on at various experimental stations throughout the land. This work is certainly a most important one if properly conducted or carried on. In our report three years ago, in reference to this subject we took occasion to call attention to some of the benefits to be derived in this direction from actual experiments by horticulturists, for the promotion of theoretical and practical horticulture in this state; we sought to show the need of systematic effort being made. Among the lines of research and experiment named as proper subjects for investigation, were the following: "Protection from contingencies of climate; effects of drought; averting injuries to fruit from scorching heat, from storms in summer and disastrous frosts in winter; originating new varieties of the hardiest, healthiest and best kinds of fruit trees, plants, flowers, vines, and shrubbery; (casting out worthless and unworthy); studying the nature of plants, their diseases, their acclimation and methods of cross-fertilization; the habits and influence of insect life upon plants and fruits, and carefully noting the results."

Now that the Hatch experiment law has been made effective we have been fortunate at last in getting our central station so thoroughly equipped for work. It has been officered with earnest and thorough-going men who will undoubtedly endeavor to bring about the best and most practical results. Since the conditions are now so favorable we do not doubt that every proper means will be employed to make our station among the very foremost of the land. The horticultural department is especially well equipped and manned for work. It was, no doubt a fortunate selection of a site—near St. Anthony Park—in many ways that might be named.

T. T. Lyon, president of the Michigan Horticultural Society, in his address a few days since, at Grand Rapids, in speaking of their station recently equipped, now under the control of the agricultural college of that state, has this to say: "It may reasonably be anticipated that with the special and recognized horticultural standing of this state, horticulture, and especially

pomology, will be made a prominent feature of its system of experimentation. There is, however, a very serious, if not in fact insurmountable obstacle in the way of successful pomological experimentation at the college, namely, the location of the institution in the low and frosty valley of the Cedar river, where only the more hardy fruits can be successfully grown."

Upon the other hand this feature seems to us as quite desirable; for why should not these stations be situated where the severest tests of climate, soil, or rigorous treatment may be had? And where the new varieties of fruits, that may from time to time be recommended, will only be such kinds as have been shown by rigid tests to have sufficient merit to recommend them to the public use at large.

ARE THEY A FAILURE?

We have no patience with the pessimistic notion that "it doesn't pay" to make experiments. In view of all the progress being made and the results accomplished in the past, such empty arguments should be like cobwebs, quickly brushed aside. The proofs to us seem wellnigh overwhelming.

We are reminded that our favorite vegetable, the potato, comes from the small and bitter wild variety, which has its native home along the rocky coast of Chili, South America. Dean, in his *New England Farm Dictionary*, published in 1790, says: "No longer ago than 1740 we had but one sort, a small, reddish colored potato, of so rank a taste that it was scarcely eatable." But on the contrary, we find to-day, a single American experimenter, guided by the knowledge since acquired, claims to have tested and produced six thousand different varieties.

Our turnips, cabbages and cauliflowers, all come from different species of brassica, which in their native form have bitter, woody stems and leaves and worthless roots.

That sweet-scented and umbeliferous plant, the common carrot, was propagated from the small and spindling wild variety.

Tomatoes (*solanum esculentum*) are of American origin and have been brought to their present degree of perfection within a very recent period.

The apricot, which has become a favorite fruit, was found growing wild in Armenia and Persia, and was from so small and sour a variety as to be considered of little value. The common plum, the varieties of which are very numerous, are said to have been grown from a shrubby plant of southern Russia.

It is said the pear (*pyrus communis*), grown generally throughout continental Europe, is sour and bitter, and scarcely fit for use.

The common grape vine (*vitis vitifera*), is a native of central Asia. From our common northern fox grape (*v. labruska*), sprung most of our valuable tame varieties.

Our favorite fruit the common apple (*pyrus malus*), as is well understood, has been brought to its present degree of perfection by a long and tedious process. The European crab apple is supposed to be the kind from which all others have sprung.

And thus we find that nearly everything of use for food, of vegetable, fruit, or grain, has been improved by careful cultivation and propagation, and by the use of scientific, or experimental methods, which in some instances have been continued through quite extended periods of time. We therefore do not doubt that great and lasting benefit will be derived from the experiments to be conducted, and from the information to be gained at agricultural stations which have lately been established in our own and other states. We trust that sure and constant progress may be made in this direction.

METEOROLOGY.

Much has been said and written concerning the peculiar and somewhat phenomenal climate of Minnesota. Meteorology is a subject of never-failing interest in all its many phases. This science is much better understood than formerly, since it is now made a subject of scientific study and investigation.

We merely wish to call attention to the importance of gaining more accurate information. We daily make some observations of the weather, and yet how little do we understand the laws that govern, or control these many changes. In order to succeed at raising fruit, the industry must be adapted to a large extent to the latitude, the conditions of the climate, and the environment. It has been often said that efforts made at growing any of the larger fruits in Minnesota, such as the apple, peach or pear, must be attended with very serious difficulty, from the contingencies which exist in a changeful and very trying climate. Our atmosphere is dry and bracing, and great extremes of temperature are found at every season of the year; although it may be said perhaps there are few places to be found that boast a greater number of pleasant and sunshiny days than in Minnesota.

These marked and sudden changes, especially of the summer and winter months, are often very trying to trees of various kinds.

We are indebted to P. F. Lyons, of the United States signal service, for some valuable statistics of observations taken at St. Paul. The normal winter temperature, deduced from sixteen years' observations, is as follows: December, 17.7; January, 11.9; February, 17.7; average, or mean for winter months, 15.8 degrees. This is practically identical with the winter temperature at Quebec.

The following table will be found of interest as it exhibits at a glance some of the difficulties to be overcome in raising fruit successfully in Minnesota. For instance, the mean temperature for 1888 was below 40°, accounting for the fact that grapes the present season have ripened badly.

SUMMER TEMPERATURE.

Following is a table showing average summer temperature at St. Paul from 1871 to 1888 inclusive, to which is appended the normal summer temperature. The deductions are made from the means for June, July and August of each year.

YEAR.	Average	YEAR.	Average
1871.....	68.1	1880.....	68.9
1872.....	69.6	1881.....	70.8
1873.....	71.3	1882.....	67.9
1874.....	71.2	1883.....	67.3
1875.....	66.9	1884.....	69.3
1876.....	70.0	1885.....	68.1
1877.....	69.8	1886.....	69.4
1878.....	70.7	1887.....	69.9
1879.....	71.3	1888.....	68.2

Sums1248.7
 Normal 69.4

NOTE.—Just before going to press Mr. Lyons gives us the mean temperature for winter of 1888–9 as follows:

Mean temperature, as deduced from maximum and minimum temperature, December, 1888, 24.9; January, 1889, 20.2; February, 1889, 10.2; average, 18.4.

TABLE IV.

ANNUAL MEANS, NORMALS AND DEPARTURES THEREFROM.
 ANNUAL NORMAL TEMPERATURE FOR ST. PAUL,
 43.6°; PRECIPITATION, 28.99 IN.

YEAR.	TEMPERATURE.						PRECIPITATION IN INCHES AND HUNDRETHS.	
	Mean.	Excess or Deficiency.	Highest.	Date.	Lowest.	Date.	Total.	Excess or Deficiency.
1871.....	43.6	.....	.....	No Data	No	Data	30.63	+ 1.64
1872.....	Dta In	c'mplt	.....	.....	-16.0	Jan. 31	Data	Inc'mplet
1873.....	41.6	-2.0	92.5	July 16	-29.0	Jan. 28	34.75	+ 5.76
1874.....	43.3	-0.3	99.0	July 6	-23.0	Jan. 14	35.51	+ 5.52
1875.....	39.8	-3.8	95.0	July 15	-32.0	Feb. 9	30.66	+ 1.67
1876.....	42.3	-1.3	93.0	Jul 1-8	-27.0	Dec. 9	23.66	- 5.33
1877.....	47.5	+3.9	93.0	July 17	-26.0	Jan. 8	28.80	- 0.19
1878.....	48.3	+4.7	96.0	July 16	-13.0	Jan. 1	22.80	- 6.19
1879.....	45.5	+1.9	92.0	Aug. 29	-39.0	Dec. 25	32.39	- 3.40
1880.....	44.1	+0.5	98.0	Aug. 13	-27.0	Dec. 28	29.76	+ 0.77
1881.....	45.2	+1.6	96.2	Aug. 11	-25.0	Jan. 11	39.16	+10.17
1882.....	45.6	+2.0	95.0	Aug. 14	-18.5	Dec. 7	23.14	- 5.85
1883.....	40.9	-2.7	100.0	July 1	-31.0	Jan. 22	26.70	- 2.29
1884.....	43.7	+0.1	90.0	July 24	-31.5	Jan. 4	26.11	- 2.88
1885.....	42.0	-1.6	94.7	July 30	-35.6	Jan. 2	25.33	- 3.66
1886.....	42.6	-1.0	94.2	Aug. 4	-33.9	Jan. 23	22.89	- 6.10
1887.....	42.1	-1.5	93.9	July 15	-35.7	Jan. 18	25.85	- 3.14
1888.....	39.9	-3.7	94.0	July 11	-41.2	Jan. 21	25.86	- 3.13
1888.....	39.9	-3.7	94.0	Aug. 2	-41.2	Jan. 21	25.86	- 3.13

Note in the columns of this table headed "excess or deficiency," the plus (+) sign indicates above normal, and the minus (-) one, below normal. The data in this table has been carefully determined from the records at St. Paul, and compared and verified at the chief signal office, Washington, D. C.

P. F. LYONS,
 Observer Signal Service, U. S. Army.

THE AMERICAN HORTICULTURAL SOCIETY.

Among the most important horticultural gatherings held since our last annual session was the meeting of the American Horticultural Society, in January and February last, in the state of California. The meetings were well attended by distinguished horticulturists of the land, and the discussions had at the meetings were of marked interest and appropriate to the occasion. Our Society was well represented by Messrs. J. T. Grimes and our worthy President; the former at San Jose, and the latter at Riverside, and who will make suitable reports.

The efficient and worthy secretary of that society is with us at this meeting. He has labored with ceaseless energy to place that society in the fore front as a representative national institution. In this effort he has succeeded admirably. We are indeed fortunate in having him with us at this meeting.

THE AMERICAN POMOLOGICAL SOCIETY.

The twenty-second biennial session of this long established and popular society holds its next meeting in Florida, commencing February 20th, continuing three days. It is important that our Society should be represented at the meeting. Much has been accomplished in the interest of American pomology by this organization, which should be encouraged and sustained. We are highly honored in having with us one of its charter members who assisted in 1848 in founding the society, in the person of Prof. Cleveland, who for a number of years has been engaged in the important enterprise of beautifying the public grounds of Minneapolis and St. Paul.

THE PAST YEAR

was on the whole a most favorable one for growing fruit. Some serious losses were, however, experienced from the late spring frosts as well as from the early frosts of autumn, the plum crop especially being cut short by the former and grapes by the latter. With a few more warm, sunny days our grape crop would have been quite large.

Apples were an unusually abundant yield, of fine appearance and of excellent quality. Where orchards had received the proper care and culture, the tendency was to an over production, and to the injury of trees in certain instances. For the first time many of the new Russian apples were fruited. Some of the more promising seedlings also bore well the past season.

The crop of small fruits was generally satisfactory. Cranberries, however, were injured by the frost, where grown without protection or cultivation of any kind. One of the largest crops of this fruit ever produced by artificial means, was grown in the adjoining State of Wisconsin, by A. C. Tuttle and others, who gathered we understand, one hundred barrels per day of this choice fruit, during the early days of September for which they found a ready sale at remunerative prices.

FRUIT AT THE STATE FAIR.

At the state fair, under the auspices of our Society and the superintendency of our worthy President, there was a very fine exhibit made of fruits, of apples, grapes, small fruits in jars, and also plants and flowers.

The fine display of New Russian varieties of apples, some seventy-five in number by A. G. Tuttle, of Baraboo, attracted much attention and very effectually convinced some of the skeptical who witnessed the large and beautiful specimens of fruit, concerning the production of choice fall and winter apples in this northern region. This fine exhibit is worthy of more extended notice than can be given it at this time. He was very justly awarded first prize on his fine collection, all of which was from his own orchard, in Wisconsin.

Wm. Somerville, of Olmsted county, exhibited nearly fifty varieties of apples from his orchard, including some twenty-five varieties of New Russians. One variety called "Russian Wax" attracted much attention; its genuineness as a real apple was even questioned by many till critically examined. There were several other fine exhibits made. The display of fruit in general was indeed most creditable to all.

The many varieties of grapes exhibited by Messrs. Latham, Knapheide, Pearse, Gould and others, also made a fine display, the most of which appeared to be fairly well ripened before September 10th, the opening day of the fair.

THE STATE AGRICULTURAL SOCIETY.

In this connection we wish briefly to refer to the state agricultural society, under the management of its president, the present governor of the state, and its efficient board of managers and secretary. The annual fair was well attended, and, considering the shortness of cereal crops in general, the display of farm products, including live stock, was very creditable to the state. The program was well carried out in spite of one or two rainy

days. The management are to be congratulated on their success in dispensing with the services of the gambling fraternity, with their numerous wheels of fortune and games of chance, of every kind.

The statement of the treasurer, at the annual meeting held at St. Paul last week, indicates the society is established upon a very satisfactory basis.

The receipts of the agricultural society, as shown by the report of its treasurer, include the sum of \$52,400 on account of the annual fair, \$25,000 balance of state appropriation, and some small items, which, with a balance of a little over \$3,000 on hand, swell the grand total of receipts for the year to \$81,588. Of this amount, \$25,000 was paid on indebtedness the of society, and \$45,452 for fair expenses. The property assets of the society are estimated at \$575,786, including 200 acres of land valued at \$2,000 per acre, and about \$170,000 in buildings and fixtures. This is indeed a very creditable showing.

At the annual meeting in St. Paul last week, on motion of Col. J. H. Stevens, on a close vote, a somewhat radical change was made with reference to annual meetings. In place of the annual election of officers and the usual routine of business, the annual meeting is to consist of a three days' session, with a program of exercises to include addresses from speakers of ability on agricultural topics, etc., the transactions of the society to be published in connection with reports from the state dairymen's association, the poultry, and other state associations of an agricultural nature which do not at present publish their proceedings. This plan has been followed for some years past in Wisconsin, provision being made in that state for the publication of 15,000 copies of the transactions of the state agricultural society.

THE SOCIETY.

It is unnecessary here, perhaps, to state the fact that our own Society is making steady progress; nor would it be expected that mention should be made of all our various lines of work. With some degree of satisfaction we may glance at what has been accomplished in the past, and feel encouraged to renew the work that seems to lie before us. New fields of work are being brought to light, and in this busy age of progress, there is constant need of putting forth our every effort to reach the highest measure of success and usefulness.

Some of our eastern friends seem to be troubled by the fact that we have such a live and wide-awake society in this progres-

sive northern region, as may be gathered from the following pleasant complimentary notice, from that reliable seedsman, Mr. Peter Henderson, of New York, who writes:

NEW YORK, July 31, 1888.

S. D. Hillman, Secretary, etc.,

DEAR SIR: I am in receipt of the annual report of the Minnesota Horticultural Society, and a glance at it indicates that it is exceedingly well gotten up, and must be very interesting reading. It is certainly to the credit of you Western men to get up anything so successful as your Society seems to be. With our two millions of population of the city of New York and vicinity, we have never been able to permanently keep alive a horticultural society; we have one in existence now, but I am afraid it is on its last legs. What is the reason of it? I have tried my best to discover and have failed to get at any cause, but it has been tried for the last fifty years, and in no case has the society existed more than fifteen years, and then in a from-hand-to-mouth sort of way.

Yours very truly,

PETER HENDERSON & SON.

It is unnecessary here to add, perhaps, that this Society has much to do to make it in the future a wide-awake and really progressive institution. Nor can its officers, however earnest, do all the work required. They need the co-operation and united support of all its members and earnest friends.

VOLUME SIXTEEN.

The last number of our transactions was issued in the month of June. Though less voluminous than the preceding number, it still contained 464 pages. Typographically the work was executed with much care by Messrs. J. W. Cunningham & Co., the painstaking publishers. Of the 3,500 copies issued, 900 were bound in cloth, including 300 at the expense of the Society. The larger portion of the edition was distributed among our members, local societies, and among those entitled by law to receive a copy.

Many complimentary notices were received concerning our report which speak with credit of the work of the Society.

In conclusion it may be proper to add that an apology is due the Society for this hastily prepared and quite too lengthy report. We are admonished that our space is limited, and that it is highly important that brevity and conciseness of statement is required on every page, in order to bring our next volume within reasonable limits, and to secure the publication of what is truly valuable.

FINANCIAL REPORT OF SECRETARY.

The following is a statement of receipts and disbursements by the Secretary for the year ending Jan. 15, 1889, as shown by itemized statement submitted:

The amount of membership fees received by the Secretary during the year was..... \$81 00

DISBURSEMENTS.

Library set, report American horticultural society.....	\$2 00
Stationery	10 15
Expressage on reports.....	13 35
Postage stamps and cards.....	25 50
Membership fees paid treasurer.....	30 00
Total.....	<u>\$81 00</u>

Respectfully submitted,

S. D. HILLMAN,

Secretary.

TREASURER'S ANNUAL REPORT.

To the President and Secretary of the Minnesota State Horticultural Society:

Following is a statement of receipts and disbursements from Jan. 20, 1888, to Jan. 17, 1889, inclusive:

RECEIPTS.

1888.		
Jan. 20.	From J. T. Grimes, treasurer.....	\$510 42
Jan. 20.	Membership fees from W. H. Brimhall.....	19 00
Jan. 20.	Membership fees from S. D. Hillman	30 00
Jan. 20.	State treasurer, one-half annual appropriation for 1887....	500 00
Jan. 20.	Membership fees.....	6 00
Aug. 2.	State treasurer, one-half annual appropriation for 1888...	500 00
Aug. 2.	Membership fees.....	3 00
1889.		
Jan. 16.	N. J. Stubbs, overpaid on premium.....	1 00
Total receipts.....		\$1,569 42

The following disbursements have been made, as shown by vouchers returned:

DISBURSEMENTS.

1888.		
Jan. 20.	R. A. Latham, prize essay on grape growing.....	\$25 00
Jan. 20.	Archie N. Wilcox, prize essay on strawberries and raspberries.....	25 00
Jan. 20.	Burton T. Wilcox, prize essay on blackberries and dewberries	25 00
Jan. 20.	N. F. Brand, prize essay on orcharding.....	25 00
Jan. 20.	S. A. McHenry, prize essay on	25 00

Jan. 20.	S. D. Hillman, balance of account of 1887.....	8 95
Jan. 20.	S. D. Hillman, fourth quarter's salary	125 00
Jan. 20.	Wyman Elliot, salary for 1887.....	25 00
Jan. 20.	A. W. Sias, vice president and expenses to Dakota.....	29 00
Jan. 20.	G. W. Fuller, expenses as vice president.....	3 90
Jan. 20.	E. H. S. Dartt, expenses as vice president.....	2 75
Jan. 20.	J. S. Harris, expenses on seedling committee.....	17 00
Jan. 20.	J. M. Underwood, expenses on executive committee.....	3 00
Jan. 20.	H. A. Gale, for use of Market Hall rooms	40 00
Jan. 20.	W. A. Fisher, entertainment of delegates.....	13 50
Jan. 20.	E. A. Cuzner, salary as librarian.....	10 00
Jan. 20.	Premiums at winter meeting.....	93 00
Jan. 20.	M. Cutler, expenses as vice president.....	2 25
Feb. 28.	S. M. Owen, address on forestry, 1,000 copies.....	25 00
Feb. 28.	O. F. Brand, expenses on executive committee.....	2 25
May 15.	S. D. Hillman, first quarter's salary	125 00
June 28.	Premiums at summer meeting.....	109 50
June 15.	J. W. Cunningham & Co., circulars.....	6 00
June 28.	J. W. Cunningham & Co., binding 300 reports.....	90 00
July 31.	S. D. Hillman, second quarter's salary.....	125 00
July 31.	P. J. Geisen, packing and expressing reports.....	22 25
June 28.	J. S. Harris, expenses at summer meeting.....	10 88
Oct. 1.	S. D. Hillman, third quarter's salary.....	125 00
Oct. 1.	S. D. Hillman, postage on reports	102 00
Oct. 8.	Geo. W. Fuller, expenses on seedling committee.....	32 26
Nov. 17.	A. M. Pratt & Co., paper and twine, tying reports, etc....	10 00
Nov. 22.	A. W. Sias, expenses on seedling committee.....	26 79
	1889.	
Jan. 3.	Brown, Treacy & Co., programs, etc.....	14 75
Jan. 17.	Salary of treasurer.....	25 00
	Total expenditures.....	\$1,350 03
	Balance in treasurer's hands.....	\$219 39
		\$1,569 42

Respectfully submitted,

DITUS DAY,
Treasurer.

The report of the Treasurer and the financial statement of the Secretary were referred to the finance committee.

Subsequently Mr. Harris, Chairman of the Finance Committee, presented the following report:

The Finance Committee report that they have examined the books and vouchers of the Treasurer and find them all correct.

That they have also examined the financial statement and itemized account of the Secretary and find the same correct.

LIBRARIAN'S REPORT.

Mr. President:

As most of the members are doubtless aware, the agricultural building on the university campus was badly wrecked by fire on the night of Sept. 26, 1888. Our reports suffered with other things. Those on shelves or in cases were damaged but little, while those piled on the floor were badly disfigured by the water and ashes falling upon them. As soon as we could move things out of the building, our president and secretary came over with a large wagon and took away those most prized and such as needed more room, to be dried at once, so as to save them if possible.

There is now in the old library the following: Reports of 1866 to 1873, bound in cloth, 134 copies; 1874, paper 1,200; 1875, paper, 75; 1876, paper, 160; 1877, paper, 350; 1878, paper, 130, cloth, 31; 1879, paper, 4, cloth 1; 1880, cloth, 106, 1881, paper, 650, cloth, 432; 1882, paper, 1,077, cloth, 97; 1883, paper, 296, cloth 64; 1884, paper, 383, cloth, 758; 1885, paper, 1,575, cloth, 3; 1886, paper, 460; 1887, 200.

There are some few other odds and ends hardly worth caring for; also some twine and wrapping paper left.

E. A. CUZNER,
Librarian.

The following from Mr. Gibbs, formerly secretary of the Society, was received and placed on file:

NOTES FROM SOUTH DAKOTA.

By Oliver Gibbs Jr., Ramsey, Dak.

S. D. Hillman, Secretary, etc.:

As it is uncertain whether I can attend your annual meeting this year, I will make a few notes as you requested and send them in.

Prof. Keffer, from his observations at the Brookings agricultural college, and at the Dakota horticultural meetings, and from his travels and extensive correspondence, will be likely to give the general news of horticulture in the territory.* I will therefore limit my notes mostly to my own personal work and to what I have learned from my neighbors' gardens.

* Prof. Keffer writes that owing to a press of duties he can not furnish the article promised.—Sec'y.

VEGETABLE GARDEN.

In the vegetable garden I was victimized by one of our Western seed firms whose senior member I had known for merit some years ago in a single specialty, and whom I trusted last year for my entire order of garden seeds. I planted and tilled with the intention of aiding our county fair with a large line of choice and showy products. A pound of "giant" mangel seed yielded two kinds of sugar beets, two kinds of turnip beets, a long blood beet, one or two kinds of globe beets, and not a single mangel wurzel in the lot. A neighbor raised a similar lot from seed obtained from the same firm, and entered them at the county fair as "———— Giant Mangel Wurzels" because the paper of seeds said so, and gave the firm the benefit of the advertising. Of course the judges recognized the joke, and rejected the entry. "Danver's half-long" carrot seed yielded about every sort of carrot except Danver's half-long. Pickling onions were more than half scullions, good large ones. Several other sorts of onion seed might have been true to name, all through, and of fair stock in the days of their youth. I can not speak for the dead seed. The few live ones were all right. A barrel of six kinds of potatoes were all of one sort except a few accidental scatterings of unnamed sorts. And so on—"the cankerings of a calm world and a long peace" served me right; I should have known better than to have bought of a seedsman who attaches his own name to almost every seed in his catalogue and who flames out with gaudy pictures of vegetable impossibilities. Hereafter I want a plain catalogue; and in our local farmers' meeting here, where we discuss such things during the winter months, we will make a black list of seedsmen and—may I be permitted to say it in this presence—of nurserymen who cheat us.

Of several sorts I save my own seeds. Excelsior watermelon, of successive years' selection, mixed with the Stokes, still heads my list for size and quality, productiveness and earliness; planted the middle of May, they commence ripening not later than the twentieth of August, average about twenty pounds weight, and yield many above thirty pounds. We never get a poor Excelsior melon; they continue ripening till frost comes, and are good keepers. The Stokes is not equaled for quality when the season is favorable for its growth, and is fairly productive. The cross between these two, I spoke of last year,

bred back into a long-necked mongrel, and was discarded. Another cross between Miller's Cream Nutmeg and Bird Cantaloupe also bred back to both sides with the virtues of neither parents and faults that neither had. I am now bred entirely out of a good muskmelon. What shall I try next? Someone tell me.

The William Hurst pea, seed originally from Gregory, is all we want for an early sort. With my other purchased seeds I received a lot ordered for and labeled "Champion of England." They were not champion of anything whatever. Does any seedsman preserve this old king of the late peas? I have not been able to get it for many years.

SMALL FRUITS. .

I have found, as yet, no strawberry quite suited to this soil and climate except the Crescent, though Glendale does fairly well; shall discard Sharpless, Jewell, Parry and Warren, have ordered Wilson, Gaudy, Jessie, Bubach, and Monmouth. Lucretia Dewberry wintered well but bore no fruit, probably uncovered too early. Grapes, the few found in the garden when I came here, bore well and ripened before the frost of September 10th. My first planting of grapes was last spring. Out of sixty-five vines, partly from Mr. Latham and the rest from the Minnesota Experimental Farm, all lived and grew well but three. In the lot are Moore's Early, Worden, Concord, Delaware, Niagara, Pocklington, Brighton, Janesville, Wilder, Agawam, Ives, Hartford, and Rogers 9. Will watch their foliage and general habits carefully and report. We have a great study here in Dakota to find out what sorts of plants are adapted to our climate. My place is too much the headquarters for birds to do anything with raspberries till this fruit becomes more common in farmers' gardens.

FLOWERS.

In the flower garden we have good success, and it goes a long way to make us contented in Dakota. In the centre of the plat, a little bench garden devoted exclusively to flowers, we have a wild grape trained over a cheap arbor of poles and crotches, under which a dozen persons can be comfortably seated, and the foliage so dense over head that the brown thrushes often chirrup and eat their grapes there while we are sitting beneath, and it is but three years since we put the arbor up. The young shoots hang pendant on the sides, and some of them are taking fresh

root. I speak of this because it is so easy a thing for anyone to have in the flower garden for a retreat and resting place where one, or two, or the family, or a social group of visitors, can repose in refreshing shade, and enjoy the odors of flowers, the beauty of form and color all around, the music and motion of the fitting birds, the hum of insects, and all the associations that make flowers agreeable. This arbor I call my private office. I fancy there is no plant for an arbor equal to the wild grape. The air beneath its shade seems fresher, to more "nimble and sweetly recommend itself" through the grape foliage than through other vines; like that where the "temple-haunting martlet at Macbeth's castle decorated each jutting freize and buttress with his loved mansionry because the air smelled wooingly at Inverness."

We have been much interested during the past dry summer in noting the differences among the flowering plants and shrubs in their apparent capacity to resist the drought. Some seem to care nothing about it. Others wince a little but stand it. Still others give up. Among the shrubs the strongest are the Tartarian honeysuckles and the lilacs. Next are the *Hydrangea grandiflora*, the syringas, the wisterias, the *clematis vitalba* (virgin's bower). The weakest are the spireas. We let our snowballs bloom too heavy the first season of their budding, and they are weak in consequence. Others leave them in good growth. The wild shrubs and small trees, as the grape, the bittersweet, the ampelopsis, the scarlet thorn, the shepherdie, the wahoo, the Juneberry, the sand cherry, etc., are independent of drought. The boursoult climber, the blush and the Princess Adelaide moss are the strongest of the roses in a dry season; next are the glory of mosses, the Countess de Muriinois, the black rose, and the damask; the weakest are the Scotch. Of the annuals, the portulacca is queen of the desert. We often wonder why this flower is so little appreciated. We fringe the front slope of our garden with a long bed of it. Keep it clean of any weeds by hand picking, and it seeds itself from year to year and covers the slope with brilliant many colored bloom all summer, and the dryer the weather is the better. It likes heavy fertilizing, yet is thrifty under neglect. In thinning out the volunteer plants, the colors of the bloom can be distinguished by the shade of the plant itself, so that a mixing of colors can be regulated to suit one's fancy.

Next in drought resisting powers are the petunias, the phlox

Drummondia, the nasturtiums, the four o'clocks, and the Schizanthus Centranthus, Vicaria, Antirrhinum, bartonia, pyrethrum, Verbenas and all the pinks. Pansies drooped, asters quit, Ziinnias, candytufts, marygolds and many others of unknown names, from papers of mixed seeds, withered badly. We tried to get the scarlet lobelia, but received the blue instead, as we did several other uncertain sorts of flowers from the same seedsman who partly wasted a summer's work for us in the vegetable garden. The blue home proved to be a good little rustler and bloomed in a nice border at our feet by the arbor all summer. Gladiolus made moderate blooms.

THE ORCHARD.

There is nothing to say under this head except that everything did so well since the trying year when they were first planted, I can not tell yet what varieties are hardiest. All the weak trees were cut back the second spring, and most of them made new stems and have since done well. All are too young to have the blight. I was greatly encouraged last spring, after we had such long continued and severe cold weather, and scarcely any protection from snow in my wind-swept orchard, to find no traces of winter-killing whatever. The Leinherting and Bessemianka pears, the Maldaoski and Arab plums, the Osheim and Riga cherries, came out as fresh and vigorous as the wild brush.

WILD PLUMS.

No fruit last year—first failure since the country was settled, so say the old settlers. I find so much variation in the fruit, due to intermixing of pollen, and some other causes perhaps not so well understood, that to protect myself from being advertised as a fraud by people who “know not Joseph,” or the nature of the wild plum, I am declining all applications for cions, except from the official experimental stations, but shall save the pits of my best fruit the next time I have a crop, and send there instead. People will then know they have to take their chances. But I am cutting down all groves of inferior sorts.

THE SAND CHERRY.

I find this germinates readily from spring planting of the pits. We have an increasing number of reports of its behavior under

domestication. It is growing in popularity. H. C. Warner, of Forestburg, one of our best posted and most reliable authorities in Dakota horticulture, says, that for cooking purposes it is equal to the early Richmond, and that the yellow variety is more globular in form and of better quality than the others. Nurserymen do not seem to have it in stock as yet, but every cherry that shows itself next summer in the markets of the towns will be saved for seed.

THE SHEPHERDIE.

Small sprouts dug up in my pasture a year ago last spring and set out in the garden are now seven feet high and loaded with fruit buds. In the wilds the trees look scrawny. In the garden, straight and symmetrical—a handsome ornamental tree in every way. Has anyone yet learned how to germinate the seeds? A friend of mine tried the scheme of fermenting them in the body of a hen, shut up for the purpose, but lost the seeds before the planting season, by some neglect.

May you all have a pleasant annual meeting.

RAMSEY, McCook county, South Dakota, Jan. 5, 1889.

HORTICULTURAL INSTITUTES.

Mr. Barrett presented a resolution in reference to the horticultural instruction to be given at farmers' institutes, etc.

Mr. Fuller moved the adoption of the resolution. He said there was great need of educating the people in horticulture; it was useless for a farmer to buy a lot of strawberries when he knew nothing about taking care of them.

Col. Stevens said while he was in favor of the resolution he had doubts as to the propriety of its passage at this time. There were too many interests needing assistance to ask a special appropriation in the interest of horticulture alone. The institute work, under the management of Supt. Gregg, had been a great success, and the subject of horticulture had been well represented as a rule at the meetings, by Mr. Smith, Mr. Harris, Mr. Barrett and others. It was better to continue the present system than to hold separate horticultural institutes. He thought a better attendance would be secured, and more accomplished in the interest of horticulture to conduct the institutes in the manner heretofore pursued.

Mr. Fuller said he was opposed to holding the institutes separately from the agricultural and dairy interests. He did not understand that to be the object.

Mr. Barrett. I was at the farmers' institutes during the summer campaign, and traveled over the Red River valley, where forests are greatly needed. I want to say that in Mr. Gregg I found the right man in the right place, and I do hope that not a word will be dropped here by any member of this Society, that will in any sense conflict with the good work that he is carrying on. I have noticed, however, that there is a lack of interest in horticultural and forestry topics; farmers are all absorbed in the horse; dairy interests and the hog take a prominent place. Mr. Gregg allowed me to wedge in here and there some talk on horticulture, but from necessity it was limited, seldom more than twenty or thirty minutes; in some localities the subject was not mentioned. Under such circumstances ought we not to do something? We have been tinkering away to induce people to plant forests. But they have wheat on the brain. We must compel the people to come in. I used to entertain the idea that men could save themselves, but I have about come to a different conclusion. We must have line upon line, precept upon precept.

Mr. Pearse. I have been with Mr. Gregg over the southern part of the state. I have found usually at these institutes twenty-five or thirty persons that were deeply interested in horticulture, but other topics took up most of the time—the cow and the horse. They were the leading subjects of the day. If we got in half an hour on horticulture in a three days' session we did remarkably well. I have found it the best plan to get those interested into a separate room and give them instruction. They then went away perfectly satisfied.

A portion of this appropriation belongs to the Society just as it belongs to any other interest. If there is any business that ought to be attended to it is that of planting trees on our Western prairies. There are thousands of acres there that will have to be planted to trees. All those people there should be taught how to grow evergreens. The State of Minnesota could well afford to expend \$100,000 to plant evergreens in that section of the country; it would be worth millions to them. Why should we hesitate in urging such a worthy cause? Those people are, many of them, as good people as there are in Minnesota; they are Eastern people; they are educated; they are ladies and gentle-

men. Do you want to deprive them of these blessings which are in our power to bestow upon them?

Mr. Allyn thought if "the cream and the horse" were taken from the farm there would be very little left. It was where people gave most attention to the pig and the horse that horticulture was coming forward—in other words, the luxuries of life. If farmers would continue to prosper they must have the cow; thousands were needed where very few were now to be found. There was no industry in the state so important as the live stock industry. A farmer planting the strawberries might get something and he might not. Prof. Gregg was doing a work that the state had need to be proud of. Too much was said on this fruit question and too little on that of vegetables. He had been here now three days and hadn't had a chance to put even a beet into the department. (Laughter).

Mr. Pearse. Mr. Gregg is a first-class man; I esteem him highly. I will give him all the time; but I will take my dozen men and women and go into a separate room with them, to teach horticulture. I have done it time and again and it interferes with nobody.

Mr. Barrett. The idea that we horticulturists are opposed to the cow, the hog and the horse is ridiculous, it seems to me. We are as earnest as anybody else. Take, for instance, the subject of forestry; how can you make the improvements you require in regard to your stock unless you have forests? The people up north are wide awake for improved stock, but they neglect the forest. You can't very well dove-tail this in with farmers' institutes and do the subject full justice.

REMARKS OF MR. SMITH.

Mr. Smith. Mr. President, I think there is some misunderstanding as to this question. I am in sympathy with the object presented in the resolution. I have attended many institutes, and I have urged the horticultural part of the work with all the ability I could bring to bear upon the question. It has not received that share of attention that I thought the subject deserved, but I fail to see wherein the resolution offered would help the matter particularly. If horticulture has not received its fair share of time in the work of the institute it has been largely the fault of horticulturists themselves. It is true the farmers do not show that degree of interest in horticulture they ought to, and as Mr. Barrett says, they give more attention to the talk about the horse, the cow and the pig.

The institute work under Prof. Gregg has been a sort of an experiment. While he has aimed to give careful and detailed instruction in the subjects brought upon the platform, he has always kept in mind the popularity of the work. And he has honestly and earnestly believed that the people did not want the horticultural instruction as much as they wanted the horse and cow and pig talks; and he has been inclined to give them what they wanted, perhaps, rather than what they needed.

We do not know as yet how the board may be organized, or whether we will have any appropriation or not; but we do not want any misunderstanding as to the use of that appropriation or the management of the institutes. I believe that if the Minnesota Horticultural Society, through its executive committee, or through the leading members of the Society would ask and insist, as they have the right to do, and will have opportunity to do, that a certain share of the time of each institute be given to the discussion of these subjects, that it will be given by the superintendant, whoever he may be, whether Mr. Gregg, or somebody else. The reason why this has not been done before is, perhaps, because of the indifference of horticulturists themselves.

In my own talks at these institutes I have always been very conservative, and very careful in regard to statements that I would make; and I am satisfied that I would have been given more opportunity to talk on horticultural subjects, and the work would have had more prominence than it has had, if it had not been for the severe criticism of members of this Society.

If this Society will agree in regard to the amount of instruction and present it to the institute board, or whoever shall have the management of the work, I believe they will receive what they ask. It would certainly be unfortunate at this time to pass any resolution asking for any division of this fund, to any special interest. The same thing might be urged by the dairy-men, by the poultry men, or the amber cane interest, that each should be allowed their certain part of this money.

In regard to the matter of time. I started out with the idea that if I was going to tell a man how to grow strawberries I wanted an hour and a half; but I was so drilled in this work that I have been able to impart in ten minutes more information to farmers in regard to how to plant and grow strawberries than I could do before in an hour and a half. I think this has been one of the mistakes, that sometimes the horticultural part of the

work has been drawn out so long that people lost their interest in it and in some instances would go away from the hall and didn't give it that attention that it deserved; and so Mr. Gregg would bring on the horse, the cow, or something that would hold the attention of the people.

Mr. Pearse struck the key note when he spoke about going into another room to teach horticulture. During the last eight weeks of last winter's course, at least one hour was given at each institute to this class of work and we found it very profitable. In these horticultural classes there would be perhaps from ten to thirty-five persons present, interested in horticulture. I finally brought Mr. Gregg to believe, as I did, that there ought to be ten or fifteen minutes given to present the claims of horticulture during the large attendance, and then allow those who were impressed with these claims and with the questions expressed upon them, to gather in the class room and receive instruction that proved very acceptable.

I think instead of this resolution we need an agreement in regard to the amount or kind of horticultural instruction this Society wants given; let that be given on any particular day, and let the balance of the horticultural instruction be given in class rooms, as suggested by Mr. Pearse.

I certainly hope there will be no division of this fund, or any interference with the powers of the superintendent; because I believe the superintendent ought to be untrameled in his work.

President Elliot. This is a very important subject and I thought at the time it was introduced the proper way to dispose of it was to put it in the hands of a committee and let them go to work and see what was the best to do. I wish to say a word in regard to a remark of Mr. Smith about some of the officers of this Society having criticised the work that was being done in the institutes, and that we were not giving it our hearty support. Perhaps there are other members in the Society that have thought more and done more, and have put in more time thinking over it than I have, as an executive officer. But whenever I have seen Mr. Gregg and had a chance to talk with him, I have always brought up the horticultural part of the institute work. We have talked it over time in and time out. He was not satisfied with the work as it was being conducted; this year it has been experimental work. He was feeling his way. Last year we had any amount of opposition in getting a small appropriation and the idea has been to carry the work along and please the people,

not so much to give them the instruction needed, but in the first place to win them over; this I think he has effectually done. We are on just the right ground to-day to claim our rights; and now I think we can make our requests of the superintendent and get whatever is rightly due us.

Mr. Ridout. I think if we hold on in this line and do not separate into two institutions that we will get our rights.

Mr. Cutler. I had wished to say a few words, but Mr. Smith stole all my thunder. I am in favor of special sessions being given to horticulture during the holding of institutes.

President Elliot. I think if we will explain to the superintendent the situation and what is desired we will get just what we want.

Mr. Cutler. Furthermore, I think the selection of horticultural instructors should be left with the executive committee of the State Horticultural Society.

On motion of Mr. Wilcox the following committee was then appointed to confer in regard to this matter, to-wit: Messrs. Wilcox, Barrett and Stevens.

The committee subsequently reported the following preamble and resolutions, which were unanimously adopted:

WHEREAS, The farmers' institutes, under the superintendence of O. C. Gregg, have prove to be the most efficient method yet devised by which to induce improvements in breeds, condition of stock and in the dairy interests; and

WHEREAS, The horticultural interests, being correlated with the agricultural, are of equal importance, therefore

Resolved, That this Society recommends and urges that a large portion of the time in the farmers' institutes be employed in horticultural instruction, leaving to the superintendent the right of arranging the same as will best subserve the success of the work.

Resolved, That the objects to be attained are to teach in the farmers' institutes all the essential branches of horticultural industry, to organize county societies, as auxiliaries to this, and by every means possible pave the way for the building up of forestry wherewith to mitigate the rigors of our climate and thereby secure better protection to our farming industries, and for the growing of all fruit plants indigenous to the Northwest.

The following report was read by Mr. Dartt, with reference to the Owatonna experiment station:

OWATONNA EXPERIMENTAL TREE STATION.

By Supt. E. H. S. Dartt.

Mr. President and Members:

The progress of this station, though not rapid, has been substantial during the past year. The amount of \$700 was appropriated for its use, \$500 being for salary and \$200 for expenses. It was found necessary to erect a small building for shelter, storage and general use, at a cost of \$150. This left but \$50 for the purchase of stock and all other expenses. But to help out in finances the state school board paid for a bill of young trees, about 2,200 in number, mostly evergreens, and costing about \$100, on condition that they should be grown to transplanting size without expense to them. This gave more work to do and added materially to the appearance of the grounds. At the close of the year, April 1st, I shall have expended about \$100 in excess of the appropriation. It will be seen that about \$400 has been expended during the year, besides my own labor, and in view of contemplated improvements about that amount will be necessary for another year.

During last winter letters were sent to our leading nurserymen asking them to send scions of new and promising varieties for trial. Most of them responded liberally and some sent young trees in the spring. The scions thus obtained, with those cut on our own grounds, enabled us to graft about one hundred varieties. Nearly all of these have made a fair growth and some of them will evidently take a high position on the perfected fruit list of Minnesota. The persons to whom our Society is under the greatest obligations for these favors are Prof. E. D. Porter, A. W. Sias, M. Pearse and O. M. Lord, of our own state, F. K. Phoenix and J. C. Plumb, of Wisconsin, and C. G. Patton, of Iowa. I received about one hundred and fifty varieties of Russian apple trees from Prof. Porter, all of which are alive, and though there seems to be quite a difference in vitality, yet I think it premature to report on indications of hardiness since there are four or five other requirements besides hardiness, a lack of any one of which makes the tree of little value. It is generally conceded that though a seedling apple tree may be found to possess all the valuable points as an original tree, yet when the variety

is grafted, grown in nursery, and transplanted to orchard, it is quite likely to be found deficient in some one or more of these essential requirements. If this is true and we let a seedling tree take its natural course, it must stand at least ten years in its original position to prove its value as an original tree; then we must graft it and wait another like period to test it in orchard as a root grafted tree. A very long time to wait for those of us who are old. But to cut this time down to its shortest limit we will cut scions from our most promising three year old seedling trees and graft them. Then by the time the original tree begins to bear the grafted tree will be of bearing size. We will also make root cuttings from some of the original trees and grow trees in this way, believing that if our method of propagation by root grafting is defective, this method of growing trees from root cuttings will cure that defect. We will top graft the sooner to get fruit and to compare this with other methods of propagation. In this way we can test a seedling variety fairly well in ten to fifteen years and get strong indications in much less time. And if a variety proves really valuable there will be sufficient stock to make it available for public use in a short time.

In this connection it may be stated that twenty-seven varieties of seedlings from a seedling of the Tetofsky have been grafted. What the fruit of this third generation will be no one can tell. But the Tetofsky is almost hardy enough for Minnesota, and if each generation adds a little in this direction, to use a now common expression, we will soon get there.

At our last state fair Mr. A. G. Tuttle, of Baraboo, Wisconsin, made one of the finest displays of Russian apples ever seen in the Northwest and generously donated the most of his collection to the Owatonna station. These apples were grown in an orchard exclusively Russian and the seeds of the most of about sixty varieties have been planted by themselves and so marked that the parentage of seedling grown trees will be known on one side at least. It is expected to find out which varieties reproduce themselves from seed with the greatest precision, if there is a difference, and also the relative hardiness of Russian seedlings as compared with American seedlings. Seeds have been planted of several noted varieties such as Peerless, Okabena, Wealthy, Duchess, and others. Also a lot from Thompson's seedling orchard in Iowa. But perhaps the fewest seeds with the biggest pedigree are from J. S. Harris, who sent seeds last week of Klein's seedling, and says the grandmother tree is living in Canada and has born apples for more than one hundred years.

The Trial Orchard has been started with about one hundred trees, nearly two-thirds of which are mostly common varieties and one-third hybrids set with a view of using them for stocks for top grafting. Ten varieties of plums are on trial as follows: Patton's Native, Rockford, De Soto, Forest Garden, Speer, White Nicholas, Wolf, Black Prune, Owatonna and Rollingstone. The Speer plum looks best among those that have grown two seasons and White Nicholas and Black Prune look the poorest. All these and several other varieties will be placed in orchard next season and Russian cherries and pears will likely receive attention. Owing to the many discouragements in regard to orcharding in our state, I have regarded the apple question as paramount to all others and have given it a large share of my study and labor. And while there appears no reason for a change in this respect, yet forest and ornamental trees must receive more attention in the future.

The Evergreen List contains the following: White Pine, Scotch Pine, Austrian Pine, Corsican Pine, Dwarf Mountain Pine, Norway Spruce, White Spruce, Douglas Spruce, Colorado Blue Spruce, Hemlock Spruce, Balsam Fir, Siberian Fir, American Arborvitæ (White Cedar), Golden Arborvitæ, Pyramidal Arborvitæ, Little Gem Arborvitæ, Silver Tipped Arborvitæ, Siberian Arborvitæ, Red Cedar and Common Juniper. The Douglas Spruce was injured at the snow line but is likely to recover. Golden Arborvitæ is apparently as hardy as the American.

In Deciduous Trees we have on trial, White Ash, Black Cherry, White Elm, English Elm, Scotch Elm, Hackberry, European Alder, Hard Maple, Weir's Cut-leaved Maple, European White Birch, Purple-leaved Birch, European Larch, Russian Mulberry, Downing's Mulberry, Catalpa, Butternut, Black Walnut, Horse Chestnut, Sweet Chestnut, Wisconsin Weeping Willow, Red Willow and ten varieties of Russian Poplars and Willows designated as follows: Populus Petrovsky, 23 Riga, 40 Riga, Populus Laurifolia, Salix Acutifolia, 122 Vor, 123 Vor, 127 Vor, Populus Catinensis and Populus Fantaga. I have grown some of the Catalpas from seed and though last winter was the coldest we have ever seen, yet the Catalpa stood bravely up and started within a few inches of the tips and one blossomed. We will plant more seeds. The Russian Mulberry frequently kills to the snow line but some of them stood a little above last winter, and we have hopes that it will finally succeed, especially if grown from seeds in our own state. The fruit is said to be so poor that it has no market value.

DISCUSSION.

Col. Stevens inquired if it would not be in order to offer a resolution requesting that the money appropriated by the legislature for the support of the Excelsior experiment station be transferred to that at Owatonna. The Society had received no reports from the former station for some time.

Mr. Pearse inquired if Mr. Gideon was still under pay by the state.

President Elliot stated that he was.

Prof. Porter said that he would like to be heard briefly in regard to the Excelsior station. That station was the creation of this Society; without its aid there never would have been one there; but the condition of things there now was very unsatisfactory. So far as he was concerned and his connection with it, he said he was neither fish, flesh nor fowl, nor even "red herring," and never had been; he had several years ago washed his hands of the whole affair, as far as possible. As the matter now stood, without some additional legislation the Society was powerless, and the board of regents, in whose hands the management of that station was placed, were also powerless. Nothing could be done with reference to it but by legislative action. The bill creating that station was very peculiarly framed. It was well understood the station was created not so much for the purpose of benefiting horticulture in Minnesota as it was to pension off a man who had been devoting twenty-five or thirty years of his life to horticulture and was in embarrassed circumstances, who had introduced the Wealthy apple, and which was a very great acquisition to the pomology of the country. It was no more than proper and right that the Society should recognize the efforts of Mr. Gideon, and the state should, as it were, make a donation to him. That was practically what it amounted to. The older members of the Society of course understand all the details connected with the organization of that station, the pressing of the matter through the legislature, the annual appropriation of \$1,000 and the naming of Mr. Gideon as the beneficiary of that appropriation. But there was the point that led to the embarrassment. In order to make somebody responsible for its management they put it into the hands of the regents of the university and requested the board to purchase this land and equip it. The board did so out of the current expense fund of the university; so it belongs neither to the state nor to the Society,

but to the university; hence it was purchased out of the current expense account of the university. Of course it belongs to the state as all public institutions do, but the governor was requested to appoint Mr. Gideon, and hence he became partially responsible to the governor and partially to the board of regents. Neither one feels like touching the matter, and have not for several years past.

He said when he first took charge of the agricultural department of the university he was informed that the management of that station would be placed under his direction and Mr. Gideon would report to him, but on coming to investigate the matter he found it one of those things that he wanted to keep his fingers off just as long as possible; that if responsible he had no authority in the matter. As responsibility and authority went hand in hand, if he did not have authority he didn't intend to assume responsibility; consequently he had kept entirely aloof from the Minnetonka station. He had endeavored to put Mr. Gideon into harmonious relations with the Society at one time, and some of them would remember the somewhat remarkable love-feast held for his benefit at one of the annual meetings, and it was hoped with all the "hugging and kissing" he might start in anew and the friendship might continue; however, it only lasted about six months, and he had seen no results from that union since! (Laughter).

A year ago, or last spring, this matter had been brought before the board of regents in a decided manner, in order that something might be done, for the reason that Mr. Gideon announced the fact that he was going to leave the place and leave the state. The matter was referred to him by the board to inquire what Mr. Gideon was going to do. He had then written him, stating the circumstances and requesting some definite statement as to his plans and views. Mr. Gideon replied that he would remain in the state during the current season, and that in the fall he expected to close up all of the work that had been commenced in relation to that station; that the seedlings would all be distributed, and the impression was gathered from the letter that there would be a prompt announcement of his resignation made by fall. However, nothing of that kind had been received and no communication whatever from him, so far as he was aware, except he had understood from President Northrop that a report had been received as to the work at the station.

The Society could readily understand that the matter was in a very unsatisfactory condition. He wished something could be done to make the station effective and in that event to have Mr. Gideon continued. He had thought it no more than proper to mention the peculiar relations existing between him and the board of regents.

Mr. Dartt. Mr. Chairman, perhaps I am not the right one to say anything on this question, although I may understand it as well as anybody. If there is dissatisfaction with the work of that station, and Mr. Gideon is not earning his money, and if this law ought to be repealed, if they get some member of the legislature to introduce a bill it will undoubtedly go through; because they say they are rather short for funds down there. And if they can cut off \$1,000 without doing any particular harm I think they will be willing; the only thing required to be done will be to start the bill.

In regard to the station I am superintendent of, I may say that I suppose the regents have authority, and may now have the funds with which to support the station. I think that is the understanding at the present time, so that no legislation in that direction is necessary.

Prof. Porter said it was proper to make an explanation in regard to that matter. The bill creating the Owatonna station had been passed near the close of the last session of the legislature and after the appropriation bills for the support of the university had been passed. When the requisitions for the annual support of the university were made up it was not known the new station had been contemplated; consequently the amount required for its support was not included in the appropriation. When the bill became a law and the board found themselves charged with the support of the station they were without funds for that purpose. That was the conditions of things. The money that was asked for was required for particular objects that had to be provided for. When the new station was created it was very much like the thirteenth guest that comes in after the pie has been cut, and when they looked for the thirteenth piece it wasn't there. As many of the members knew it became necessary to rely to some extent upon the generosity of a private individual, and the station was started very imperfectly with that aid and some subscriptions added by citizens of Owatonna. When we came to the next year we were in about the same fix. We were charged with the responsibility of the station and were very anx-

ious to assist it. Just about that time the Hatch bill became effective and we received the appropriation from the general government of \$15,000. But as the central station had to be equipped and furnished with its buildings, laboratories and machinery, the money was insufficient for the purpose. Desiring to aid the Owatonna station so far as possible the board appropriated \$700, although it was found that fully \$10,000 would be required to complete the work of equipment begun at the central station. Of course the bulk of expenditures had now been made; the fitting of the station had made very heavy drafts upon the treasury of the university.

Secretary Hillman stated that he had called upon Mr. Gideon this past fall and had been informed that it was the design of Mr. Gideon to make a distribution of the stock on hand and to resign the position of superintendent. He therefore moved that the Society recommend the repeal of the law providing for the support of the Excelsior station.

Col. Stevens said he was opposed to taking such action at present. Mr. Gideon had done a great work for his country. While it was to be regretted that Mr. Gideon had not come forward and helped the Society he thought the state could well afford to give him \$1,000 a year during his natural life. They could do that very much better than to appoint fifteen or twenty extra clerks, or assistants, as had been done by the present legislature.

Mr. Cutler thought Mr. Gideon did not need this appropriation. He had sold his farm for a large sum, and had no one but himself to support, and this money might be used for a better purpose, or where it would be of more benefit. If he really needed it he would have no objection to it, but he is now in a condition where he does not need the money.

Mr. Dartt. Mr. President, it occurs to me that if there is a feeling in the direction of this resolution that it would be just a little nicer to offer it as a suggestion and let it go in that way rather than as a recommendation of the Society.

President Elliot. I have listened with a good deal of interest to this discussion, having taken a prominent part in securing the passage of this measure and being a pretty good friend of Mr. Gideon. I hope you won't do anything now that you will regret in the future. While Mr. Gideon is, perhaps, not in full accord with the Society, in his line he may be doing as much as we are. I think we can well afford to allow the appropriation to

stand as it is; but if you are going to change it I would make this suggestion, that we need not do away with the \$1,000 entirely, but let us as a Society have it to put into institute instruction. Transfer it in that direction so that we will get the benefit of it. I just merely throw this out as a suggestion.

Mr. Sias. I feel exactly as our chairman does in regard to this. I helped, with others, to obtain this appropriation, and as Mr. Gideon seems to be about ready to resign anyway, and about old enough to die, it seems to me to be better to wait a short time to see what may happen. (Laughter.)

Col. Stevens said the Society should not lose sight of the fact that Mr. Gideon had originated many valuable seedling apples. He had one superior to Wealthy, the Martha, the Excelsior, or the Gideon. While he is doing this good work he should be encouraged in it. We are getting the benefit of all these hardy apples for our orchards; why not encourage him to keep on?

Mr. Pearse. I think that Mr. Gideon's apples have been over-rated and misrepresented altogether. I live three miles from that orchard; I am there frequently. I have examined every variety. Gentlemen, I pretend to be a horticulturist and a fruit grower; Peter M. Gideon hasn't got an apple, except the Wealthy, that I would take under any circumstances, whatever.

Col. Stevens. Are they not just as good as yours?

Mr. Pearse. He hasn't a thing that I would take except the Wealthy. That is just the view I take of it; I have had every opportunity to do it and I would not take them. I have never found an apple there but was water-cored, or sour, or of bad quality, small, and all that. His whole secret of success is in "infusing" the crab in the apple; and you will readily imagine what the result will be. This theory is denounced, I think, by every prominent horticulturist in the land. That is his great claim—infusing the hardiness of the crab into the standard apple. The result is he has got it there and the longer it stays there the worse it becomes; the trees are full of blight and the apples amount to nothing. I think Mr. Gideon has been well paid for the Wealthy apple. He has had his living and his support from that, year after year. He has become independent and he has kicked us out; he has kicked everything out, even his own wife, and he stands alone and feels above us; a good deal younger than he used to be, is getting younger every day; is looking for a new wife, I am told! (Laughter.)

Mr. Smith. I don't believe the passage of this resolution would be of any particular credit to this Society. I am aware of the feeling in regard to this matter; but I don't think that we as a Society can afford to take any action in that direction.

Mr. Fuller moved to amend the motion by referring the matter to the legislative committee.

The motion as amended was then adopted.

QUESTION BOX

The following questions were then read:

"Do you think the twin city press could be an important factor in awakening an interest in the State Horticultural Society, and by advancing their interests forward their own?"

Mr. Dartt suggested the question be passed by.

"Can cranberries be grown without overflow?"

Mr. Pearse. No.

Col. Stevens. Yes; I know they can be grown. Our President himself has taken up the wild cranberry and they have borne without being overflowed at all.

President Elliot. It can be done successfully.

Mr. Wilcox. It seems to me the cranberry ought to have about ten minutes of this Society's time. I would say I have had several acres under cultivation for several years where it was impossible to overflow them and have grown them with absolute success.

Mr. Allyn. In what condition was the soil?

Mr. Wilcox. It was a marshy place away down in old Vermont where they have been cultivating them—not very much cultivating either. The kind of cranberry Col. Stevens refers to is the native wild variety. We have no other variety here, although there are as many varieties as there are of apples, and the best varieties prove very successful under cultivation. There are many advantages in having a location where the bed can be overflowed, but it is not at all essential; their successful culture does not depend upon that requisite.

Mr. Pearse. I live in a section where they grow wild by hundreds of acres, but they never grow them without overflowing from the fact there is an insect that destroys them. They can't be grown successfully in this country without overflowing; I don't know what was done in Vermont.

Col. Stevens. I have known of marshes so situated that it was almost impossible to overflow and yet the cranberries bore every year. I have bought many a barrel of them of the Indians, and used to ship them south.

Mr. Kenney. I have a cranberry marsh that I have cultivated and worked on several years. I find the late frosts are more injurious to the cranberry than insects.

Mr. Smith. Flooding will protect from late frosts and that is the principal advantage derived from it.

“Is there such a red raspberry as New York State?”

Mr. Cutler. A gentleman in our county is advertising a raspberry extensively under that name and selling it in large numbers. It is similar to Philadelphia and I am inclined to think that is the true name of it; the berries are of a very dark purple color. They resemble berries sold through our county years ago under that name, by a rascally agent.

Mrs. Stager. I bought some of those berries because they were highly recommended and when they bore there were very few on a bush, although the agent claimed they produced six quarts to a bush; then the berries were crumby. They wouldn't bear well for me for some reason.

President Elliot. He doesn't sell the secret of production, does he?

Mrs. Stager. No; I asked him how he managed to raise so many and he said he wouldn't tell me.

Mr. Smith. This man is advertising this variety as wonderfully productive. I saw the bushes and berries and I pronounced them Philadelphia. I presume some one had imposed upon him and as he had never seen any raspberries before he supposed they were the best to be found.

“Is there an early blackberry, profitable for cultivation in Minnesota?”

Mr. Harris. Nothing earlier than the Snyder.

Mr. Smith. I have a few of the Wilson and my experience has not been satisfactory. They made a fine growth last year but seemed badly predisposed to blight. I secured five hundred plants on the recommendation of parties in Michigan.

“Is the Manchester a profitable strawberry on clay soil?”

Mr. Harris. No, sir.

Mr. Sias. It has been with me.

Mr. Smith. During our last strawberry season there was one party who brought in some fine Manchesters for a week or more

at the market, which were grown on clay land. They were fine berries and brought a good price.

“Which are the best six hybrid perpetual roses for Minnesota?”

President Elliott called on Mr. Gould to answer the question.

Mr. Gould. To start with that is not an easy question to answer, there are so many tastes to suit. It would be difficult to make up a list of only six varieties. I might want a number of light colored varieties, and again I might think dark roses were better. I can give a list of six or more good ones, representing several shades of color. General Jacqueminot, a variety well known, is a standard rose and suits nearly everybody who use roses for personal ornamentation, because the shade is constant. By some it is esteemed as pretty as any. The bush is hardy and tolerably productive. There are other dark roses just as hardy, among which I would name Fisher Holmes, which I think is prettier than Jacqueminot. The latter is not good as a full blown rose, but rather inferior. Louis Van Houtte is the prettiest shaded of any to my notion. It is rather dwarfed in its habit and does not produce as many blooms as we would like, but is one of the prettiest roses I have seen. Baron de Bonstetten is a hardy rose, and while not as full as I would like, it equals Jacqueminot on my place.

Among the light varieties there are so many it is hard to make a selection. Baronesse Rothschild is one of the hardiest. Mabel Morrison is of white and sometimes of pinkish color. I suppose they are among the hardiest perpetuals. I have only started with a small list but would prefer to hear from others.

Mr. Gould was asked if he knew of any climbers.

Mr. Gould said he thought the climbing teas were worthless for outdoor culture; it was hard to winter them.

“How and why shall we interest young people in horticulture?”

President Elliot. That is a pretty deep subject for the present, till we have more time.

“Arbor Day; what shall be done to increase its popularity and usefulness?”

“How can we increase the yield of potatoes?”

“In what way does it pay to give attention to plants in the house, and are they injurious?”

Prof. Porter. The last part of the question I can answer, that it is not, except in sleeping rooms, with doors shut.

Mr. Perry. May I ask Prof. Porter if that rule holds good with all plants?

Prof. Porter. It does, for the reason that at night when we are generally asleep, the processes of exhalation are changed; during the daytime the plant is absorbing carbonic acid and breathing out oxygen. During the night it is reversing the process; is taking up the oxygen.

“Our timber; shall means be taken to preserve it?”

“Sheep, hogs and other stock in orchards—what is the effect?”

“Place and work of local societies?”

“What inducements have farmers for increasing their apple orchards?”

It being already past the hour of adjournment the Society took a recess till two o'clock P. M.

AFTERNOON SESSION.

THURSDAY JAN. 17, 1889.

The meeting was called to order at two o'clock P. M.

TELEGRAMS RECEIVED.

ST. PAUL, JAN. 17, 1889.

S. D. Hillman, Secretary, etc.:

Owing to my illness during the past week, have been unable to participate in the meetings of the Society, and my physician advises me against going up to-day.

D. A. ROBERTSON.

SPRINGFIELD, ILL., JAN. 17, 1889.

S. D. Hillman, Secretary, etc.:

At the National Dairy Fair Association meeting in this city the following resolution was adopted:

Resolved, That the various county, state and other horticultural societies be invited to make a display on exhibit of their respective state pomological products in conjunction with and at the same time of the holding of the National Dairy Fair Association.

HORACE J. NEWBERRY.

JOHN BOYD.

FRANK D. HOLMES.

Committee.

President Elliot. We have with us this afternoon a gentleman who is secretary of the Central Missouri Horticultural Society, Mr. C. C. Bell, of Booneville, whom I am pleased to introduce.

REMARKS OF MR. BELL.

Mr. President and Members of the Horticultural Society:

I don't know that I can say anything of interest at this time. I am sure I did not come here to make a speech; I have rather an apology to make for being here. I came uninvited and took the liberty of walking right into the hall. I was not aware of this meeting until a short time since and am here by accident today. I was appointed by our society as a delegate to attend the meeting of the Iowa State Horticultural Society at Des Moines, which is now in session at that place. But a telegram called me here to attend to some business matters. I want to say that I am not at present engaged in the business of raising fruit, but of shipping it. I ship a great many apples to Minneapolis and St. Paul annually, as well as to other places in your state. When informed by my friends this meeting was in session, I at once made tracks for the hall, and that is how I happen to be here. I will not occupy your time at present further, but will try to be with you this afternoon and to-morrow as much as possible, thanking you kindly for the introduction.

The *ad interim*, or district reports, of the vice presidents being in order, the following were presented:

REPORT FROM FIRST DISTRICT.

By Vice President A. W. Sias, Rochester.

Mr. President, Ladies and Gentlemen:

We shipped quite a quantity of strawberries, raspberries and blackberries, besides several hundred barrels of fine apples from our district the past season, and as there is a reason for all things, please to bear with me while I give one or two why we did not produce more apples. You see we are a very busy, hard-working people, and don't always stop to consider just where we are located on the earth's surface, and many of us had got the impression somehow — can't say just how — that we were located some

distance north of the apple belt, and hence it was useless to try to grow apples. Now, let us see if this is not an unfortunate blunder.

You will all no doubt admit that apples are grown to considerable extent as far north as St. Petersburg, or latitude 60°, and to no considerable extent south of New Orleans, or latitude 30°. Now, this is an approximation of the great apple belt on this continent, and the centre is latitude 45°, or at St. Paul.

Another serious cause of discouragement is, that we are in the habit of ordering more than one-half of the trees we plant from the Middle States. I agree with Edson Gaylord as to the style of planting and pruning trees, viz.: Lean them to the southwest, and see that the heaviest limbs are on the south or southwest side, and then either cultivate often or mulch heavy.

Fruit statistics never come without the asking, and I have been too busy to look up very many, but such as I have I will present:

R. C. Keel, Haverhill, 275 bushels Duchess, 200 bushels Wealthy, 75 bushels Hybrids, 25 bushels of various other sorts, 16,000 quarts of raspberries, 5,000 quarts strawberries, 600 quarts blackberries, 7,230 quarts currants. C. H. Pond, Kasson, 9,000 quarts of blackberries, and a good crop of apples—have not received the amount. Wm. Somerville, Viola, fine crop of fruit (am not in possession of the number of barrels) and took premiums to the amount of \$125 last September. Sidney Corp, over 100 bushels of fine apples.

The exhibit before the Southern Minnesota Agricultural Society at Rochester in September was one of the best ever made at our fair.

We find that the most successful fruit growers in this district pasture their orchards with hogs, and have good wind breaks of evergreens, or deciduous trees.

REPORT FROM SECOND DISTRICT.

By Vice President E. H. S. Dartt, Owatonna.

Mr. President:

I had intended to write out a report to be presented here, but understood that papers were not in demand. I thought perhaps it would not be called for and so I have written nothing.

Our spring at Owatonna was remarkably late, wet and cold. We had to mud in everything that we planted, but it was favorable to the starting of trees. The crop of fruit through that section I think was generally fair of the different varieties.

The grape crop, as far as I know, was rather late; too late to ripen the leading varieties. Janesville ripened but was so poor that we concluded at our house that we'd rather buy good grapes than to raise the Janesville.

In regard to the apple crop, there was an abundant bloom and a fair starting of apples; but insects and hard winds diminished the crop wonderfully. Apples ripened later than commonly, so they kept better than usual. I raised two or three hundred bushels of Duchess, and might have raised a good many more only for the depredations of insects.

I think the insect that did the greatest harm is what they call the apple gouger, or the plum curculio; I think the two are very similar; they sting the apples early in the season. Some time along in the fore part of July I examined the apples carefully and found the little egg, which had been laid in the side of the apple, had hatched into a worm which was working its way through the apple at that time. I found some of the worms about the size of a pin, perhaps a sixth of an inch in length. But one had to look pretty sharp to find them. Three or four weeks later I gathered some specimens and thought I would send them to the agricultural college for inspection. But on investigation found the worms were gone.

I intended to spray my trees in the spring, as I had been troubled the same way the year before. I sent to Chicago for a spraying apparatus but it arrived too late. I had hoped that as the crop was light the preceding year there would not be enough insects to go around. I thought the apples would not all get stung, from the fact that a number of my large crab apple trees were full of blossoms. But I regret to say I found there was enough to go all around the whole field, and I found many of the apples had three or four punctures apiece. I have concluded we can not get them thinned out by not raising a crop of apples; we must try something else. I shall try spraying another year.

I don't know as there is anything else that I should take up your time with except to refer to the mistake that was made in electing me one of your vice presidents. One method this Society has adopted for communication with all sections of the state, is

through its vice presidents. They are supposed to be appointed, one from each of the five congressional districts, and required to make an annual report. Now, if there had been no mistake made the vice president from the Second district would have been from Southwestern Minnesota. I don't know whether it was on account of a desire of the Society to honor me that the mistake was made. I presume not; however, I am under obligations for the honor they have conferred upon me for several years past, and do not wish to continue to receive that honor to the detriment of a section of the state that is properly entitled to it. Therefore, while thanking you for former honors, I hope this will be corrected when you make up the list of vice presidents to-day.

REPORT FROM THIRD DISTRICT.

By Vice President M. Cutler, Sumter.

Mr. President, Ladies and Gentlemen:

Interest in small fruit growing is still on the increase in our district. Many of our farmers are trying to raise enough fruits for their families. Still I should like to see more interest taken in them. If we were able to employ a good horticultural lecturer to travel among the farmers and speak on fruit growing, I think it would be of great benefit.

Strawberries were a good crop and brought fair prices. I am trying several new kinds, and find some very promising. Burbach has the strongest looking foliage, and Jessie promises well. I am trying Countess; the vines made a good growth and I look for a good crop the coming season. Through the courtesy of Wm. Lyons I received and set out six plants of his new seedling for trial. They made a good growth of plants with fine dark green foliage. As usual, most of my berries were Crescents.

My red raspberries blighted badly, and I heard complaints from others; wet, hot weather is supposed to have been the cause. Most of my crop of raspberries were Turner's. They were laid down and covered last winter. When we gathered them, those not laid down seemed to be as nice and productive as the others.

Currants were badly blighted. Blackberries were laid down and bore pretty well. Stone's Hardy and Ancient Briton were the only ones in bearing. Some hills of Briton were as heavily loaded with fine fruit as any bushes I ever saw, and I believe they will prove as productive as our enthusiastic Wisconsin friends claim them to be. I obtained about two hundred quarts, and many of them were engaged by customers before they were ripe at a good price, people were so afraid they would not get them.

My greatest need is a blackberry that will ripen two weeks earlier than the Briton and productive enough for profit. One trouble in growing blackberries is the high winds which blow them down and destroy the young growth. To be profitable, stakes and wire must be used, or they must be cut back.

Wild plums and crab apples were a failure, nearly all blighting. Standard apple trees have about all gone to the brush heap, and if there are a few lonely ones left they will soon die of a broken heart. Grape vines were well loaded, but few got ripe.

The crop of potatoes was the best for years. Onions the same. Cabbages good and free from worms. Other vegetables fine.

The display of vegetables at our county fair was large and fine.

There are those among us who are disposed to criticise the management of our fairs. It does us little good to see a big pumpkin or a mammoth squash unless we can learn something of the manner in which it was grown. It does little good to see farmer A's fine horse worth two hundred dollars, or to hear that he obtained fifty bushels of oats per acre, unless we can learn something of his management. Hence there seems to be a demand for more agricultural instruction, and, I might say, less politics, fakirs and fast horses at our fairs. As our fairs are now conducted a single issue of a good agricultural paper, like *Farm Stock and Home*, gives more good practical information than all the fairs in the state.

This should be changed, and when a man makes a fine exhibit he should be required to state how it was obtained. Make of the fairs a school of agricultural information and I have no doubt farmers will take much more interest in them.

There is also a feeling among our farmers that (in view of the fact that the agricultural school recently established is largely under the control of the board of regents of the state university, and that many of the university students come from the farms) they should have a larger representation on the board of regents.

REPORT FROM FOURTH DISTRICT.

By N. J. Stubbs, Long Lake.

The past season has been a very remarkable one in this part of Minnesota, and yet a very successful one for small fruits of all kinds. The spring being so late and cold, when summer came with its copious showers of rain, our fruits matured very rapidly and were quite free from disease, all except grapes, which never do well in a cold, damp, or wet season, as these conditions develop diseases, or delay the maturing of the grape.

In apples there seems to be little progress, or a desire to plant new orchards, as the old trees have about all disappeared; but there have been a good many crab apple trees, such as Whitney, Transcendent and other valuable varieties planted, and there will be more the coming season. The Duchess seems to be our only refuge for a good, early cooking apple.

In raspberries the crop was above the average and prices good, averaging about sixteen cents per quart. For blacks, the Gregg and Souhegan seem to take the lead, the latter being quite early, very prolific and hardy; the former is well known and seems to be the most popular raspberry all over the United States (where berries are grown for market), of any ever introduced, so far as I can judge. In reds, Turner, Marlborough and Cuthbert are planted mostly; for a showy, nice berry that will command a good price and sell quick, the Marlborough has proved to be the best for me. But I find it is very capricious and will not succeed except in certain localities. I think it will do best on clay loam, moderately rich.

In blackberries we are just making a start — not many planted as yet. The Snyder seems to give good satisfaction as it ripens early, so we have no competition from berries shipped in at that time. For late, Stone's Hardy and Ancient Briton take the lead; the former on clay do the best, and the latter on sandy loam succeed remarkably well; they are both quite hardy and of good quality when fully ripe. The habits of their growth are such that it is quite easy to lay them down in the fall for winter protection — much easier than Snyder.

For a trailing blackberry, the Lucretia dewberry, I think, stands superior to any yet introduced; the berries are so large and strong, and the vines so prolific, that they will never disap-

point the amateur if he succeeds in getting the true berry. There have been so many plants sent out that were not the Lucretia that accounts for many failures.

Currants did not do so well as at other times, the wet weather causing the leaves to drop prematurely, so the fruit did not develop or ripen so well as in previous years. The crop was large and prices ran very low, except Fay's, which were wonderful in size and quantity. They brought on the market five dollars per bushel, while others were selling from two dollars and a half to three dollars. I think they are going to be a success, and prices for the plants will be maintained.

In strawberries we had a bountiful crop; season very favorable; prices run very low, so that many have plowed up their strawberry plantations, or let them go. Jessie and Bubach, I think, will prove very fair, but have not tried them long enough yet to give an opinion.

In grapes there has been only one season out of the last twenty so unfavorable. A late, cold spring and a wet season, made the grape crop almost a failure. What grapes were well ripened brought a fair price. Moore's Early, Brighton and Delaware were among the earliest and best. I have not tried any of the newer varieties of grapes, but it seems to me it is doubtful if Nature can ever produce a better variety every way, when it succeeds, than the Delaware.

REPORT FROM FIFTH DISTRICT.

By Vice President G. W. Fuller, Litchfield.

As far as I can learn, apple trees in my section of the state are reduced to the Transcendent with a few Hyslops, Beech's Sweet and Minnesota. But while the last is hardy enough to stand our winters pretty well it produces no fruit to amount to anything. On my grounds were two trees which bore each year a medium crop; a dozen others bore hardly one to each tree, and last spring they were sent to the wood pile and brush heap. My last Duchess was also sent in the same direction and all but two of my Wealthies. These stood on the north side of evergreens, and as they seemed to have some life left, I decided to give them another chance. They tried to grow about a dozen apples between

them, but the effort was too great and they also follow the rest.

My Russian apples obtained from Prof. Budd, have all pretty much failed. But the willows and poplars have done well and promise to be a valuable addition to our forest and ornamental tree list. My two pear trees, grown from scions from Mr. Peterson's best Russians, look well now, but the real test will come after this.

As to fruit, the past season has been quite encouraging. The only apples brought to market were Transcendents; and while the trees standing bore a fair crop, there were not enough to meet the demand.

The crop of currants promised large the first of the season, but when about full size a large part of them fell off, and not a third of a crop was gathered. I think it was a few days of hot sun and dry wind that caused this. Gooseberries bore a full crop; also the red raspberry. Strawberries also did well where proper attention was given them. But so many fail to give the proper attention, and hence are disappointed in the results.

I think harm is done unintentionally, perhaps, by statements so often made that these small fruits can be grown so very easily, and with such large profits. "No excellence without labor" is true here as elsewhere. The strawberry bed must be kept clean and rich, and the vines covered in winter, and well mulched in summer, or berries will be small and few of them. And very few, doing the best they can will realize one hundred bushels per acre, to say nothing about three and four hundred, so often promised them.

But here, in my opinion, is our real field of labor, as fruit growers. I have given up trying to grow apples in our part of the state, except the very hardiest crabs—I might almost say—except the Transcendent. But there is no reason why we may not have an abundance of currants, gooseberries, raspberries, and strawberries, together with our native plums, except the ignorance and neglect of the people themselves. But these difficulties will gradually be removed by suitable instruction and experience gained. We have much to encourage us in this direction.

Mr. Reeves. There are two or three things I would like to speak of. Inquiry has been made as to a remedy for white grubs. I let the moles work in the ground, and would not let them be destroyed. The common mole will destroy the white grub. Another matter: I would like to ask Mr. Dartt if he can kill those in-

sects or prevent their ravages by spraying when the insects simply dispose of their egg on the side of the apples and do not live in the foliage of the plant? How will the poison reach them?

Mr. Dartt. I think the theory is to apply the poison to the insect that punctures the apple and lays the egg; that is, to spray the trees with a solution of Paris green, or London purple. Experimenters have found that applying too strong a solution injures the leaves, but if applied reasonably strong it does no injury to the trees while destroying the insects. They use one or two sprayings early in the season while the apples are very small, using the poison in such small quantities the rain will wash it off without injury to fruit. The reports seem to indicate that it can be made very effectual for the purpose desired.

The subject of small fruits was taken up and the discussion opened by Mr. Wilcox.

THE CULTURE OF SMALL FRUITS.

By L. H. Wilcox, Hastings.

Mr. Chairman:

Recognizing the entire impossibility for me to review this subject in a paper and to present the same in the short space of time to be given I shall speak very briefly upon a few subjects connected with this branch of pomology. It is a subject deserving of the most thorough attention and one which with the most careful condensation, to present it properly, would require at least a hundred pages of your reports, to do it anything like adequate justice.

The culture of small fruits is one of the most if not the most important object requiring the consideration of this Society and so, instead of presenting a paper I will open the discussion with a little talk, a few unstudied thoughts, suggestive of ideas to other minds, or, as you might say, take a little ramble through the fields of horticulture, plucking a flower here or trampling on a stray weed, a false theory there, and perhaps taking a whack at gregarious grubs and festive worms, that cross my path.

All of us have at least two volumes in horticulture, one of which is a large and nicely bound volume, imposing and magnificent, with a title page full of fine spun theories, setting forth

grand ideas. It contains glowing descriptions of results with seedlings, or with Russian apples. It tells us how to conduct the growing of the Sharpless strawberry and other monstrosities through all the dangers that beset them. It tells us of the vast profits attained in the horticultural field, of immense yields, hundreds and hundreds of bushels to the acre, and of the wealth that must result from engaging in any horticultural enterprise.

Now, gentlemen, that volume of my experience is full from title page to finis, and closed, and I don't propose to open it, for the reason that you can find extracts from it in all of our horticultural reports, and the catalogues of the nurserymen are constructed from it, and you will find its influence in all our horticultural literature. It is the volume that is most popular, as well as entertaining.

The other volume is so small that one could carry it in his vest pocket, and contains a few plain words and actual facts derived from experience.

It has been proven by experience among all practical horticulturists that certain of our small fruits, and those of great value, are peculiarly adapted to the soil and climate of Minnesota. Of these the strawberry, and raspberry, the blackberry and grape, are perhaps the most important. Their culture not only adds to our commercial prosperity but to the attractiveness of homes and the pleasures of every day life. The demand is constantly growing for this class of fruit and I think that where interest is developed in the culture of small fruits it becomes a centre of distribution and the demand grows much faster than the increase in cultivation, and for that reason it becomes of more and more importance every year. Later on I may allude briefly to what it has done for the prosperity of certain localities.

But there is one thing in reference to the culture of all our fruits that I am quite sick of considering; and that is in trying to use and adopt fruits whose only recommendation is their hardiness. I have no faith in so-called hardy fruits, especially for this climate, whether it be large or small, but particularly in the small fruits. I have no faith in fruits that are claimed to be so hardy they will support themselves without the protection which every successful cultivator must give them. The most tender variety of blackberries, strawberries or raspberries, will, with proper care and protection, succeed better than the most hardy on our lists with neglect.

One of the most pernicious features of this branch has been that people — reading from their large volume, see a statement, for instance, that Mr. So & So, of Connecticut, or this or the other man, has raised hundreds of bushels of strawberries, or how they produce \$1,200 or \$1,500 worth of small fruits to the acre, and they proceed to figure out how much there is in it. They say a hundred acres will produce at that rate so much. And so they proceed to set the hundred acres and calculate they are to get \$120,000. It is a delusion and a snare. I had a friend in Southern Illinois, who undertook to set one hundred acres in strawberries, and succeeded in setting out seventy-five. But he didn't keep them but a year or two, and where his \$100,000 came in I don't know; I never heard of his having it.

There are certain well known varieties of strawberries that prove such a success it is not necessary to say much about them. I do not believe in going into the cultivation extensively of new and untried varieties which have not been thoroughly approved. If you will go with me to Hastings, upon the brow of a hill overlooking the Mississippi river, I can show you a patch of the Wilson strawberry, which is about four rods square, or one-tenth of an acre; and from that little field was sold this last season over a hundred dollars worth of fruit; nine hundred and thirty quarts. That is high culture and on a small scale. That is no criterion from which to judge of large fields, or for culture for commercial purposes.

The raspberry is usually hardy, though in this climate it is better to give it some winter protection perhaps. While the blackberry and dewberry are always tender, there are no varieties yet developed that are worthy to be called hardy. They should receive all the protection that we can give them, and a covering of earth late in fall is best of all.

Another, and the most important perhaps of all our small fruits, and whose successful growth in Minnesota has been demonstrated, and of all localities, grown in this climate it is of the highest quality, far superior to those grown in vineyards further south, is the grape. It is grown here under favorable conditions to the satisfaction of its growers. Those that are planting suitable varieties and giving them proper cultivation are reaping a bountiful reward. Of the varieties that I might speak of, I will mention the Brighton. Although it is of partial foreign origin, being one-quarter foreign blood and three-quarters Labrusca, it is a variety that will prove of great value

in this state, and in my judgment should stand at the head of all others, at least of the red varieties, in receiving the attention of horticulturists.

Delaware is a little peculiar in its make-up, in its lineage, we would say. It is one-half *Æstivalis*, or summer grape; one-quarter foreign and one-quarter *Labrusca*, and has certain peculiarities which have rendered it unsuccessful in some localities. It is now doing better in Southern Minnesota than any other locality, and perhaps is worthy of further cultivation, but its growth should be discouraged in large vineyards except for fruiting. It has a very bad root and other defects which I have not time to speak of.

Lindley is coming forward and gaining in favor every day. It is one of the numerous Rogers hybrids, and except for the fact that it has an imperfect blossom, what we call reflex stamens, would rank at the head of our grapes. But this can be obviated largely by planting it in connection with other perfect flowering varieties. It perhaps would be unnecessary to refer to the well-known Worden, Concord, and Moore's Early. The latter has been overrated, is already losing ground and is being cut down in Michigan, in its rating, from eight to five. Its want of productiveness, and other faults tell largely against it. There are one or two white varieties of comparatively new origin, the Empire State, for instance, claimed to be a *Labrusca*, but showing unmistakable marks of foreign blood; also the Niagara are promising very well.

Of insect enemies to small fruit to speak in a few moments of time it would be perhaps useless to try to allude to any of them. In our immediate section we have suffered very heavily from the depredations of the white grub this season. And if anybody knows of a remedy that will be effectual, I should like very much to hear it. A French scientist recently reported that he had great success by treating them with benzine. But it is something I know nothing about. Cut worms are not nearly as bad in Minnesota as in some other localities, and the currant worm and raspberry insects are easily managed.

As to the cultivation of small fruits necessary to their success, there is but one point I will speak of and that is the policy of mulching. The best mulching in a blackberry field, or raspberry field, or any other for that matter, during the summer, that I ever saw is thorough surface cultivation; three or four inches of fine, loose soil on the surface, stirred frequently, is as much

better than any mulch as you can imagine. If you don't believe it try it.

Of scientific crossing, or hybridizing, which is necessary to produce the ideal fruit of the future, that does not come practically within the scope of private culture. It should be the work of our experimental stations rather than of private individuals. Hybridizing between species has produced some wonderful results. Cross fertilizing between varieties has produced many varieties that are almost invaluable, and this is a subject that is not receiving one-half, nor an iota of the attention which it deserves, and which it will receive in the future.

The science of pomology is far behind stock breeding in this respect. The laws pertaining to stock breeding are pretty well understood. By the majority of horticulturists who have not made a specialty of the study of the science or art of hybridizing and proper crossing, it is very little understood.

Now, as to what we may reasonably expect from a business standpoint perhaps I should speak for one moment as I have had quite a large experience in commercial growing. It is entirely wrong to create the impression to the grower that he is to receive immense remuneration without exertion. Because he will be disappointed and its effects will last a good while. But we may reasonably expect that a field of strawberries, if properly managed, and with suitable cultivation, will yield 150 to 300 cases of sixteen quarts each per acre.

In the large commercial fields of Southern Illinois and the East it is calculated that strawberries can be produced ready for market in cases and boxes for four cents per quart. Assuming that to be a fact, all that is received net above that price can be regarded as profit. You know as well as I the cost of cultivating, so it will be unnecessary to refer to it.

Raspberries yield less but are more free from insect enemies. Blackberries give about the yield of strawberries; you will never get them quite up to the line of strawberries (and you will probably never get the amount of strawberries you read about), but you may raise two hundred cases per acre in a suitable place.

Blackberries are at the present time almost without insect enemies or parasites. Some kinds suffer slightly from rust, but that is a matter easily managed, and we may look upon them as entirely exempt from casualties.

I don't think I will refer to the management of grapes, currants or gooseberries.

I would like to say with reference to cranberries, since that was taken up this forenoon for a few minutes, that in an extended experience in their cultivation without overflowing, I do not hesitate at all to pronounce it a decided success, for the reason that they are usually grown on land that is of very little value. They require very little attention; you go to very little expense except to wait. And if you secure a crop once in ten years, it will pay for all expense, the value of the land and a good profit besides. But you will not have to wait that length of time to secure a crop. You will get one much oftener than that. The insect that was alluded to is simply a species of the codling moth and easily destroyed. Our climate is perhaps no worse than that of Northern Wisconsin for raising cranberries, and they only succeed in northern localities, thriving well wild in Alaska.

Now, gentlemen, there is one fertilizer that everyone that is engaged in small fruit culture should use and that extensively, and that is a judicious mixture of brains and elbow grease. And it must be used in the field, and manufactured on the spot. It has that peculiarity that it is of little value without it is applied in the field, and applied every day and every hour in the day, from five o'clock in the morning until nine at night during the growing season; in this way it is as efficacious as a patent medicine; it will develop the plants and kill the weeds, it will keep the ground loose and clean and destroy the insects and worms, in short will make a success, when everything else will fail. Try it.

Mr. Urie said he had nine acres of strawberries at one time in Illinois; it was a mistake to say they could be profitably grown at four cents a quart. It could not be done; no matter how large the crop, they could not be handled at that price when cost of picking, expressage, etc., were considered.

Mr. Wilcox said he meant four cents net in the field.

Mr. Pearse said it was a great error to suppose that everybody would succeed in raising strawberries. The enemies of the strawberry were now almost beyond control, at least for the ordinary grower. The ability to succeed depends upon one's skill and judgment, to hold in check the enemies ready to devour the plants as fast as they grow. The leaves becomes diseased; they become covered with spores that grow and feed upon the plants. These spores send out roots and poison the structure of the leaves. For the last few years he had been experimenting somewhat and had adopted a new system. He set his strawberries in

the spring, perhaps five hundred plants, away from the main patch; gave them good cultivation and by the twentieth of July had several thousand young plants entirely free from disease. He plants in rows, six inches apart in the row, and the rows eighteen inches apart. He finishes planting in July, giving good cultivation afterwards. Plants set in July and August will give the finest fruit the following season.

Some varieties are freer from leaf blight than others. For the hardiest of the list he would place Crescent as the best and most productive. Next came Windsor Chief as a favorite variety. Formerly he had recommended setting Crescent in alternate rows with other varieties. He had now discontinued the practice, and sets fertilizing plants in a block or square and was pleased with the results thus obtained.

Five minute papers on vegetables being called for, Mr. Allyn addressed the Society.

GROWING OF VEGETABLES.

By Joshua Allyn, Red Wing.

Mr. President, Ladies and Gentlemen:

I came here in the interest of the vegetable department. That is my business. I expected to hear from the market gardeners and to receive much information. I regard the market gardener as a man who should hold his head pretty high, but of course he should do it reverently. If we have anything of value to others we should be willing to communicate the information that others may receive the benefit therefrom.

THE HUBBARD SQUASH.

According to my observation the Hubbard squash is badly handled. They are often mixed with other varieties. There is no other variety in my estimation that equals the Hubbard. I have tried to keep them pure, and it is done by care in saving the seeds.

The genuine Hubbard squash, if well ripened, will keep well, if put in a proper place. They should be grown on warm, deep, rich soil. A sidehill is to be preferred. The seed should be

well matured. They should be thoroughly dried. They will keep for several years.

Gather your squashes just before frost and let them lie a few days to become thoroughly dry, then store in a cool place. Handle as little as possible. Do not allow them to lie on the ground; you can keep them till February. They bring good prices and are a very profitable crop for farmers to raise, and then it is so much easier to raise them than your Russian apples; more certain every time.

The yield per acre depends of course upon the character of the soil and how highly fertilized. On a light sandy soil, the more it is manured the better. I use a compost in the hills to make them come forward rapidly. I have raised nearly twenty tons to the acre, but six or seven tons of marketable squashes is a fair crop. I plant in rows ten feet apart each way and leave only two healthy plants to a hill.

Col. Stevens inquired if he experienced any trouble with the common striped bug.

Mr. Allyn replied that he had and it was a difficult matter to kill them. He had a remedy that proved very effectual. It was to use air-slacked. It should be applied as soon as the bugs make their first appearance, but not too freely, or when the vines are wet. Soot was very good and might be used in larger quantities; a handful to a hill. He preferred the lime. As soon as he commenced using it pretty freely the bugs would disappear.

Mr. Underwood inquired how it would do to put up a sign that there was lime on the place.

Mr. Allyn said the bugs might not understand English.

Mr. Ridout inquired if it was advisable to prune vines planted on sod, or to remove the first sets. Cucumbers, it is said, are more productive if treated in this way.

Mr. Allyn said he had never found any advantage to result from trimming. He usually let them take their own course and gave them plenty of room.

Mr. Allyn said he would like to say a word as to starting seeds in the spring. It is earliness we are after. We don't want products sent here from a distance when he can raise them at home. We want to keep our money here. It is important to start our vegetables as early as we can. I take leaf mold; you all know what it is. I use a box about four inches deep and sprinkle leaf mold in the bottom with sufficient dirt and plant the seed, such as radishes, onions, cabbage, lettuce, etc. Seeds.

can be started in this manner and transplanted when the weather is suitable and thus gain a week or more. He had also used Meadow moss with good results.

EARLY POTATOES.

I shall have to ask for a little time to speak on this subject. It is necessary to make an impression if there is any benefit derived from what is said. I will therefore relate a story. (Laughter.)

Mr Allyn here told an anecdote of a man who was perishing in a blizzard and whose life was saved by his fellow traveler who used such rough treatment as to arouse the anger of the man who was about to perish with the cold.

For one of the earliest varieties of potatoes he would choose Ohio. About the middle of March cut them with a knife, leaving two eyes to a piece. They are placed in the hot-house and half an inch of dirt spread over them. In a short time the roots will be two or three inches long. As soon as the weather is suitable they should be taken outside and planted. When the ground is prepared take them in baskets, roots and all, to the field; as one drops them another follows and covers them. If there is danger of heavy frost after the potatoes are above ground, take the shovel plow and cover them up. You can't keep doing that all summer, but if treated in this manner, as described, they will be two to three weeks earlier than by the ordinary method of planting. In this way you get control of the market and you can readily get two dollars a bushels for the crop. By the time farmers come in with their potatoes you can put them down to a dollar.

Mr. Underwood. How do you hold them back?

Mr. Allyn. You can hold them back if you are careful. If you have no hothouse to start them in you can start them in your kitchen, and beat your neighbors. Most people who fail with potatoes do so because they don't plant early enough; they delay too long. If potatoes are sprouted and have lost half their vitality they are not fit to plant, and if planted too late are apt to be spoiled by dry weather. Have your potatoes cut a couple of weeks before planting and as soon as they send out a few vigorous sprouts, plant them. Cover four to five inches deep in good soil and give good cultivation during the season.

Prof. Porter. I want to take a little space in the report for a subject that ought to have some interest. A great many inquiries have come to the station from different portions of the country with regard to the value of the sugar beet. Two years ago, in order to be able to answer these inquiries, we imported from Paris thirteen varieties of their most celebrated strains of seeds that were to be found in either Germany or France, for the production of sugar. We planted them and the results are given in one of the bulletins you have already received. I have just received from the chemist an analysis made from these thirteen varieties placed under different conditions of growth, on natural soil, on soil fertilized with different compounds, etc.

When they first commenced the development of the sugar beet in Europe they got 1 per cent of sugar, and it took 100 years to bring it up to 6 per cent. In 150 years the maximum was 15 per cent, running down to 9, 10, and 11 per cent.

I will not take up your time only just to refer to the result of this experimental work. So far as the yield is concerned we have grown beets at the rate of thirty tons per acre; this year we have run down to fifteen tons, but the soil was not fertilized. The average per cent of sugar, as shown by the tests made, was over twelve per cent.

Mr. Underwood. What do you recommend them for?

Prof. Porter. For sugar making or for stock.

Mr. Underwood. What is the comparative value of the beet and the carrot for stock?

Prof. Porter. There is more sugar in the beet but less of albuminoids. But all this information will be found in the next bulletin, to be issued in time for the spring planting.

Mr. Ridout. The plan of sprouting potatoes in a hothouse is all right in certain cases. I generally set my potatoes in frames, one frame above another, behind the kitchen stove. I can start potatoes enough very readily to set out a quarter of an acre. I have a seedling that is two weeks earlier than Early Ohio; I raised 160 bushels of potatoes on 38 rods of ground, or at the rate of 673 bushels per acre. I have been growing them four years. I have a sample of them here.

Mr. Dartt. Mr. President, the thought came into my mind that if it were possible to keep the potato over the whole season, so they would be good the second year it would some times be a grand thing; especially this year when only worth twenty-five cents. With the right atmosphere it might perhaps be done.

President Elliot. That is one of the lines to be tried by our friend Dartt at the new experimental station at Owatonna.

Mrs. Kennedy. I heard a gentleman say a short time ago that he visited his father in New York state where they had a lot of potatoes that had laid in the cellar for seven years and they were hard yet! (Laughter.)

On motion of Mr. Cutler, the Society proceeded to the annual election of officers for the ensuing year.

ANNUAL ELECTION OF OFFICERS.

The following list of officers were duly elected:

President—Wyman Elliot, Minneapolis.

Vice Presidents—A. W. Sias, Rochester; Alfred Terry, Slayton; M. Cutler, Sumter; M. Pearse, Minneapolis; J. O. Barrett, Browns Valley.

Secretary—S. D. Hillman, Minneapolis.

Treasurer—Ditus Day, Farmington.

Executive Committee—A. W. Latham, chairman, Excelsior; J. S. Harris, La Crescent; J. M. Underwood, Lake City; O. F. Brand, Faribault; L. H. Wilcox, Hastings.

Librarian—E. A. Cuzner, Minneapolis.

Entomologist—Prof. O. W. Oestlund, Minneapolis.

The committee on grape diseases presented the following:

GRAPE DISEASES.

By J. S. Harris, La Crescent.

Of late years grape growers of Minnesota are beginning to meet with greater difficulties in the way of growing this most valuable fruit than did the old pioneers who demonstrated to a certainty that our soil and climate in the earlier years of this industry possessed in a high degree the most essential properties to fully develop the very best qualities of every variety that was early enough to mature in this latitude. Formerly our vines were absolutely free from every form of disease as well as the deprecations of noxious insects. The latter we expected would in the course of time make their appearance, as it seems to be the law of nature that insects follow upon the track of every species of fruit tree and plant, as soon after it has been introduced in new

localities long enough to afford them sustenance; but we had hoped that our climatic conditions were such as would give us immunity from disease.

Our attention is now being called to the fact that a number of diseases of the fruit and vine have made their appearance in different sections of the state, and it is in view of this fact that our Society has created a standing committee on grape diseases. I am not enough of a scientist to enlighten you very much on the subject and my opportunities for study and observation have been limited on account of the pressure of other duties, therefore I will confine myself chiefly to what I have observed at home.

The spring of 1888 was unusually backward; growth commenced late as well as the season of blooming. The setting of fruit was about three weeks later than in 1887. Again the season was characterized, especially in this locality, by heavy and continuous rains, while the spring of 1887 was noted for lack of rain fall and the absence of moisture in the form of dew, and entire freedom from disease.

The first appearance of disease, I noticed in some of the vineyards about Lake Minnetonka, at the time of our summer meeting. Some of the leaves of Concord showed on the upper surface wrinkled spots and a slight change of color and were somewhat curled. At first I thought it might be the work of aphides, but upon examination I detected slight traces of grape mildew (*Pernospora viticulo*); experts say this is always found on the under surface of the leaves commencing in spots of brownish color which adhere closely to the leaf ribs and when the conditions are favorable spreads rapidly and destroys the vitality of the parts affected, causing upon the upper side the appearance of sun-scald.

Later I discovered it upon leaves of the wild grapes which are growing abundantly in this vicinity. Some of the cultivated varieties in my own vineyard showed a grayish mildew that not only was of a white velvety appearance in patches on the under side of the leaf, but frequently covered the upper side and the leaf stalk, extending to the fruit stems and the younger growth of the cane. In many instances it was so luxurious on wild grapes as to defoliate them and stop further development of the fruit. This was at about the period of coloring of the fruit; the leaves upon some vines of the Delaware and Agawam commenced dropping before the fruit was fully grown, and in such instances if the fruit did not drop it was worthless, the berries either scalded in the sun or failed to ripen.

About the fifteenth of June there were some indications of dry rot, confined chiefly to Clinton and wild grapes. A small portion of the berries shriveled, turned black, and after a time dropped from the vine. Besides the black or dry rot, there are instances of white rot, brown rot and bitter rot. What I suppose to be the latter form became very serious in many localities last year. It first began to appear about the last week in August. In some clusters one-fifth of the berries were affected by this rot causing the berries to color prematurely, but the pulp remained hard and bitter showing that there had been a cessation of growth. The berries thus affected usually fall to the ground by the time the remainder of the bunch has perfectly ripened, but last year did not do so, as is evidenced by the quality of the fruit placed upon the market. I am informed that this rot and the mildew were so bad in some vineyards that almost none of the fruit matured to a good eating quality. I am strongly inclined to the opinion that the hardness of our vines depends very much upon their immunity from mildew and that at least some types of the fruit rot have their origin from the same cause.

REMEDIES AND PREVENTURES.

If, as some of the most intelligent vineyardists believe, the mildew was the prime cause of the almost general low quality and unripe condition of Minnesota grapes last season, it has become a grave matter and threatens serious damage to an industry for which we hoped much. In a recent conversation with one of the leading growers of Houston county he made the statement that the foliage was so badly affected by mildew at one period in his vineyard that the fruit, at the time when it should have been ripening, remained about stationary nearly a whole month, and that he did not gather a pound of perfectly ripe fruit. Scores of smaller growers were caught in the same predicament. Investigation has demonstrated to a certainty that the mildew and rot are contagious diseases, or a fungus, that propagate themselves and spread readily from plant to plant by means of spores wherever conditions are favorable.

The free use of sulphur applied to the affected vines with a sulphur bellows has long been in vogue for the destruction of fungus. Some successful vineyardists have kept their vineyards free from rot by picking off every affected grape as soon as it shows it has been attacked by rot or insects, and then destroy-

ing by burning or burying them away from the vineyard. Bagging is highly recommended and considerably practiced. It is a protection against birds as well as insects, and helps somewhat against the mildew, because it keeps the clusters dry, but it is hardly practical for large vineyards.

The commissioner of agriculture in the year 1887, engaged a number of special agents to conduct experiments in the treatment of downy mildew and black rot; at the same time he furnished a formula to all of the leading grape growers throughout the country. The report of the results of the experiments in 1887 has been published in Bulletin No. 5, and doubtless will be furnished to any who apply for it through members of Congress.* The results of the experimenting are really encouraging and later reports from 1888 would indicate that science will soon give the hand of man power to control these destructive maladies. It is probable that the spread of the disease might be arrested very materially by collecting and burning every fall all leaves and prunings, thus destroying myriads of spores that would, under favorable conditions, propagate and spread the disease the following year.

Grape growers are slow to recognize the importance of location. The best site for a grape plantation is where the leaves of the vine will be freest from moisture, from rains or dew; sloping hillsides, contiguous to well defined valleys or near lakes of considerable extent are the best sites for growing healthy vines; upon such places dews are less frequent and dry off sooner than on level lands or in the bottoms of valleys. I do not think it is well to allow wild vines to grow in the near vicinity of the vineyards, and all vines that have from any cause become so worthless that they will be neglected should be rooted out and not left to breed insects and disease.

DISEASES OF THE GRAPE VINE IN MINNESOTA.

By A. W. Latham, Excelsior.

Growers of the vine in Minnesota are fortunate in bright and sunny summer skies and a clear and dry atmosphere in giving them, to a large degree, exemption from the plagues of the vine,

*The brown rot is described on page 50, transactions for 1885, as American grape rot, and differed very materially from that which was prevalent in 1888.

that in so many localities are fatal to success ; save under an unusual combination of unfavorable circumstances the cultivated vine in the northwest glows with healthy vigor in leaf, branch and root and matures to the finest perfection a grade of fruit that in quality and appearance ranks at the head of America grapes. The most virulent and fatal of all diseases, the grape rot, is with us comparatively unknown and we are happily free from the anxiety and uncertainty attending the presence of this dread disease in the vineyard. In many localities it makes successful grape growing of any variety a practical failure.

But let not the grower be too boastful ; living in this grand and prosperous state, surrounded by a vigorous and healthful air one is apt to think too confidently of his power to succeed and must be reminded that success is not to be attained without constant vigilance and effort.

The diseases that are occasionally encountered here are the Greely rot, the common mildew and the downy mildew.

Of the first of these, the Greely rot, there is little to be said. It is seldom found except upon the Concord and is here described that the grower may satisfy his curiosity as to whether it is in his vineyard. It shows itself upon the fruit after it is turned black and is known by the color of the spot affected, which may cover a third or a quarter of the berry and is of a light unwholesome purple shade. It injures the quality of the berry attacked but is not apparently a disease to be feared. The common or European mildew attacks the fruit and fruit stems of a few varieties, mainly the Rogers hybrids. It appears, as a rule, a few weeks after the fruit is set when the weather is favorable, and covers the parts attacked with a white velvety substance, which under the microscope looks like a miniature forest. If the planter wishes to retain in his vineyard the few kinds that are found to be affected by this disease, the system of pruning and summer pinching should be adopted that does not crowd the wood and leaves upon the trellis, and then by constant watchfulness, and, at its first appearance sprinkling it well with flour of sulphur, it is easily held in check.

The only disease that with us needs serious attention is the downy mildew or American mildew, called by the scholars *Pero-nospora viticola*. The clearness and dryness of our atmosphere gives us as a rule exemption from this disease, but an occasional season when in the latter part of July or in August the weather has been for a succession of days or weeks hot and changeable,

showers followed by damp, close, muggy air with hot sunshine, followed by more showers, etc., then the conditions are favorable for the spores of this variety of mildew to germinate and take lodgement, or literally to take root upon the under side of the leaves. The varieties of grapes subject to this attack are those whose leaves have a skin and structure delicate and sensitive; those whose leaves have a tougher skin and structure are never attacked except in the neighborhood of a large plot of a variety very seriously affected, and even then no injury is done to them. As a rule the Concord and all its seedlings are exempt from this disease and all the other varieties planted in Minnesota are more or less liable to it. When a block of any variety susceptible to it is attacked, it appears at once over the whole block as though the spores has been dusted upon it at once from an immense dredging box. It appears at first as fine white down upon the under side of the leaves and if the attack is a mild one it will be confined largely to the half grown leaves; if a severe one all leaves are liable to be affected, except perhaps a few of the very smallest. After the spores have found lodgment, they instantly take root and sprout up, a miniature white forest. It usually covers only a portion of the leaf and lies in spots, which do not spread very much. As it grows the roots rapidly permeate the interior of the leaf and eat up its substance. In a few days the white appearance is succeeded by a yellowish tinge and then changes to dark, followed by a drying of that portion of the leaf affected; in many cases the leaves fall, at least their ability to nurture the vine and ripen the fruit is seriously impaired, and the quality of the grape is greatly injured.

Our climate is the great natural safeguard against this disease, but among precautions which experience suggests as reasonable to take against an attack, are locating the vineyard upon high, well drained, yet good, soil, where there is a good circulation of air; spreading the vines well out upon the trellis without crowding; a reasonable amount of summer pinching, not so much as to entirely denude the vine of young leaves, but enough to mature a large number of healthy, well developed leaves; keeping the vines up off the ground and cultivating well. A nursery of young, growing vines is particularly susceptible to this disease, and should not be located near a vineyard. With all these precautions in peculiarly unfavorable seasons the vineyard may not escape, but all things being equal the chances will be better and

the grower will at least have the consolation of having done his duty according to the light possessed.

It would be wise for every grower to get the reports upon this subject, published annually by the agricultural department at Washington. They are conducting officially a very interesting series of investigations into the cause and cure of this kind of mildew, and these reports include also the results of many private investigators. Good results are following from this work, and it is the privilege of all growers to assist, as all would reap the benefits. The experiments to control this disease are now pretty much confined to spraying the vine with various preparations in which the active principle is sulphate of copper, and the results accomplished indicate that they are in the right direction. These applications must be made before the mildew appears so that the spores will be destroyed as they fall upon the leaf, in advance of their taking root. The different formulas for making the preparations called Eau Celeste, Bordeaux Mixture, Sulphate Mixture, etc., are long, and as they are all contained in the report referred to, time will not be taken up with them here.

Minnesota is peculiarly well adapted in climate and soil to the growth of some early varieties of the grape vine, and a little setback from disease should not discourage the grower. Industry, good judgment and perseverance will make him master of the situation.

DISCUSSION.

Mr. Pearse. I burn all leaves that are diseased, and all the trimmings.

President Elliot. We are aware that these grape diseases are here and the question is now how to get rid of them. I don't know that we can find any remedy but perhaps we may.

Mr. Pearse. I have two questions to ask on the grape. At what time should grape vines be uncovered in the spring?

Mr. Dartt. When it is warm enough.

Mr. Latham. When you can go out and pull them up—that is the best time.

Mr. Harris. I think as soon as the frost is out of the ground and you can get them up.

Mr. Underwood. A good deal depends upon the location; whether they are grown in a warm and sheltered place. If they start too early in the spring the blossoms will be pretty certain to be killed by late frosts. We should not raise any grapes if

we took them up as early as we could; they would start too soon.

Mr. Pearse. My second question is, What is the best way to keep grapes, the fruit?

Prof. Ragan. Don't eat them too soon.

Mr. Allyn. Preserve them.

Mr. Pearse. No, I want them fresh. I want to hear from Mr. Latham, Mr. Gould, or others.

Mr. Frisselle. I can give you my experience. I have been enabled to keep grapes by packing them in baskets as you would put them on the market, keeping them in a cool, dry place, and covered tight. Put on a glass cover and keep them covered until you wish to use them. I have just finished eating Iona and Delaware that were kept in baskets.

Prof. Green. I have generally kept grapes for five or six years past until about Christmas. Our plan is to use trays about fifteen inches long and five or six inches wide. Set the trays one on top of another. We cut off the bad berries and lay them in single layers in the trays, then place them in the cellar in a cool place, a little damp, and we keep them there until Christmas. Sometimes we may have a warm spell, and then we put a couple hundred pounds of ice into the cellar.

Mr. Pearse. What varieties keep best?

Prof. Green. Nothing keeps as well as Catawba.

Mr. Frisselle. The Iona keeps well.

Prof. Green. It is a fine keeper, but hard to ripen.

Mr. Gray from the special committee appointed to confer with the city board of health, presented the following report:

We called on the city health officers agreeably to appointment, and listened to suggestions made in reference to the subject of the disposition of future accumulations of stable manure in the city. During the winter months the market gardeners about the city have taken care of the bulk of it, but during the summer months there is a daily accumulation of from four hundred to 1,000 two-horse loads to be disposed of, the practice heretofore having been to dump a large portion thereof in the river. For obvious reasons this practice can not be continued. The health officer informs your committee that he has conferred with the railroad companies in reference to shipping this manure out of the city, and finds them liberal in their ideas, and willing to assist in the solution of this question. The city pro-

poses to load the manure on the cars free of charge, so the cost to the shipper would be the cost of transportation only, and this would be affected largely by the amount to be transported to any given point.

Your committee suggested the fact that the members of our Society are scattered more or less over the whole state, consequently but a limited number could be directly interested in the subject.

We realize the difficulties in the way of an organized plan to have this manure utilized on the outlying farms. All must agree that it is a great, and almost a criminal waste, to have so much valuable material destroyed.

Therefore your committee would recommend that a permanent committee be appointed to canvas among the interested neighborhoods to the end that some arrangement may be made while there is an opportunity.

J. S. GRAY,
F. G. GOULD,
WILLIAM LYONS,
Committee.

President Elliot. We are having dumped into the river from three hundred to 1,000 loads of material every day that should go back to the farms, and it is a great waste. Our gardens will sooner or later show the necessity of saving this material, and there ought to be some way devised whereby it might be utilized.

Mr. Brand. Can't your local society look after it?

President Elliot. It is a nonentity; it has a name, but doesn't have an existence; it hasn't had any vitality for some time, or has run down to a very low ebb.

Mr. Gray. This matter was discussed by the local society last winter, but the railroads wanted so much for carrying off the manure a few miles that it would not pay. When it comes to paying a dollar a mile to the railroads to take a load to the farmers, they couldn't stand it. The farmers need it, but it is simply a matter of transportation at the present time. Some of the city officers are conferring with the railroad companies and I hope will be able to make some arrangements that will prove satisfactory. Of course the railroads would be benefited in two ways, every load that is carried out contains so much plant food, and will be returned again in the form of produce; it will be a source of wealth to the men who use it, an income to the rail-

roads and a relief to this city, and to those who live contiguous to the river into which this enormous quantity of plant food is now being thrown.

Mr. Pearse. This is a question in which I have been deeply interested and I labored on it for about two months. I found the gardeners were so indifferent that I finally dropped the whole matter in disgust. This manure is worth millions of dollars to them and it is being wasted by the thousands of loads. But as soon as arrangements can be made, we are going to get it.

President Elliot. If you are not too slow in making your arrangements, and do not let some syndicate step in and take this thing. If they do, the farmers and gardeners will have to pay for all they get.

Prof. Green. In Boston where I was foreman of a nursery, we used to buy large quantities of such material for use, and a high price was paid for it, and it was considered a good investment.

The meeting then adjourned until seven o'clock P. M.

EVENING SESSION.

THURSDAY, JAN. 17, 1889.

The meeting was called to order at seven o'clock P. M., by President Elliot.

The following paper was read by Prof. Green:

NECESSITY OF HORTICULTURAL EDUCATION.

By Prof. Samuel B. Green, St. Anthony Park.

Members of the Minnesota Horticultural Society,

LADIES AND GENTLEMEN: Allow me to call your attention to something of the progress made in horticulture, and also to the education best suited for the young men who desire to engage in it.

I well know that many of the efforts made to educate young men in this country, who would take firm hold upon agriculture and horticulture, and follow it as a life work, have been partially unsuccessful, and some times it has happened that for a

time the efforts to help have resulted in a temporary hindrance, and a set-back to the very object which it was intended to help. When these young men have failed, men have said: "You see how it is! As soon as a man gets an education, his inclination to labor with his hands, to raise the fruits of the earth, is gone. He will no longer stay in the country with its simple pleasures and rounds of duties; his place is in a store, or he should be a minister, doctor or lawyer; there is no need of book learning to cultivate a market garden, to run a green house successfully, or to raise grapes, raspberries or blackberries. All the education he needs is that of the common school and a short period of laboring in the garden, greenhouse or vineyard, and he can raise as good vegetables, flowers, grapes and berries as anyone. It is all nonsense to talk about education for farmers and gardeners; they do not need it, and all the money spent in trying to educate men to fill such positions, is as good as wasted. Such positions are servile and not worthy the entire attention of liberally educated men."

Much of such a tenor as this has been written and said, and that, too, by men who have honestly believed it. And they believed it because they thought that only was worthy the name of education which was classical in its nature. Such an education as is to-day given by the best agricultural and horticultural schools, in this county and abroad, was not known.

I well remember a man speaking to such effect at a meeting of the state board of agriculture in Massachusetts, about ten years ago, and Prof. Stockbridge's reply to him. The old man arose with dignity and said something like the following: "The gentleman who has just spoken is ignorant of the first principles of agriculture. He is behind the times in which he lives and is still enveloped in the fogs and mists that characterized the dark ages. Such language might suit the period of knight errantry, when men thought the only calling worthy of ambition was that of arms, but it is entirely unsuited to the time in which we live."

But these efforts to educate and make horticulturists have not been barren of results. The strong minds that believed a liberal education was necessary for a full development and were pioneers in the labor of introducing such education, did not labor in vain.

In the older states, from the agitation of this educational idea, has come much good. It served to stimulate horticultural and agricultural thought, and while the results at once achieved did not equal the expectations of the founders, much dissemination

of useful information resulted, and men have begun to think more seriously of the subject of thus applying education. Although farmers have talked a good deal about "kid glove," "side walk" and "educated farmers" with a sneer, they yet taught something about their business which was new and of interest to them.

Marshall P. Wilder was a man whom horticulturists delighted to honor, and one whose name is widely known in connection with his endeavor to establish agricultural and horticultural education on a helpful, enduring basis. I heard his reply to an attack on the Massachusetts Agricultural College. I think it was in 1880. Mr. Moore, whose name has been made famous in connection with the introduction of desirable fruits and vegetables, said the college had not accomplished anything. Mr. Wilder's reply was: "The farmers of Massachusetts have been the worst enemies of the college. While the college desired to help them, they would not help the college, but have criticized its administration scathingly, while they would not take hold and make the institution what it should be." In speaking of the education it had developed and the stimulation of agricultural thought it had produced in the face of these difficulties, he said: "A few years ago the names nitrogen and phosphoric acid were never heard in a farmer's conversation, and if most of them had been told that phosphoric acid was the son of Queen Victoria, and that nitrogen was his sister, they would not have thought it at all strange. To-day, the names of nitrogen and phosphoric acid are common words in farmer's meetings, and they understand their meaning and use them intelligently."

In Massachusetts the farmers have changed from a position of enmity to the college and its work and are now the best supporters of it and of agricultural education.

How has this change been brought about? When the country was new and the soil rich in the elements of vegetation, and noxious insects as yet did but little damage, there were not many grave problems which presented themselves to our farmers. They could grow wheat, grass, cattle and fruit without much labor. Then, too, the standard of living was not as high as to-day, and many things considered luxuries then, are felt to be necessities now. Then it was, that cruder methods of horticulture and agriculture prevailed and were successful. It was only necessary to seed down land, plant corn or apple trees, and good crops were produced.

No thought was given to the exhaustion of the soil, and it was treated as a spendthrift spends his money. It was continually drawn upon and no thought taken for the future. The pastures and arable lands of New England were continually furnishing potash, nitrogen and phosphoric acid, which were carried to the cities in the form of beef, pork, hay, milk, fruit, etc., and then thrown into the sea. Fruit trees grew and produced abundantly. There were few noxious insects. They did not have pear and apple blight, peach yellows or grape rot. They planted pear, apple and peach trees, and they grew without any special care.

This exhaustion of soils and the development of insects and diseases, produced a state of things which made it most necessary to educate our farmers, as they could scarcely make a living on the farms which had been worn out by this continually exhaustive treatment, and they were obliged to adopt some more rational farm system.

Another point which disturbed the calculations of horticulturists was the introduction of swift and cheap freight lines to Florida and the whole eastern coast. These routes brought in early vegetables before our gardeners could think of producing them, or planting them, perhaps. They brought in strawberries before ours were in blossom. This influx of early vegetables and fruits seriously injured our home markets; for, after the consumers had a taste of these fruits and vegetables, they did not feel so ready to pay the high prices which they formerly paid for those home-grown, and instead of our fruits and vegetables being first in the market, they were second. Then, too, there were the changes brought about by the development of noxious insects and weeds, and the need of more and higher grade fertilizers. All these difficulties and others made it necessary for our horticulturists and farmers to till the land closer and by more economical methods; to look more sharply after the insects; to more carefully husband their fertilizers, and to originate new and improved varieties of fruits and vegetables. Then it was that superior intelligence began to count, and horticulturists felt the need of a more liberal knowledge of the natural sciences to aid them in their lines of competition.

The education disseminated by the college has come into demand. The graduates and former students of the college have become active spirits in farmers' meetings. They write for the papers; represent their districts in the legislature, and to-

day the real strength of agricultural education in Massachusetts lies in its fulfilling a need, and in having gained a strong constituency among the farmers, by supplying them with what they most needed in the form of young, active, educated men upon the farms of the state, who dignify labor.

The history of agriculture and horticulture in Minnesota, will vary, in some important respects, from that of the eastern and older states. Minnesota is being developed in the face of competition from the older and also the newer states. It is necessary to raise here not only large crops, but crops of the best quality, to enable the producer to successfully meet competition and to secure a fair compensation for his labors. The people of Minnesota are progressive and active and will not be satisfied with anything but the best in each class. The farmer wants the best live stock, tools and help. The horticulturist wants the best varieties of fruits, vegetables and flowers. They are not satisfied with any second-rate goods. And so in turn the miller wants the best wheat; the public wants the best fruits, vegetables and flowers, and they will have them. Not only do they want them in their season, but out of season, and the very best. If they can not obtain them in the state, they send for them east, south or west. As the wealth, refinement and intelligence of the people increase, so must the demand for these products increase, and the willingness of the people to pay a fair price for the best. There will always be a call for second or third class goods, but as the grade of the first improves, so must the second and third, in turn. But second or third rate products often require nearly the same amount of labor as first, and the only difference in production may be the application of intelligence, while the difference in remuneration is that the first generally gives fifty per cent more profit than the second, or else it yields a profit while the second is sold at a loss. I might cite many instances where brains paid better than brawn in horticultural pursuits; but you are doubtless familiar with many such instances.

To-day there is great competition in every branch of business. Once horticulture was considered the essence of refined farming. It has now become subdivided into many branches. The whole field of horticulture was found to be too large for any one man to excel in as a whole, and we now have such subdivisions and hear such terms as the small fruit grower, the grape grower, lettuce grower, rose grower, the grower of aster seed, grower of

bedding stuff, forcer of tea roses, of hybrid perpetual roses, vegetable gardening, grower of vegetable seed, the florist, pansy-farm, strawberry farm, apple farm, and I might mention many other subdivisions, each of which calls for special skill.

No one man of good judgment would think of undertaking to cover the whole field of horticulture in his work. It is too broad. It requires too extended an acquaintance and too much practical application for him to do so successfully. Then again each locality has its special adaptation to special crops. In the counties of Ulster and Orange in New York, we find growing the Hudson River Red Antwerp raspberry, which is without doubt the best red raspberry in cultivation, but it succeeds in no other locality in the United States, that I can learn. We find that cauliflower and cabbage seed can be grown most successfully near salt water; that the Cuthbert raspberry is highly spoken of in some quarters, while in others it is as strongly condemned. Some apparently barren land in New England has been found especially well adapted to raising pansy seed; some sections of the country are noted for producing mints containing a sufficient amount of essential oil to make its manufacture a profitable industry. Only this week, I have received a package of cauliflower seed which was raised in Washington Territory and I think it is a precursor of a new industry there. In each state and locality, we find that only a limited number and kind of fruits and vegetables are recommended; and undoubtedly these lists could often be much more circumscribed with improvement.

New crops and methods of raising crops are continually being brought to light. A comparatively few years ago all the cranberries in the country were produced without cultivation on natural bogs, and there was no literature on the subject. To day there are thousands of acres of cranberries cultivated on artificially prepared bogs and the yields are sure and ten-fold greater. Cranberry raising has become an important business and there is a great amount of reliable information on the subject.

The same thing can be said of the strawberry and the raspberry. They have been developed and become generally cultivated within a short time.

I would mention many improvements made in flowering plants, vegetables and fruits; how we now have many improved varieties of flowering plants which afford pleasure to thousands, and a substantial means of livelihood to hundreds of our citizens.

Great improvements have been made in roses, especially in the development of hybrid, tea and perpetual classes.

Great improvements have been made in pansies, chrysanthemums, carnations, asters, etc.

In vegetables a great advance has been made in twenty years, in improved varieties of onions, celery, beets, cauliflower, cabbage, etc., while our fruit lists have been wonderfully improved in the same period.

In all departments of horticulture there have been great improvements made; so that the gardener of fifty years ago could not make a living and use the same methods and varieties that he did then. We have given up large kinds of celery and planting it in trenches; we no longer consider it necessary to trench land to grow onions; we cultivate our strawberries with a horse instead of by hand. Our florists conduct their business on business principles, and grow their crops in a wholesale way. Flowers and dealers in flowers are common. I think it would surprise a florist of twenty years ago to hear of a rose grower who had a selling agent in each of three cities, Boston, New York and Philadelphia, whose sole business it was to sell roses at wholesale, or to hear of flowers being shipped from Boston to Chicago, to be there distributed.

These instances which I have stated, may serve to give those not acquainted with the work, some little idea of the advance made in horticultural pursuits within the memory of the middle aged man. And does anyone doubt that the advances and changes of the future will not be as great as those of the past? When scarcely a day goes by without some new discovery, and when we have many experiment stations, whose sole duty is to investigate agricultural and horticultural matters in the light of science. Who knows in how many ways we may call electricity to our aid in raising plants, and in utilizing the nitrogen of the air as a fertilizer! While the introduction of new varieties of fruits, vegetables and forest trees is tremendous with its possibilities.

Can any man of good judgment, in the light of these facts, combat the idea of a horticultural education? I think not. The only question on which horticulturists differ, is the kind of education one should receive, in order to best fit him for his avocation.

Now, of what should this education consist? I would have our future horticulturist brought up in the wholesome atmosphere of a christian home, and taught that success in life was

co-ordinate with his success as a christian citizen of this great republic; that success in life was not synonymous with the making of a large amount of money by hook or by crook, so long as he did not bring himself under the law. I would have him imbued with a love of nature, and a respect for manual labor, and acquire the habit of depending on his own judgment, and of asking questions and keeping his eyes open. I would have him believe it were better to be thought a fool than to be one.

Wherever our future horticulturist may be, he should have a small garden, hot-beds and hens of his own. He should have a fair stock of garden and bench tools and be allowed to use them, even if he did leave the chisels and saw very dull. He should have all the produce he raised, should be encouraged to experiment with various kinds of seeds and fruits and to note how, and when they grew. He should only cultivate so much land as he can cultivate easily and well. Try to furnish him interesting reading on such subjects as fruits, flowers, vegetables and poultry. Give him a chance, and encourage him to play and take some recreation, and in a general way supply him with so much of interest to think about that he can not find time to let his mind run on foolish thoughts. Teach him "of a little to save a little," and that "a penny saved is a penny gained." He should respect the calling of a minister, but should know how grand a thing it is to be a noble layman. Take him to the city, perhaps send him to market with his own produce to teach him to trade and let him see how the produce of the land reaches the consumer. Let him understand that the middle man has a good and legitimate work to do. Have him see the great factories and let him understand that they are producers of wealth and necessary for the well being of society. At the same time I would tell him for how small a salary many clerks worked and that in the slow-going city of Boston ninety-three per cent, and in New York ninety-seven per cent of the men who go into business fail. He should understand how much power for good was in the hands of a strong, determined, clear-headed lawyer, and how much there was for wrong. At the same time show him that young lawyers have a pretty hard time, generally, and that it requires years of hard application to become an expert in law, and that many good lawyers after leading a worried and fretted life are left in needy circumstances in their old age. He should understand the blessings which a physician may be able to bestow, and the power he may be in helping nature make our bodies do better service.

He should also know how long it takes to gain a practice and a living, and that it is not the easiest nor pleasantest thing in the world to be continually coming in contact with sick people. To-day, we have more doctors than are needed for health; more lawyers than are needed for justice; more ministers than are needed for religion, and more middlemen than the farmers can support. Thus the boy is receiving impressions easily and carrying on this education himself, without realizing it. When the time comes that the boy has reached the limit of the district school the father wishes he could have a more liberal education, but his observations have made him afraid that if the boy studies too much in the current schools of to-day, he will be desirous of being a bookkeeper or clerk and get out of sympathy with manual labor; and the father hesitates about educating him further. Now is the time when the boy should be put in some horticultural school to strengthen his powers of observation, to broaden his ideas of horticulture, and to increase his knowledge of the natural sciences which underlie all agricultural and horticultural operations.

What these studies should be, I will not enumerate, but will say that the curriculum, as laid out for the agricultural school of the University of Minnesota, carried out fully and with special prominence given to the natural sciences, but with the requirement of an additional year of study, would meet the necessities of our present needs as well as that of any course I know. The young man would know more about horticulture and agriculture than anything else, and there would be no trouble about his following them as an occupation, and when the time came for him to decide on a profession for life with a seriousness that should be given to such a choice, he will choose this branch because he is most familiar with its great possibilities, and he has become acquainted with the idea that "it is the man who makes the occupation," and not "the occupation that makes the man," and that horticulture yields as good interest for the money invested, as any safe business, and that it does not make so much difference what business a man goes into as how he applies himself to it. After such a training the young graduate would naturally turn his attention to the cultivation of the soil, and I know if such young men will follow the practical part after they graduate and obtain reasonable experience in practical lines of horticulture, they will not lack for positions which are interesting and also remunerative.

There is to-day a large call for active young men of good education and experience in horticultural pursuits. This training may be gained with very little expense, and I think a young man with it is more independent and as sure of a living and a competence, as he would be by any other system.

I wish to call your attention to a few facts taken mostly from a paper by President Goodell, of the Massachusetts Agricultural College bearing on this point, and showing somewhat the extent of agricultural education abroad:

In all, the German empire contains not less than one hundred and eighty-four agricultural colleges and experiment stations.

The agricultural school at Berlin forms simply a department of the university, having its own separate faculty, lecture rooms, apparatus, etc. Its staff consists of ten professors, twenty instructors, and six assistants, besides clerks, modelers and others.

The French government recommends that in the selection of teachers, preference be given to those able to impart instruction in agricultural subjects; and in some departments this is made a requisit of first importance. France contains not less than eighty-nine agricultural schools, and twenty-five schools of horticulture.

The Abbott institution at Glasnevin furnishes the higher agricultural education of Ireland; and to it are brought yearly at the expense of the government, the schoolmasters of the lower schools, fifty at a time, for a six weeks' course.

In closing, it seems to me that the lessons we have to learn from foreign governments and from our own experience are: That the state must take the lead in introducing and maintaining agricultural education; and that agricultural science should be introduced into all our public schools, from the lower grades up; and be made compulsory, even if in order to find time for it, we have to dispense with some of the less important studies now taught.

In a state like Minnesota, whose main resources are agricultural, there can not be too great a dissemination of agricultural education.

In this age of close competition and speculation, we should remember that the day when quacks and empirics were successful has gone by and that now, intelligence, care and foresight, when associated with industry, are the winning qualities. To-day the man with the best training wins, and it is but the carrying out in every day life of the idea, that other things being equal,

a good theory is the first step in a successful practice. The successful horticulturist of the future will be the man who "progresses with science and practices with prudence."

The following paper was read by Mrs. Campbell:

ETHICS OF HORTICULTURE.

By Mrs. V. H. Campbell, Evansville, Wis.

"As a man thinketh so is he," may well be supplemented by the expression, as a man worketh so is he. It is an incontrovertible fact that the nature of a man's business vitally affects his character on both its moral and intellectual sides, and it does not require close scrutiny or a deep insight of character to determine a man's occupation by his personal appearance. Labor in one channel for successive years has the effect to change not only muscle but bone, so that in time the very features have assumed a difference of expression. We can readily discern a man who tills the soil, and so it is in the various professions, each man's face bearing witness of his occupation.

When man, through the exertion necessary to applied effort, has become self-sustaining, he has climbed the first round of the ladder of individual existence—has become an important factor in the industries of the world.

The primal man—possessing only the most limited mental outreach, feeling but the promptings of physical needs,—was stimulated to only a sufficient amount of exertion necessary to provide for those demands, viz., food and shelter. As his ideas of each were very crude, his efforts to obtain them were sluggish and limited and were only stimulated by immediate demand, consequently he manifested little or no desire to provide for future emergencies. But after a period of slow evolution, the inner man was developed to a degree that the needs of the individual were largely multiplied. Especially would this be the case if he dwelt in a climate sufficiently rigorous to give him brain stimulus; if it was too rigorous he would remain enervated and sluggish as in the other extreme. As his wants became multiplied new appliances for obtaining those necessities became necessary, and his hands, directed by his crude ideas,

began clumsily to fashion them, and he had climbed another round of the ladder—he was a contributor to the wealth of the world.

Man has made great advancement in the scale of human progress when his æsthetical nature has developed to a degree that prompts him to surround himself with the beautiful and to cultivate fruits and flowers. He has then advanced sufficiently to dignify the labor that has developed and glorified him; that has made him the fittest to survive. For,

“Labor in life. 'Tis the still water faileth,
Idleness ever dispaireth—bewaileth.”

Although labor tends to energize and individualize, yet man makes no intellectual advancement by labor mechanically performed. He who merely plods along will never meet with marked success, for to succeed in any profession one must have a real love, a stirring enthusiasm, for his work; an enthusiasm born of love of the work, an enthusiasm which lifts it above drudgery. Especially is this essential to perfect success in the profession of horticulture. An intelligent person revolts at the idea of being nothing more than a machine. His thoughts keep pace with his hands and he does not turn out inferior or second rate work.

The ethical culture of the horticulturist should be of the broadest kind. Honesty of purpose and integrity in dealing with his fellow man should be strongly defined in his code of ethics. Benevolence, conscientiousness, punctuality and order should be the cardinal points in his character, and tributary to these, all other qualities that tend toward the advancement and elevation of the individual.

There is a peculiar beauty to be found in horticultural pursuits—an ineffable charm and delicacy in watching the growth of and caring for fruits and flowers—that constantly tends toward the development of a higher moral and intellectual life, for no one will deny that there is a moral development in beauty itself for the individual who possesses a sense of appreciation, and he will be uplifted by it; its influence on him will only be limited by his ability, whether natural or cultivated, to appreciate the beautiful in the world. The indifferent eye sees no beauty in his lines of life, while the æsthetic eye sees beauty in every wayside shrub and flower. While each expanding bud preaches a sermon of love to the one, the other passes it by unheeded. The differ-

ence is in the individual; the object is the same. Wordsworth says:

“Who has no inward beauty, none perceives,
Though all around is beautiful.”

And Coleridge says:

“We receive but what we give,
And in our lives alone does Nature live.”

There is a charm, refreshing and exhilarating, in the study of nature, not to be found elsewhere. Nature's museum lies at the very threshold of our own doorway if we but open our eyes to the fact, and seek the wonders, to the careful observer revealed; and we possess no one faculty capable of so great cultivation as the faculty of observation. This power of observation is the power of intensifying thought upon objects seen, so as to produce lasting impressions. To be able to see a fact and make an intelligent note of it is a faculty all possess, in a degree only limited by the amount of cultivation we have given it. A distinguished writer has said: “The eyes are of no use without the observing power.” And how negligent we are about cultivating that power. Of how many of us can it be said: “Having eyes, they see not.” The faculty of observation has much to do with the success of horticulturists; they must possess the power to investigate, read, and interpret nature in an eminent degree; they must be able to go to the fountain head and draw knowledge from the original source. He who can observe nature understandingly is like the mariner, who, with chart and compass, cares not for the shining of the sun nor the glimmering of the north star, but steers confidently on o'er the trackless deep without a fear, for he has an unfailing index before him. The cultivation of the power to observe should be commenced very early in life, for with it many a difficult lesson is easily mastered.

The profession and study of horticulture would seem to the casual observer to be one unending round of delightful and pleasant duties. The horticulturist lives close to Nature's great heart, and to him she confides her utmost secrets; to him she discloses the wonderful problem of assimilation and growth. Through the propagation of her fruits and flowers she reveals to him the laws which govern the material world. She is his hand-maiden, and by her aid he watches the scale of gradation from the lowest form of organism to man. Her book is open to him, and on its pages he reads laws that are identical in lower and

higher forms of life. He knows that what some are pleased to call sports, in the vegetable world, are simply the results of higher cause little understood; that Nature never makes mistakes, takes freaks, nor produces "sports,"—yet with all the fascinations of the study and work connected with the profession of horticulture, the high road to success is far from being a smooth one. The horticulturist is constantly called upon to deal with new factors; new avenues of exchange are being opened; greater requirements must be met.

Propagation and cross-fertilization constantly produce new varieties which must be carefully tested, and the good culled out from the worthless. Climatic changes have to be met which require new methods of adaptation. The present era of sharp competition—an era which has come to stay—is doing much to change the relation of the horticulturist to his profession, and to be able to acquire any degree of pecuniary success he must be fully alive to the exigencies of the case; he must be constantly on the *qui vive* to seek out and adopt every agency for the enlargement of his knowledge of the facts surrounding him and the wider relations to which his interests are constantly tending; in short, he must put forth greater efforts to provide for better methods. He must have lists of facts, every one of which may be separately verified, valued and revalued, and the whole accurately summed up. A clear recognition of the possibilities and limitations of the profession is of vast importance to those who would woo success; to be able to acquire any possible degree of success, there is necessity for mental activity—a hundred times more so than was the case a half century ago.

He can no longer follow in the furrow which his predecessors have turned, but must strike out new lands for himself. Horticulturists will have accomplished much toward driving out the unequal and damaging competition of the oily tongued tree peddler with his wonderful and unnatural productions, if they will confine themselves a little more closely to the text of the golden rule and cultivate conscientiousness more. A perfect confidence once established between them and their patrons will not allow the intervention of those dishonest scavengers who reap the fruit of honest men's toil.

The man who conducts the long line of experiments necessary to produce a new variety that shall prove satisfactory for general cultivation is a public benefactor and should be regarded as such, but alas! the truth is, the public is usually very slow to

make any such acknowledgement. We seldom think, when eating our luscious fruits or admiring our beautiful flowers, of the careful, painstaking labor—the anxious watchfulness—that has brought them to their present degree of perfection. We are indifferent to and thoughtless of the labors of these men, yet the names of Harris, Gideon, Ragan, Budd, Peffer and Loudon, together with a score of others, who have spent years of their lives in developing, demonstrating and adapting certain principles of nature, will go down to posterity while ours will have been long forgotten. When we look at simple results we are often disappointed with their meagerness compared with the expenditure of time, labor and money they have cost, but it is unfair to measure them in that way. It is not the labor, the time nor the hundreds of dollars an experiment has cost that should be counted if a theory, a fact, has been demonstrated that shall prove a foundation upon which to base further investigations. The need is for more insight as well as for more outlook. There is also a need of an awakening in the interest of horticulture—an arrest of thought in the profession. People not directly interested in the cultivation of fruit are slow to perceive that the study of horticulture holds any attractions for them. Education furnishes a remedy for this indifference. Early impressions are lasting and enough of horticulture should be taught in our common schools to familiarize children with the trees and shrubs indigenous to our country, also our fruits and the methods of their cultivation. As horticulturists we have a duty in this direction that we can not afford to neglect.

In the course of evolution, new generations outgrow the conditions of preceding ones; new words are coined and the old words receive new definitions. The word horticulture, in the last quarter of a century, has grown to signify more than it did formerly and, in its larger signification, covers a wide range.

It has outgrown its former restricted definition and is now regarded as a science which includes not only the modern sciences and arts which relate to the orchard, the garden, the vineyard, and the forest, which is essential in our rigorous climate for the protection of them all, but also relates to all that embellishes the home, the park, the public highway and the farm, as well as to other branches of industry that directly affect all of these interests. With the broader meaning of the term there is no need for the modern horticulturist to grow narrow. His education must be of the broadest kind; let him leave the narrowness—

the "one idea"—to those in some of the, so-called, learned professions who are only educated in one particular line of thought. I have been pained to note a disposition among some of our leading horticulturists, at the conventions I have attended, to crowd out every topic not strictly relative to the cultivation of fruit and flowers. I have noticed the shrug and frown of impatience and the inclination to check discussion when papers were presented on subjects that related to the home and its outlook for a better regime in the future. I have been sorry to see this tendency, because I feel that all these things are essential to the broader development, and the horticulturist should guard against everything that will tend to make him warped and one-sided in his nature; he must uproot all these tendencies to narrowness and not tolerate them any more than he would the distorted and unsymmetrical tree.

The evolution in ethical culture which the horticulturist is sure to experience, very largely, affords an imposing outlook for his future. Virtue and happiness are inseparable in the goal which he approaches in a steady line of advancement. Nature herself leads him on and he instinctively feels the assurance, within himself, of victory. Ceaselessly bent upon the advancement of his profession, restlessly at work improving the conditions of his existence, he simultaneously strengthens his moral life, while at the same time the influence of his own right life will serve as an inspiration to others. A beautiful faith is the faith in the upward tendency of humanity; it renders easy the numerous battles, the countless sacrifices and the dangers that betide the way.

Although we meet, at these conventions, give cordial greetings, read papers, discuss different methods, and part again with regretful good-byes, we are, unconsciously, perhaps, marking epochs in the work, making history, and making horticultural literature that may serve as stepping stones for those upon whom our mantles may fall. It is to be hoped that we may leave some lighthouse, built upon our rock of experience, that may warn others of reefs of danger whereon we have been well nigh stranded. And although the obstacles that we may meet may often seem too great to be overcome and our progress so slow that we can scarcely note any advancement, let us not forget that

"The sweetest parables of truth,
In our daily pathway lie,
And we read, without interpreter,
The writing on the sky.

“The sunshine drops, like a leaf of gold,
From the book of life above;
And the lily’s missal is written full,
Of the words of a Father’s love.

“So, when we turn from the sacred page,
Where the holy record lies,
And its gracious plans and promises,
Are hidden from our eyes,

“One open volume still is ours,
To read and understand;
And its living characters are writ,
By our Father’s loving hand.”

Mr. Wilcox moved a vote of thanks to Mrs. Campbell for her able and instructive paper, which motion was adopted.

On motion of Mr. Gray Mrs. Campbell was made an honorary member of the Society for five years.

To which Mrs. Campbell replied:

Mr. President and Members of the State Horticultural Society:

I thank you most sincerely for this honor, for I certainly deem it a great honor to be a member of your Society. I will say I have been very much pleased with your convention and the way I have been received and so pleasantly entertained; I hope the time will not be far distant when I may be able to meet with you again.

The following paper was then read by Mrs. Underwood:

ROSES.

By Mrs. Anna B. Underwood, Lake City.

A great deal might be said upon “the ethics” of rose culture; many quotations from rose-enraptured poets and prose writers might be made; enough in fact could be selected to fill a good sized volume, and even then the subject would be far from exhausted. But such a course would be unprofitable at this time, for although our members might listen in a courteous manner to such an article read to them, in a printed volume I fear the said article would be studiously avoided, because these volumes of the Horticultural Society are only read by busy people to whom

time is money, and who do not have to read to kill time. So, instead of writing upon the beauties of and the pleasures obtainable from roses, it will be wiser to attempt to make these beauties and pleasures attainable by flower lovers.

Among my friends I can not name over a half dozen that have so much as one rose bush in their yard. And this condition of affairs is no worse in our town than it is in all others of the state. And how is it with the farmer, with plenty of ground, with all the necessary implements for work, fertilizers in abundance, plenty of sunshine, etc.? Does he revel in roses? Does he occasionally bring in to his good wife a nice bouquet of fresh-opened, brilliant Jacqueminot roses, or a large handful of the dainty buds and blossoms of the lovely white Mad. Plantier, with the fresh drops of dew upon them? By contact with them feeling the presence of God, and by the act of giving them, brought into closer harmony with his home? Such a gift convinces any one that the love and affection of the donor goes with it.

The chief reason for this great dearth of the Royal Beauties is that it is generally believed that they can not be grown successfully in this climate. It has been fully demonstrated, however, that with a little care and right management, our eyes may be gladdened and our homes beautified with the presence of this queen of flowers. Let each one of us make it a point of duty to our Society, to urge his neighbors (of course each one here is supposed to have them in his yard), to plant roses and plant them in profusion.

A theory of mine is that detailed experiences, failures and successes alike, are more helpful than simple rules laid down for following; as any one can make rules but we do not all have experiences; and knowing wherein a failure has been made, we can strive to avoid it if forewarned.

And now a leaf from my book of experiences relating to rose culture: About four years ago I had an attack of "roses on the brain." I already had some eight or ten kinds in my garden, but there was not variety enough, either in color or name. So I consulted catalogue after catalogue, and the result was a most glorious list of between sixty to seventy varieties, and really some of the names were quite new and beautiful! The plants were sent for; they arrived in good condition and were put in the ground, and the names on the stakes, to say the least, were very imposing. If I could I would pronounce some of them, but my early education in the foreign languages was neglected. After

the plants were set out the ground looked so bare, that annuals were planted between them, fast growing kinds that soon covered the ground, and the bushes, too; to their detriment, however, as they soon ceased to grow, and fall found them but very little larger than in the spring, and consequently with but little vitality to endure the winter, which was a severe one. Spring found many of them injured, killed back to the ground; but after awhile new growth started from the roots in profusion, some of it being four, five, or even six feet long. What a wonderful wealth of flowers would be mine another year! I made a memorandum of these rapid, strong growers, and also recommended them to friends. The uninjured plants made fair growth and gave a reasonable amount of blossoms through the season. In the fall all were carefully covered again. The following spring they came out beautifully, particularly my rapid growers of the previous season, and were alive to the tip bud; but for some reason they would not blossom, although they branched out and grew finely. In imagination I could see how beautiful those tree like bushes, way above my head, would look covered with blossoms. Last spring, however, when the month of roses came—the secret leaked out—all the luxuriant growing kinds I have mentioned, put out a very few blossoms each, and they were exactly alike, a small single rose. I waited until fall, and then had them grubbed out. No more budding roses for me, unless they are top worked as tree roses. So, to begin with, be sure that your roses are grown on their own roots, and not grafted on wild stock, and then all the growth from the roots will be the pure article, ready to bloom if given a chance. If the roses are to be grown in beds plant all of one kind or color together. Do not mix the shades. Study harmony in color if you desire your roses to appear to best advantage. I have in mind now two splendid dark roses, Pierre Notting and Fisher Holmes, with just a shade of difference between them, growing side by side; the branches interlacing. An artist would say they kill each other but when arranged in separate vases or bouquets each is a rich, beautiful rose.

In starting a rosery, unless the soil is A No. 1 in every respect, dig it out to the depth of a foot or more and fill in with the *best* you can get, *making* a soil if necessary, for roses, to do well, must have it rich and mellow. There is little, if any, danger of having it too rich.

Do not hesitate to trim the bushes closely. It is a great temptation I know to leave those long branches, but cutting them back to twelve or eighteen inches will cause many more branches to start out; and the blossoms are increased. Never allow them to go to seed, as it is always at the expense of the blossoms. It will be quite a little tax to watch them so closely, but they will repay the time spent on them many fold. In the rose bed hybrid perpetual and moss should be planted about three feet apart. The teas or smaller growing varieties may be nearer together. And here I will speak a word for the tree rose. No handsomer ornament can be found for the lawn or garden, however small, than the tree rose. Standing three feet or more high on its hardy stock, every individual bud and blossom can be seen, and budded with hybrid perpetual roses it is a beautiful object the season through. They seem to be exceptionally profuse bloomers, as many as two hundred and sixty blossoms having been counted on a single bush. They are as easily cared for as other roses, requiring in fact the same management. During the summer keep the ground well stirred, not allowing a weed to grow as the sunlight is fully as needful on the soil as on the foliage of the plants. If the season is dry, water once a week thoroughly at night and if possible shower them.

The only enemy appearing on the scene, thus far with me, has been a small, pale green worm, working on the underside of the leaves. They appear very suddenly, between two days as it were, and until last season they were very injurious to my bushes. Not being on the watch for them the dead or dying leaves were ascribed to dry weather and it was a source of much sorrow to look on the poor denuded branches. During this period my rose bed was anything but a thing of beauty. In a few weeks time however they were in full leaf and bloom again. This season I resolved to be on the watch for them, and every morning the underside of the leaves was closely scrutinized; just as I had begun to congratulate myself that I would not be troubled by them my watchfulness was one morning rewarded by finding on the first bush examined my dreaded enemy, very small in size, but alas! on almost every one of my one hundred plants. We had a quantity of London purple on hand and I determined to try its effect upon them, so with one part of London purple and three parts of flour and in a tin pepper box I sprinkled the undersides of the leaves in the early morning before the dew was off. I cannot say whether it killed them

or whether they objected to the kind of seasoning in their food and left. There were no remains lying around and I did not witness their departure. The fact sufficient is that in three days time there was not one left on the leaves and my roses did not drop their foliage as usual. On applying the powder, however, with a light breeze at the time, some would get on the buds, and I found that they were more or less injured, the smaller ones refusing to perfect themselves. I could not see that the leaves were affected in the least. If the worms appear next season I shall try London purple with a larger proportion of flour and take extra care not to get it on the buds. Would like to inquire if any one has used it with water or any other way and in what proportion, also the scientific name of the worm. With regard to varieties. If one variety has stood the test well with you, is a good bloomer, strong grower, good color, etc., "tie to it," have a dozen plants, a whole bed of them, for it is profusion of buds and blossoms in roses, not numbers of varieties that gives the greatest amount of satisfaction. For one starting out on a small scale, say twenty-four plants, I would suggest the following list as good: 4 Gen. Jacqueminot, 4 Fisher Holmes, 2 Alfred Colomb, 2 Climbing Jules Margottin, 2 Moss, 2 Mad. Plantier, 4 Coquette Des Alpes, 2 Tree roses in white and 2 in red colors. The main feature in successful rose culture, good soil and sunny location granted, is *proper protection* in winter, with which any variety may be grown; straw and leaves are not suitable as they do not prevent alternate freezing and thawing which saps the vitality of the bush and is fatal in its results. I have found that a sure and successful way is to lay the bushes down carefully so as not to break them and cover completely with dirt and sod. Be in no haste to uncover in the spring, as some of the tender varieties may be injured by late frosts; when you feel positive there will be no more freezing weather, then is the time to uncover. Finally, what can I say to induce more of our farmers and townsmen to plant and cultivate roses? Having pointed out the way, may I not hope that their beauty and fragrance will woo you to the effort necessary to possess them?

Mrs. Gould from the Committee on Floriculture presented the following report:

ROSE CULTURE.

By Mrs. M. S. Gould, Excelsior.

That choice roses can be successfully grown in Minnesota, is no longer questioned. June roses will endure more cold and neglect than any others, and are therefore still valuable, especially to people who can have no others. Some are fragrant and beautiful, but are not equal in attractiveness to the newer varieties, and the public generally are not satisfied with a rose that will bloom but once.

For open air culture in our climate Hybrid Perpetuals are the most valuable class; none surpass them in attractive qualities sought for in the rose, viz., size, form, color, fragrance and habit. While it can not be claimed that these give such constant bloom throughout the season as the Teas, Bon-bons, Bengals, etc., commonly called monthly, or ever-blooming roses, yet they may be depended on to produce a good quantity long after the last June rose has disappeared.

Monthly roses are too tender for outdoor culture, as they can not endure the amount of cover needed to protect them in winter. To be more explicit, they are liable to rot or mould, the wood not being sufficiently ripened at the time they must be covered.

The Hybrid Perpetuals need covering to ensure them through an average winter, and they will endure the ordeal, coming out well rested from the long sleep. Notwithstanding the severity of last winter (1887-8) we lost not more than two per cent.

After giving one hundred varieties (selected on account of their superior merits as claimed by numerous individual growers) a fair trial, we have decided on the following as among the best for our use, and for general cultivation:

Gen. Jacqueminot, brilliant crimson, fragrant and hardy.

Fisher Holmes, dark crimson, a superb rose.

Alfred Colomb, brilliant carmine crimson; one of the most useful for general cultivation.

Baroness Rothschild, light pink; without fragrance, but of beautiful form and a late bloomer.

Caroline de Sansal, pale flesh color, deepening toward the centre, a lovely rose.

Anne de Diesbach, carmine, a beautiful shade, fragrant; a superior garden sort.

Baron de Bonstetten, rich velvety maroon, large and full.

Marguerite de St. Amande, bright rose, vigorous, valuable.

Paul Neyron, deep rose color, a free bloomer, very large and desirable as a garden rose.

John Hopper, bright rose with carmine centre, large and full; a profuse bloomer.

Salet (perpetual moss), light rose, large, full, pretty in bud; one of the most valuable.

Mable Morrison, white, sometimes tinged with bluish; a fine rose but shy bloomer.

Madam Plantier (June rose), vigorous, white, fragrant; free bloomer, early in the season.

Queen of the Prairies, bright rosy red.

It has been suggested that I should add to this imperfect report, something of how to grow them. I fear I should be poor authority, household cares having occupied too much of my time and attention. I might give a few items, though, viz., that the selection and preparation of a suitable place for planting is very important. An expert rose grower once said, "All that follows depends upon the care used in this first step."

Good, rich soil deeply worked in a location protected from bleak, sweeping winds, northern slope preferred, sunny, but a situation partially shaded from the hot rays during a portion of the afternoon is desirable. In short they are worthy the best place in your garden.

On motion of Mr. Sias a vote of thanks was given Mrs. Underwood for her interesting paper.

DISCUSSION.

President Elliot. I think there are quite a number of points that are very instructive in this paper. I would like to inquire of Mrs. Underwood what protection she gives to roses?

Mrs. Underwood. I cover with earth around the bushes in the ground. Some times tender varieties need to be covered with boards.

Mr. Pearse. At what time do you uncover them?

Mrs. Underwood. After the snow is gone and when the leaves begin to start. I don't think it is well to let it go too long.

Mr. Carleton. When do you do the pruning; how soon after they are uncovered?

Mrs. Underwood. In the spring as soon as uncovered, before the leaves start out.

President Elliot. Why I inquired about protection was, I have been experimenting with roses some little time, and trying some hardy varieties the last two years. We have always had more or less trouble in our sandy soil, it being too warm some years, and in others they would come out in good condition. We have tried putting them down and covering with earth. The last two years we have covered entirely with leaves. We take a sheet and spread it out and gather the leaves in it. We pin the bushes down close to the ground with forked sticks and cover over with leaves, and throw some pieces of boards over, and that is all the protection given. My roses have done better in that way than by any other treatment.

Mr. Gray. What varieties have you?

President Elliot. Gen. Jacqueminot, Maiden Blush, Madam Plantier, Moses, and half a dozen other different varieties.

Mr. Smith. Do you put the boards on so as to keep the water from settling in?

President Elliot. Just enough old pieces to carry off the water.

Mr. Frisselle. What was the character of the subsoil of your ground?

Mrs. Underwood. I guess Mr. Underwood can tell better about that.

Mr. Underwood. Clay subsoil; black soil on top. I will say in regard to covering that we have not had as good results with straw and leaves as with dirt, or boards. I have kept them very well with boards alone, but think the proper object to be gained is to keep them from alternately freezing and thawing. Perhaps leaves will do it, but I think we have had better results from the use of earth than from leaves or boards. I am anxious to try a plan recommended by an enthusiastic grower of roses in Canada. He digs a pit, and takes up his roses every fall, and places them in the pit. He grows the most delicate varieties, and takes them out in the spring and resets them.

Mrs. Campbell. I would like to suggest that if Mrs. Underwood will use white hellebore, it will destroy the bugs without injury in any way to the bushes. I think the little worms she describes are the common slugs.

President Elliot. Do they roll the leaf?

Mrs. Underwood. No, sir, they do not. They look very much like worms that are found on gooseberries; it is a green bug with a big head.

Mr. Harris. I can corroborate what Mrs. Campbell says. White hellebore is a perfect remedy and where I have used it, I have saved every plant.

Mr. Pearse. If I wish to hold back my roses until in July, how shall I do it? I was told if I would cover with sawdust, I could hold them almost any length of time, and that I should not take up but a part of the roses at a time. I am going into the rose speculation as I live on a thoroughfare where there are thousands of people going to and from the lake and I wish to arrange our yard so that people passing by can look at something very beautiful.

Mr. Underwood. I don't think I should invest much money in sawdust. It is a first class thing to retain heat and to make things start, at least that is our experience in the nursery. If I were going to try anything I would cover well with dirt and mulch well with any course litter, that would keep frost in the ground as late as possible. That is the only way, so far as I can judge, you could accomplish anything.

Mr. Gould. Don't cover too early in the fall. As a rule, I do not cover until late, but I would uncover when satisfied the mercury would not go down again to zero. A great many leave them in the ground too long in the spring. It is almost fatal to leave roses long enough for the buds to start.

Mr. Pearse. I have another question to ask. I have covered in various ways; I have had very good success. The best success is in using barrels with no heads. A barrel would set over a rose bush. I have filled that with leaves. Now can you tell me what will be the result?

Mr. Underwood. They will probably die.

Mr. Bunnell. The tender ones won't stand it.

Mr. Pearse. Well, I have Gen. Jacqueminot.

Mr. Smith. If you succeed in that way write an account of it and publish in the *Farm, Stock and Home*.

Mr. Pearse. I am told if you let the covering of leaves get wet it will injure the rose, but not if you keep them perfectly dry. I have experimented on it and think it is a desirable way.

Mr. Harris. I was going to tell Mr. Pearse he would have to put something over the barrel, and it would be a good plan to bore one or two small holes so if moisture accumulates it would work out.

Mr. Smith. I think Mr. Gould made a good point about covering too early. I have sometimes covered too early in the season

as I have found when uncovered in the spring. Have found the same result where the ground froze and cracked open so the water would run in and they got wet during spring when the frost was coming out. I think we should wait just as late as possible before we cover them. Be careful to round up the earth to throw off the water, and then use some mulching of some kind so the ground won't crack; that is of advantage. That also keeps them back in the spring.

Mrs. Stager. I have had good success in covering by putting a lot of straw over them and making quite a mound of earth. Last spring, not having much help, it was near the middle of June when they were uncovered; the consequence was I grew the most beautiful roses I ever had. There was a fuller bloom than I have ever seen before. People would come from six and eight miles around to see my roses.

President Elliot. I would inquire if the rose buds had started much?

Mrs. Stager. Not at all. They had just commenced. They looked a very light green color and I was afraid it would kill them entirely.

Mr. Pearse. I am in favor of covering with earth. I have tried it. It should be done I think as late as possible when the wood is as ripe as it can be. My neighbor, a lady across the way, has had wonderful success. I never have known her to have her roses injured. She covers late with coarse litter from the barn and then protects the covering from moisture. Her roses have never failed to come out and I am impressed with the idea it is the correct way.

Mr. Reeves. I would ask if any of those who have covered with leaves or straw have had trouble caused by moisture. I never raised but a few roses, but I covered twice with leaves and straw and both times the mice girdled the plants. I have covered with dirt and had good success.

President Elliot. There is no trouble covering with straw or mulching, providing you take a little tin can and put in a little corn meal and mix in a little strychnine and lay it down among your rose bushes. The mice will always find it and will never leave it.

Mr. Bunnell. Where you cover with stable litter is it not liable to be too hot?

President Elliot. I never cover with that.

Mr. Harris. Whoever uses that will meet with disaster from it.

Mr. Underwood. Mr. Gould is the premium rose man of the country, and I would ask what he covers them with?

Mr. Gould. Well, I cover the most of my roses with sods and earth. But in covering with sods it is not safe to put the grass side down on the rose bush; I have found out that much by experience. There is a good deal of an inclination to heat in the grass, and perhaps, too, a large proportion will be green and a portion will be dry; when there is quite an accumulation, it gets up too much of a heating process for the plant's good, so I would advise to put the earth side of the sod down on the bush or on the plant, and the grass up the same as it grew. I have covered with leaves also. I have taken a good deal of pains to cover roses, the tender kinds, the teas, with dry leaves, and have made a sort of a roof that comes up to a peak and slopes down like the roof of a house. I fill this with leaves and press them together so as to have that as solid and full of leaves as possible. It is considerable trouble to do that where one has a good many of them. They must be left till late in the season — until the tenth or fifteenth of November the past year. Have known people that covered earlier that didn't have any roses the following year.

On motion of Mr. Gray the following committee was appointed to select and recommend a list of roses for general cultivation, to-wit.: Mrs. E. J. Stager, Mrs. Anna B. Underwood and F. G. Gould.

Subsequently the committee presented the following report:

REPORT OF COMMITTEE.

In submitting the following list of roses your committee do so with the remark (in the way of explanation) that our aim in this work has been to make a list not too long, but to include enough of such sorts as would embrace the most pronounced shades of color with some of the intermediate shades, having in mind the importance of the selection of such as have the most desirable qualities, as beautiful color, form, fragrance, freedom of bloom, good constitution, and permanent shade, etc. We can scarcely expect all the good qualities concentrated in an individual variety of any class. Consequently, some are left out that are as beautiful, and perhaps more so, than any in the list on

account of constitutional defect, or other fault. The difficulty of judging between the many grandly beautiful roses, accounts for the absence of many a favorite. Winter protection is recommended for all, even the June roses.

HYBRID PERPETUAL ROSES.

Alfred Colomb — Brilliant carmine crimson; very large, full, and of fine globular form; extremely fragrant.

Anne de Diesbach — Carmine, a beautiful shade; very large, fragrant.

Baron de Bonstetten — Rich velvety maroon; large, full.

Baroness Rothschild — Light pink; cupped form; very symmetrical, without fragrance.

Caroline de Sansal — Pale flesh color; large, full, flat; does not always open well; best flowers late in the season; a lovely rose when perfect.

Fisher Holmes — Deep glowing crimson; large, moderately full, and of fine form.

Gen. Jacqueminot — Brilliant crimson; not full, but large, and extremely effective; fragrant.

John Hopper — Bright rose with carmine centre; large and full; a profuse bloomer.

Marguerite de St. Amande — Bright rose color; very beautiful in the bud, gives many fine blooms late in the season.

Paul Neyron — Deep rose color; good tough foliage; free bloomer; about the largest variety in cultivation.

TEA ROSES.

Bon Silene — Rosy carmine, shaded with salmon; fragrant and very free flowering; valuable for the buds.

Perle des Jardins — A beautiful straw color, sometimes deep canary; very large, full, fine form and free flowering.

Souvenir d'un Ami — Pale rose, sometimes slightly suffused with salmon; very large, full, and highly perfumed.

Sombreuil — Creamy white, tinted with rose; very large.

HYBRID TEA.

La France — Delicate silvery rose color, changing to silvery pink; very large, full, fragrant; constant bloomer.

PERPETUAL MOSS.

Salet — Pink, or light rose color; large; pretty in bud; a true perpetual, and the most valuable moss rose.

JUNE ROSES.

Mme. Plantier — Pure white; above medium size; full; flowers profusely, fragrant, vigorous grower.

Harrison's Yellow — Early; fragrant.

Queen of the Prairie and Baltimore Bell — Climbing; red, sometimes with white stripes, with very slight fragrance; blush, changing to nearly white.

The following paper was contributed by Mr. Nagel by special request:

THE CHRYSANTHEMUM AND ITS CULTURE.

By E. Nagel, Minneapolis.

The chrysanthemum is now the most popular flower of the day; it is rightly called the Queen of Autumn. It rules royally from September till December, in the most gorgeous colors, cardinal and old gold, bright bronze-brown and white as pure as snow, and feathery as ostrich plumes, clear golden yellow, rosy pink silvery gray; no other flower can compare with it for variety and purity of color. No wonder that the admirers go wild over the chrysanthemum shows in New York, Philadelphia, Baltimore and other large eastern cities. To think of the endless varieties and the most gorgeous colors, and oddest shapes, flowers to measure five inches or more across and color as bright as gold, it is certainly the most gorgeous and beautiful flower for decorating and all other purposes for which flowers are used. At the same time it is not an expensive flower, it is the flower for everybody, rich or poor, all alike, awaiting with a good deal of anticipation, when the flowering season of chrysanthemum is approaching.

The popularity of the flower seems to be increasing from year to year in this country, and in Europe. The growing demand in the last four or five years is astonishing. Not very many years ago the chrysanthemum was classed among the most common flowers, and used only in the most common floral work.

And to-day, it is used at the most brilliant receptions, parties and weddings, everywhere where flowers are used, the chrysanthemum is the leading flower in its season.

It is not an exotic which commands a great deal of care and tender treatment; it has some peculiarities, but they are easily learned, and by a little watchfulness anyone can grow them. Their propagation is so easy that a great many florists put them almost any place, because they think they will grow anywhere, and abuse them in the most shameful manner.

They certainly do grow anywhere, but to grow them well they want some care and a good place, like other plants. The propagation is easy, and should be done as early as possible. After they are through flowering they should be cut down to the pot — and they will throw out suckers from the roots around the stem, and when large enough they may be taken off as cuttings and put in cutting bench or divided and planted in small pots at once — one way is as good as the other. January and February are the best months for it, but it may be done later, any month until May, with good results. After the young plants are potted, care must be taken not to let them get pot-bound. As soon as the pot is full of roots they must be transplanted into a larger pot; and they must be pinched back from time to time, so as to give the plants a good shape and make them bushy. The pinching back should be done a few days before transplanting, so as to have them sprout again before transplanting. The soil should be good and rich; compost made of well rotted sods with one-third old cow manure is best. At all times they require plenty of water; they should never be left dry enough to wilt.

In potting, the pots should not be filled too full with earth, so as to leave at least one inch space for water, that is when they are in pots the sizes from seven to ten inches.

In the month of May they can be put out doors, but they must have plenty of sun and air; give the plants plenty of room, so as not to crowd each other; the pots must be sunk in the ground, and the limbs tied to stakes so the wind won't break them, or they may be planted out in the open ground and left until fall, and potted and brought into the house before cold weather sets in; in either case they will flower in abundance.

The main point in growing chrysanthemums is, to keep them growing, and that must be done by giving water freely and transplanting whenever necessary; whenever a chrysanthemum is checked in its growth the result will be crippled flowers.

The chrysanthemums are divided in three classes, the Chinese, Japanese, and Pomponé.

The Japanese are the oddest shapes, many of them having whorled centres; others have short blunt centres, petals with long erect outer rows forming a saucer shape; others are partly quilled, each quill is a flat spathe.

The Chinese are more regular in form, many being incurved, others are like full rosettes of narrow ribbon, the petals being slightly reflexed.

The Pomponé are very small flowers, very regular, but not very popular, therefore not much grown.

There is an endless variety of them, and every year many new ones added. We had over seventy varieties last season. I will describe a few of the best of them.

Bicolor—Japanese; flat flower of very large size; color red striped with orange; last long in bloom.

Christmas Eve—Japanese; fine white large flower, each petal twisted and curved; an old, but one of the best varieties.

Diana—Chinese; rather dwarf growing, but very free bloomer; centre petals quilled and short outer petals flat; one of the purest white.

Frank Wilcox—Chinese; above medium size; rich golden amber, slightly shaded deep bronze; one of the best for specimen plants.

Lady St. Clair—Chinese; one of the finest white; incurved, soft, and plummy; fine for cut flowers.

Moonlight—Chinese; a grand flower of the purest white; petal like pointed ribbons; one of the best for specimen plants.

Mrs. Geo. Bullock—Pure white flower; slightly incurved; fine for cut flowers.

Mrs. Langtry—Japanese; a perfectly formed flat flower of unusual size and perfection; color, snow white; fine for exhibition.

Robert Bottumly—Japanese; petals long and when well grown half an inch in breadth; flowers often measure six to seven inches in diameter; color, pure white; one of the best to grow for exhibition.

Domination—A grand variety; flowers large and beautiful form; petals slightly incurved; color bluish white; one of the best for specimen plants.

Gloriosum—Light lemon yellow; immense flower; narrow petals, curved and twisted; one of the freest bloomers.

Abdel Kader—Japanese; color deep maroon; petals twisted; a very fine variety.

Elaine—Japanese; pure white; back of petals slightly tinted when old; an exceedingly useful flower with broad petals; very full, extra fine.

Golden Dragon—Japanese; long petals of rich golden yellow, whorled and twisted; fine flower.

Temple of Solomon—Japanese; bright golden yellow; petals twisted towards the centre; large flower and very free bloomer.

There are a great many other kinds equally as good but too numerous to mention; those I have mentioned here, are the very best of the varieties we grew last season. As there is much interest taken in the chrysanthemum, I hope that by next fall we shall see a chrysanthemum show here.

The following paper was read by Mr. Carleton:

SUMMER FLOWERING BULBS.

By Frank H. Carleton, Minneapolis.

No flower garden is complete without a few summer flowering bulbs. They are so easily cultivated and cared for, and are so certain to send up their spikes of flowers every season, as to be deserving of more general cultivation. There is nothing in the flower garden that requires less attention when once planted, and which affords so much beauty as the summer flowering bulbs, whether they be the gladioli, tigridia, oxalis, *amaryllis atamaseo* more commonly called the Fairy Lily, the *caladium esculentum* and the canna, which are forms of bulbs proper, or the dahlia, or madeira, or mignonette vine, which, though properly called tubers, yet require about the same general treatment as bulbs. When bulbs are once planted in the spring they are certain to develop and make a grand show, provided they are given half an opportunity.

First and foremost of all these summer flowering bulbs, of course comes the gladioli. It is the lazy gardener's friend. It requires no hoeing, no mulching, no stirring of the soil, but if the weeds are simply kept away it will come along itself, and send forth its gorgeous spikes of flowers which will arrest the attention of every passerby. As a cut flower it is unexcelled. If put in water when the two lower flowers of the spike commence to open, it will last for a fortnight and until every blossom has fully expanded.

A few years ago, at Long Island, as the guest of John Thorpe, the former president of the American Horticultural Society, — the man who probably has hybridized and produced more new colorings of gladioli than any man in this country, who was the first in this country to thoroughly cultivate that queen of autumn flowers, the chrysanthemum, and who has spent many years of his life in endeavoring to produce a yellow geranium, which, with his “gilded gold geranium,” he has almost accomplished, — while with him, I saw thousands of gladioli being picked for the New York market. As soon as the two lowest blossoms were about two-thirds opened the spikes were cut with a sharp knife, bound in bundles like bunches of asparagus, and shipped.

So far as can be ascertained the first gladioli was taken as a wild bulb from the Cape of Good Hope, less than a century ago. Other varieties were found wild in other parts of the world, and now about sixty species are found. But the beautiful products of our garden with their varieties of coloring ranging through all shades except blue, are the products of hybridization. New shades are being produced each year, — some of the novelties selling for over five dollars for a single bulb.

How shall a person procure them? They are easily bought — catalogue prices for named varieties averaging from a dime to a dollar each — or what is better still buying assorted shades of the named varieties from a dollar to two dollars a dozen. But they are raised easily from seed, the seed the first season producing little bulblets, very many of which will blossom the second year afterwards. And when a person has a few bulbs to start with they will multiply rapidly. Each year a full grown bulb will form around itself from one to a dozen or more little bulblets, which, if taken up each fall and planted the following spring, will produce bulbs, most of which will flower the second season. Five years ago I commenced my study of the gladioli, commencing with about a hundred bulbs and two packets of seeds. I procured only the named varieties. The spring I planted them I could put all I had in the pockets of my overcoat, but by carefully saving all the bulblets each fall and planting them the next season, I have now in my cellar for next season’s planting fully four bushels of the named varieties, and I have supplied several of my friends last season. I presume I have now three quarts of bulblets about the size of peas, which I shall plant next season. The parent bulb dies each year, but it forms a new bulb of equal size each season, and often two, in addition to the little bulblets of which I have spoken.

The bulbs should be planted from three to five inches deep, and not nearer to each other than six inches. For successive flowerings they can be planted as early in the spring as common peas and as late as the twentieth of June. They can be put in as early as the ground can be properly worked, and a spring frost, or even an occasional late spring snow, will not hurt them, as they are very hardy. Avoid planting a second season on the same ground, but plant them anywhere. Stick a few bulbs among the rose bushes and they will make the bushes beautiful after the roses have gone, and if not cut each spike will remain beautiful for a week or ten days, at least. Some of Lemoine's hybrids are truly gorgeous. The gladiolus needs no watering, and will care for itself if the weeds are kept down. I doubt if any soil is better adapted to their vigorous growth and flowering than the average soil of this section, into which should be worked a very little well rotted stable manure.

With many the lily is a favorite flower. Many of its varieties are truly queenly, but the *lilium auratum* is the only one which I have found perfectly hardy. If planted in a sandy soil it will last for four or five years without a division of the bulbs, and increase in vigor each year.

The Lily of the Valley, which we all admire for its beauty and purity, everyone can have. By enriching the soil on the shady side of the house it will grow with wonderful vigor and increase each year.

Next to the gladioli, as a bulb for general cultivation, I would name the canna, by many called Indian shot. Within a comparatively few years a large number of French hybrids have been produced, which are truly splendid and range through various shades of red and yellow. The bulbs increase rapidly; they can be taken up each fall and kept in the cellar as easily as potatoes, and are as easily planted in the spring.

For large beds and lawn decorations they are unrivaled. Their companion bulb, which forms an excellent border or edging for them, is the *caladium esculentum*, which, although flowerless, yet with its immense long and broad leaves gives a tropical appearance to any garden or lawn. The caladium bulbs are also easily cared for and kept, and require but little attention, when once planted, beyond keeping the weeds down.

Of the amaryllis family, the *amaryllis atamasco* or "fairy lily" is the only variety which I have found to succeed well in ordinary garden soil with average cultivation. This is a beauti-

ful flower, which increases rapidly and is an accession to any garden. The bulbs can be treated the same as the gladioli. The blossoms are of two colors,—a pure white and a delicate pink.

In this paper the bulbs of which I speak are only the late spring or summer flowering out of door varieties. I therefore pass over the tulip, hyacinth, crocus, and narcissus. Of these the tulip is too well known to require comment,—more than to say that for intensity of color it has no equals,—while the hyacinth and narcissus generally require better attention than the amateur can usually give them.

But I must not omit to speak of a grand section of bulbs which are of rare beauty and which are very soon destined to become general favorites. I refer to the tuberous rooted begonias. These, although similar in leaf and flower to several of the begonia plants, are yet very different. The bulbs, which are to be planted out each spring, are about the size of a twenty-five cent piece and flat, about half an inch thick. They are genuine bulbs and not plants, the foliage dying down each autumn, when the bulb is to be taken up and kept through the winter in a dry cellar. The colors range through various shades of red, yellow and white. When planted in the late spring, in rather a shady place where they will get moisture, they commence blossoming when very small and continue through the entire summer, giving a flower and foliage which are unique and beautiful, and of such delicacy of coloring in flower and leaf as to harmonize with the most delicate flowers like the heliotrope and carnation or the most delicate tea rose. I would recommend all amateurs to try a few bulbs, for they make a choice bouquet or corsage flowers.

Asparagus tenissimus is a comparatively new bulb, of the same family as the common garden asparagus, but it has a delicate and beautiful foliage, fully equal to smilax, and it is easily cultivated.

Of the dahlia—the favorite of our grandmothers—I will not take time to speak, more than to say that no bulb, except it be the gladiolus, has responded more beautifully to cultivation than this. It was discovered in Mexico by Baron Humboldt in 1789—just a century ago—and by him sent to Madrid to Prof. Cavanilles, of the Botanical Garden, who gave the genus the name of dahlia, in honor of the Swedish Professor, Dahl. From the single, common variety have come by cultivation the various double flowers with the many shades of crimson, purple, white,

yellow, orange, and scarlet. No blue has yet been obtained, although efforts have been made to produce it. But Nature seems to be invincible to the rule, that there shall be in nature no single family of plants in which blue, yellow and scarlet in varieties of the same species shall be produced. In many varieties of plants we find two of these different colors, but in none are all these found. Dahlias are easily raised, but they require a deep, rich soil, and the side shoots should be vigorously pruned, so as to throw the strength of the plant into the main stock.

There are two other flowers of which I wish to say but a brief word; and these are roots and not bulbs, but they are rare garden ornaments, and are entirely hardy. I refer to the *clematis Jackmanii* and the hollyhock. The hollyhock has been marvelously improved of late. The old single varieties, which many of us associate with our early homes, are striking and attractive, but the new varieties, as double as a dahlia and of a variety of shades, are an ornament to any home. I had a row of the double varieties last year which attracted so much attention as to almost cultivate vanity. Passers by would stop and gaze at them, and many would ask to come and look at them, and beg a blossom. They require but little attention, and will send up their tall stalks higher than the tallest man, and for home and church decoration, when brilliancy is wanted, will compare with the gladiolus. The Japanese single varieties, with the odd markings, are also easily raised and are very striking.

There are other summer flowering bulbs and roots of which I would speak if time permitted, but those which I have mentioned are all practicable for the amateur to raise, and amply repay the little attention which they require.

Now, in closing, let me add one single suggestion. Although there may be some little outlay in the original cost of bulbs, yet, after all, bulbs are in the end among the cheapest of nature's gifts. They will live from year to year, producing their own kind, and one outlay covers the entire cost; while many annuals have to be raised or bought new each year, and the outlay has to be made over again each season. Let me ask each of you, who care for flowers, to plant in the coming season, at least a few gladioli, tuberous rooted begonias and hollyhock, and I believe that none of your plants will give you as much enjoyment as these bulbs and roots.

The paper of Mr. Carleton was greeted with applause, and on motion of Mr. Terry he was tendered a vote of thanks.

No report was made by Prof. Oestlund as entomologist, although present at the meeting. He sent the following explanatory note:

LETTER FROM PROF. OESTLUND.

UNIVERSITY OF MINNESOTA, }
 GEOLOGICAL AND NATURAL HISTORY SURVEY, }
 MINNEAPOLIS, MINN., Feb. 27, 1889. }

S. D. Hillman, Secretary, etc.,

DEAR SIR: I did not prepare any report or paper this time with intention to have it published. As I supposed Prof. Luger would present an elaborate paper on the subject, and with the hope that I could slip out of the responsibility of serving as your entomologist, I only wrote out a few notes from which I intended to speak extempore to the Society.

But as you have again honored me with the position of entomologist, it shall now be my earnest endeavor to do some special work during the year for the Society. All along I have felt the want of some elementary work on horticultural entomology adapted to our locality to put in the hands of our members—a work simple enough to be understood by all yet comprehensive enough to present the subject in all its importance and serving as a basis for observations and practical work. We do not care so much for learned and scientific papers on the subject, which are but little understood and I think will rather retard and increase the interest for the subject. But this want is easier to state than to fill, and I know that my own knowledge and experience is not up to the task; yet with the resources that are at hand in the entomological work of the experimental station, etc., I think it is going to be possible to do something in this direction during the year. I have no plans to submit in detail at present, but you can expect to hear from me further on.

It is with much pleasure that I have watched of late the rapid increase of interest for the subject of entomology in Minnesota, and I hope that this will continue as it has begun. There are reasons why Minnesota should take the lead in this work as it is already doing in other directions.

Yours truly,

O. W. OESTLUND.

The following paper was read by Prof. Pendergast:

THE NEW SCHOOL OF AGRICULTURE.

By Prof. W. W. Pendergast, St. Anthony Park.

The primary object of the Minnesota State School of Agriculture is to bring together as large a number of the intelligent and ambitious farmer boys of the state, as the resources of the institution will permit, for the purpose of giving them a scientific, practical training in the elementary principles of agriculture, horticulture and allied industries to the end that these pursuits may be conducted with greater skill and judgment, and that they may be helped forward to the high position in public esteem and honor which of right is theirs.

For the successful accomplishment of these objects a somewhat extended and thorough drill in certain branches not bearing directly upon the cultivation of the soil seems to be essential.

First—The mind of the student must be strengthened and prepared by proper discipline, to grapple with and finally to master the perplexing problems that will be continually coming up for solution as he advances in the line of work marked out for him.

Second—As a foundation for the intelligent prosecution of the studies for which the school was organized, there must be a knowledge of the principles which underlie them, and without which the time spent upon the desired branches would be well-nigh thrown away. Agricultural chemistry, for instance, might seem to call only for a knowledge of the few elementary substances which enter into organic life, but this knowledge can not be attained by one who is entirely destitute of general chemical discipline. The same is true of veterinary science, entomology, the theory of plant growth. In short, of every branch of scientific agriculture.

The requirements for admission into the state school are necessarily moderate in order that its benefits may be brought within the reach of the average farmer boys, for whose improvement it was designed.

If the standard could be so raised, as to require at least a year of training in the natural sciences before entering, the work of the school would be more complete and satisfactory, unless we take an extra year at the beginning of the course for preparatory work. The foundation on which our boys are to stand should be as broad and firm as possible, and the parent makes a great

mistake, who decides that because he intends to give his son a specific education, he shall not have any general culture to build on.

It will be the aim of this school then, to give a good general disciplinary education, by a systematic study of the natural sciences which are necessary to the pursuit of the arts of life, particularly those of farm life, and by the practical application of them to those arts.

The sciences to which especial attention will thus be given are physical geography, philosophy, chemistry, botany, veterinary and physiology, all to be brought home vividly to the understanding of the students by illustrations and experiments, for which the chemical and philosophical apparatus, the farm, the garden and the green house will furnish ample facilities.

It is recognized that the great and crying need of the agriculturists as a class is not high scholarship, but a liberal education along those lines which are necessary to a proper understanding of the principles upon which successful farming depends.

The paramount importance of this kind of an education seems to be better appreciated on the other side of the Atlantic than with us. In Germany, France, Belgium, Switzerland, Sweden, Austria, Holland, and Denmark, agriculture enters into the regular normal school curriculum. In all Europe there are not less than 10,000 schools in which this science, as well as horticulture, arboriculture and kindred pursuits, is taught.

It is gratifying, however, to note that in this country each succeeding year is marked by increased attention to the demands made upon it by the tillers of the soil, for the simple reason that each year affords new evidence of the wisdom of what has already been done in this direction.

There is a constantly deepening conviction in the minds of practical business men that the exigencies of the times demand provision, at the public expense, for a specific education in certain industrial lines, not solely with a view to furnishing our school boys and girls with a sure means of obtaining a livelihood, in case the uncertainties of the future may drive them to it, but that they may, while yet in a plastic state, receive the impression that skill in manual labor is something worth striving for, possession of which will be valuable in proportion to proficiency, and as honorable as valuable. A general training of this kind will inevitably bring about an increased respect for honest industry. For students will naturally look up to those who stand

highest and take first rank in the operations in which they themselves are engaged, and the world will honor them for having attained a position which assures them the surest and most reliable source of profit.

Now, though it must be admitted that agriculture is the one essential industry which underlies all others and makes civilization itself possible, though its successful prosecution demands better judgment, more consummate skill, greater practical ability and more exact knowledge of the natural sciences on which it is based than is required in any other avocation, yet, strange to say, it is the only pursuit for which no special preparation is deemed necessary, or, at least, none made.

The successful farmer is one who by patient study has solved the problem of economical production; who has learned to so systematize and plan his work as to make every blow count one toward the final result. He must understand the character of his soil and know what crops it is best adapted to produce, and if it is not up to the highest standard he must be able to ascertain what elements are lacking and the best and most economical method of supplying them. In short, scientific knowledge must be invoked at every step to aid him in the general management and improvement of his farm, and to assist him in eliminating the elements of failure and mastering the principles upon which, and upon which alone, successful farming can be carried on.

In view of what has been said it may be readily inferred that the great object of the state school of agriculture is to furnish a sound and substantial education in the basic sciences just mentioned. This will be just as valuable viewed in a disciplinary light as can be obtained elsewhere. At the same time care will be taken that the education so given shall at every stage point toward the farm, and be of such a character as will enable the students to accomplish greater results with less labor than would have been possible without its aid. The end kept constantly in view is to develop the thinking powers and strengthen judgment rather than to fill the mind with a vast store of miscellaneous facts which will never be put to any practical use. As a basis of thought certain important truths must be grasped.

From these the student by the aid of his reasoning powers, will make deductions, not only valuable in themselves, but which will still further develop the mental faculties thus brought into healthy exercise. Conclusions thus obtained will make decidedly

deeper impressions than if learned by rote from the teaching of another and will be far more abiding.

The great desideratum is the production of clear headed independent thinkers, able to reason logically and arrive at correct conclusions; ready to analyze critically, discriminating between gold and glittering dust, between what is true and what is merely specious; who can from daily observations and known facts, make sound generalizations, with minds alert and judgments keen.

It seems hardly to require any argument to show that these results should, if possible, be accomplished and the minds of the students thus disciplined by vigorous exercise along those lines which they are to follow in after life. Let us take the young man who is fitting himself for the profession of civil engineer to illustrate the point. Now, while it may be admitted at the start that the thorough literary and classical course would be of great value in quickening his mind and strengthening his judgment, yet it is no less true that the special qualifications essential to his success in his chosen calling and the particular kind of judgment and mental strength which he must possess in order to attain to the highest degree of perfection, or in fact to succeed at all, could only be acquired through the medium of geometry, trigonometry, surveying and other branches of mathematics. It is with this idea uppermost that the plan for our agricultural school has been laid, and the young men there engaged in fitting themselves for future usefulness upon the farm are working in conformity to this plan. They are bright, intelligent and ambitious. They entered the school with the fixed resolution to do its work thoroughly, faithfully and cheerfully. The success with which this resolution is being carried out is a surprise even to the instructors, though their expectations at the outset were very high. The attainments of the boys upon entrance were found to be below the desired standard, but in industry, application, and manly deportment they are far above the standard which had been mentally set. The most noticeable thing about them is the straight-forward, earnest and dignified way in which they go about their work. There is no "foolishness" about them. In study hours it is all business, and even the intermissions are devoted chiefly to reading and the preparation of their lessons. They evidently believe with Dr. Franklin, that "A little leisure is time to do something useful." At 5 A. M. the earliest risers begin to make their appearance in the reading and

study room. At 6:30 A. M. the whole house is astir. At 7 A. M. comes breakfast, and at 7:40 A. M. the regular school work of the day begins. This is kept up until 4 P. M., when those who desire to reduce expenses by assisting in the necessary work about the building, in the greenhouse, or on the farm, take an hour or two for this purpose. Monday being a holiday, is similarly improved. In this way they earn from 50 cents to \$2.50 per week. The cost of board, including washing, has averaged, so far, about \$2.75 per week. Judging from present appearances, this school will, in the near future, if sufficient room be given it in which to expand, become one of the best patronized institutions in the state.

A few months ago the great question to be solved was, "where shall we find our students?" Now it has taken a different shape, and the troublesome query which is awaiting an answer is "what shall we do with the boys that are coming to us for instruction?"

On the eighteenth of October we began with seventeen students. In two months that number has more than doubled, and nine new applications have been received and accepted. The "Home" is full. The nine can be housed at the experimental farm house, but "still there's more to follow." What shall be done with them?

The following report was then read by Mr. Grimes:

MEETING OF THE AMERICAN HORTICULTURAL SOCIETY AT SAN JOSE, JAN. 24, 1888, AND FRUIT GROWING IN CALIFORNIA.

By J. T. Grimes, Minneapolis.

Mr. President and Fellow Members of the State Horticultural Society,

LADIES AND GENTLEMEN: California has a great future. To begin with: Its development, commencing with the old Mexican rancho; its cowboys and immense herds of cattle, grown principally for their hides. We pass on to the breaking out of the gold fever excitement in '49, when thousands rushed in to reap a golden harvest, or disappointment, the alternative in most instances. The old forty-niners were as whole souled, open hearted and generous people as ever lived. The uncertainty of their occu-

pation, their very surroundings and mode of life made them dependent upon each other, aside from any consideration of fortune, luck or educational advantages. We here mark the second period in the progress and development of the country, and in its civilization from the time of the semi-barbarous cowboy to the rough hospitality of the miner in his camp. Like a panorama, the scene has again changed; the large herds of cattle have disappeared from the plains, and the miners have mostly forsaken their camps; the plowshare is now turning its long furrows, and wheatfields almost beyond limit have taken the place of those pasture lands to the extent that their products have ruled the markets of the world. But now comes another change in the scene before us; the wheatfields are giving place to the orchard.

There is nothing small about California. Our friend Jordan used to tell how many thousand fruit trees he had in his orchard, but some of the orchards in California have as many acres planted out as Jordan ever had of trees. I can not make a comparison of the capability of fruit growing in that country here, without showing the disadvantages we possess, from the fact that the very fruits they grow to the greatest perfection and profit we can not grow at all.

Then what have we to do with this matter, anyway? Much, my brother; do not forget that this Society is a small branch of that great river, that leads to the market ocean of the world. Our discussions should not be confined to a narrow channel, but give us all the advantages we may be able to draw from the experience of others as well as ourselves. While we can not grow pears and plums for one dollar and twenty-five cents per one one hundred pounds, or grapes for fifteen dollars per ton or make wine for twenty cents per gallon as is done in California, we grow many kinds of fruit with fair success and small fruits in great abundance and get good prices; we are less troubled with insects than our neighbors over the hill and do not have to depend upon irrigation for our crops.

In the discussions at the horticultural meetings at San Jose the fact was brought out that the nearer to their northern limits fruits were grown the more perfect the specimens were found to be, and it was not a matter of surprise that Minnesota should be awarded first premiums on her fruits at our great national exhibitions.

There are some things which at first sight may seem remote.

and yet may have a direct bearing upon our success. For instance a heavy, rich soil in California is of little value for either the production of raisins or wine. The best vineyards are located upon gravelly soil—some of them upon gravel almost entirely. The grapes grown in such soil are much sweeter and ripen earlier.

Some facts may also be learned in regard to irrigation. The southern portion of the state produces the largest and finest looking fruits, while the northern section produces the same fruits but of less size and better quality. The reason is obvious. South of a line that may be drawn direct from Monterey Bay to Sacramento City their crops have to depend almost entirely upon irrigation, as rain seldom falls between the months of March and November, while north of that supposed line they generally have sufficient rain during the season to produce a crop. Hence we find the fruits from along the Sacramento, and other northern valleys within the moist belt, upon the market at San Francisco a week or more in advance of those produced five hundred miles further south. Oranges, peaches, pears, prunes, apricots, etc., are ripe at Oroville as soon as they are at San Diego. The same is also true in regard to the time of blossoming. The difference is perhaps entirely on account of irrigation, and while it has its advantages it also has its disadvantages, not only upon the quality of the fruits and their time of ripening, but upon the health of the people as well, on account of the miasma produced by the overflow of water.

You ask me if the fruit business in California is not likely to be overdone, and what bearing it will have upon the horticultural interests of our state and upon the eastern markets? I answer, no! the more they can produce the better for us. They have an almost unlimited market and very little competition in their line of goods, which consists largely of oranges, lemons and dried fruits, such as we can not produce and yet must have. Just think of it! We have been buying those goods east and shipping them from New York, while we occupy a half-way station between the point of production and that from which we receive our supplies. Fruit in the eastern states is dear and always will be. We think the time has about come, when we should receive our supplies direct from the producer and save the double railroad freight and the intervention of that long line of useless appendages called middle men. To illustrate my meaning in regard to the costs and profits under the present sys-

tem of trade, it is only necessary to state that the so-called California wine houses in Minneapolis that profess to sell a pure unadulterated article of wines at bed rock prices, charge from \$2 to \$2.50 per gallon for wines which I was informed by one of the principal wine makers of Napa Valley, Cal., could be made profitably at from 15 to 20 cents per gallon. The grapes cost them from \$15 to \$18 per ton, which is the usual price, and they realize from 20 to 25 cents per gallon for their wines at wholesale. I do know, however, that the business is immense from the size of the vineyards and wine houses which we saw almost everywhere in California. At Vina, where our excursion halted to see Senator Stanford's place, there are over 3,500 acres in vineyard with a winery attached, having a capacity of 1,500,000 gallons. There were in stock at the time over 600,000 gallons of last year's vintage.

Horticulture in California may be classed under three separate heads or divisions, viz.: First, the growing of grapes; second, of citrus fruits; and third, of deciduous fruits, and no one pretends to pursue more than one branch of those industries. It stands us in hand as much to look after our needed supplies of fruits as it does to procure a market for our own products. Having glanced at the wine industry by way of illustration (for I take no stock in it, believing it to be a greater curse than blessing), I proceed to notice more particularly the class of deciduous fruits.

Minnesota consumes annually a large amount of canned and dried fruits, and it is a satisfaction to know that they are produced so abundantly, and at so small a cost as to place them within our reach.

The largest orchards perhaps in the state are those around San Jose, in fact the county may be said to be one entire orchard. Most of them contain several varieties of fruits, but some plant largely of only one or two kinds for a special purpose. Near Walnut creek, in Contra Costa county, I saw a young orchard of three hundred acres, all in Bartlett pears. At San Le Andro, in Alameda county, there is an orchard containing ten acres of cherries, the finest trees I ever saw, all of them of the Gov. Wood variety. The fruit is used at the canneries. Most of the canned goods were formerly put up under the brand of Lusk & Co., of San Francisco, who really were the purchasers and not the producers. Very little in proportion is shipped to the eastern markets fresh as gathered from the trees.

Next in importance to the canning business are the drying establishments. The one I visited at San Jose had a capacity to handle forty tons of green fruit per day. The process in drying prunes and some other fruits is first to dip in hot lye, then rinse, then place on platters in the dry house about four hours, then change to the open ground, in the sun, where the process is soon completed.

The worthy President of our Society requested me to give some kind of report of the American horticultural meeting held last winter at San Jose. I can only speak from the most pleasant recollections. The meeting of the society was most happily conceived, arranged and carried out, and royal guests could not have received a more hearty welcome than did the disciples of Flora and Pomona upon this auspicious occasion. We met there for the first time as representative horticulturists from all the states east of the mountains, and shall I say that we there found much in little; better far, we found much in much, and much more.

I shall not pretend to give any detailed account of the society's transactions; they are already published in book form which anyone can procure by sending two dollars to W. H. Ragan, secretary, Greencastle, Ind., who will send you the volume and enroll your name in the list of the honorary members of that society. If you are a growing scion of progressive horticulture you will have more than cause to thank me for these suggestions.

I can truly say that the hospitality of the people of California is unbounded and which can only be compared with the state itself which is more than a thousand miles long and twice as wide if the journey had to be made east or west on foot. But then we did not have to walk, they carried us wherever they wished to have us go. We were the guests of the railroads and of the cities and towns wherever we went and none of our party seemed inclined to go anywhere else. Our meeting at San Jose was one not to be forgotten. Every preparation had been made for our reception, entertainment and enjoyment.

We were first taken to their homes (every body seemed to be keeping open house) and made to feel that they were our homes as well.

The meeting was formally opened on Tuesday, Jan. 24, 1888, at 10 o'clock A. M., Hon. Parker Earle, president, in the chair. But I shall omit any details of the proceedings of the meeting for reasons already given.

The citrus fair and horticultural exhibition were in progress here during the time of our meeting, to which each member of our society received complimentary tickets through the courtesy of the manager, President Jones. If any of you Minnesotians could have been placed unawares in the midst of such a collection of fruits and flowers you would have supposed you were lost in Paradise. All the varieties of citrus and deciduous fruits, fresh, dried and otherwise, grains, nuts and vegetables, products of every sort and kind, gathered as it were from every country and clime, and yet principally grown in the valley of Santa Clara, California.

But the crowning feature of our entertainment was the banquet gotten up by the ladies of San Jose on the last evening of our meeting. Words would fail to describe; it was simply immense, superb, perfect, whatever those terms may mean.

The next morning carriages were in readiness, according to previous arrangement, to convey us into and over the country round about, where we were shown the immense orchards, vineyards, dry-houses, and the entire modus operandi of successful fruit culture, from the planting out, the kinds mostly planted, the manner of cultivation, pruning, irrigation, gathering of the fruit, taking care of it, marketing, etc.

When looking over this vast extent of country, devoted almost entirely to orchards, I felt like exclaiming, "Oh! Santa Clara, thou art a jewel in the crown of California."

We next proceeded on our northern excursion. Tickets had been generously furnished to each member of our party by the agent of the Southern Pacific Railway, Mr. J. B. Lanck, and the program of our journey announced, which would extend a distance of several hundred miles through the most fertile valleys of Northern California.

By way of Monterey we next found ourselves at Oakland, where another banquet was in waiting to receive us, or rather we were there to receive it. These banquetings furnished grand opportunities for speech making and nut cracking, and with the usual ride around, passed off very pleasantly. The next morning we started on our northern trip proper, an army of horticulturists, fully 200 strong, prepared to capture everything before us. The first place of attack was Napa, famous for its wines, and the trophies here won consisted principally of bouquets and ladies' smiles, followed by a most sumptuous banquet for a second course. After the usual speech making we were taken to the

insane asylum, located near by, an institution with about 1,450 patients. They claim to have another similar institution of the same kind located somewhere in the state, so it would seem that a great many people become crazy after they get there, if they never were before.

From here we marched to Sacramento city the capital of the state which we captured and the great seal of the state was surrendered into our hand. The best of everything the city could furnish was provided and spread before us, the tables were arranged with an array of tasty fruits and beautiful flowers. The banquet was spread in the hall of representatives and was served without wine showing in the whole arrangement the good taste and refinement of the ladies of Sacramento.

The next morning we marched forward on the wheels of our elegant sleepers, past Marysville to Oroville on the Feather river. This is about the centre of the old placer mining district and the country round about has been dug up and much disfigured by mining operations. It is also the northern limit of orange orchards in this state. We now return to Marysville where we were again banqueted with the usual ceremonies which are indispensable upon all such occasions; thence we proceed to Chico which lies on another branch of the road. Here I saw some fine native black walnut timber, the first I had seen. Here are also some very fine orchards belonging to Gen. Bidwell who seems to own the town and pretty much everything around it. This is one great drawback to Northern California; the lands in many instances are held in very large estates.

Passing Vina of which I have already had occasion to speak we make our next attack upon Redding at the head of the great valley where we marched to conquer the great banquet which was here spread before us. A little more speech making (though some of us were too full for utterance), and we retired for the night with old Mount Shasta standing 14,444 feet above our heads or rather above the level of the sea as a sentinel placed on guard duty for the night.

We now returned by way of Red Bluff, making Woodland the objective point, where we were welcomed to another sumptuous entertainment followed by the usual little neat stereotype speeches prepared by our nut crackers for the occasion. But perhaps we are distributing our chestnuts too freely. It may be accounted for, however, on the high wine pressure of the spontaneous mo-

ment. But this is said to be a democratic country and we are all Jeffersonians.

Eight P. M. finds us back at headquarters at San Francisco, where, upon our arrival, we find that we are under marching orders for to-morrow morning. An excursion had been planned to carry us up through the Santa Rosa valley and also for a steam-boat ride out through the Golden Gate the next day. Our equipments were at hand early the next morning and we took the boat across the bay to where the train was waiting to convey us north as far as the great red wood forests, where are seen some of the largest trees in the world only excepting those of a similar species, the *Sequoi Gigantea*, found growing in Miraposa county. Some of those trees are between two hundred and three hundred feet high, without any large sized branches, and as straight as an arrow. The stump from which the plank was made and which was exhibited at the centennial in 1876 we found to measure twenty-one feet in diameter clear of the bark. Under the brave leadership of the ladies in command we soon had stormed its heights and stood conquerors triumphant beneath the banners, and in the name of the American Horticultural Society.

We now return to Santa Rosa where carriages, a banquet and a host of friends are waiting to extend a hearty welcome; but I will not particularize. Our line of march has been one constant innovation; the ladies have done themselves proud; our victories have been complete, and we have carried away many trophies which we shall hold in lasting remembrance.

We go to San Francisco for the night, but to-morrow morning return to San Raphael upon the invitation of Hon. Wm. T. Coleman, at whose hands a bull's head breakfast is to be served complimentary to ourselves and in remembrance of the days of the old regular forty-niners. What a bull's head breakfast was, anyway, no one could even guess, and we felt the more anxious to lay ourselves open for an attack. The early morn again found us in line, and by forced marches we were soon upon the ground where carriages, hacks, what-nots, and everything that could be called into requisition were in readiness to convey us wherever our presence was most needed. We formed in procession and commenced our march with Mr. Coleman in the lead, who seemed anxious to show it all. So we rode around to the east side of the town all the forenoon, and those of us who had come expecting a ten o'clock breakfast were a little disappointed to find that the morning ride had occupied the time till one o'clock.

But at last we returned to find our breakfast waiting, and soon our seats were occupied at the table. Our host then informed us that he had prepared a regular forty-nine breakfast for our special benefit, and introduced the head cook, who stood up in greasy buckskin, and in a way befitting the occasion, explained the manner and skill required to get up such a breakfast. Next came the speech of welcome by the host, and in response a few chestnuts were cracked by some of our worthy members.

Our breakfast consisted of seven bull's heads with red pepper sauce, baked beans "a la mode," peppered chowder, Spanish stew, chicken and red pepper, meat balls, half pepper, Spanish rolls and California wines, which last I suppose was added by way of luxury.

Our long fasting and ride had given us an excellent appetite, so we leaned forward and devoured our repast promiscuously without noticing some little peculiarities mixed up in the cooking.

After dinner came the regular toasts and every nut cracker of our party declared that they had never seen anything to compare with the breakfast given by our host. When we were at San Jose we thought we had found it, at Sacramento we thought we had found it, at the various places where we had been entertained we still thought we had found it, but right here at San Raphael we know we have found it. This was a most supreme moment. We could only suppress our risibilities by thinking the Lord's prayer.

Our host proved to be equal to the occasion for on our emerging from the dining hall we found the carriages all in line waiting to convey us over the west half of the town. Mr. Coleman, again took the lead, and we in all courtesy were bound to follow although at the sacrifice of our contemplated ride out through the Golden Gate.

Mr. Coleman claimed to be a true Democrat and nothing would do but we must see it all, so we rode and rode until at last we pulled up at a beer garden and all were invited to alight and "take" something. We now found ourselves completely outgeneraled and the enemy taking advantage of the situation made bold to charge our lines and spike a few of our guns.

What effect the foaming lager may have had upon the still wines in a horticultural point of view the world will never know.

The reading of the report was greeted with hearty applause. The meeting then adjourned till Friday morning.

MORNING SESSION.

FOURTH DAY, FRIDAY, JAN. 18, 1889.

The meeting was called to order at nine o'clock by President Elliot.

The following paper was read by Mr. Dartt :

ORCHARD PROTECTION—FACT AND THEORY.

By E. H. S. Dartt, Owatonna.

This subject of orchard location and protection must be getting somewhat stale. We have been told so frequently that the orchard should be placed in a high, airy location and be protected by trees, and also by an intelligent and energetic man, that it would seem useless to plant an orchard in any other location, or for any other kind of a man to attempt to raise an orchard. But there are certain phases of this subject that seem worthy of consideration.

There is an orchard near Owatonna that is favorably situated and has been planted out ten years. The trees were set twelve feet apart each way—the owner believing that trees thus planted would naturally protect each other, and that if they did well they could be thinned out, and if they did poorly, the less ground covered the better. On the east side is a single row of European larch trees; on the south and west, a row of box elders on the outside, with a row of Scotch pines on the inside. These trees are now about 20 feet high. Scotch pines are also set 60 feet apart all through the orchard. The east part of the orchard is entirely Dutchess, and of the row standing 12 feet from the pines on the south side of the orchard, 16 trees are standing in fair condition, while only 2 are dead. In the second row, 24 feet from pine trees, 13 trees are standing and 5 are dead. In the third row, 36 feet from pines, 12 are standing and 6 are dead. In the fourth row, 48 feet from pines, 7 trees are standing and 11 are dead. The next three or four rows are similar to fourth row. Then slightly higher ground is reached, and trees are in better condition. These facts seem to prove that while partial shade is very beneficial, yet these beneficial effects do not extend much farther north than twice the height of the windbreak. From these results we might expect

to find the trees standing on the north side of the pine trees scattered through the orchard in much better condition than those on the south side, but careful inspection shows no material difference. And we conclude that it is a mistake to set isolated trees as has been done in this orchard, and that continuous single rows of evergreen trees—rows to be about four rods apart, and run east and west, or, perhaps, a little to the northwest and southeast, would be far better. For this inside protection I think Norway spruce an excellent tree, as it would soon become tall, and if set eight to ten feet apart in the row, would soon effectually shade a wide space. Cottonwood trees would hardly do, as they would soon monopolize the whole ground and starve out the fruit trees.

It may not be amiss hereto ask a question or two, with a view of eliciting discussion: What killed these Duchess apple trees? Our friend Gaylord, of Iowa, will promptly answer sun-scald. All right, so far, but what causes sun-scald? Here is room for theory. If we put our hand on a Duchess apple growing on the south side of the tree and exposed to the hottest August sun, it will feel cool. It is alive and the principles of life convey the power to resist death, or those conditions that produce death. If this apple falls to the ground and is exposed to the direct rays of the sun for an hour or two, it is affected by sun-scald. It is dead now, and death having deprived it of all resistant or protective power it falls an easy prey to sun-scald or other disease.

This life principle which we call vitality, tenacity of life, or hardiness when applied to trees, is strongest in plants and animals in perfect health. And although certain diseases, such as blight in trees, are most likely to attack individuals of robust habits, yet the general rule holds good. Disease is but a modified degree of death. We would hardly expect a consumptive to stand the fatigue of a long march and if he fell by the way we might say he died from sun-stroke. But we would feel confident that it was the seeds of death previously planted in his system that had rendered fatal attacks of disease so slight that they would have been successfully resisted or warded off by a robust man. So it is with our apple trees. In our severest winters some of our trees are frozen so dry that they never burst a bud, but most of them are so hardy that, though seriously injured, they start into growth in the spring. Now, if in June we examine some of our standard varieties that have just squeezed through, we will find a thin white film growing over and covering the dead, blackened

wood underneath. This new cambium layer may be no thicker than writing paper, but it is there and it proves that a struggle is going on in that tree as in all trees, and all living things between life and death — life seeking to build up and death seeking to destroy. In this particular case the scale seems so evenly balanced between these two opposites that it is not at all strange that such trees die from sun-scald or other trivial cause, not likely to affect a sound, healthy tree.

We have heard about tempering the wind to the shorn lamb. We can certainly temper the winds and the heat of the sun to some extent by tree plantations. Now, if we can leave the fleece on the lamb (the cambium layer is the fleece) by not allowing our trees to overbear, and by the liberal application of manure to bearing trees, and by supplying just the kind and amount of shade needed, then certainly we *deserve* success.

DISCUSSION.

Mr. Barrett said there was an orchard near Brown's valley that was in good condition, although in the hands of a careless farmer. The trees were located near the lake and there was protection afforded by timber.

Mr. Dartt. Trees in our section generally, wherever southern protection is afforded, are doing much better than those a little removed from that protection. I have several instances in mind where this rule holds good; there are Wealthy trees of considerable size that have stood quite well and have produced good crops of apples. They are in the kind of location I have described, having a southern protection, with considerable of a slope on the northern side. They are in what we call in Minnesota a favorable location. This southern protection is a subject worthy of consideration.

Mr. Frankland. I have been somewhat interested in this subject lately and more perhaps in the paper just read than any other, as it seems to apply to my circumstances. However, I want some explanation as to the conclusions arrived at, from the practical experiments Mr. Dartt has made. It seems to me rather anomalous that trees nearest a southern protection are prevented from dying with frost; I would think the northern trees would be in the most danger. The west and northwest being protected; as I understand, it preserves them; whereas I should think the north breezes from Manitoba would come down and scorch the

trees right off. It would seem that if the sap freezes it would become more and more solid, and when the sun thaws it out and the bark begins to split, sunscald would set in. We think it is the effect of the sun in March that kills the trees.

Mr. Dartt. My theory is that the extreme cold kills the tree, or it becomes almost dead. It is then in the condition of a very sick man; it needs care and nursing. This protection on the south side affords a shade and a protection from the effects of the extreme heat of the sun. These extremes of heat and cold have a bad effect on trees. They may stand one extreme, but if exposed to both it may prove too much.

Mr. Pearse said in the winter the moisture was constantly passing off, and it was the starch which supported the life of the tree.

Mr. Frankland. Is there an evaporation from the trees all the time?

Mr. Pearse. All the time; unless trees are very large and the proper amount of food is supplied, in our long winters the trees become exhausted and when the starch is gone the tree dies from starvation. I have examined the wood with a microscope. The south side of the tree will be entirely exhausted while there is a supply of food on the north side.

Mr. Barrett. What is your remedy?

Mr. Pearse. Select trees that have a capacity for storing food. Southern trees are not prepared to stand our winters as they do not have the proper cell structure. Trees have to store up nutriment for several months, and need to be fed the same as animals.

Mr. Dartt. If the trees haven't enough food stored up how are they going to get it?

Mr. Pearse. During the growing season there isn't one particle of nourishment stored up; it all goes to the growth of wood and fruit. This laying up of food for winter supply commences after the growth of wood is done.

Mr. Dartt. Do you say there is no life in the tree in the winter?

Mr. Pearse. Yes, there is. Vegetation commences in the spring; life commences in the spring. In getting hardy varieties, we must get those that are capable of storing up food sufficient to run them through our long winters.

Mr. Frankland. My trees came through the Manitoba winter last year and it got down to forty degrees, and the glass got discouraged; we couldn't tell how much further excepting with a spirit glass; but there was no protection excepting a mound of

earth. This last fall, some time the latter end of October, we had a pretty sharp frost. I suppose it came pretty near to zero. About the fifth of November I begin to mound up those trees to protect them for winter; that is all the protection I give them.

Mr. Underwood read the following paper:

SEEDLING APPLES.

By J. M. Underwood, Lake City.

In opening the discussion of the topic, Seedling Apples, I would urge, first, the importance of enlisting the interest of our farmers, their wives and children in the search for those kinds of fruits, and particularly of apples best adapted to the Northwest. When we reflect that every apple we have ever known or seen, had its origin as a seedling, it will not seem a new or uninteresting field for us all to experiment in.

It is not common to think or speak of the Baldwin, the Spy, the Bellflower or the Talman Sweet as seedlings, as their names, with many others, have become so familiar that it would seem that they must have always existed, and yet it is not many years back to the time when many of our choicest apples were originated among a pack of seedlings, growing in nursery rows, or, it may be, sprung from the seed of some choice apple eaten at the fireside under the parental roof, where they were saved and taken to a distant home and tenderly planted and cared for, mainly for the loving associations connected with their origin. Perhaps long years elapse before the public generally are aware of the results, but at last they are incorporated in the pomological records of our country.

Of course, to us who are familiar with the subject, it is perfectly clear, but I believe a majority of our people do not understand the exact origin of the apple. It is possible that the energetic missionary, sometimes called the tree agent, has fully explained all the mysteries connected therewith, but I will at least venture to say that the variations in the growing of apples from the seed, is so great that no two seeds ever produce exactly the same variety of tree and fruit, hence to those who like variety, it is an interesting field.

It is also a well established fact that the pollen of one tree in blossom will fertilize the blossoms of an adjoining tree, thereby

imparting, in a measure, some characteristic of each to the other. So, if we can secure in this cross-fertilization, the combination of hardiness and color in one, with that of flavor and keeping qualities in the other, we may reasonably expect once in a while, to make an advance in the right direction. This fact must not be lost sight of, however, that the chances are about one in 10,000 of obtaining a desirable result, consequently we need to enlist the co-operation of every man, woman and child in the state to make that progress which our condition demands.

With wise and enterprising forethought, our Society has planned to stimulate this endeavor by offering liberal premiums to encourage work in growing seedlings, and, since all are really seedlings and the most progress we have made has been from that source, I am quite inclined to think it is the direction from which is to come our best results. Think of the seedling we call the "Wealthy;" thousands of bushels have been raised in our state already. It captured for us the Wilder Medal at Philadelphia and placed us among the foremost at New Orleans, and while it may not be the apple that we are looking for, it has attracted the favorable consideration of the foremost pomologists of our land. Then look at the improvements that have come to us through seedlings in our list of crabs or hybrids, as we call them, giving us better flavor, larger size, and longer keeping qualities. There is now rising in the horizon, other candidates for favor; seedlings of the Duchess are prominently and favorably mentioned by our Seedling Committee, to which we look for improvement in hardiness, flavor and keeping qualities; I refer to the Okabena, originated by H. J. Ludlow and controlled by the Jewell Nursery Co., of Lake City, Minn., and the Peerless, originated by J. G. Miller and controlled by O. F. Brand, of Fari-bault.

In connection with this subject, let me refer to an orchard of seedlings in which we have become interested, growing at Grundy Center, Iowa. The history of it is briefly as follows: During the days of our civil war, J. S. B. Thompson left his family, as many others were doing, while he went into the army to serve his country. His wife, in the mean time, visited her parents in New York. While there her father brought her the choicest apples from his large orchard of seedlings, to pare and dry for her western home. With keen forethought, she saved the seeds of the best, and took them with her as well as the dried fruit.

They were planted in rows and cultivated until large enough to transplant, when about three hundred were set out in orchard. The soil is a rich black prairie loam with a clay subsoil, inclining a little toward the south, and on the southern edge of the orchard is a strip of low, almost marshy ground, through which runs a small stream of water. On the north, east and west sides of the orchard is a large willow hedge that has grown with the trees, and which in a measure protects the fruit from being blown off by the winds.

And here in this orchard, to-day, are upwards of one hundred of the finest apple trees that a man ever saw. The fruit is quite varied as to size, color, flavor and season. After a large experience in Illinois, in Michigan, as well as twenty years of orcharding in Minnesota, I must say that this is the most wonderful orchard I have ever known, comprising as it does, so many large, excellent, sweet, sour, red, yellow, and green varieties. The most wonderful features of this orchard, however, is the fact that while in the large extent of territory, around it, where the Wealthy, Duchess and Whitney have been planted and have all died out, even in this same orchard, these new seedlings are growing, strong and vigorous, and bearing large crops of apples. These apples have been exhibited at many of the fairs in Iowa, and have always taken first premium for their size, beauty of color and delicious quality.

Some of the trees have attained a large size, being 12 to 18 inches in diameter, and from 25 to 35 feet in height. We have cut from some of these trees this fall as high as 360 scions, 10 to 18 inches long, which I think a good indication of their hardiness. This orchard is growing only one hundred and eighty miles south of here, and in a large prairie district, which is a pretty good guarantee that some of them, at least, will prove of value to us in Minnesota. In conclusion, then, as we think of what Mrs. Thompson has done by saving the seeds of those apples away back twenty-five years ago, and planting them in her new home on the bleak prairie of Northern Iowa, may we not all be stimulated to follow her example and reasonably hope for ultimate success in finding something desirable for our reward?

DISCUSSION.

Mr. Dartt. I would inquire where the seeds of Thompson's seedlings came from?

Mr. Underwood. In the vicinity of the Hudson river. The

exact place I cannot tell. These apples are grown at Grundy Centre, in the central part of Iowa in the third or fourth tier of counties.

Mr. Smith. It is the highest point of land to be found in the central part of that state.

Mr. Cutler. I would ask if there are not other orchards growing in that part of the state?

Mr. Underwood. Yes; but they have met with the same fatality as other orchards in this state. I think there is nothing there that compares with them in point of hardiness and vigor at the present day. They were grown from seedling trees, or so reported to me.

Mr. Poor understood they were grown from choice apples. This was an important subject. He believed it the best plan to rely upon seedling trees so as to get a good tap root which would penetrate the ground as far as possible. But it was important to depend upon grafted and budded trees for our orchards. Seedlings as a rule could not be depended upon whether of the apple, plum or peach.

Mr. Brand thought the paper contained an important lesson as it explained why trees were killed so much throughout the Northwest. This orchard of Thompson's was on damp soil and the roots of the trees were probably standing in water. The great destruction of trees in 1884 was caused by a warm fall and late flow of sap. He cited a case where trees stood near the St. Joe river, some of which were over a hundred years old. Some of the trees stood only four feet above the level of the river at low water.

Mr. Sias thought it was a mistake to suppose the cause of mortality of trees was due to root grafting. He had been experimenting for twenty-five years and had as high as 20,000 seedlings at one time that were destroyed, although the tap roots of the trees were in perfect condition. It was the tops that were killed. He did not find one of the lot not hardy enough among the seedlings so far as the roots were concerned. He had many hardy Russian varieties grafted in the same manner, but they didn't have the long tap root; trees would die anyhow if too tender, whether seedlings or not. They must have the right variety and then it would stand the test. Every tree had a peculiar habit of growth. Haas, for instance, had an upright, rapid growth; if the top was cut off it would sprout up again, and the root corresponded largely with the top. If the habit of a tree

was to go down deep it would not be easy to change that habit.

Mr. Pearse. A tree will not grow if not hardy, whether it has a tap root or not, but seedling trees are the longest lived. My experience is, the only varieties we can depend upon are those that are hardy.

Mr. Frankland. I would like to ask Mr. Underwood how many of the Thompson seedlings are as hardy and of as good quality as the Duchess?

Mr. Underwood. There are very few trees standing in the orchard that are not of good quality, and there are over three hundred planted. There are perhaps sixty or seventy that have indications of hardiness and good quality sufficient to recommend them for propagation.

President Elliot. How many of them do you consider worthy of propagation?

Mr. Underwood. Well, we are just investigating the thing thoroughly, and may have a higher appreciation of them now than we will after awhile; but we are grafting some seventy-five varieties now. I wouldn't want to warrant them all to be superior to Duchess, or anything of that kind. I simply bring this matter before you, gentlemen, calling your attention in this direction, asking you to watch them carefully and to see if anything comes out of them. The point made by Mr. Brand that the trees are living where the roots have moisture could hardly be a good one, because on that same ground the Duchess, Wealthy and Whitney ought to live that have been planted in the same orchard.

Mr. Brand. I meant that was one reason for their hardiness.

Mr. Frankland. What do you know of the hardiness of these trees?

Mr. Underwood. All the trees these apples came from on exhibition, are hardy and vigorous—all of them. Some varieties are long keepers; some sweet and some sour.

Mr. Frankland. Have any particular efforts been made to keep them?

Mr. Underwood. Mr. Thompson has no way of keeping apples better than a small dugout cellar; he hasn't even a good cellar to his house. Most of these apples came from his place since we have been in session here. A few of them I had at my place that were simply wrapped in paper and kept in the cellar.

Mr. Philips. In Wisconsin I will say they are about in the same relative condition regarding the discovery of new hardy

varieties that will withstand the severities of our northern winters as you are here in Minnesota. As one of a committee appointed by our state society three years ago to investigate the Russian apples as grown in our state and Minnesota, as to quality and hardiness, and also to discover if there are any good winter varieties, I had hoped to gain some valuable information at this meeting; but though there has been for years past a fine, creditable and beautiful show of Russian apples at the state fairs of Wisconsin and Minnesota, for the past ten years in attendance at the winter meetings of both states, I could carry all the Russian apples I have seen at both places in a bushel basket. We usually have—as you have here—a fine show of native seedlings, which still shows they are ahead. They must be recognized and their cultivation encouraged until something better is found. The best twenty years of my life have been spent in apple growing. I have raised in a single year 1,000 bushels—half of them winter varieties. The past year all the apples I stored in my cellar for winter use were the product of seedling trees—one of which has borne twenty-one consecutive crops, the other fourteen crops, but the young trees of neither are good enough to recommend; still I keep setting them—for my own use—and will do so until I find something better. Continual planting is the only way to produce fruit for the family.

Mr. Brand. What is the character of the soil and how far are the trees standing from water?

Mr. Philips. The trees are in a limestone soil and stand some five hundred feet from running water.

BRANCH SOCIETIES.

Mr. Barrett then offered the following resolutions:

Resolved, That the state be divided into four horticultural districts, to be known as the Northern, the Southern, the Eastern and the Western Minnesota Horticultural Districts, and societies duly organized therein.

Resolved, That to make these missionary labors a success, the legislature be memorialized for an appropriation of \$1,000, giving to each district the equal sum of two hundred and fifty dollars, said money to be put into the hands of the treasurer of this Society, to be drawn upon the orders of its President, countersigned by its Secretary, and audited in its accounts.

Resolved, That the transactions of the district societies be incorporated in the annual reports of this Society.

Mr. Sias. This matter was brought up at our meeting at Rochester, as Mr. Harris will remember, and he favored the project. He is a man that has done more for this Society probably, than any other member. He is the Marshall P. Wilder of the Northwest. I have heard that remark frequently, and as he favored it, and was placed on the committee, I thought it would not be tabled or carelessly put aside.

I might compare this Society to the century plant, which I understand grows very fast and after it blossoms, dies. It comes to be a large tree in its native habitat in Mexico. I have understood in some cases it attains a height of sixty feet, then blossoms and dies. Perhaps the reason is because it has no branches.

Now, for fear this Society may die prematurely, I recommend these four branches, which I think we need, one from the north to protect from the arctic waves that come down so severe. I think we have an agent running a station at Moorehead, who would be a good man to run that one. We need one on the east to protect us from eastern tree frauds that come here; we need one on the south to protect us from the direct rays of the sun—to prevent sunscald. We need a good, heavy branch there, and we have already got it started—about a year ago. Then we need a good, heavy branch on the west, near the border line, where Prof. Barrett lives. He is a man that believes in evergreens and forestry, and we need a good strong branch there to protect us against the tornados that sweep across those prairies. We need it to protect this beautiful city, and he is just the man to run it. We need all those branches. This Society might live without them, but it may die suddenly or prematurely some time without them. We need these branches just as much as they need them in Iowa. All we ask of this Society is to sanction this measure. We want a committee to memorialize the state legislature. We ought to organize these societies and do the best we can. We must not give up the ship, but let us fight for success.

Mr. Dartt said money was required to carry forward such an enterprise, and he favored the societies if they could be kept up. It was necessary that somebody should do a great deal of work for nothing, or to have the money to provide the sinews of war. It was not very likely that a state appropriation could be obtained, but perhaps one hundred dollars could be secured for each society. He had tried to start a society at Owatonna and succeeded in getting a few members, but it soon dwindled out.

He said it was a rule among tree men if they allowed suckers to grow at the roots of a tree, it would absorb the vitality of the tree. If that were true, perhaps this Society should not encourage many "suckers."

Mr. Frankland. These are branches and they ought to be encouraged. This money is needed to keep these organizations together; it is a necessity. This Society ought to ask the legislature for enough so they can give these outside societies some encouragement.

Mr. Sias. I don't know as it is the best thing to compare us to suckers. A sucker is not the best fish in the world. I don't think Mr. Dartt ever gives us anything, but he gives us some things we can't understand. He told us a year ago that the box elder was failing in Minnesota, although he was the only man I think that knew it. I looked his place over, and while I wouldn't dispute anything he says, I think he is making a mistake in comparing this committee, of which he is one himself, to suckers. If the century plant had some suckers there would be some life in the plant. This Society must have branches.

Mr. Fuller. I would ask if the century plant has any branches whatever.

Mr. Sias. I think at the top it has.

Mr. Fuller. Oh, no.

Mr. Sias. What do you get your flowers from?

Mr. Fuller. It has a large branch, however.

Mr. Sias. I helped to organize this Society and I think this work of establishing these branches just as important. They will do just as much good as this Society has done or can do. It will bring in an interest over all parts of the state. We don't intend to ask for help from this Society; it hasn't any more than enough means to run itself, and I wouldn't consent to that. But we propose to start these branches and get this help if we can. We will let them die when we are obliged to, and not before.

Mr. Dartt. I simply said the box elder was doing poorly on poor ground.

Mr. Sias. I understood that it was "failing."

Mr. Dartt. It will be a shortlived tree and not worth much.

Mr. Harris thought the Society should receive \$1,000 or \$1,500 more than at present, in order to aid in establishing local societies. The Forestry Association might be merged into this Society as that association has no active organization at present.

Col. Stevens thought the state had been very liberal with the Society and would not be apt to increase the appropriation at present. If they asked too much they would get nothing. He favored an appropriation for the Forestry Association. When this Society had no funds and wanted to be represented at the meeting of the American Pomological Society Mr. Elliot and Mr. Mendenhall furnished the money from their own pockets.

Mr. Cutler thought it was premature to ask for an appropriation for something not in existence. It would be better to wait till they were organized.

Mr. Barrett said he felt some delicacy in saying much for the resolutions, he having introduced them, but thought the demand for \$1,000 a modest one. They had a promising local society at Browns Valley but he could not afford to pay all its bills much longer.

Mr. Pearse thought the time had not arrived when the appropriation could be asked for.

Mr. Gould moved to refer the matter to the legislative committee. The motion was adopted.

The committees on prize essays presented reports which were, on motion, adopted.

PRIZE ESSAYS.

Your committee on best essay on orcharding in Minnesota by young men under twenty-five years of age, would respectfully submit that the five essays on that subject have been put into our hands, and we have given them a careful and full consideration, and would recommend that the premium of twenty-five dollars offered by this Society be equally divided between Edgar D. Sias and Archie M. Brand, as we have been unable to decide upon their respective merits, as both seem to be of equal value to the orchardist. We would further suggest that persons receiving special premiums for essays at any time should be excluded from competing for the same premium at any future time, and that a first and second premium be offered.

While we would encourage our boys and girls without distinction we would like to give all an equal chance, and the three essays before us which we have excluded as not being equal in merit

contain many excellent suggestions, and with a little more study and experience those boys will be able to write a very instructive and valuable essay upon that subject, and no doubt eventually become valuable members of the State Horticultural Society.

J. T. GRIMES,
J. M. UNDERWOOD,
B. TAYLOR,
Committee.

ORCHARDING IN MINNESOTA.

By Edgar D. Sias, Rochester.

Honorable Judges and Gentlemen of the State Horticultural Society:

Of the delights of the orchard it is not necessary to speak. Thereof have bards long since sung their lays and tree peddlers recited their pieces. My purpose is to tell how to secure these delights in Minnesota. Let us follow the successive steps which one must take to attain the desired end. Naturally, the first thing to consider is

LOCATION.

Repeated experiment has shown that our apple trees do best near the lakes, other circumstances being equal; that is, latitude, slope, windbreaks, etc. The climate is usually more equable, the soil better, and perhaps above all, the best feature of such a location, is the moisture. Droughts are among the greatest of obstacles we have to overcome in growing fruit in our state. Besides these general principles of location, such as latitude, elevation and relation to large bodies of water, one must, for a model orchard, select a north or northeastern slope, with a windbreak on the southwest. The soil must be suitable. Avoid a sandy subsoil. A clay loam is good.

VARIETIES.

Having decided upon the situation, we have next to consider what varieties of the apple, plum, etc., are adapted to this climate. We have also to determine which are the better, home-grown trees, which are thought to have become in a measure ac-

climated, or trees imported from other states; and also to learn what age the trees should be. Upon these three things hinge much of our possibility to succeed. As for varieties, we must give up all hopes of making a long lived orchard out of old eastern sorts. "Experience is a good school," and if anyone has had experience in horticulture it is the veterans of Minnesota. Then what better way is there to settle the question of varieties than to follow their list for "general cultivation," which has been culled and reculled for over a score of years? It is true that experiments are going on and apples being produced which show signs of sterling qualities in the last few years, but let their worth be thoroughly tested before hazarding much upon them. Then I refrain from offering the names of any of my "pets," but just say that the Duchess, Wealthy, some of the Anis, Transparent, and many other Russian families of the *pyrus malus* can be raised with profit; but they are mostly fall, or, at the best, early winter apples.

The Grucheoka seems to be the hardiest of the late-keeping Russian varieties, which have been tried at the State Experiment Station. The Transcendent, Hyslop, Whitney and Minnesota are crabs or hybrids, commonly grown.

The Weaver and Rollingstone plums can be successfully raised. The verdict in the state report ought to be final; for it will include decisions from all the experiment stations of the state, among them the State University Station near St. Anthony Park, the newly created experimental station at Owatonna, and Mr. Gideon's at Excelsior.

Notwithstanding all the untiring efforts which the horticulturists of the state have made to obtain a first class late keeping winter apple, the ideal is not yet produced and the opportunity is still presented to someone to make himself immortal in the horticultural world. The best way I can suggest to win this laurel is to plant seeds of the very best late keeping varieties of the common apple and await results. Care should be taken to know from what variety the seed was taken and by what variety fertilized. If this little pains were taken much of the mystery about the seeming freaks which arise from planting seeds would be explained. Then, whoever starts an orchard, let him also start a seed bed at the same time.

In setting an orchard do not stake all your fortune on one variety; that would be like a farmer seeding his land to just one kind of grain. The farmer must diversify his products in order

to be sure of something every year. And so it is with orcharding. But don't go to the other extreme and have a very large number of different kinds, for some will be quite sure to be of no value. It is all right for experiment to try one or two trees of fifty or a hundred kinds, but for profit I would recommend about three varieties each of the earliest, autumn, early winter and late winter sorts. In this way one will have apples to sell all the season and they will not ripen all at once, thus giving time to dispose of them.

PLANTING.

Having determined on location, varieties and the proportion of each to plant, the trees are the next in order. Obtain trees which are thrifty and well ripened in the fall and bury root and branch for the winter, taking care that no straw is in the vicinity to attract the mice. These trees should not be over four years old and two to three years old are considered preferable by some. The holes for the trees in the orchard should be about twenty feet apart each way. Dig the holes in the fall and let the frost act upon the soil in the winter. Make them good and large and in the spring fill in again, setting the trees a trifle deeper than they stood in the nursery. Lean the trunks a little toward the direction from whence come the prevailing winds. Then in a few years the tree will gradually straighten up and having become thoroughly rooted can resist the strong winds, thus adding much to the welfare and appearance of the orchard.

While the tree is being started it will stand a considerable amount of fertilizing, and especially in a dry soil the tree should be pushed a little when it is young, otherwise it is liable to always remain stunted. This rapid growth should not have been done in the nursery, however, because it lessens the ability of the tree to stand transplanting. Care must be taken not to cultivate or mulch the young orchard so late in the season as to protract the growth and not have time for the ripening of the terminal buds before winter sets in. The tree should always have a fine dressing spread around it for several feet, but none banked up against it, for it is liable to heat and scald the trunk, which has caused the death of many a tree.

CULTIVATION.

For the first six or seven years the land can and should be planted to some kind of garden truck. Potatoes are good for

this. When you cultivate the potatoes you are also cultivating the orchard. This is practical, for it has been tried and good results followed.

When the orchard is ten years old, it may be seeded down, but every three or four years after it should be broken and re-seeded with a different species of grass. The ground should be well plowed, spring and fall, till the trees are at least ten or twelve years old, to get the best results. Besides keeping the soil in good condition this destroys countless numbers of harmful insect. A coating of straw about a foot thick on the ground is said to be an excellent mulch for an orchard and it keeps the soil very moist.

PRUNING.

The trees should be headed rather low in this state to give them stability. Have the lowest limbs so the horses can walk along pretty close to the trees when plowing. Prune the trees well in June or in the fall and always keep them trimmed; it adds much to the looks of the tree, the apples are easier to pick, the limbs do not gall each other and the fruit will be much more highly colored and withal it makes the tree itself much more thrifty. All webs found in the branches should be removed at once and burned, and no offenders allowed to escape. In winter the trees can be protected from rabbits by placing a piece of tarred paper about eighteen inches high loosely about the trunk. In about the finest orchard I have ever visited, the trunks of the trees are bound with laths. This prevents any injury from the sun's heat, or any gnawing by animals. These laths are fastened together and are easily removed twice a year, when the trunks are given a sulphur wash to remove any insects and prevent any from coming up the trunk from the ground. Of course the injurious insects produced by flying species can not be thus dispatched. The arsenic emulsion given in Mr. Riley's report last year is perhaps the best spray for the tops of orchard trees.

IN CONCLUSION.

In the fruit garden I referred to above, the ground is plowed spring and fall, webs removed as soon as discovered, and in short no pains spared to keep the trees thrifty and sound. The result is a success and the gentleman has not only good crops of apples, but they are beautiful and free from worms, which is saying

much for this decade of fruit-growing, so we see that advantage in location is not all; great care must be exercised, but the reward is many fold and it must be a source of great pleasure and gratification, as well as profit, to the person, who, in spite of so many barriers to be removed, produces a conclusive evidence to the inscription on the banner which will head the triumphal march of horticulture in this state — which banner is:

We *can* raise apples in Minnesota.

ORCHARDING IN MINNESOTA.

By Archie M. Brand, Faribault.

In writing upon this subject we take it for granted that the members of the Society for whose consideration this essay is composed, are well versed in the art of horticulture, and consequently write more on a line suited to the wants of the amateur, rather than those of the professional.

The first thing that comes to our mind after deciding to plant an orchard is—what is the best locality or site to plant upon?

To one without experience the natural conclusion would be a good southern slope, where the trees may have the full benefit of the sun's warmth. But experience has taught us that here is where we "miss" it, if we are allowed to use the expression. Go into any orchard where the trees have attained to any size and have received no southern protection; you will notice that while the bark on the north side of the tree is firm and healthy in appearance, that on the southern side will be found warped, cracked and in many cases decaying. From this we would naturally conclude that it was the sun and not solely the cold, severe winters that is doing the mischief.

Such has proved to be the case. Late in the winter, or early spring, the warm rays of the sun beating upon the tree, stimulate a heavy flow of sap during the day, which is frozen at night and as a consequence ruptures the sap cells in the bark, thus leaving it in a condition easily acted upon by the elements of decay. No, we will not take a southern exposure, but on the contrary

choose a northern one, if possible. But in this case, as in most other things, we must be governed by circumstances. We are not all favored with northern slopes upon our farms, but if there be one, even a very slight one, that is the site to choose. For in this slope we not only have our orchard so situated as to allow to a certain extent of a natural protection from the sun, but also have it more favorably situated than it would be if placed upon a level plat, to the extent of its natural drainage, something very important as regards future success with fruit trees.

A sandy soil is the poorest possible soil for fruit, and if possible such an one should be avoided. Apple trees need an abundance of lime in the soil, and sand is very poor in this element. If trees have to be planted in such soil, the holes should be dug very large and filled in with suitable soil well mixed with crushed limestone and bones, if obtainable.

High land is preferable to low land, but we must not become discouraged if we are forced to take land naturally holding a great deal of water. It may not be ill placed to cite a little of one's observation at the Faribault Nursery. There are small belts of trees growing upon all imaginable soils and locations. The majority of these trees are Duchess. The finest bearing Duchess on the place, and there are five hundred more or less of them, are to be found upon soil where as late as the middle of May of any ordinary spring, you have to dig from but two and a half to three feet in depth to obtain plenty of water. In fact until late in the spring the place is so saturated with water as to form a perfect bog. Here upon these trees grow as fine apples as anyone might wish to see. Large apples, uniform in shape and finely colored. Apples that will command a market anywhere.

A garden or dooryard should never be selected to plant trees in for while in the one case there is not room enough for good cultivation, in the other, we are liable to allow the trees to grow up to grass and weeds, a certain death to the fruit tree.

Now, that a site is selected, the next thing is to prepare the soil for the trees. This may be done by successive deep plowing and harrowing until the soil becomes fine and mellow.

Apple trees should be set in rows twenty-five feet apart and about eighteen feet in the row.

VARIETIES.

From thirty to thirty-five years of experience has now placed the honest tree dealer in such a position that he finds himself able to recommend without hesitancy, certain varieties of apples that are sure to prove successful if properly handled. The farmer and other persons interested in fruit growing, but not professionals, have by this time learned to shun the fine plate book or cans of preserved fruit of the southern or eastern man, and to look to the trees of their own state for success. There are but few varieties that we can raise profitably, and of these the old Duchess stands at the head of the list, it being grown over a greater extent of territory than any other variety in the state, and although from time to time new varieties have been brought forward as rivals, still they have long since passed away and left the Duchess master of the field. And who would seek for a finer apple for baking than this?

As a winter apple the Wealthy stands at the head; but it can only be grown in favored localities. Of the newer sorts the Peerless and Itasca, seedlings of the Duchess, are well worthy of mention.

In choosing trees for an orchard of a hundred, one could not do better than to choose in the following proportion: Seventy-five Duchess, seven Wealthy, five Tetofsky, five Whitney, three Transcendent, two Early Strawberry, three Meader's Winter.

This selection is based upon the following facts: Beginning with the Early Strawberry, which ripens about the first of August, we have fruit ripening up until we come to the Meader's Winter, which should be picked late in September. Then we choose the seventy-five Duchess because we can sell their fruit. So few crabs are chosen on account of their commanding such low prices, and the above number of trees are enough to satisfy the wants of any family. Of the new varieties we say wait until they have been tried before you invest.

WHAT TREES TO SELECT.

It would be best if possible for one to go to the nursery himself and select his own trees, but it is not convenient for most people to do so. So they must resort to the next best method, and purchase their stock from some good, reliable tree man. Here it might be well to add that trees for Minnesota use should be purchased from nurserymen living within the boundaries of

our own state, for it has been tried time and again to raise fruit from trees brought from other states, and complete failure has in every case been the result. In selecting trees, take good, healthy two-year-olds. Select medium sized stock, trees having good, bushy tops, and but one body, for trees that crotch near the ground are very apt to split during our heavy wind storms, after which they are worthless. Medium sized trees are more liable to have good roots than large trees of the same age. They will also be more liable to live after being transplanted, and the wood, as a consequence of its slow growth, is more apt to prove ironclad.

As far as early bearing is concerned we know that a small, thrifty tree with plenty of good roots when planted, will be a good bearing tree long before a large one of the same age, with mutilated roots, has shown the least sign of a fruit bud.

A great deal has been said upon the subject of when to get trees, some preferring spring while others like the fall the best, but the practice of procuring trees in the fall is becoming more and more general as each season demonstrates its wisdom. It is a more favorable time than spring, because of the cooler and less fickle weather, and the lighter pressure of business with nurserymen, the freighting company and the planter. And while our severe climate will not admit of fall planting, the trees, etc., may be procured in the fall, and thus be on hand at the proper moment in the spring. It is not that the trees were dug in the fall that caused their dying, but often through want of proper care on your own part. Through carelessness, want of time or other causes, young trees when received at the delivery ground are too often left exposed to frost or drying winds. As an inevitable result, the planter loses a large per cent of his trees that with but little trouble might have been saved.

Do not fail to be at the place of delivery on the day specified by the man from whom you get your stock. Bring plenty of damp straw and old blankets to wrap the roots up in that they may be kept moist. If the trees are in good condition heal them in immediately, but if somewhat dry it would do no harm to let them remain in a tub of water over night, and also sprinkle the tops.

They may be healed in by digging in clean plowed land, a hole two feet deep and the length of the longest trees. Lay the trees in, the roots a little lower than the tops, and cover with six inches of good, well pulverized clean soil. On this place a board, then

fill the hole rounding full with dirt. After the ground is frozen a little, cover over with straw to prevent freezing. Early in the spring lift up the tops of the trees, leaving the lower half still in the soil.

About the first of May is the time to plant. The first thing to do is to dig the holes. Do not be afraid of getting them too large. Dig them large enough that the roots may in no way be cramped, and deep enough that the tree may set from three to four inches deeper than it stood in the nursery.

Before planting trim off all roots that have been mutilated, as such roots are apt to rot, and by so doing, make the tree sickly and retard its growth. Place the tree in the hole leaning towards the southwest on a slant of thirty degrees. Spread out the roots well that they may not only grow in their natural way and have a large tract of soil to derive sustenance from, but that they may also act as a brace to the tree against the twistings of our storms. Manure should never be placed in the holes under the roots of trees, as it is apt to give the tree a very rapid growth which can not ripen up before frost and consequently will be winter killed. Only damp and mellow soil should be used, and plenty of water, say from a pail and a half to two pails to a tree. So much water is used to settle the earth firmly about the roots of the tree, and saves a great deal of tramping, and by settling the earth about the roots leaves no room for small spaces being left, which would eventually allow of the roots drying up. Never water the trees after the day of planting, as the water, acted upon by the sun, only crusts the surface of the soil and does not penetrate to the roots. A far better plan is to place a quantity of short wet straw about the tree, about six inches in depth, and covering a circle about the tree with a diameter of from five to six feet. This will keep in the moisture and at the same time save a great deal of unnecessary labor.

CULTIVATION.

Do not as is the general custom plant trees in a hay field. If a man desires fruit for himself and family only, and is indifferent as to the time he gets it, and indifferent about the quality and quantity, then he may plant his trees in grass land and keep them in that condition; but if he intends to make the business of fruit growing a dependence for his living, he would hardly be satisfied

to wait from twelve to fifteen years for results that might be obtained by good culture in seven or eight years; nor would he be likely to be pleased with the moderate returns from common or inferior fruit, while his neighbor was receiving high prices for a superior article grown on ground where fruit was the only crop.

It is true that there are soils so rich, that culture would give trees an excessive growth, and not only postpone fruitfulness, but make them liable to be injured by severe winters.

One great advantage of having the ground under culture is, that it enables the orchardist to give his trees a more uniform growth without regard to condition or unfavorable seasons.

If his trees are loaded with fruit or the season unusually dry, a more frequent stirring of the surface will generally keep up the desired vigor, but if the trees are in grass and the season very dry, he is powerless to help the case, and can only watch and worry to see his trees fail to grow, the leaves turn brown or yellow, and the fruit drop for want of sustenance. No, we will start in as if we meant business and cultivate as if it were any other field crop. Plow as deep as possible, harrow well and then plant the trees.

For the sake of protection it is well to plant the trees in rows running northeast and southwest. This will allow of the shade of one tree protecting the body of the next during the warmest part of the day. Begin to cultivate as soon as the weeds start but do not come closer than three feet from the trees so as not to allow of the whiffletrees scraping the bark from the bodies; keep the cultivator going until the first of July among young trees but not after the middle of June in any orchard where the trees are old. Be careful not to plow deep among old trees so as not to disturb the surface roots. After you have stopped the cultivator go in and mulch heavily among the trees, which will keep in the moisture and not permit the weeds to grow.

MULCHING, MANURES, ETC.

It is well for us in Minnesota to mulch our trees well, as a heavy mulch will keep the frost in the ground until late, thereby retarding the opening of the fruit bud so early that it is apt to be nipped by late frosts, and also the early flow of the sap, and in this way protects the trees from sunscald. As early as it is safe and the ground becomes dry enough to admit of cultivation, remove the mulch and cultivate for an early growth. But in

spreading mulch never let it come within a foot of the tree, on account of mice. Corn stalks and begasse are probably the best mulches, with coarse swamp hay, clover, or straw next in order.

As regards fertilizers, wood ashes are probably one of the best things that we can obtain. Wood ashes contain all the required elements of plant nutrition, except nitrogen, and are very rich in potash and lime, the principal constituents of the apple tree. About fifty bushels should be used per acre, but care should be used not to allow the ashes to come in contact with the tree, trunk, or they will eat the bark off and thereby kill the tree. Manure from stables is also good, and should be liberally sprinkled through the orchard every year, while the carcasses of dead animals placed under ground several feet from a tree pay well for the trouble of placing them there, although in case of a well being anywhere in the vicinity, the latter method should not be resorted to.

RABBITS, MICE, BORERS, CODLING MOTH, ETC.

Of the many pests that the orchardist has to contend with it is probably well to speak of a few. It makes the heart of the orchardist sink away down below the zero point when on walking through his orchard on some fine winter's day he perceives great patches of bark gnawed from some of his trees, or entirely girdled and nearly spoiled. He knows this to be the work of the rabbit or mouse. If he wants to save his orchard he must set about to exterminate his little foes. In the case of the rabbit one of the best methods is the use of the figure four trap baited with sweet apple. Cabbage leaves and turnips are also good. The rabbit being very hungry and smelling the tempting bait loses all fear of the huge trap and creeps under to his doom. He has but to nibble a little at the bait, the triggers are sprung and bunny lies at the mercy of his captor. A more handy way but at the same time a more dangerous one is to stick little pieces of apples containing strychnine on little sticks. These sticks are then stuck in the snow deep enough that the apple is left about six inches above the snow's surface. The rabbit eats the apple, is poisoned and generally may be found in the morning where he partook of the fatal fruit. The little mice are harder to destroy on account of their size and numbers. In the winter time they are to be found under the snow where any litter, such as grass and weeds, have been allowed to remain. Therefore all such

should be removed from around the trees back a foot or two. They will also work at a tree surrounded by heavy snow, eating the bark off the tree just where it leaves the soil. To prevent this go among the trees and tramp the snow down solid about the trunks and their operations will cease. They may also be headed off by going among the trees in the fall before the ground freezes and placing several shovelfuls of dirt around the bodies of the trees. But in case the mouse gets the start and does his work first, a good remedy is to bank up around the injured parts with damp earth as soon as the ground thaws in the spring.

Where the rabbit and mouse do their work above ground, and a pretty neat job while they are at it, we have one less manly, namely the pocket gopher, who in an underhanded manner, follows his occupation beneath the surface among the roots of the tree. His presence may be detected otherwise than by his mounds of dirt, by the bark of the tree becoming yellow, the leaves wither and droop and the fruit being small, shriveled and worthless. The steel trap or strychnine put in potatoes and the holes are among the best means for destroying him.

Another pest in the orchard is the borer, probably the greatest one in regard to the tree itself that we of the Northwest have to contend with, that is in the presence of hickory or poplar timber. The eggs which produce these borers are laid by a beetle in the bark of the tree. By closely examining the trunk and large limbs if eggs are present a slit, instantly recognized by the experienced eye, a mere scratch about an inch long, is to be seen. This is where the eggs are laid and if they have not been hatched, the pressing upon the bark, under which they lay, with any hard substance will crack the eggs and consequently save further trouble. But if the eggs have hatched the young grubs must be found and destroyed. As soon as hatched the young grubs begin to gnaw into the bark of the tree. Their presence may be detected by their refuse which is shoved out through the opening made by their entrance, which being of a glutinous nature collects around the mouth of the hole, resembling very fine chewed pine wood, is yellow in color and instantly detected by the orchardist. One way to destroy the young grubs is to take a sharp knife and peel off the dead bark around the hole and underneath which he is working where he may be found, but this mode is objectionable on account of having to expose the inner part of the tree to the atmosphere, and should not be resorted to, unless the injured part may be immediately smeared over with wax.

While a safer method is to inject water into the hole and drown the grub or by running a copper wire in and probing about until you have killed him.

CODLING MOTH.

Now we come to the codling moth which is more high-toned than his fellow knaves, and for his part takes the fruit itself. If we want apples that will sell, and such as we would wish to eat, apples perfect and uniform in size, we must fight the codling moth. Now while this moth or its young could do more damage than all the other pests combined, still the method to prevent its ravages is the most simple of all. Take a barrel of water and into this stir one-half pound of Paris green. With this mixture sprinkle the trees just as the blossoms are beginning to fall and repeat in about two weeks. Use about a pailful to an average sized tree.

When the orchard has become old enough not to be hurt by hogs turn a few in. They will eat all the rotten and poor apples that fall to the ground, keep the soil rich and well stirred up, and also keep the weeds down. But never let cattle into the orchard as they will do more damage in one day than you could remedy in a year.

All worms' nests found among the branches of the trees should be removed and the worms killed, which may be done by placing the nest on something firm and stamping upon it with the heel of the boot.

PROTECTION.

You must begin to look to the protection of your trees from the time they are planted. Plant a good windbreak of evergreens all about the site chosen. For this purpose the American White Spruce fills the bill. It not only makes a fine, solid bottom, but its top is generally close, and if the trees be planted six feet apart, in fifteen years from time of planting they will form a solid breastwork, six feet through and twenty-five feet high against the snow and wind. The trees next best suited for this purpose rank in the following order: Norway spruce, Scotch pine, white pine, etc. If nothing else can be had willows are better than nothing; also any of the deciduous trees. But do not plant them so they will stand less than four rods from the apple trees. If nearer, the snow lodged will break the trees

while small, and their roots will take much nutrition from the soil needed by the apple trees. Never trim for beauty. Hardiness is what we are after. Cut off all limbs that rub each other; all dead ones, and remove all blight. In all cases immediately cover the wound with wax. A little trimming may also be done on the north side of the tree to throw the growth to the south side as a means of protection. In closing, I would say that although this essay is long, still I see no point that I could have left out, while I do see many, very many more, that might have been added.

The committee to whom was referred the following essay would report that they have examined it and find that there is no competition. As it is a worthy and exhaustive paper we recommend that it be awarded first premium, and that the writer be requested to re-write and condense it as much as can be done without detracting from its value before it goes into the hands of the printer.

J. S. HARRIS,
Chairman of Committee.

GRAPE GROWING IN MINNESOTA.

By Archie N. Wilcox, Hastings.

THE GRAPE.

Species: *Vitis labrusca*, v. *Aestivalis*, v. *riparia*, v. *vinifera*.

Of the sixteen American and numerous foreign species I have named, but four are worthy of attention here. From these and their various hybrids we must secure the varieties we cultivate. It is useless and I will not attempt to give a detailed history of the grape except to touch upon the different varieties under another head for there is probably no fruit grown of so much value to mankind or so widespread in its commercial or horticultural value. Dating its growth from the earliest antiquity we may safely assume that all our numerous species are derived from the garden of that ancient pomologist, Noah, who planted a vineyard with the lamentable results recorded in Holy Writ.

The most essential elements of success with grape growing in Minnesota lie in the capabilities of the grower himself. Being

obliged to contend with an unfavorable climate and a great variety of soil, he should call to his aid all the advantages which science and the experience of others can give. Plants are living things. He should know something of the structure, methods of growth, their constituents, so as to select their food. He should know something of their relationship to the climate and soil in which they received their birth and development, that he may still preserve their vigor and productiveness. He must know the structure and formation of their productive organs so as to make the most desirable crosses and hybrids and secure the most perfect fertility and development of fruit.

Munson says: "When we consider that here, in the United States alone, there are some fifteen different species of grapes with different adaptabilities and properties with innumerable varieties of earth, that all the species are polygamous and are capable of intermingling, thus making hybrids, and that we must at least use several of these species conjointly to secure greater excellency in quality, and make rapid progress, it is at once apparent how important is a knowledge of grape botany at least to the successful vinegrower and still more to the originator."

But more than all else he must be a clear sighted practical specialist in horticulture and love for its own sake the labor in which he is engaged; with these requirements his success is assured, for most all fruit, grain and vegetables reach their highest perfection near the northern limit of their growth, and this limit is far north of the latitude of Central Minnesota as the abundance of its wild species (*vitis riparia*) on our river bottoms even in Manitoba will testify.

Prof. Budd says there are no wild grapes in Russia north of the shores of the Black sea; yet he has seen raisins from the east for sale at the Russian fairs as good as any from Spain.

Mr. Harris says, "good grapes can be successfully grown in many portions of Minnesota by all who select a suitable location and soil, plant the right varieties and give suitable attention to the preparation of the soil, planting and management."

LOCATION.

In selecting a location for a vineyard bear in mind the fact that once well established it will remain productive for a life time; choose high ground on the shores of a lake or river, if possible with a moderate slope to the south or southeast, where air and drainage will assist to protect against the late frosts of spring

and early frost of fall; if sheltered by nature or a belt of evergreens so much the better.

The best vineyards in Michigan are on a ridge of land about one mile wide and one hundred and fifty feet above the water, surrounded on three sides, east, north and west by the St. Joseph river and Lake Michigan.

SOIL.

For soil a deep, warm, sandy loam which will give the earliest start in spring and make a moderate growth of well ripened sound wood is better than a richer muck or colder clay in this climate for we need all the warmth we can secure in our short summers to develop the fruit and bring the growing vine to perfect maturity.

A stiff clay with proper exposure is better than muck, while the limestone along the Mississippi below St. Paul is quite desirable.

To prepare for planting, plow deep and fine, for the long, slender roots will penetrate far and near, and draw nourishment from every available atom of soil within reach. If the soil is poor and you desire to fertilize it, employ ground bone or wood ashes for that purpose; stable manure will promote a rank growth of wood and late unripe fruit to be killed by the first frosts of autumn, to the great injury of both root and vine.

PLANTS, PLANTING AND CULTIVATION.

A cheap way to secure the best vines for planting, with the advantage of knowing what you have got, is to grow them from cuttings; this may be done in a small way by making cuttings of two or three buds from mature new wood; when you trim in the fall pack in moist sand or moss in the cellar over winter, and in spring secure a box; requisite size two feet high; fill two-thirds full of rich dirt, and set the cuttings with the top bud just above the surface, pressing firmly about them. Nail a thin piece of cotton cloth over the top and place it in a sunny spot near the kitchen door, where you will not forget to sprinkle with warm, soft water every evening. In a few weeks the box will be full of growing vines ready to transplant to a plant bed where you can have them handy when you need, at one, two or three years old. Use the best first; a strong one year old plant is better than a weak one at three years. To buy vines will cost from

two dollars per hundred for Concords to twenty for some of the finer varieties. For plants, use good, strong two year old vines grown from cuttings with two rows of well developed fibrous roots and sound, mature wood, cut back to two or three eyes; or, with varieties like the Delaware, which root very poorly from cuttings, one year old layers are best.

Set the vines early in the spring, and mark off the rows in a straight line not less than 8 nor more than 12 feet apart, and set 8 feet apart in the rows; 8x10 will give 528 vines per acre, which is enough when we stop to consider that each vine will extend its roots 20 feet or more in every direction. Make the holes large enough in setting to spread the roots out in a natural manner without crowding each other, and set the plants in a slanting position lengthwise of the row so the lower eye will be at the surface of the ground, with one or two eyes above; fill the hole with good soil, keeping the roots well apart, pressing the dirt firmly about them, and if the weather is dry mulch lightly over them to retain the moisture; this will insure a vigorous, healthy growth that will well pay for a little extra care and resetting.

During the first season grow one strong cane from the plant with no pinching or pruning whatever in the summer, except to remove such extra sprouts as may start around the vine at the surface of the ground, and all fruit stems which may form. When the season's growth is past and the leaves have fallen, trim away the entire growth above the second well developed bud on the new growth which is usually about one foot from the base where the cane started. Just before the ground freezes bend in the direction which the vine naturally leans and cover entire with three or four inches of earth, for winter protection. A crop of beans may be grown the first and second years without injury, and sometimes when cut worms are thick, with positive benefit to the vines. Corn or potatoes are better than weeds.

The first operation of the second year is to remove the covering and lift the vines, when all danger of spring frost is past, handle with care, without injury to the tender buds, and tie to stakes with bagging twine. Stakes may be of any cheap wood that will last two years, and five or six feet high. Plow at once with one horse three or four inches deep as near the row as possible to cut the surface roots, throwing the dirt away from the vines afterwards; cultivate clean. This season allow two canes to grow, one of which may be stopped at three and the other at six feet from

the base by pinching the end bud. Check all laterals in the same way after one leaf has formed until the first of August, then let them alone until the wood has ripened, and the leaves have fallen. In November the fall pruning should be done by cutting all laterals and shortening the stronger cane to about four feet, and the reserve cane to two buds. Two or three bunches of fruit may be ripened this year. Always lay down and cover with earth as previously described for winter protection.

During the third season follow the same directions as previously given for taking up, tying to stakes, plowing, clean cultivation, and covering. In pruning carry the leaders forward to about double their previous length; remove all feeble or secondary sprouts as soon as they start and pinch laterals freely but never cut away the foliage or full grown leaves; much injury is often done in this way and it should not be tolerated; pinching the end bud is the true way for summer pruning. Yet no arbitrary rule can be given, for no two vines and no two varieties are alike in growth and needed requirements, so the good judgment of the grower with some general suggestions will be the best guide from this time on. One general rule should apply; when the trellis is covered with vines the fall trimming should leave nothing but fruit buds, and these well distributed along the vines, and only in such quantities as the age and vigor of the root will bear; for the form of trellis to be covered, the ideal vine to be grown, and the variety of grape under cultivation, and its liability to disease, all have an important influence on the treatment required. Always have an ideal vineyard in mind and keep the vines as perfect as possible; this may be done by permitting the strong and vigorous vines to ripen a full crop of fruit, while the vigor of the weaker ones is increased to thinning to a few perfect bunches. Never permit the vine to overbear; it will impair its vitality, retard its growth and damage the succeeding crop, and the grower should be prudent in limiting its productive capacity. The formation of seed is the most exhaustive function of plant life, so a few large, compact, well-formed bunches, weighing ten or twenty pounds, are much less injurious to the vine than the same amount in small, inferior fruit.

During the summer and fall of the third year or in early spring of the fourth as most convenient, the holes may be dug, posts set and trellises built, and here we must decide definitely what form will best suit our wants, but for me I would use none other than the flat horizontal trellis, four feet wide and five feet above the

ground with three No 9 galvanized wires, for I know this form is superseding all others among the most intelligent grape growers of Michigan.

To make this trellis, use pieces of 2x4 four feet long nailed on top of strong posts in the form of a letter T; set these twenty-four feet apart and of a uniform height; upon these stretch three wires, one in the centre and one at the end of each arm; this may be done with long wires permanently, or as some prefer by cutting the wires one foot longer than the distance between posts and twisting a loop in each end and fastening to each post with small staples so they can lay down each length separately with the vines if desirable.

Train the vines to the centre wire and the laterals will reach out over the sides like an arbor, while the fruit will hang at a desirable height overhead, protected by the leaves and in the best possible position to receive any attention it requires.

The additional height from the ground is a great advantage in locations subject to mildew and rot, while the artistic beauty of a vineyard so arranged can not be surpassed.

VARIETIES.

There is no operation in grape growing on which the success or failure of the vineyard more certainly depends than selecting suitable varieties for planting. More than half of the vines in cultivation about Hastings are worthless and it is safe to say nine out of ten of the kinds recommended in the catalogues of eastern nurserymen are of no value here.

The ideal grape for this state will yet be produced; meanwhile we should plant the Concord or Worden for the main crop, the latter being a little the earliest and best. Moore's Early and Delaware are both losing ground in other places but do well here; while the Brighton and Niagara are both gaining in popular favor.

I would plant in the order named: Worden, Concord and Moore's Early for black; Brighton, Lindley and Delaware for red, and Niagara, Lady and Martha for white, with as many of the new highly praised varieties as I could afford to spend my time on, and money with. The Lindley, like others of Rogers hybrids, should be planted next to other perfect flowering varieties to insure its productiveness. Clinton and Janesville are better than none for a farmer in the extreme north when all others would fail.

PICKING AND PACKING.

In picking use the so-called climax ten pound basket with flat covers; these will hold eight pounds of fruit and can be bought for about five cents each. Wait until the dew is off in the morning, and gather only the ripest bunches of fruit. Handle with care and don't disturb the bloom; if you do it will injure the looks of the fruit. Place directly in the basket and when nearly full carry to the packing table, where they will be finished out and covered.

If danger of frost occurs before the crop is fully ripened, gather at once and use the green ones for jelly, which they will make of the finest quality, while those which are nearly ripe may be further developed by spreading in a light warm room with a frequent sprinkling of lukewarm water. These may be made of passable quality, but in marketing sell them for just what they are and do not mark them as "Best Minnetonkas." Pack nothing in light-weight baskets, but guard with jealous care the reputation for high flavor and superior quality attained by Minnesota grapes.

Having but two years' practical experience in grape growing I have drawn freely from such authorities as Munson, Budd, Rogers and Parker, also from original notes of my father and the writings of Harris, Pearse, Latham, and Porter, of your Society, to all of whom I would gratefully acknowledge my indebtedness.

Mr. Stedman, from the committee on prize essays on strawberries and raspberries, reported that of the two essays handed in they had selected the one prepared by Mr. Lyons as entitled to the award.

STRAWBERRY AND RASPBERRY GROWING IN MINNESOTA.

By John Lyons, Minneapolis.

In looking over the program, I see the Society offers special prizes for essays from young men under twenty-five years, and as I am under that age, I propose to tell what I know about growing and marketing small fruits.

It is a very difficult matter to prepare an essay of this kind for

a Society that covers so large a territory as the State of Minnesota, with its great diversity of soil and climate. I shall be understood as referring only to the locality in which I live.

STRAWBERRIES.

The fruit and vegetable grower like the producer of nearly all other farm crops has done but a part of the needed labor to prepare the products of his industry for the use of mankind. Though a larger proportion of fruit can be converted directly to the use of man without preparation than that of any other product of his labor, they are also the most perishable. The grower has to be constantly on the alert to get them to market as soon as ripe and in the best possible shape. Taking it for granted that all present are tillers of the soil and depending upon the production of your gardens or farms for your support, the question arises how shall we make our farms yield a profit on our investments and a reward for our labor? That which affords the greatest profit affords the greatest pleasure; farming or gardening if not profitable is not pleasant. At least that is the view taken by most young people, who do not like to meet with failures, or disappointments such as sometimes happen to gardeners and farmers through drought, insect depredations and prices below the cost of production. Market gardening and growing small fruits for the Minneapolis and St. Paul markets is the only branch of the business that I am somewhat posted on. I will say here that I know more about marketing than I do about growing the fruit. It has been my business for the last five years to market all our produce.

The strawberry is the first fruit to ripen in this locality. I shall confine myself in this paper to my practical experience in cultivating and handling the strawberry. It is said that any land that will raise good corn or potatoes will do; so it will, but it is better to help it a little.

Select a piece of land sloping to the south or east, manure it evenly with good stable manure; plow deep and plant to potatoes; give good cultivation, letting no weeds go to seed. When the potatoes are harvested plow deep as you can, and if followed by a subsoil plow it would be all the better. As soon as the land will work in the spring spread on ashes or well rotted manure; plow about six inches deep; pulverize well, set the plants in rows from three and one half to four feet apart and from fifteen to twenty inches in the rows. When everything is ready we dig a

lot of one year old plants putting them in tight boxes; cover with a wet sack provided for the purpose; then they are taken to a cellar or some outhouse where they are trimmed, roots straightened, wetted and again placed in shallow boxes, and covered as before, when they are taken to the planters. Four men work to a better advantage than any other number. One man with a spade makes holes for the other three, each being provided with a tin pan, holding about fifty plants, and each straddling the row holding the plant in the left hand on one side of the hole as near level as possible; with the right hand draw back the fresh earth which was thrown out and press firmly about the plant. By this method planting can be done with good success even when the weather is dry and warm.

My idea of the best system of renewing is, to set a new plantation every spring, and let each one bear two crops of fruit. This is the best system we have ever tried in our locality. Some varieties, such as Countess, Charles Downing, Manchester and Downer's Prolific invariably yield their largest crop the second year, while other varieties, like the Wilson, may do their best the first season and would not be profitable to keep for a second crop. After a little experience the grower will soon learn which is best. By this means, after the first year, we have a bed in full bearing, one in partial bearing, and a new one coming on each season; considerable land is required, it is true, and much work, but the results are more profitable and almost a certainty. My experience and observations are that the best method for field culture, is the matted row system. The cultivation should be thorough, never letting the ground get hard or weedy during the growing season. Lay the first runners along the row and let them take root; cut off the very late runners, as there will be plenty of bearing plants without them, and the ground should not be more than half covered with plants. About the first of November, or when the ground is frozen hard enough to hold up a wagon, mulch with slough grass, straw or corn stalks, or any coarse material free from fowl seeds. The object of mulching is to protect the plants from thawing and freezing during the warm spells in winter and early spring. Be careful not to get it too deep—just enough to hide the plants. If the land is sandy, rake the mulch between the rows in the spring and leave it; if on clay land, take it off and cultivate with small tooth cultivator a number of times. When the fruit begins to set put the mulch back; it keeps all the weeds down and the fruit clean.

When fruiting is over take off the mulch and cultivate same as the season before.

For profitable and successful cultivation of the strawberry there are several things necessary which the fruit grower must remember.

The right kind of soil, proper preparation, strong young plants, clean and thorough cultivation, winter protection, mulched in the rows in summer, careful picking and handling for market. These conditions carefully complied with, it is as easy to grow strawberries as corn or potatoes. They will grow just as well for one as another with similar treatment.

What varieties to plant is a question often asked but hard to answer satisfactorily. Location, soil and season differ so much that but few general rules can be given that will hold good under all the varied circumstances. For the last few years Crescent, fertilized by Countess, has given the best results and largest returns to the grower in our locality. Nine-tenths of the strawberries on the Minneapolis market are Countess and Crescent. The latter is the best berry for general planting of which I have any knowledge. There are several good, productive and hardy pistillate varieties suitable for this climate.

I think all fruit growers will agree with me that the berry most needed at present is a hermaphrodite to fertilize them; it should be as productive and hardy as the Crescent, firm as the Wilson; size and color of Wilson would do very well. With a berry of that description we could get along very well until the perfect berry is introduced.

Having tested all the new varieties that appeared in the last few years May King, Jessie and Bubach are the only varieties that proved valuable on our grounds this last season.

A new strawberry possesses great attraction; we all desire to know how large and productive it will prove to be. It will draw a larger crowd of admiring friends around the market stand than any other fruit ever raised.

There are a great many farmers in the berry business all over the country who ought to go out of it simply because they will not do the business right; they produce quantity at the expense of quality. These men are not making any money in the business and there are many of them making much less from their farm crop because of the neglect that comes from their berry culture. I think these large planters by having so many small soft berries badly handled have glutted the markets and almost

ruined the business. I have seen this class of goods a drug in the market at from two to three cents per quart, but good berries sold quick at from eight to ten cents per quart. Prime fruit in full measure, well and carefully handled, kept perfectly clean, in new boxes and crates and marketed promptly pays a fair profit. There is not too much good fruit grown of any kind; there is not enough of such to supply the constant demand.

To succeed in horticulture as in anything else we must be on time, use judgment, industry and economy. It is not so hard a matter to raise fruit or vegetables as to prepare it for the market. We must bear in mind the fact that our goods must be exposed for sale in competition with those of other producers, and that clean, bright fruit or vegetables will in every case attract the eye of the buyer before that of your less careful neighbor. There is no part of fruit raising pays so well for the labor expended as that of putting it in shape for market. Don't be afraid of spending money for neat packages as it adds more to the fruit than it costs. Early planting cannot be too rigidly adhered to by reason of the frequency of droughts later in the spring, just at the critical time when the newly set plant has yet but a feeble hold in the soil. We have more than twenty varieties under cultivation at present for home use and market. I would select six varieties and raise them alone. Not because they are just what we want, but because they are good and I will hold onto them until something better is found. I would select Countess, Crescent, Windsor Chief, May King, Jessie and Bubach. These are all soft berries but answer very well for the home market.

When I started to write this essay I had but the one object in view, namely to show the profits to be derived from the business. The pleasures of horticulture I will leave with someone older than myself to write about.

I would not wish to discourage anyone from engaging in this interesting occupation, but I ask the question how many of us are making the growing of strawberries a success? What is meant by success is that the acre of strawberries has paid for planting, cultivating, picking, marketing and interest on the money invested, with a fair per cent left for net profit. As to profits of the business we have the advantage over many other sections of the country, by having two large cities only a few miles distant, furnishing a home market for almost all our products, delivering with our own teams and selling either directly

to consumers or to the retail dealers, thus avoiding all cost of transportation and commissions that our brethren of the south have to pay when shipping to our market. But a small portion of our fruit is shipped west or north; it is too soft. No attention is paid to the growing of firmer and better fruit that could be shipped to a distant market. The bulk of our crop is sold and consumed within ten miles of where it is picked, yet with these advantages none of us are getting rich out of the business; some are only making a living, while others are losing money and becoming discouraged with the low prices that have ruled the past few years. In reading the papers I notice a great deal is said about the man who grows from 5,000 to 10,000 quarts of strawberries and raspberries to the acre and sells them at fifteen and twenty cents per quart while nothing is said about the man that gets from 1,000 to 2,000 quarts per acre and sells them at four or five cents per quart. Less acres, more and better cultivation might remedy some of the evils.

RASPBERRIES.

I do not intend to tell where the first raspberry came from by what name called, nor their quality or value, but give in brief form what I know about raspberry growing and marketing. Raspberries are attracting more attention at the present time than ever before; it is a fruit much admired by many. Though never so popular as the strawberry, we have grown them for a number of years for market, but not to the same extent as at present, their cultivation is quite profitable. No fruit that comes after the strawberry is more sought for than the raspberry and until the last few years was very scarce in our market. The red varieties are getting quite plentiful; the black is not grown in sufficient quantities to supply the demand.

Our land is of rather a sandy nature but by preparing it the same as for strawberries we have good success with the hardy red varieties, namely Philadelphia, Turner and Cuthbert. The preparation of the land is of great importance for on this depends the growth of canes the first year and the crop of fruit the second as well as for years after. The land should be plowed deep, and well pulverized, then marked off in rows three feet by six for the red and three feet by eight for the black. At this distance apart they are easily mulched, which is very essential in this dry climate. Marking is done both ways using a marker similar to

a corn marker, then with a shovel plow run one way. The furrow is made deep enough for planting and the plants placed three feet apart and a little earth drawn around them and firmed to hold them in place; then the furrow is filled from each side with a small plow. The land is thoroughly cultivated both ways during the growing season and the plants topped at two feet high to cause them to throw out laterals; in the following spring these laterals should be cut back to six inches long. The land may be cultivated until the berries begin to form and again after the fruit is picked. The second year pinch the tops off at about three feet high. Cultivation should be the same as the previous season. By planting deep and pinching off the tips the canes grow stronger and are self-supporting, thus doing away with the old practice of tying to stakes and wires which was both laborious and costly. Pinch the canes while young and tender. I can use both hands and get along very fast. The canes are not all ready at the same time; it is necessary to go over the ground twice; if the canes get too large, use a knife; treat suckers between the rows as you would weeds unless you want plants; cut them out when young and tender; sprouts or suckers are great annoyances. In growing red raspberries if taken in time they are easily kept down. Raspberries should be kept in hills; this can be done by cutting away with a sharp hoe all sprouts between the hills and the rows, allowing from three to six canes to the hill. For home market all things considered the Turner has given us the most money; its large size and its bright color makes it sell readily at good prices. Philadelphia is an old variety, hardy, and very prolific; the fruit is soft and dark colored, second quality, but grown in large quantities owing to its great productiveness. The Cuthbert is very popular, selling for better prices than any other on the market. It is not hardy, must have good winter protection or it will kill back to the ground. Gregg and Nemaha have done best; cultivation should be the same as for the reds.

Red raspberries should be picked in pint boxes; twenty-four to the crate makes the handiest and neatest package to ship or handle.

Getting our berries picked is the most difficult part of the whole business to handle. Good hands are scarce and earn good wages in the height of the berry season. We are often obliged to get along with a very poor class of pickers. We use a stand, with a handle, holding four boxes; each picker is given a stand

with four boxes in it. The pickers are put two to a row, one on each side. It is necessary to have a trusty man with them continually; his business is to keep order and see that the work is properly done. When the stand has four full boxes they are brought out to where the packing is done, in the shade of a large canvas, or tent; they get a ticket for the full stand and an empty stand with four boxes to fill again, and so on till the day is over. Each day's picking is sold as early as possible the following day, on the market, mostly to retail dealers.

For winter protection the canes are laid down and the tips covered with earth enough to hold them down until spring. One man holds the hill down while another puts on the earth; this, with our usual amount of snow, is enough for hardy varieties. If time permits, the old canes are cut out in the fall; if not, it is done in the spring, not being very particular as to time, the old canes holding the snow and giving additional winter protection.

The blacks should be planted in the spring quite shallow. The reds may be planted either in the fall or early spring.

If any are inclined to differ with some of my ideas, please remember that they are based much on local experience, and have more local than general application. As to cultivation, my advice is simply this — let it be first class.

Mr. Philips from the committee on prize essays on blackberries and dewberries presented the following:

REPORT OF COMMITTEE.

Your committee on prize essays on blackberries and dewberries would respectfully report that we have examined two essays which have been handed to us. We find them both good and instructive, and showing thought and study, and we award the premium to Frank C. Shepherd, aged sixteen. We find such a similarity that we would respectfully recommend that if the Society in the future offer premiums for prize essays, that instead of paying it all to one person, that it be divided into two or three prizes, so that other essays, as in this case, that are worthy can be suitably rewarded. We heartily approve of the plan to encourage the young to pursue this line; to do something useful to themselves and others which will be pleasant and profitable, and make them better citizens, and add new interest to the cause of horticulture.

A. J. PHILIPS,
L. H. WILCOX, *Committee.*

BLACKBERRIES AND DEWBERRIES IN MINNESOTA.

By Frank C. Shepherd, Hastings.

Both the blackberry and dewberry grow abundantly in their native wild state over nearly all the United States and a portion of Canada, growing best under the partial protection of forest and shade, on a rocky or sandy soil, around old logs or brush heaps. It will thrive from year to year without care, and produce a large amount of the finest berries, surpassing in their flavor and quality all other kinds of our native fruit.

Under cultivation the size of the berry, as well as its productiveness, has been increased, while its high flavor has been partially lost, and it seems to be even more tender than in its wild state.

SOIL AND CULTIVATION.

In selecting a location choose a rich, well drained clay soil which will not be liable to suffer with drought, for the finest fruit ripens late in summer when a dry spell is most likely to occur, and an abundance of moisture at that time is necessary to produce a large crop of large and luscious fruit. Work the ground deep and fine before setting them. Early in spring mark the field in straight rows eight feet apart, and set the plants two feet apart in the row, treading the dirt close about them. Cultivate clean afterwards, unless you wish to grow a crop of strawberries or beans among them, either of which will do no harm.

The blackberries grow on bushes of the previous year's growth, so the treatment of the first year will only consist in keeping down the weeds and making them grow as thrifty as possible. Stop cultivating about August 1st, so the bushes will mature their wood before winter; then late in the fall before the ground freezes give winter protection by removing a shovelful of dirt from one side of the bush, and, bending them in that direction, press carefully near the roots to avoid breaking and fasten them down, with a shovelful of dirt on the tops. This will hold them down until you can cover them completely with dirt, and do not stop until they are out of sight from root to top, and then you need have no fear of their winter-killing. When the buds begin to swell in the spring, remove the covering and

straighten the bushes up in line, pressing the dirt about the roots to keep them so; then plow the field lightly, not more than three or four inches, turning the dirt away from the rows on each side to make them run deeper and help to preserve against drought. This season there will be about half a crop of berries, and should be picked in quart boxes, when they will find a ready sale at a good price. They averaged about fifteen cents a quart here the past summer.

After picking go through the field, pinch the tops of the new bushes at the height you want them to remain and they will throw out fruit bearing laterals very freely, which will give the bushes a desirable, strong, low, stocky form and save the use of wires to keep them in position. The proper height to train the bushes depends on the kind grown and should be about two and a half or three feet for Wilson's and the smaller kinds, and four feet for the stronger growing varieties. At this time remove all old wood of the first year's growth, for it will die anyway, and the sooner it is out of the way the better. Then cut the new wood to three or four of the best canes in a hill. These will give better results than a larger number.

Treat all suckers, which on some kinds will be plenty, the same as weeds and kill them, unless you want them for plants. Do not cultivate in the fall, as it will make a late tender growth to be winter-killed. Plants may be secured from suckers or root cuttings, either of which grow rapidly.

VARIETIES.

All varieties of blackberries in general cultivation are selections from the wild fruit, and it is desirable for the grower to set such kinds as will ripen in succession from early to late. Snyder is the best early variety, a strong grower, hardy and very productive on heavy soil, but fails on sand; berries medium size and fine quality. Stone's Hardy or Taylor will succeed the Snyder; the latter of these is of fine quality but a rather uncertain bearer on some soils. For a late market nothing equals Ancient Briton, a large, late, strong growing variety and very productive; this is probably the best of all for this state. Lawton and Wilson are the great market varieties of the East but have been little planted here. The best dewberries for general cultivation are Lucretia and Windom. These may be treated the same as blackberries except to train to wires to hold the

fruit up from the ground. They ripen one or two weeks before blackberries which makes them desirable. In size they are large and in quality excellent.

PROFITS.

The growers may reasonably expect a yield of 100 or 150 cases per acre of 24 quarts each, which at ten cents a quart will give from \$240 to \$360 per acre, less about \$20 or \$30 for cases. It will cost one and a half cents a quart for picking, besides which the cost of cultivation, after a field is well established, will not exceed the cost of growing a field of potatoes.

The committee on prize essays on currants and gooseberries, reported that of the four papers handed in they had selected the one prepared by Mr. Brand, aged seventeen years, and he was entitled to the award.

CURRANTS AND GOOSEBERRIES.

By Norton F. Brand, Faribault.

Order or Family :

Tribe: *Grossulariæ*.

Genus: *Ribes*.

In two Sub-genera: { *Grossulariæ* (Gooseberry).
{ *Ribesia* (Currant).

From the above table we see that not only do the gooseberry and currant class together in our gardens and from a horticultural point of view, but that they are intimately connected botanically as well, belonging as they do to the same genus and being the sole sub-genera of that genus.

We long for something sour in the spring; the system needs it — or acid; just such as the currant affords. No one will be likely to use too many of these, and not one in a thousand will use as many as he should. They make pies, and such pies! When one has had nothing but dried apple pies for ever so long, a good piece of currant pie makes you think that there is much in this world worth living for.

Currants and gooseberries, growing in a wild state on rich moist land supplied with an abundance of leaf mold and decaying wood, suggest to us that they are gross feeders and will well repay deep and thorough cultivation and a liberal supply of fertilizers and manure. As no one will want to buy a new place for the purpose of going into the business, I will say but little about the location, except that which applies to all fruit growers, which is, to be as near a good market as possible; although these fruits are not as perishable as strawberries and raspberries, and a plantation of them lasts much longer without renewal.

As the chief endeavor of man is to make money and to have something good to eat, my object in writing this essay shall be directed to the unfolding of the former idea,—to enable him who plants to make money.

SOIL.

Good, deep, moist loam, on clay subsoil, is the best, as this soil needs less manure and mulching than sandy soils. Most any soil however can be made suitable. Deep plowing and thorough harrowing with a liberal supply of well rotted or rich stable manure or woodland mold will put the ground in condition for planting.

AGE OF BUSHES TO BE PLANTED.

They may be either cuttings or one or two year old bushes. If a large quantity are to be set and money is scarce set long cuttings. If money be plenty set strong two year old bushes, for they will begin to bear the next year after planting. To grow from cuttings, select one year old wood about twelve to fifteen inches long. Cut about the first of October. Cut smooth with a sharp knife. I prefer long cuttings. Those who sell cuttings will say that nine inches is the right length, but we have always had the greatest success with long cuttings having tips. Tie in bunches of fifty keeping the cut ends even. Cover them up in a good sunny place in warm, mellow soil, packing the soil firmly against the cut ends. Tie each variety separate with wire. (String will rot off.) Write the names plainly on each side of a label which should be placed in the middle of the bunch. Cover with six or eight inches of good soil; and before hard freezing weather cover them with a coat of manure so thick that they will not freeze. This is so the cuts will callous and begin to heal

at once. Remove the manure from the cuttings as soon as the frost is well out of the ground in spring. The ground to be set out may be prepared in the fall or as soon as convenient in spring.

Planting is next in order. The right distance to plant currants is four to five feet apart each way, according to the size of bush of a particular variety. This will give opportunity to cultivate both ways. Mark the ground off both ways and plant two cuttings at each intersection of the rows. If both grow, one can be dug up. In planting them be very careful not to break off the little newly formed rootlets nor to expose to the air too long. Select the varieties wanted. Put them in a pail which has a little mud and water in it to keep the roots moist. With a spade make a clear cut down on one side five inches deep, throwing the soil out on the other side. In this hole place two cuttings six inches apart. Set them a little slanting; pressing moist soil firmly around the base, being careful not to break off any rootlets. If the soil is inclined to be dry pour in a dipper of water. Sprinkle in the hole about two tablespoonfuls of wood ashes. Fill the hole with mellow soil,—press firmly with the foot, then a little loose soil on the top and they are set. Finish the piece in this way and there will be little or no loss.

CULTIVATION.

Cultivation should be thorough until July when it may cease, or be continued until August 1st, but not later. Great care should be taken to avoid coming too near the cuttings, for if loosened they may die. It is well to use a five toothed cultivator, cultivating both ways.

PLANTING IN FALL.

Cuttings may also be set in September, but if so planted they should be short—about eight inches long. Set the top of the cutting even with the top of the ground; covering with three or four inches of soil, to be raked off in early spring. If one or two year old bushes are used they may be set in October or September. One in a place is enough; a mound of earth should be pulled up around each bush; mulch with manure and tie the top up with a band of hay, which should be removed in the spring. If the planting is done in the spring, plant early, as currants are one of the first things to start in the spring. Good

cultivation should follow the spring planting as well as fall; run the cultivator through every ten days till July. Should the soil be clay and a heavy rain follow right after cultivation, then another cultivation should be given as soon as the condition of the soil will permit, to keep the soil from baking.

VARIETIES OF CURRANTS.

On soils inclined to be sandy the Red Dutch is the best. On heavy soil Red Dutch, Stewart, White Grape, Long Bunch Holland and Black Naples. On heavy soil the Long Bunch Holland lives the longest, makes the largest bush and bears the most fruit of any variety I have ever seen. I have known more than ten bushels to be produced in one year on a row of Long Bunch Holland only fifty feet long. This row was on a northern slope—nearly level—rich black timber soil, and had been heavily mulched in the autumn previous with begasse from a sorghum mill. This variety retains its foliage all through our hot dry summers and frequently holds its fruits till September. It is very valuable on that account. It needs more room than any other variety and they should be set five feet in the row by six feet between rows.

VARIETIES OF GOOSEBERRIES.

So far as our observation and experience has extended the Houghton is the only profitable variety. It may be considered the standard. There have been some instances where the English White Smith has produced remarkable crops for a single season. We have known eight quarts to be gathered from a single bush, but they are not as reliable as the Houghton.

Gooseberries may be grown from cuttings like currants but it is better to take layers—strong, one year olds—to set for fruiting. Set and cultivate the same as currants. The third year they begin to bear well. After they have borne two crops mow the tops off in the autumn or early spring, in this way enabling them to bear a new top and have a season of rest. If they don't get this one year of rest they will take two or three without asking permission. They must have a new top and plenty of stable manure and wood ashes in order to bear much fruit; but with liberal care judiciously bestowed they may be made profitable without these. Gooseberries need mulching as soon as the fruit is gathered to keep the ground cool and moist. In early

spring work the mulching in and cultivate well, keeping the ground clean till the fruit is gathered. Children do not like to pick gooseberries as well as they do strawberries. They say they have "prickles" on. They are right, but they can generally be hired to pick them for one and one-half or two cents per quart. How can this fruit be used to the best advantage? Sell them for from ten to fifteen cents per quart. They are good stewed green for sauce; made into pie; good enough for a "Daniel," provided the sugar bucket has been patronized. They are good canned for winter use and are excellent appetizers along toward spring. They also make as good wine as currants. Preserved they satisfy most appetites. They are more profitable to grow than corn. The farmer gets 25 cents for a bushel of corn while upon the same ground he can produce 3 bushels of gooseberries, worth, at 10 cents a quart, \$9.60, which gives the producer \$9.35 more than he could get out of corn. There are also profits in growing currants. The best way to sell them is by weight, 40 pounds to a bushel, picked with stems. For market always pick them stems and all. Where they can not be sold thus, of course the best way is to sell in quart boxes like strawberries.

PRESERVING CURRANTS.

Currants like gooseberries will not bear well on old wood, so it is best to cut out all the old wood after they have borne two or three crops. This had better be done as soon as the leaves are ripe in summer or early autumn. Cut close to the ground leaving only wood not more than three years old, mostly one and two years old. Some trimming can be done every year after once begun, and no old wood allowed at any time to accumulate in the bushes. Thorough, clean cultivation, from early spring till July, followed with a heavy coat of manure in July or August, with ashes in the spring sown broadcast, will produce the best crop.

Gooseberries and currants have their enemies. Worms which defoliate the bushes must be poisoned with white hellebore or London purple. If the worms come on early a solution of one-fourth pound of London purple to fifty gallons of water sprayed over the bushes will be sufficient to destroy them. This must not be applied after the fruit has attained considerable size; but should be immediately after the fruit is picked. Should they be-

come bad harvest the crop as soon as possible, then spray twice per week with poisoned water. If the crop is small and the worms bad, better sacrifice the crop at once and exterminate the enemy. Powdered white hellebore dusted on the bushes when the dew is on is also an excellent and effectual insect destroyer. With good care and watchfulness the enemies will be killed out. I had almost forgot to mention black currants. Cultivate the same as other currants. The fruit is good for suet puddings, wines and cordials, and of great value in sickness. Every garden should have a few.

TO CAN CURRANTS.

Look the fruit over carefully, rejecting all injured berries. Pick from the stems, put into a kettle and let them heat slowly and stew gently for twenty or thirty minutes. Then add an equal weight of sugar. Shake occasionally to mix with fruit. Do not allow it to boil but keep as hot as possible till the sugar is dissolved. Put into cans at once and put the covers on tightly.

TO DRY CURRANTS.

Stem the currants. Take one quart of sugar for one quart of fruit. Put in a porcelain kettle a layer of fruit, then a layer of sugar. Add a very little water. When the sugar is dissolved let them boil about two minutes. Skim them from the syrup and spread on plates to dry in partly cooled oven. Boil the syrup till thickened and pour it on the currants to dry with them. Pack in jars and cover closely.

Another way is to dry in a jar, in the proportion of one pound of currants to one-half pound of sugar. Let it stand over night. Boil gently; skin off all skum; then boil ten to fifteen minutes; skim the fruit out and spread on plates to dry in the sun or by the fire, turning frequently till dry. Then place in the oven in pans, stirring often with the hand till too hot to bear. Pack in jars with sugar or put away in paper sacks or in crocks with cloth tied over the tops. Exclude light and keep in a dry place.

TO MAKE CURRANT JELLY.

Use the liquid spoken of in the first recipe for drying currants; skim it well after the currants are taken out until it becomes thick. Put away in jelly glasses and cover them.

Mr. Smith, from the committee on forestry presented the following verbal report:

REPORT ON FORESTRY.

By C. L. Smith, Minneapolis.

Mr. President:

We have not very much to report. The bill presented to the last legislature was buried with the other bills in the rush of business towards the close of the session. As a committee, during the time since then we have done but little except to investigate and compare notes.

The interest in forestry throughout the state is growing. There is a greater interest this year than there was last, or the year before. More than that, our investigation would lead us to believe that the work of forest tree planting is being carried on more intelligently each year. The demand for information upon the subject increases and the information furnished to planters is more intelligent and easier understood than in the past; and some vexed questions have been settled.

One thing I think I mentioned in my report one year ago is the fact that the craze for new foreign varieties seems to have died out, and planters are generally falling back on the native sorts; the demand for white willow cuttings has been greater during the past year than for the Russian mulberry, a hopeful indication of common sense.

One matter I wish to call particular attention to; I have investigated it carefully, on account of the opposition manifested by some to my statements, made a year ago; that is the law regarding tree claims and the distance apart that trees should be planted. I think it has worked an injury to the forestry interests of the state, from the fact that it has led people into the mistake of planting timber plantations too sparsely; getting their trees too far apart. I have visited very many successful timber plantations and quite as many more that have been failures during the last year, and I wish to say that of over one hundred successful tree plantations that I have visited every one of them were closely planted, and of those that have been perfect failures they were generally scattered plantations.

Some four years ago I investigated the tree claim of President Drake, of the Sioux City railroad, that was planted six years ago. He used perhaps eight or ten different varieties of trees

in planting the claim. The ground was simply prairie. Trees have been fairly well cultivated each year, and yet I found cottonwoods, that at the surface were as large as my wrist, only five feet high. The money that he has paid out for pruning those trees would have filled those rows with cottonwoods, standing a foot apart in the row. The expense of trimming those trees standing out by themselves, has been more than the first expense of planting would be. My conclusion is, ordinarily it is a mistake to plant trees on the prairie eight or ten feet apart, whatever variety they are; trees that are closely planted do the best, and there is the greatest success when not over four feet apart. I have been observing the condition of these plantations in prairie counties for the past six years. When trees are finally thinned out they should stand six or eight feet apart. They do better if planted close; the time saved in trimming will more than pay the entire expense of close planting.

Again, I think a great deal of money has been wasted, not as much probably during the last year, or the preceding year as in previous years, in trying foreign varieties of trees. I have heard a great many things about the value of foreign varieties of timber and their habits of growth. I was at Mr. Fuller's place. Some of the foreign cottonwoods had a remarkable growth and were promising trees; but on the whole when I come to gather together the exact facts of the history of plantations, as they are growing throughout the state, I must say that so far as actual timber now growing in our state is concerned, there is nothing in the character of the foreign trees that have been planted to justify us in putting any more money in that direction, or to warrant us in planting them in place of native varieties of trees. The ash, box elder, cottonwood, and maple seem to me far superior to any of the foreign trees we hear so much about.

I have been very suspicious of the catalpa. I must say that my experience during the past two winters and the present winter is such that I can not recommend it for general planting. That, however, is not a foreign tree, but it has lately come to the front more particularly as a timber tree for the Northwest.

Col. Stevens. I want to correct you there. The catalpa is a native of Minnesota. The first tree that I saw was found not far from here and it was larger round than that stove.

Mr. Smith. I said it was not a foreign tree, but I have noticed it was killing back. I got some seed from Northern Illinois and planted here four years ago and I must say that the results were

not flattering in the direction of the catalpa as a timber tree. A gentleman went down with me night before last to look at my trees, many of them two inches through, but they killed back on the average two inches and some of them more than three inches, although they made a growth this year of from four to eight feet.

Col. Stevens. Probably you have seen one that I have in my yard that never was killed back a bud, that blossoms every year. I have scattered large quantities of seed broadcast all over the state and especially in my neighborhood. My neighbor has one he brought from Illinois long ago that is as hardy as the oak.

Mr. Smith. Perhaps I have been a little too suspicious in recommending the catalpa. I have seen the tree referred to; and I must say it had the most magnificent show of flowers I ever saw on any lawn. I also saw trees, four years from seed that blossomed profusely last year. I had one cluster with twenty-eight flowers on it, and the tree only four years from seed; it is somewhat remarkable. But I do feel that the catalpa is a tree we can profitably invest in. We should be careful in regard to the locality from which we get our seed. I find the same thing true in regard to the black walnut.

I visited the place of H. J. Ludlow, of Worthington, a short time ago, who is very successful in growing the black walnut. I examined the trees; they are growing very rapidly and are certainly a success there. He related to me some of his experience with the black walnut and the same experience I referred to. They had not produced as hardy trees as those grown from seed procured in Minnesota. Consequently I have every reason to suppose the tree which Col. Stevens has will produce better seed than those obtained in Illinois and further south for anyone buying catalpa trees. We ought to be careful and know where seed is grown if we went to get hardy trees.

The Russian mulberry was referred to here the other day. I have never been a particular friend of the Russian mulberry and I think less and less of it every year. I spent something like a week in Cottonwood county in December last and I investigated there. And I must say though we got our start in them from that county, I found none there that would be any inducement to me to plant mulberries. Those men there who have the mulberries and who know the most about them are planting more or less cottonwoods for windbreaks, more than of mulberries. I asked one gentleman why he planted out willows for a snowbreak to the west of his tree plantation instead of mulberries and the

reasons he gave were these: First, that it was less trouble to plant and care for; second, that the willow grew much faster than the mulberry; next, that it was much more valuable for fuel, and taking all three of those into consideration, why, I must say that I agree with him in his conclusions and approve of his judgment.

Now, my idea, from all these investigations is that in planting a tree plantation on the prairies the first necessity is a snow-break, or protection of white willows; which I believe is the best or cheapest of anything that we can get. They should be planted especially to the north and west; I would rather put it clear around for a timber plantation, but certainly to the north and west, at least two rows of willows; the rows to be four feet apart, and about a foot in the row. Then leave a space beyond that which should not be planted to timber at least four rods wide, where the snow will gather and not break down the young trees.

Again, in the matter of mixing of timber. I do not believe that we can grow walnuts and evergreens as successfully as single specimens as we can when we mix them with other trees. If I were to start a timber plantation to-day on the prairie I would start with my willows on the outside, cottonwoods, maples, then walnuts, starting at the same time a nursery of small evergreens and then transplanting after the third year and mixing in the evergreens with the outside trees. The best plantations I have seen throughout the northwest were planted in that way.

One word in regard to evergreens. I must say I was surprised last summer in seeing the large quantities of young evergreens that have been planted in Minnesota during the past two years. Although we have urged through the press and from the platform and other places the planting of evergreens, I was surprised to see the large quantities of the evergreens in Minnesota in 1888, and that a much larger percentage of them had lived and grown better than in any previous year. One reason for this is that the people have learned the best way to handle them and are beginning to understand that evergreens must not be exposed to sun and wind if they would have them live. Shippers and growers are more careful in the handling and packing of their trees. There has been considerable improvement in that direction. And I would say that I think there is still further improvement to be made. One thing I want to recommend to nurserymen is, my conclusions last fall that every bundle of trees shipped to the planter ought to be properly packed with moss

around the roots, so it could be thrown into a wagon and carried around for a day or two, instead of packing the bundle without any sort of protection, putting moss and straw in the box. The farmer gets them with naked roots; frequently leaves them in his wagon over night and gives no care or protection before they are planted.

One word more in regard to matters of legislation; then I am through. I have investigated the matter of legislation, looking to the protection of timber plantations already growing in the state and just want to call attention to one thing that impressed me the other day. I came through Faribault county where more premiums are being paid by the state for timber plantations and lines of trees along the highway than in any other county in Minnesota. Now, I approve of that. I believe it is right and proper to encourage the planting of these timber plantations. I approve of the bounty that the state gives for these lines of trees and plantations. But I think it is a mistake for the state to pay bounties for the planting of timber in one county and then allow such reckless destruction of timber in an adjoining county. The farmers of the Northwest need to be protected first. A few days since I passed by a large tract of land too rough to ever be utilized for agricultural purposes. There was a second growth of maple, butternut, ash, elm and poplar growing. Most of the trees were about as large around as that stove pipe. They were a handsome timber plantation. That ought to be protected. I inquired of a man living there why this timber was not protected. He said that the original growth of timber there was very rank, mostly hard maple; a man bought it simply for the timber and cut the timber off. The land wasn't worth anything except for timber. He let it be sold for taxes, and it went back and lay for fourteen years; then by some trick he got a quitclaim from the original owner of the land, paid up a portion only of the taxes or bid it in at tax sale, securing that valuable timber for less than seven dollars per acre, went to cutting and burning again; and will probably let it revert to the state for taxes, as the original purchaser did. This is a condition of affair to be corrected by legislation.

I have talked with some of our legislators, and I believe that while we should encourage the idea of planting by every means, one of the most imperative things to be accomplished is the protection of natural timber plantations already existing, and to have such land as is not fit for agricultural purposes preserved

for timber. I do believe that some law can be framed that will meet the demands of this question; that land unfitted for agricultural purposes, natural for timber, can be put into the hands of the state, to be held there for timber purposes.

Mr. Terry. Mr. President, I have been a tree grower all my life, an amateur tree grower, and I migrated into one of the prairie counties of Southwestern Minnesota. Of course what little knowledge I had before that was of great help to me, but the most I had to learn. I do believe that the planting of trees and growing of trees on these large prairies is but in its infancy, and that the best of us know but very little about it yet. I admire much that has been said on this subject; we have had some good pointers given to us, especially to have the willow planted on the outside and leave a centre space. I always leave a pasture field between my willows and think it is of great advantage.

First of all I want to say, for the sake of the prairie, don't be too quick in discouraging the planting of the mulberry. I have them grown from Minnesota seed. I value it first as a forest tree and next for shelter, for it will turn the wind better than any willow yet grown; one mulberry will turn more than three willows, and that in our country is of great advantage. Have known them to stop a bank of snow fifteen feet high, and they never break down from the weight of snow. In the next place we need the birds. We need them for our orchards; for a thousand different reasons we need them; and there is no tree that will induce the birds quicker than the mulberry. You have to feed your birds, and the mulberry is so prodigious in its yield of fruit that I prefer it to anything but the cherry. You can feed the birds in this way without any expense. It makes a very good fruit to can or to make into pies, and it will produce large quantities. It must not be discouraged. I shall have to fight the Society if they fight the mulberry. (Laughter.) I would not advise the president to plant it in his garden, but for the Western prairie, where something is needed that is extremely hardy, it is just the thing. Out of some two hundred and thirty trees that have passed through the severest winters I have experienced for a number of years, I have the first tree yet to lose.

Mr Smith. You find them killing back more or less, don't you?

Mr. Terry. Just about as much as the hardy catalpa, of which I have hundreds of trees that have blossomed, and which is also a tree I would not discard.

Again, I believe in the willow. It makes a good screen. It makes very good fuel; but I prefer one cord of wood of mulberry to three or four cords of willow. I came here to learn and have not pretended to know much about anything so far; but as to these forestry questions I claim to know something, because I have tested different kinds of trees. We have just heard that trees ought to be mixed. I would emphasize that point. Perhaps the most of you know that as sap rises it does not make wood, but after it goes out into the leaves, receives the rays of the sun, and goes through a certain chemical change, it returns and begins to form wood. If we plant the same kind of trees side by side we get the shade from the one kind of tree. If we go into the woods we find the ash will grow in the shade of the cottonwood, but almost any other kind of tree planted under the cottonwood will not thrive. Plant ash with box elder and it will grow very rapidly, but if planted alone it will require a long time to make a tree of it. It grows well with box elder; am I right?

Mr. Smith. Yes, that is correct; they grow well together.

Mr. Terry. With regard to these premiums for timber plantations I would say it is a good thing. I wish some of you gentlemen could live awhile on these western prairies and see the value of trees. One of your former members, now deceased, did a grand work — Mr. Hodges — in getting the legislature to make liberal appropriations in the interest of forestry years ago. I think there were more trees grown then than under our friend's administration.

Mr. Barrett. I have had some considerable experience while I lived on the open prairie and have paid considerable attention to the subject of forestry. I think we ought to be very cautious about how we lay down rules. I was interested in Mr. Smith's talk; but if I were to make a choice of plans, judging from my own experience in my locality, between leaving a vacant space among the trees to catch the drifting snow year after year or leaving it open, I would prefer the latter policy. In our section of the country we have comparatively little snow.

I have a very fine timber claim ten rods wide by one hundred and sixty rods long; it is considered one of the best in that section of the country. It is open for the snow to pile in. I have reaped many advantages from it. It protected my plants even after they had broken down; they would start up again. It keeps the soil moist in summer and furnishes moisture to plants

contiguous to the tree claim. I succeeded well with my trees, owing to the policy of growing them in that form.

A word in regard to windbreaks. My friend Mr. Terry has exalted the Mulberry to a higher degree than I was willing to accord it, but I am willing to try it a little more thoroughly than I have. I want to recommend the sand cherry. That plant is generally ignored. I grow it on our grounds with fine success. It is a very beautiful plant, the leaves resembling those of the willow. If the suckers are allowed to grow they come up thick and are entirely hardy, at least on my grounds. When in blossom they look like plumes waving in the wind. The fruit is fair to eat without cooking.

Mrs. Campbell. How large is it?

Mr. Barrett. The fruit is a little larger than the black cherry, and when cooked for jellies is delicious. My wife has made some very excellent pies from the fruit of the sand cherry. It is a prolific bearer. It makes a fine windbreak and it pays to raise it. I also am trying to make use of the buffalo berry. It grows native, as I stated yesterday, along the shores of the Minnesota river. I would recommend that also for a windbreak.

Mr. Cutler. I wish to say a word in regard to setting trees close together. In grasshopper times I set some soft maples. When they were about three years old I transplanted part of them and left a good many where they were grown from the seed, where they stood pretty thick. Those left in the rows undisturbed are the nicest trees and are the most symmetrical. Soft maple is apt to split, but those left where originally sown are well formed and are a good deal taller than those that have been transplanted. I believe the best way to have good trees is to sow the seed and afterwards mulch the rows to keep the young trees moist during the summer. I have seen trees set on timber claims that were too far apart and they were generally in poor condition. I refer to some timber claims I have noticed at Hector and Bird Island. Where the trees are set close together there are some nice groves. Cottonwoods may be set some distance apart.

Mr. Harris moved that visiting delegates from adjoining states be made honorary members of the Society for five years. The motion was adopted.

Col. Stevens moved to add to the list of honorary life members of the Society, the following names, to-wit: Messrs. Dartt, Gould, Latham, Brand and Smith. The motion was adopted.

Mr. Harris presented the following list of hardy trees and shrubs for general planting, which was on motion adopted:

LIST OF NATIVE TREES AND SHRUBS.

The following list of trees is suggested as most suitable for the purposes named, on account of hardiness and adaptation:

PARKS.

Sugar maple, elm, burr oak, butternut, hackberry, linden, ash, box elder, white spruce, white pine, Scotch pine, mountain ash, tamarac.

Shrubs: Blue beech, wahoo, choke cherry, buffalo berry, thorn apple, service berry, fine bark, round leaf, cornell, red osier, dogwood, red cedar and catalpa.

LAWNS.

Elm, sugar maple, linden, American larch, white birch, yellow birch, white pine, white spruce, arbor vitæ, Kentucky coffee tree, Rocky mountain pine.

Shrubs: High bush cranberry, choke cherry, sumac, wahoo, hazel, cornell, buffalo berry.

STREETS.

Elm, sugar maple, ash, linden and hackberry.

COUNTRY ROADS.

Elm, sugar maple, ash, black walnut, hackberry, Kentucky coffee tree. For prairie regions add box elder.

SCHOOL GROUNDS.

Elm, sugar maple, ash, linden, white spruce, white pine, box elder.

CEMETERIES.

White pine, white or blue spruce, arbor vitæ, and native weeping willow.

In this connection we desire to call attention to the importance of observing Arbor day, and to the following official proclamation by Hon. Wm. R. Merriam, the governor of this state.
—[Secretary.]

ARBOR DAY.

Proclamation Appointing April 26th as the Day of Observance:

Arbor day may be considered as one of the most pleasing festivals of the year, and its observance is now so general throughout the states and territories of the Union that it has become almost national in its character. The day possesses the rare feature of being one of pleasure to those who participate in the work to which it is dedicated, and of being in far greater degree fruitful in blessings to the children, the children's children and the generations to follow. Certainly no labor can better engage the hands of the men, women and children of our state, upon a designated day, than the planting of trees, shrubs and vines to beautify the home acre, and to make the nucleus of groves similar to those that now dot the prairies of our state, and which the years will develop into forests that will charm the eye, enhance the beauty of our landscape and prove beneficial to the commonwealth.

Complying with the custom requiring the chief executive of this state to designate the day, I, William R. Merriam, governor of the State of Minnesota, do hereby name Friday, April 26th, instant, as Arbor day, and do earnestly hope that all citizens of the state, individually or as communities, and through the medium of their churches and societies, shall observe the same in manner as shall seem most fitting, enjoyable, and which shall accomplish the most for the work to which the day is set apart. It is desirable that the day be made as attractive as possible to the school children of the state, and that some features interesting to them may be made part of the exercises. It is also hoped, that so far as practicable, all commercial and industrial operations may be suspended throughout the state on this day.

Given under my hand and the great seal of the state, at the capitol, St. Paul, this third day of April in the year of our Lord one thousand eight hundred and eighty-nine and of the independence of the United States the one hundred and thirteenth.

WILLIAM R. MERRIAM,
Governor.

H. MATTSON,
Secretary of State.

The committee on award of premiums, presented their report, which was, on motion, adopted. .

AWARD OF PREMIUMS.

Your committee on award of premiums presents the following:

APPLES.

	Premium.	Amount.
Best collection Minnesota apples, S. Corp, Hammond.....	First	\$5 00
Best collection Minnesota apples, F. G. Gould, Excelsior.....	Second	3 00
Best display Wealthy, F. G. Gould, Excelsior.....	First	3 00
Best plate winter apples, F. G. Gould, Excelsior.....	First	2 00
Best plate winter apples, C. G. Patten, Charles City, Iowa.....	Second	1 00
Best plate seedlings, Mrs. W. Lee, Farihault (special).....		1 00
Best plate seedling hybrid, J. C. Kramer, La Crescent (special)..		1 00

GRAPES.

Best display native grapes, F. G. Gould, Excelsior.....	First	5 00
Best plate, A. W. Latham, Excelsior.....	First	3 00
Best plate, F. G. Gould, Excelsior.....	Second	2 00

PLANTS AND FLOWERS.

Display ornamental plants, Mendenhall Greenhouse, Minneapolis	First	5 00
Display roses, Mendenhall Greenhouse.....	First	2 00
Display geraniums, Mendenhall Greenhouse.....	First	2 00
Display begonias, Mendenhall Greenhouse.....	First	2 00
Display carnations, Mendenhall Greenhouse.....	First	2 00
Best single plant in bloom, Mendenhall Greenhouse.....	First	2 00

CUT FLOWERS.

Hand bouquet, Mendenhall Greenhouse.....	First	3 00
Floral design, Mendenhall Greenhouse.....	First	5 00

VEGETABLES.

	Premium.	Amount.
Best display, J. Allyn, Red Wing.....	First	\$5 00
Best display, H. F. Busse, Minneapolis.....	Second	3 00
Early potatoes, William Lyons, Minneapolis.....	First	2 00
Early potatoes, H. F. Busse, Minneapolis.....	Second	1 00
Winter and spring potatoes, William Lyons, Minneapolis.....	First	2 00
Winter and spring potatoes, H. F. Busse, Minneapolis.....	Second	1 00
Onions, H. F. Busse, Minneapolis.....	First	2 00
Onions, William Lyons, Minneapolis.....	Second	1 00

Turnips, H. F. Busse, Minneapolis.....	First	2 00
Turnips, William Lyons, Minneapolis.....	Second	1 00
Beets, William Lyons, Minneapolis.....	First	1 00
Beets, H. F. Busse, Minneapolis.....	Second	50
Parsnips, William Lyons, Minneapolis.....	First	2 00
Carrots, William Lyons, Minneapolis.....	First	1 00
Carrots, H. F. Busse, Minneapolis.....	Second	50
Hubbard squash, William Lyons, Minneapolis.....	First	1 00
Hubbard squash, H. F. Busse, Minneapolis.....	Second	50
Winter cabbage, H. F. Busse, Minneapolis.....	First	1 00
Winter cabbage, William Lyons, Minneapolis.....	Second	50
Winter lettuce, J. S. Gray, Minneapolis.....	First	1 00

PANTRY STORES.

Display fruit in glass jars, William Lyons, Minneapolis.....	First	5 00
Display canned fruits, William Lyons, Minneapolis.....	First	3 00
Display canned fruits, L. H. Wilcox, Hastings.....	Second	2 00
Display jellies, William Lyons, Minneapolis.....	First	2 00
Display jellies, L. H. Wilcox, Hastings.....	Second	1 00
Display pickles, William Lyons, Minneapolis.....	First	1 00
Sample comb honey, William Urie, Minneapolis.....	First	2 00
Sample comb honey, William Danforth, Red Wing.....	Second	1 00
Sample strained honey, William Danforth, Red Wing.....	First	1 00
Sample strained honey, L. H. Wilcox, Hastings.....	Second	50

WORKS OF ART.

Single fruit painting, Mrs. E. B. Webster, La Crescent.....	First	3 00
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Your committee find upon the tables twenty-nine varieties of seedling apples grown by J. S. B. Thompson, of Iowa, that are particularly noticeable for their large size, fine appearance and good condition. They are a valuable lesson for the encouragement of all who contemplate growing fruits from seeds. There is no provision made for them in the premium list. Therefore we recommend that they receive honorable mention in the report of this meeting.

Your committee desire to express their appreciation of the exceedingly fine display of plants and cut flowers made by the Mendenhall greenhouse, which has added much to the attractions of the convention.

J. T. GRIMES,
V. H. CAMPBELL,
O. F. BRAND,
Committee.

QUESTION BOX.

The following questions were read:

“What is the relative result of planting blackcap raspberries in the shade or in open ground?”

Mr. Harris. In open ground the yield is a little better, although they are peculiarly adapted to orchards and where there is a little shade. A small amount of shade is no material injury; some think it is a benefit.

Prof. Ragan. That is our experience in Indiana.

“Was there more blight than usual last year among the bearing Russian apple trees?”

Mr. Brand. I think Mr. Peterson reports more blight than usual among his Russians, especially those in bearing.

“What is the best remedy for the destruction of insects on young cabbage plants?”

Mr. Busse. Insects are most numerous after plants have been transplanted.

Mr. Smith. A kerosene emulsion is the best thing I have seen tried. The same thing may be used on the seed bed.

President Elliot. We use whale oil soap and tobacco. That is a preventive to the little black flea.

Mr. Allyn. In putting out plants in a seed bed I always caution my wife to save all the dishwater. It is the best thing I ever tried.

“Should this Society take some action toward the enactment of stringent laws for the prevention of the adulteration of food?”

Mr. Brand offered the following, which was adopted:

Resolved, That we are in favor of the immediate passage of more stringent laws for the purpose of preventing the sale in this state of adulterated articles of food.

“What was the cause of blight among red raspberries last season?”

Mr. Harris. Too much wet weather.

Mr. Cutler. In some places west of the Big Woods raspberries were badly blighted. It came on about the same time as on wheat. At that time there was wet, heavy weather a short time before the berries began to ripen. The young bushes were affected but not killed. I do not know but putting a heavy mulching between the rows had some bad effect.

“Where in this state have the Hibernian or Autumn Streak

borne sufficient fruit to entitle them to be placed on the same list with Duchess?"

Mr. Sias. I would say Mr. Sidney Corp took the first prize for the best collection at this meeting. He is among the first I knew of to grow the Autumn Streak successfully. He lives some fifteen miles north of Rochester and a mile and a half from Hammond.

Mr. Brand. How old are his trees?

Mr. Sias. They must be ten or twelve years old.

Mr. Philips. Hibernial has been in bearing on Mr. Tuttle's grounds for some ten years and is a very heavy bearer.

Mr. Brand. Does it bear any better than Talman Sweet?

Mr. Philips. Yes, it does now, because the Talman Sweets are dead, mostly.

Mr. Underwood was called upon for a song, and rendered a few stanzas of "Tim Finnegan's Wake," much to the amusement of his auditors.

The meeting then adjourned till two o'clock P. M.

AFTERNOON SESSION.

FRIDAY, JAN. 18, 1889.

The meeting was called to order at two o'clock by President Elliot.

Col. Stevens moved that the committee on seedling fruits be continued for another year. The motion was adopted.

Mr. Sias moved the following persons be named to revise the premium list for the horticultural department at the state fair, to-wit: Wyman Elliot, chairman, J. T. Grimes, J. S. Harris, F. G. Gould, E. Nagel.

The motion was adopted.

Reports were called for from experimental stations.

CENTRAL EXPERIMENT STATION.

Report of Prof. Edward D. Porter, Supt., St. Anthony Park.

Mr. President and Gentlemen:

I wish to make a few remarks as introductory to the report of our central station. As you are aware it has largely devolved upon me heretofore to look after its general supervision, but during the past year there has been a division of the work, and the horticultural department has been placed under the supervision of Prof. Green, who is prepared to make a written report at this time. Our plan of work has been thoroughly re-organized, but as most of you are no doubt familiar with it, I need not refer to it at length. As you are aware we have been engaged during the past year in putting up our buildings, getting each department under its proper manager and getting them familiarized with the work to be undertaken and carried forward.

We have issued thus far five bulletins, giving the details of organization and the results of experiments conducted at the station. We are now fully equipped for the conducting of the various lines of horticultural experimentation, as well as the work in other departments. We are at your service and shall be most happy to receive suggestions from those interested in experimental work, or from any who can render us valuable assistance. I am very sorry to note the apparent lack of interest manifested on the part of the farmers of Minnesota in this matter. I have received but two suggestions within the past twelve months from farmers; and I don't know but that may be two too many!

Now, gentlemen, this station having been thus so thoroughly organized and equipped, it is to-day the best station in the United States. We have been working with this object in view from the start, and we are so situated now that we don't turn our hands over for any other station anywhere else in the Union. And yet this station will be just what you make it in the future, and what the farmers of Minnesota make it. They can make it a grand success, or they can make it a signal failure. If you are going to set on your nests expecting somebody is going to fill them, it is going to be a failure. But if farmers will put their

shoulders to the work we can make the station invaluable to every department of agriculture.

As an illustration as to the want of help and co-operation, the subject of frosted wheat is one of vital importance to at least one-half the people of Minnesota. The great wheat interests of the state have met with a terrible check by the effects of frost and rust. Thinking it was necessary to get reliable information on this subject I published an article in *Farm, Stock and Home* stating some facts in regard to it, asking farmers to send us samples for analysis and experiment. Now, gentlemen, I waited until the last week in December and I got responses from three men, and out of the great wheat belt of Minnesota I got four samples of frosted wheat. That is a specimen of the interest farmers seem to take in this work. The only way to get the samples was to send Dr. Lugger right up along the different lines of railway where the greatest injury was reported, to let him go right out among the farmers, gather the samples and bring them down to us. Now, that is not the kind of help we are looking for among the agriculturists and horticulturists of Minnesota. Will you not take hold now and help us? As I say, the station will be a success, or a failure, in proportion as it meets with encouragement at your hands.

Mr. Pearse. I want to say that I have just been to the farm and have examined every department, including the new agricultural school; have been through from cellar to garret. I have examined every department of the work. Gentlemen, I will tell you right here that if there was capacity in the building there would be no difficulty in getting three hundred students in the school. I have never seen a more desirable place for a farmer's boy to obtain an education and get such information as properly pertains to his calling. Every department of agriculture is thoroughly treated; mechanical education is also conducted. It is necessary for farmers to understand the handling of tools. I was gratified in finding such perfect system in each department, and to find the boys there so entirely satisfied and pleased with the instruction they are receiving.

Mr. Grimes. I was over the farm last summer and examined the buildings. I was there again to-day, and I was very much pleased with what I saw. We were in the school room and everything seemed to be going on nicely. The superintendent showed us through the different rooms, and everything was in complete order. At the greenhouses we saw the plants, the

samples of frosted wheat that had been placed under test, foreign grains that were being tested, etc. We visited the workshop where we found the boys engaged in making different articles necessary upon a farm. It was evident the school was being conducted in a manner to make the instruction for the farmer's son as complete as possible.

Mr. Reeves said he had supposed on going to the station he would find an institution that was just getting into working order. He had understood the new school building had just been erected, and supposed it was still incomplete. He had been surprised to find everything there in such fine working order, and it was the most complete institution of the kind in the country. Everything in the school room, workshop, greenhouse, etc., was in good working order. At the barn he had been interested in examining the silo and samples of food taken therefrom as well as the foods used in experimental feeding. This "sauer kraut," as one of the professors called it, was fed to the cattle, but it was not as sour as he had supposed. It was preserved in this way and was very palatable to the live stock.

The following report was made by Prof. Green:

CENTRAL EXPERIMENT STATION.

Report of Prof. Samuel B. Green, St. Anthony Park.

Members of the Minnesota Horticultural Society, Ladies and Gentlemen:

I will not take your time to more than suggest some of the lines of work which have been undertaken and have occupied the time of my division of the experiment station the past season. A full and detailed account of the work accomplished during the eight months I have been in charge will be found in the report of the university experiment station for the year about to close.

The season as a whole has been favorable to plant growth here, although so much damage has resulted from early frosts in the northern portions of our state. We have been somewhat troubled with excessive rains but the work generally speaking has been satisfactory. I have labored under the disadvantages

which a new man always experiences, no matter how well qualified he may be for his position, in not being familiar with my surroundings and the people with whom I have come in contact. But right here, and before I go on with my report, I want to thank you for the uniform courtesy and kindness with which I have been received by the officers and members of this Society. I feel that from this enthusiastic and intelligent support that Minnesota horticulture receives at your hands, that it is right to look for a great advance of its interests in the near future, and that it will not be long before many of the problems now exciting your attention will be solved. Please remember that at all times you have my heartiest desire to co-operate with you in advancing the interests of horticulture in this state.

The work of the horticultural division has from necessity been largely preparatory during the past season. My report covers a period of nearly nine months, from the tenth of April, when I took charge of the department, to the end of the calendar year.

I found the department in as good condition as could be expected, when is remembered the disadvantages under which Prof. Porter labored in being obliged to divide his time between so many kinds of and so much labor, and I am indebted to him for laying a foundation from which I was able at once to obtain some conclusions of benefit to the horticultural community.

The horticultural department, it may be said, was created but last spring, for then it was that an allotment of land for its exclusive purpose was made and it has required the whole past season, practically, to arrange for carrying on the future experiment work of the department. I look upon the past season's work as the beginning of experiments which will prove more beneficial as the needs and wishes of the horticulturists of the state become better known and the work of the station more perfect. In some lines the work has not been nearly so complete as I had intended from lack of time or facilities for carrying on the same.

The lines of work proposed for the year and the future will be found in bulletin No. 3, which is included in my complete report.

RUSSIAN FRUITS.

Among the lines of work which should have special mention are our Russian apples and other Russian fruits.

The Russian apples have made an excellent growth and ripened their wood perfectly. The report in bulletin No. 3 gives their hardiness during the winter of 1887-1888, and the results therein stated have been justified by the season's growth. There has been no dying back of the branches after they had partially leaved out as has happened some past seasons, but there has been a strong, firm and healthy growth the season through. The number of trees planted out permanently has been greatly increased by planting trees between the rows in the orchard. It is my intention to use these extra trees between the rows for filling up any vacancies which may occur in the original plantation. Thus the number of Russian apple trees on trial on the station lands is about 1,300, which number includes two hundred and sixty varieties.

The original Russian orchard was planted out in a very exposed position on rich soil four years ago last spring. They have therefore as yet produced no fruit at all, and our observations have necessarily been confined to noting their hardiness and freedom from disease.

I wish it was within my power to give a more decided and conclusive report on the Russian apple tree question, but it is not and I do not believe that the subject would be improved by my drawing inferences from conclusive results obtained in other quarters. There is in fact no short cut through the task of learning all the merits of an apple tree. We must give it a careful trial and abide the results. The trial of an apple tree from one section requires almost as much time in another as the trial of a seedling. Those who like to boom a variety of apple or anything else upon a short trial seldom fully consider or care about the disappointment they may occasion or the real set back they may cause the subject of fruit culture. I believe there is much to hope for from our Russian apples and that many of them will be found adapted to the wants of Minnesota. But until we can have them fruit and grow freely on the station lands I shall not draw final conclusions but shall confine myself to issuing occasional bulletins upon their hardiness and their freedom from disease. In fact I shall confine myself to "results" from the station work in this as in all other matters.

The following are the most promising varieties in our Russian Orchard:

Green Streaked,	Klenvskoe,	Green Glass,
Pointed Pipka,	Romenskoe,	Voronesh Reinette,
Arcad,	Koursk Anis,	Pear,
Red Pipka,	Aport Orient,	109 Vor,
Keiv Reinette,	Wine Rubets,	Yellow Calville,
Blushed Calville.		

The Russian pear, Bessemianka and Waxen, which stood the winter of 1887, with little, if any, winter killing, have made a most magnificent growth and are evidently fully as hardy as the Russian apples. The growth in 1887 was much of it three feet long, and yet was but very little injured by the past winter, only something like two inches of the new growth being killed back. The foliage was thick and remained bright all the summer. I am in hopes of getting some fruit from them next year as there are some fruit spurs well developed.

I have lately made preparation to plant out a large assortment of Russian pears and also an orchard of Russian cherries and plums the coming season.

RUSSIAN WILLOWS AND POPLARS.

These are mostly of promising value for economical purposes. They have been free from diseases thus far, and are very free growing and hardy. Most of them strike readily from hard and soft wood cuttings. In my report will be found a table showing the growth they made the past season from cuttings.

Populus certinensis is a very rapid, strong, erect grower, and I think will become a favorite for windbreaks. In our nursery it has made a stocky growth of nine feet in two years from the cutting and has been perfectly healthy and hardy. This tree is very highly esteemed in Russia for its wood, and as an ornamental tree.

Salix Laurelifolia is a very handsome willow. It is hardy and a free grower, with leaves which are thick, broad, and of a very rich, dark green color. I consider it one of the most desirable of willows for ornamental planting or for windbreaks. Its bright leaves are very pretty and in striking contrast to the foliage of most trees.

DISTRIBUTION OF TREES, ETC.

Last spring we distributed nearly one hundred and fifty packages of nursery stock, consisting of an assortment of Russian apples, willows and poplars and grape vines. In all amounting to about 5,000 plants. These were distributed over a wide range of territory in this state. So far as heard from the packages have been favorably received and cared for. I anticipate that much will be accomplished by thus sending broadcast over the state so much material likely to be of value.

These packages were only sent to reliable parties who it is believed will care for them properly and will report the results to the station. The reports from these packages must form reliable data, when considered as a whole, on which to base conclusive reports.

I hope ere long to have the station nursery in such a condition that without going into a nursery business of sufficient dimensions to interfere with the business of the regular nurserymen of the state, we may be able to offer for sale, in limited quantities, novelties in the line of trees and fruits of special merit at low prices. We have now on hand quite a collection of grape vines, Russian willows and poplars and apples propagated this season which will be distributed the coming spring.

TESTING OF SEED AND PLANT NOVELTIES.

I consider that an important work may be done and that the horticultural department may serve as a salutary check in trying any novelties in the line of seeds and plants and also in testing the germinating power of seeds.

When a seedsman or nurseryman offers in his catalogue seeds or plants which he says possess all the merits possible for given seeds or plants to have and then asks a high and often excessive price for them, he should be made to feel, if he does not, that his reputation is at stake and that he has taken money and must give a fair value for it, or he has deliberately swindled his customer. There is a growing feeling in the agricultural community that the state should exercise some control in the matter and that the importance of the subject demands as much an inspector as does the fertilizer business in the older states, or the dairy business in our own state. A check of this sort, if exercised circumspcctly, would be advocated by all honest, reliable seedsmen

as a means of ridding the business of dishonest, unreliable concerns, and of putting extravagant representations at a discount.

NATIVE PLUMS.

This is the representative fruit of the great northwest. Perhaps no other fruit is so perfectly adapted to the conditions of this climate. It varies greatly in its native state, and is susceptible of much improvement under cultivation, and undoubtedly some hybrids between it and some of the larger and finer but more tender plums will give us varieties much surpassing anything we now have in quality, while of sufficient hardiness to withstand our climate.

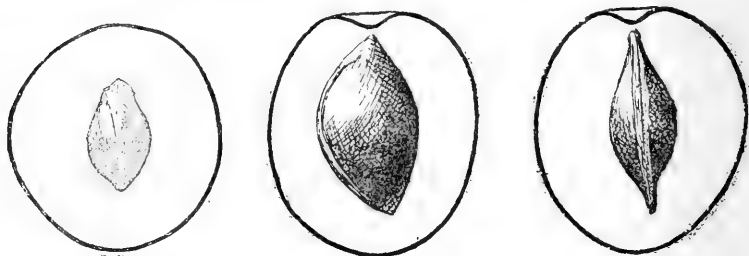
Forest Garden.—First ripe fruit, September 14th. Size $1\frac{1}{2}$ inch in diameter, nearly globular. Color, orange yellow skin, more than



Figures showing three different sections through the fruit and stone of the Forest Garden Plum. End view. Side view. Edge view. Natural size.

half covered with a red cheek, spotted with brown and yellow. Suture slight or none at all. Cavity deep. Skin acerb. Flesh sweet and pleasant, much marked by the curculio. Stem $\frac{3}{4}$ to 1 inch long. Tree rather spreading in habit.

Weaver.—First ripe fruit September 25th. Form oblong ovate. Diameter from apex to base $1\frac{1}{2}$ inches. Short diameter $1\frac{1}{4}$



Figures showing three different sections through the fruit and stone of the Weaver Plum. End view. Side view. Edge view. Natural size.

inches. Well marked suture from cavity to apex. Cavity moderately deep. Side with suture projects much more than any other. Stem 1 inch long. Color nearly to entirely red. The color deepest in many spots. Shaded red with yellow cheek, the cheek spotted with red. Flesh yellow, separates easily from the stone. Mild in flavor, and often lacking in sprightliness, but a good eating plum and nearly free from the bitter acerb skin so characteristic of our native species. Stone one-sided, projecting mostly on side next to suture. Three-fourths to 1 inch long and from $\frac{1}{2}$ to $\frac{3}{8}$ inch wide. Pointed at each end. Its thickest place is at a point a little removed from the centre and towards the stem. Tree spreading. Tree planted in 1886. First crop of fruit.

DeSoto.—First ripe fruit September 30th. Color red, with thin light bloom. Nearly round. One inch in diameter. Stone oblong,



Figures showing three different sections through the fruit and stone of the De Soto Plum. End view. Side view. Edge view. Natural size.

fattish ovate. Suture somewhat indistinct. Cavity deep. Stem 1 inch long. Flesh yellowish. Fair flavor and pleasant. Rather sprightly. Skin a little acerb. Tree rather upright in form. Tree planted in 1886. First crop of fruit.

CURCULIO PROOF PLUMS.

Much has been said and is being said about curculio proof plums, and there are many varieties being offered with this recommendation. It should be clearly understood by all growers that there is no plum that is curculio proof in the sense in which the expression is generally used — *i. e.*, that they are not liable to the attack of the curculio. Plums, so far as our observations go, are nearly equally subjected to the attacks of this insect, and a careful examination of almost any lot of our native plums will reveal its mark on many of them, there often being as many as five on a single specimen. I found it difficult this summer to select

sufficient fruit from a bushel of native plums, which were free from the little crescent mark in the skin, to fill a quart jar.

It is from this crescent-shaped mark which the insect makes in the skin of the plum, when it cuts through to lay its eggs in the fleshy tissue, that it takes the name of "Little Turk."

Our native varieties, from the fact that they are vigorous and grow very rapidly are able to either drown out or to squeeze to death any egg that may be laid in the tissue during its most rapid growth, so that but very few of the eggs come to maturity in this plum, and while they are not curculio proof, yet they have the property of killing the eggs and preventing the destructive results which come when they have full freedom to hatch and mature, as when they are laid in varieties of European origin.

Nevertheless, our native plums are much injured by this curculio, which is the cause of the many little hard blemishes in the skin. Also there are a few eggs of the curculio which grow each year in this plum, and they are those which are laid after the plum has somewhat lessened its growth.

VEGETABLES.

As it was quite impracticable to do much in the way of increasing our experiment work in the small fruit line other than by planting out and preparing for results which it will require more than one season to finish, I decided to go largely into the testing of most of the standard as well as novelties in vegetables. My reason for planting the standard vegetables was that the data thus obtained would serve to some extent as a basis for the comparison of future results obtained from a trial of novelties.

The work has been well and carefully carried out and many of the results are interesting. Some of the reports of varieties are not so complete in giving the marketing qualities as I wished. But I hope to add these features another year.

VINEYARD.

The new vineyard which was planted out in the spring of 1887, has made a vigorous, healthy growth. The only sign of disease in it occurred in August when I noticed the first appearance of downy mildew (*poronospora viticola*) on the leaves. This disease was of short duration and caused but little hindrance to the ripening of the wood. A trellis has been erected in this vineyard this fall to take the place of stakes which have been

used the past two seasons. The vines have been carefully pruned and laid down and are in excellent condition to commence our contemplated work with them in the future; this I intend shall consist in trying different methods of pruning, besides testing the many new varieties which are in it. The growth of vines in the older vineyard has been excellent, but the fruit, which was late in setting, did not ripen well on account of the cold season, and the downy mildew will be referred to in detail in my complete report.

GREENHOUSE.

There has been a new greenhouse erected on the station lands which will probably be sufficient for the work of the station for many years to come, unless it should be considered best to maintain a conservatory or to greatly enlarge the commercial feature of the department. These houses are well situated and conveniently and compactly arranged, and are exceedingly well adapted to the business of the department. A more extended description will be found in my report.

ARBORETUM.

I hope the coming season an appropriation will be made for the purchase of desirable material for an arboretum at the station. We have already some material growing in the nursery, suitable for this purpose but it must be largely increased, in order to have it embrace a fair proportion of the desirable trees, shrubs and herbaceous plants which are adapted to the climate of this state. It is very desirable that the work be commenced at once as many of the trees and shrubs must be obtained of small size and will need nursery treatment before being planted out permanently. Such plantation well and tastefully laid out along permanent drives, with all the plants easily accessible, and each plainly marked with its common and scientific names would prove especially ornamental, and materially aid in the instruction of our pupils, besides being of much interest to visitors. It would also be of much interest in determining the relative value of plants for forestry and ornamental purposes in this state. In the laying out of drives about the farm they should be made of sufficient width to allow of the carrying out of this plan of a border on each side.

EXPERIMENT STATION AT LA CRESCENT.

By J. S. Harris, Superintendent.

Mr. President and Gentlemen of the State Horticultural Society:

Like the most of the parties you have designated as managers of experimental stations, I am not a commercial nurseryman and therefore my opportunities for securing trees and plants for the purpose of testing them are somewhat limited; but my judgment of the merit of varieties I do place on trial would not naturally be warped in their favor through consideration of the amount of money that can be made out of them. One of the prime reasons that has prompted me to advocate the establishment of these stations was that when any variety of fruit had been sufficiently tested in these stations to warrant its general planting and cultivation its merits would be very generally known to the public and it would be practically out of the power of any one individual to get possession of the entire stock and make a fortune out of its sales.

Most of the individuals managing these stations are laboring under serious difficulties and perhaps the greatest is that they are not financially able to devote their whole time and attention to a work the results of which are so doubtful and the money value of which is so uncertain. While I am prepared to test the quality, adaptability and hardiness for my location of every new seedling and unknown variety that comes up I find it very difficult and sometimes expensive to get hold of them.

I have desired to make a specialty of the collecting, testing and improvement of the native plum, and to this end have repeatedly through the *Farm, Stock and Home* requested parties having or knowing of varieties of merit to send me rooted sprouts or scions and as far as possible samples of the fruit, or at least to notify me where they might be found, but have not thus far realized my expectations. As the plum very generally failed to fruit last season in most localities it was an unfavorable year for the work.

Among the varieties I have had under cultivation long enough to get into bearing last year, the Dakota fruited best, probably because it came into blossom two or three days later than most other varieties. I have added to my list of varieties during the year one variety from Blue Earth county, two from Houston

county, one or two from Brown's Valley, and two from Carver county I have received for planting next spring ten varieties from Springfield, Brown county.

None of the Russian varieties of apples I have on trial received any visible injury from the winter of 1887-8. Trees of the Red and Yellow Anis fruited for the first time. The trees were not so large as the Duchess, about a month later in season, and of rather better quality. Among the varieties received from the Iowa State Experimental Station, the Antonovka and Ostro-koff still appear to be the most promising.

Plants of the buffalo berry and sand cherry were received from Bismarck, Dak., and will be given a careful test. We have put in a few buds of Klein's seedling, of Houston county; also seeds of same and buds of the Daisy, a promising seedling originated by H. J. Ludlow, of Nobles county.

We believe that good results will be attained through the working of our experimental stations, and that they will prove valuable auxiliaries to the endowed stations at St. Paul and Owatonna, but we think it would prove a stimulus to more thorough work if a small proportion of the funds provided through the Hatch bill were judiciously expended upon them and they were placed under the oversight of a general superintendent.

EXPERIMENT STATION AT MINNESOTA CITY.

By O. M. Lord, Superintendent.

The season has been favorable for small fruit. The Jessie strawberry fruited for the first time here and answered all expectations, being very fine in growth, quality and quantity.

The Manchester, Crescent and Downer's Prolific also did well. Of numerous other kinds nothing special can be said. No attempts have been made to test different varieties of currants. The common Red Dutch has given good satisfaction.

GRAPES.

Moore's Early and Worden, and a few vines of Concord and Delaware ripened; other kinds were injured by the frost.

RED RASPBERRIES.

Another year's trial has shown the Turner and Cuthbert to be better adapted to this vicinity than any others.

Of the blackcaps the Gregg had a very rank growth of canes, which appeared early in the spring to have been winter killed, and were cut back to two and a half feet without expecting much fruit, but they bore a large crop and very fine quality.

The Gregg has not before last winter been much injured, but the precaution was taken last fall to cover them, a much less difficult work than it was supposed to be.

BLACKBERRIES.

The Ancient Briton yielded best and a good many were picked two weeks after the Snyders were gone. The Snyder bore finely and was a good crop; Stone's Hardy also did well. It has generally been said to ripen between Snyder and Briton, but here it ripened before the Snyder. Between Snyder and Stone's Hardy there is very little difference in yield and quality. In habit of growth the Hardy has a shorter, stouter cane.

DEWBERRIES.

The Lucretia bore some very large, fine fruit; but there were many imperfect berries. The Windom made a good growth of plant but did not fruit.

PLUMS.

Rollingstone and DeSoto bore a little fruit, but no other kinds had any, though all the trees blossomed very full. Several plum trees were received for testing and have made good growth.

APPLE TREES.

No apple trees bore fruit except a few Duchess and Wealthy. Some Russian trees were received from C. G. Patten, of Charles City, Iowa, and some from A. W. Sias, of Rochester, which have made a good growth.

These experiment stations, as at present organized, can not be expected to accomplish a great work, until some method can be devised to provide samples for testing, without personal expense. There is too much uncertainty of results to justify the outlay of money by those who are willing to do the work.

It was understood that a distribution would be made by the state station, as soon as possible, among the stations appointed by the Horticultural Society, but there is probably no requirement of that kind. Or, is a formal application for trees or plants necessary, to obtain them? At the best these stations are struggling along in a limited way compared with the horticultural interests of the state.

REPORT FROM WINONA COUNTY.

By O. M. Lord, Minnesota City.

There is from this vicinity no encouraging report to be made upon apples. The market was bare of all kinds except Duchess and crab apples, and these were grown upon the high lands, away from the river or upon the prairie. The market was however well supplied with these at fifty cents per bushel.

Strawberries, currants, raspberries and blackberries all yielded fairly, and in addition to the local demand, a good business was done in shipping. A large part of the grapes were injured by the early frost, but Moore's Early, Worden and some others ripened and were marketable. Comparatively no plums were produced especially in the valleys or on low grounds. There was, however, a middling crop in the western part of this county.

Increased attention is being given to the small fruits, especially raspberries and blackberries, as they were found to be quite profitable last year.

It was said that the Wisconsin growers, who have usually shipped large quantities in here, found a better market eastward.

REPORT FROM WASHINGTON COUNTY.

By M. C. Bunnell, Newport.

Mr. President and Members of the State Horticultural Society:

I have deferred writing my report until the opening of our annual meeting, consequently have not entered very minutely into details.

As to the progress of growing fruits in the counties of Washington, Ramsey and Dakota, adjacent to St. Paul that I have been over more or less within the past year, I find many that tell the same old story, that there is no use planting standard apples in Minnesota; that it is a failure. Perhaps we might attribute the failure partially to the care and management of trees after they are planted. The careful planter may lose some trees, still if he is judicious in selecting good hardy kinds, and buys them from responsible parties, he is usually amply rewarded for his time and expense. It is true we have had severe winters in the past that have injured both Duchess and Wealthy — more particularly the latter — but I find in certain locations in Washington and Dakota counties, on clay soil the Duchess bore quite bountifully. Peter Gillen, of Woodbury, Washington county, is a man who takes an interest in raising apples, and I hear he raised one hundred bushels of Duchess. His location is on a piece of ground perhaps a little rolling; clay soil. He plants carefully and takes care of his trees after he plants them. His neighbors seem to think he has the favorite spot for raising apples in Woodbury. Whenever any of his trees die he replaces them with young trees, which of course is the right way to do, to make success of orchard growing. He is now trying some of the Russians.

The winter four years ago killed a good many Wealthies; and the young trees planted since have not come into bearing much, yet I think the time is not far distant in Minnesota when Wealthies will be picked from the trees in abundance and stored away in our cellars. I notice a good many are still anxious to try it again (replant).

Minnesota, being far from any large bodies of water, has a dry temperature through the winter (as a rule), consequently is not so well adapted for apple growing as in states bordering on large bodies of water, where there is more moisture; but I am satisfied in my own mind that if the purchaser informs himself as to the best varieties for Minnesota and is not led away by some oily tongued agent who has a particular variety that he makes a hobby of because he can get a good price for it while he knows nothing about it; I say if he will buy from good authorized agents that represent good companies, plant his trees in a good location where he can get a northern slope with clay soil if possible, digs good sized holes, plants carefully and mulches well, keeps stock away, for no one

need expect to gather fruit in a cow-pasture, I think he will meet with success; so much so that he will be encouraged to re-plant whenever any of his trees die and so have fruit coming on every year.

My motto is to give the standard apple a slow steady growth that the wood may ripen up well in the fall before our hard winters set in. I think it a good plan to wash the bodies of trees with strong soap suds or weak lye. Some use whitewash. The Whitney is coming into favor more with the farmers as they plant it and see how handsome a grower it is and how well it stands Minnesota winters. I take notice, however bad the Transcendent has blighted in years gone by, that the market gardeners will order them in preference to any other crab for general use. The demand seems to be greater for them in the St. Paul market. The prices per bushel for the season of 1888 was seventy-five cents to a dollar and a quarter. Hyslops sell quite well for sweet pickles. Early Strawberry and Orange should not be left out when one is making a selection for an orchard.

I recommend those planting apples to try some of the new Russian varieties. What we need is a late keeper.

For a variety of plums I would plant De Soto, Weaver and Forest Garden. I hear that Bassett's American plum is recommended, but from practical knowledge can not say as to its merits. Plant plums in groups, as they bear much better.

The season for grapes was unfavorable, many varieties not ripening. I find that the fruit growers in Minnesota have considerable faith in grape culture. For planting I would select Concord, Delaware, Brighton, Rogers No. 4, 15 and 39.

Currants were a very fair crop, and sold from one dollar and fifty cents to two dollars and fifty cents per bushel.

Strawberries were an average crop, prices ranging from five to fifteen cents per quart.

Raspberry culture pays pretty well, planting for the blackcaps Mammoth Cluster and Gregg; reds, Turner, Cuthbert and Brandywine. Prices ranged from twelve to twenty-five cents per quart. More attention is being paid to the raising of blackberries, Ancient Britons and Stone's Hardy being the leading varieties.

I see no reason why anyone that owns a home in Minnesota can not supply his family table every year with some of the hardy fruits, and make it inviting to all lovers of horticulture.

REPORT FROM CHIPPEWA COUNTY.

By O. E. Saunders, Granite Falls.

The past season has been upon the whole quite favorable to fruit culture. Wild fruits were not plentiful, but cultivated ones did exceedingly well, in fact all the small fruits being a grand success.

Our town is well supplied with strawberries, and it appears that consumption increases with the supply. Some attention is given to raspberry culture. The red varieties succeed finely, but in some localities the blackcaps blight so badly as to make the crop a complete failure. I have not been able to raise a crop of these yet.

Grapes are proving a success, although the vines have been in bearing only a few years. The vines received from Prof. Porter in spring of 1887 are doing splendidly. Mr. Register took some of those sent me and placed them in a very favorable location, and this season they bore quite a crop of fruit. Mine have not yet fruited, but are making very satisfactory growth. Have made a large number of cuttings from them this fall.

Blight has been particularly severe on apple trees for two years past. Nearly all of mine have succumbed. So poor success has been attained in this line, that comparatively little effort is being made to succeed at present.

Of one thing we are assured, that it is a very easy matter to raise the small fruits, and no farmer need fail of having his table well supplied with these delicacies. My health has been so poor for a few years that I have done very little in horticulture, but with return of health I hope to increase my labors in this direction.

My best wishes for the success of the State Society.

REPORT FROM NICOLLET COUNTY.

By C. F. Brown, St. Peter.

S. D. Hillman, Secretary, etc.,

DEAR SIR: The report on fruit for 1888 for this locality is a brief one, as the crop, generally speaking, was decidedly so. Strawberries were a fair crop and of good quality. Raspberries were not satisfactory; probably the severe winter injured the vines. Currants were not in the market in any quantities, as very few were raised. Apples, the least number offered in the market for the past ten years; even the Transcendents did not do well. Plum trees blossomed very full but produced no fruit, either from the late spring frosts, or a cold rain which occurred while in full bloom. Grapes were overtaken by the early fall frosts, and the fruit in the market was unripe; the crop was a large one and would have been nice but for the frost. Bananas made a good growth but produced no fruit; they are not quite hardy enough to stand the winters without protection; therefore, are placed in the cellar in the winter.

REPORT FROM OLMSTED COUNTY.

By William Somerville, Viola.

Mr. President and Gentlemen of the State Horticultural Society:

In consequence of sickness in my family I can not be with you at this session of your Society, and for the same reason I was unable to meet with our horticultural friends at Rochester to give my experience in raising apples in Minnesota.

I believe I have paid out as much money for trees and have raised as many apples as any farmer in this state. As I came from a fruit-growing state I resolved when I came here to raise at least apples (I hold them to be the king of fruit) or to leave the state. So I set out twenty-five trees, purchased of A. W. Sias, who then represented a Rochester (N. Y.) nursery. They were the Talman Sweeting, Golden Russet, Fameuse and a number of other varieties. They bore fruit for fifteen or sixteen years.

In 1862 I gave Mr. Sias another order for two hundred trees including fifty Duchess. They were yearlings and small at that. Those Duchess are all living yet and are large, fine trees, bearing annually from two to six barrels each.

Since 1865 there has not been a year but I have raised more or less apples, and have planted out some trees almost every year since. For a number of years I have raised from one to five hundred bushels, but the last crop was the largest I have ever raised, as I had quite a number of new Russian varieties just coming into bearing.

As nearly all my old varieties had been killed off with hard winters previous to 1876, Mr. Sias and myself hoping to get something hardier, got "seedlings on the brain." We hunted up the best in the country and got scions from them and raised little trees and thought we had struck a bonanza. We used no scions that the parent tree had not stood the winters for from twelve to sixteen years. Among this number was the Wealthy.

In the spring of 1878 I planted out nearly 1,000 of those seedlings and top-worked a good many more on Transcendent stocks. They are nearly all dead now.

The same spring I planted out forty Russian varieties raised from scions sent from the Agricultural Department at Washington to Mr. Sias. These trees are perfectly sound and hardy and have been bearing fruit for five years of as good a quality as any of the eastern fruit.

They are summer and autumn varieties. This proves to me conclusively that the Duchess, Tetofsky and the New Russian varieties are the only standard apples that farmers can depend upon for an orchard. I think I can convince any man that these statements are facts if they will take a walk with me in my orchard.

We must have trees acclimated to this cold climate, and as the Russians have been raised successfully for generations in a climate similar to our own, they are surely the best and safest for us to plant.

Observation has taught us that mercury can run as low as forty and even below and injure our trees but little if it only remains there for two or three days, which fact we had demonstrated very clearly last winter; but when it runs down as low as thirty and remains for two or three weeks with a northwest wind is when we need trees that for generations have been used to such exposure.

I think any person who attended the state fair last fall could not help being convinced that there are as nice apples raised in Minnesota and Wisconsin as are generally exhibited at any of the fairs in the eastern states.

I would not discourage the raising of seedlings. I believe it should be encouraged by state aid and be conducted at the experimental stations. The tendency with seedlings is to retrograde, and it may take as long a time to get them acclimated to the drying winds of Minnesota as it did to make the change from China to Russia.

Experience has taught us that one generation will not do it and as life is so short we naturally want to plant trees that there is some certainty of raising fruit from. Most of the nurserymen have them in stock—then let us start in by getting the right kind of trees and raised in Minnesota if possible and from a responsible nurseryman, and I am sure we will meet with success.

When we look back over the past twenty-four years, we see that our advancement has been slow except in hybrids, though I think when we get those new Russians reduced to twenty-five or thirty varieties, to include summer, autumn and winter, we shall have such fruit in Minnesota as we have been seeking after for these many years. Let me say again, that I would encourage the raising of seedlings, and in time they may succeed, but it is too long for farmers to wait. We want apples now, and with the experience nurserymen have already had with these new varieties they should be able to recommend to the farmer what he wants.

LOCATION.

Now, as we have the trees, next is location. A northern slope is generally recommended, though I believe there is more in the trees than there is in the location. A clay subsoil is desirable. There is an orchard in this vicinity that is on a very abrupt southern slope, so much so as to nearly protect it from the north and west winds, besides being surrounded with evergreens—that of Mr. Frank Whiton. He raises more tender varieties than we do on a northern slope. So it is my opinion that this matter of location is a mere excuse for nurserymen when they sell a lot of trees to a farmer and most of them die. When he complains they say your location is a poor one. So much for location.

CULTIVATION.

As to mode of plowing and cultivating orchard trees: Set them out sixteen feet apart each way. I find that to be ample room. I have forty-nine Duchess in a square, seven trees each way, planted in the spring of 1863. They are now quite large trees, yet there is ample room. By being planted close the wind strikes the first row and rises, and does not have force enough to shake the fruit off the inner rows. In this way they protect each other.

In setting trees I dig the holes deep and wide enough to receive the roots spread out to their full length; then, after filling, in some surface soil in the bottom of the hole, set the tree in; if the ground is dry, turn some water into the hole. Have the tree four inches deeper than it was in the nursery row, lean the tree to the southwest so as to stand at an angle of about sixty-seven degrees, with the largest branches in the same direction, then put in some more surface soil and more water; lift the tree up and down a few times so the water can freshen the fibrous roots; then with dry dirt finish filling the hole and tramp in solid with the foot. In this way if there is any life in the tree it will grow. Two-year-old trees are preferable if not stunted.

By being inclined toward the southwest the sun has not the same chance to start the sap on that side of the tree in the early spring, and freeze and loosen the bark as when the tree stands perpendicular.

As the prevailing winds here in the summer are from the southwest, trees planted in this way generally straighten up and frequently are turned the other way. This has been my method of planting trees for a good many years, and I believe I have had as good success as anyone.

I cultivate the trees three years with a shovel plow, but never later than the first of July. To cultivate later keeps the wood from ripening for winter. Keep the grass from around the trees so the mice will not make nests around their roots and girdle them. If this is neglected when the first snow comes, tramp it around the trees and the mice will not trouble them.

After cultivating for three summers, mulch well as soon as the ground freezes in the fall. Seed to timothy and clover the next spring, and when it gets a good start, turn the hogs in to keep away the grubs and bugs.

Mulch each year with litter from the cowyard,—keep the

trunk smoothly trimmed to four feet high; there form the head. Leave all the limbs on the southwest side you can that will not interfere with each other; then what pruning is done after that should be done on the northeast side as the heaviest foliage always grows there. In heading trees we frequently have to form them from two or three leading branches, and there is danger of them splitting apart when they become large trees.

Some of mine were so badly split that I had to keep them tied together with ropes. To prevent this now, I cut scions, bevel both ends, and with the point of my knife make an incision in the bark and ingraft the scion from one of the leading limbs to the other like the round of a ladder. Use grafting wax the same as in ordinary way of grafting. These scions grow very fast being fed from both ends. In two or three years they become so large they can not be removed without the aid of a saw or ax.

VARIETIES.

I have already said that my apples are mostly summer and autumn varieties. Among them are Wealthy and Elgin Beauty, but they have to be kept very close to a protection to keep life in them.

I hope soon to be able to get a supply of winter varieties from among the New Russians. I assure you that at my age, I do not expect them from the seedling varieties to be originated. I will here give a brief description of my grounds for fruit purposes. I enclosed a field thirty by forty rods with a six board fence; a part of it is level and the balance sloping toward the north. I planted a row of white willows around it just inside of the fence. A few years ago thinking that willows could be improved upon for a windbreak, I grubbed them out on the south and west sides and substituted Norway spruce and balsam fir. I planted them eight feet apart, and mulched them well. They grew very fast, some of them are now twenty-five or thirty feet high, and their limbs lock together so closely as to almost bid defiance to the winds. I have besides on the south side three rows of plum trees. I divided this lot again into four equal lots by planting Norway spruce and Scotch pine both ways across the centre. The southwest fourth I use for small fruits and garden. The other three-fourths I use for an apple orchard. Now, with all this protection a large percentage of my apples blow off before

maturity. Not only is the windbreak necessary to keep the fruit from blowing off but it is a protection to the tree itself. Any person by looking over my orchard could convince himself of that fact. The trees near the windbreaks are sound and healthy and bear fruit almost every year, while those in the centre are either dead or are on the decline. I have no one in my mind who has raised apples successfully without a protection.

I think but little of the theory of some men of having a free circulation of air for fear of a scald. I think these men have never raised many apples in Minnesota, unless they tied them on with a rag. The tree might grow but it would never hold the apples long enough to ripen them.

My trees never have been scalded in that way though they have been scalded when the mercury ran as low as thirty or forty degrees below zero for two or three weeks at a time, with the wind in the north till the sap cells became ruptured and closed by the drying wind. While there is vitality enough in the trees to put out foliage in the spring, when the season comes for making what I call the second growth, the sap can go so far and no further, in consequence of the pores of the wood being closed and the vitality so near reduced, and hence when the sap can not circulate that part of the tree must perish. But trees on my grounds close to a protection are not as likely to scale as when isolated.

REPORT FROM RICE COUNTY.

By Seth H. Kenney, Morristown.

After a thirty years' residence in Minnesota and a good many years a member of this Society, we cherish a very kindly feeling toward its old members who have labored so hard to grow apples in this state. There is a sympathetic feeling begotten by meeting them annually and listening to their experience. We all reverence those early pioneers.

In looking at the labor of the nurseryman from a farmer's standpoint, we can not fail to admire this spirit of sacrifice, this untiring devotion that lingers with these men to the last hours of life. The best epitaph I could write on their record would be, "Ruling passion strong in death." Twenty-five years of orcharding in Minnesota makes the above words come home with peculiar force. If I take my own orchard of seven acres, and

the result that has been achieved in the twenty-five years, the cost, value of the necessary stock, the annual renewal of the sick trees and those that died, I have to confess that my courage has not been so enduring as that of many of my horticultural friends. It is true, the crab varieties have furnished considerable fruit. At one time the Wealthy gave great hopes, and the exhibit at New Orleans of that apple will long be remembered. The exhibit of Amber cane syrup was close to the apple exhibit. I heard many remarks that Minnesota must be a good place to live.

I bought trees and set many of them. To-day I have not a good Wealthy left. Duchess have stood with me better than Wealthy but the Duchess are prematurely old. I notice dead spots on the trunks, that effect the limbs. I found after the sap had begun to go up freely in the spring there came after a few days a cold night, and I found the bark raised from the wood by the sap freezing. The wood began to have a yellow appearance, nearly dry for want of sap. Hence it seems to me the trunks must have protection in this climate.

What shall I say about three hundred Ben Davis, a variety that once was noted iron-clad by our Society; also Haas Famuse, and a long list of trees that are hardly mentioned at present?

I have only a skeleton of the seven acres of the Transcendent crop. I think there are thirty-eight alive but they are not producing paying crops as formerly. They were set about twenty-one years ago; are ten inches in diameter. One Transcendent top worked with Whitney bore quite a crop the past season. Of the Whitney, six trees are dead or nearly so, and seven other trees are in very fair condition. They are apt to split if they are allowed to fork in training; with me not a very early bearer. Of thirty Hyslop set twenty-one years ago three trees produced two and a half bushels the past season; balance gone. Out of four Beech's Sweet two remain, looking pretty well; have borne well. Of twenty Stewart Sweet have two sprouts left that bore a few apples the past year. Early Strawberry, six planted, three of them alive; two of them have borne large crops every other year for many years. Wheeler's Red Winter, eight trees bore two barrels the past season, the first for many years to amount to anything. Of five trees of Hutchinson's Sweet only one remains; considerable blight on that. Nine Fall Orange, none of them healthy, most of them dead. Two Virginia Crabs, rather young trees, have borne some fruit for many years.

From the past experience, I should set but few varieties, such as Whitney, Transcendent, Beech's Sweet, and Early Strawberry.

We obtained a nice supply of red raspberries from Shaffer raspberry. The bushes do not sprout like Philadelphia or Turner, but grow like the black cap family; berries very large. It gives us better returns than any other variety. It is excellent to can for winter use,—the canes are largest and stand the winters best of any we have tried. We are testing Windom dewberry, planted last spring. The vines made a good growth.

Good nurserymen that grow their own trees, are the men that I always patronize. For these men I have a high regard. They are "Natures Noblemen." I do not look for them to realize the fullest reward in this life, but their failures will enable them to look for something better beyond than the short lived trees they tried all their lives to make live. Possibly in the near future some hardy variety may be brought out that will stand this severe climate, and produce a new industry.

REPORT FROM HOUSTON COUNTY.

By J. C. Kramer, La Crescent.

I send you a few words in regard to my experience with strawberries. I have been experimenting for twenty-three years, sowing seed every year, but mostly without result. During the whole time I have found but two varieties worthy of propagation, one of which is known as Kramer's Seedling No. 2. It is a profitable berry, yields well, one of the latest in ripening, and is a good market berry, always bringing a good price; hardy in winter or summer, a free runner, pistillate, very hard to pick. In order of ripening Crescent is first, Captain Jack next, and then Kramer's Seedling No. 2.

My new seedling, Early Princess is the most prolific bearer, if not the best of all the varieties I have tried, ripening a few days later than Crescent. It produces immense and strong plants, of healthy foliage, thick, green and bright; long stamens, thick and strong roots running straight down into the ground, which makes it a very strong plant. You can pick eight or more good berries from a single stem. For shipping it is one of the best. I sent three quarts to the summer meeting of the So-

ciety that were picked in a heavy thunder storm. After picking, they were placed in a large dish and the dirt washed from the berries and eighteen berries filled a quart box with fruit; the next contained twenty berries and the third twenty-two. They were in boxes for three days and were awarded first premium.

I desire to test these varieties more thoroughly before offering any of the plants for sale.

REPORT ON SMALL FRUIT.

By Wm. Lyons, Minneapolis.

The past season has been a remarkable one. Spring opened up later than the average; then came several weeks of cold, rainy weather, something very unusual in Minnesota. The summer was very cool, only a few warm days, followed by a long dry fall and up to the present time a remarkably mild winter. Aside from being a little late vegetables of nearly all kinds were an average crop; prices, however, ruling very low when the market was crowded. Potatoes were selling for 20 cents per bushel. When the Minneapolis flour trust put flour up to \$7.90 per barrel, potatoes advanced to 35 and 40 cents per bushel and staid at these figures for several weeks—about the only good I ever knew a trust to do.

Fruit of all kinds yielded a good crop except grapes; the season was not warm enough for them; only the earliest varieties or those grown in favorable locations came to maturity. A hail storm in August destroyed mine and knocked off all the raspberries that were ripe at the time.

Strawberries were a large crop and found ready sale at prices above the average of former years. The stocks of shipped berries were very small at the time our home grown fruits were ripe and hence we did not come in competition with the foreign shippers. The quality of fruit on the market the past season was better than usual. Growers are beginning to find out that it pays to produce a first class article; it sells quick and brings more money, thus combining profit and pleasure.

Of the varieties which have done best for me I will name Countess, Crescent, Windsor Chief, and a seedling of mine which

has been named Martha. Of several new varieties on trial, only three of them proved valuable on my grounds, namely, May King, Bubach and Jessie. May King is a very promising variety; it is a good grower, not quite so productive as the Crescent; it is a little larger and better in quality; it has a perfect blossom and is about as early as the Crescent; free from rust. Bubach is one of the strongest growing plants I have; rusts a little, not enough to hurt it. It is productive and the fruit is very large, irregular in form, quality not very good; not a perfect blossom. I must confess I was somewhat disappointed in the Jessie, it did not bear as I expected, although I gave it the very best of care; petted it more than any other berry I ever raised; the quality was good but there was but very little of it. The blossoms dropped off; only about one in a hundred matured any fruit. Will give it another trial. James Vick, Old Ironclad, Cumberland and Wilson were almost total failures.

RASPBERRIES.

Raspberries were a good crop and were marketed in fine condition; owing to the scarcity of blueberries were in great demand and brought prices that were satisfactory to the producer. The varieties grown were Turner, Cuthbert, Philadelphia and Schaffer of the red, Gregg and Nemaha for black. When we come to talk about varieties we have a long list to choose from, both red and black, but my experience being limited to a few of the leading varieties I have named only such and would say to those who wish to plant, if you know of a variety that is doing well in your vicinity that is the one for you to plant. Some varieties do well in certain localities and are almost worthless in others. It has been my motto to test all the new varieties as they are brought out in a small way and not to plant extensively of any variety until it has been tested, no matter how it has done elsewhere. Turner and Cuthbert maintain their place with us as the best red market raspberries. Shaffer is a mammoth berry and makes a large wood growth, berry a dark crimson color, good quality, does not sucker, but roots from tips like blackcaps, sells well when known, but its color is not attractive.

VERBAL REPORTS.

Mr. Sias. I haven't had time to prepare a written report. We have added but little to our experimental station since our last report. We received about sixteen varieties of Russians from the state experimental station. We put them out and they have done very well. We have set a few of the Russian poplars and willows, and several varieties of evergreens. We have some new varieties of raspberries and strawberries. We have added the Johnson Sweet raspberry.

Mr. Cutler. How did your thornless blackberry do the past year?

Mr. Sias. I would say the experiments made with the thornless blackberry have not been very satisfactory. The old bush when we first found it had never been protected; I got a quantity of the plants and put them out. The first hard winter killed them to the snow line. They have sprouted out, but have not done very well this year; by covering them they may do tolerably well. We haven't had sufficient time to test them, and haven't given them up as being worthless.

Mr. Fuller. I wish to say a word in regard to my Russian trees. I have one Russian pear that is over eight feet high. It killed down two years ago, but it is now doing better than any of the apple trees received from the same source. The willows I regard very highly, especially the yellow, which is very ornamental. I put in some two acres of cuttings last spring, and although I trimmed them up close, they have grown some four to five feet, and have spread over the whole ground. I think it will make one of the very best windbreaks we have. The limbs spread out over the ground. The laurel-leaved variety of the willow I think highly of. One tree is some ten feet high, and is one of the most beautiful things on my place. It grows readily from cuttings. I have a sprout that made a growth of nearly nine feet last summer. These are the finest poplars I know of. They make fine trees for shade. The leaves are very ornamental indeed. They seem to be perfectly hardy.

Secretary Hillman said he had visited Mr. Fuller's grounds at Litchfield recently and could corroborate what had been said. He had been surprised and pleased with the many evidences of careful culture and good taste there displayed; of what was formerly a smooth piece of prairie land, in a few short years Mr. Fuller

had made one of the finest and most ornamental tracts of land he had even seen, and had surrounded his home with beautiful evergreens, shrubbery, etc. This was a good illustration of what could be accomplished by planting out ornamental trees, by means of careful training and culture.

Mr. Smith said if anyone would travel much through the state he would be compelled to give the nurserymen credit for the influence exerted in promoting the planting of trees in this state. There was no town north or west of Minneapolis in the state that had such an abundance of well grown, tastefully planted deciduous and evergreen trees as this pretty little town of Litchfield. A stranger passing along on the railway could very easily recognize those towns where the enthusiastic nurserymen were located. Among the number he had in mind were Litchfield, Rochester, Fairmount, and Lake City, which would compare with any towns in the Northwest for the number of beautiful trees, tastefully arranged and well grown. This was also true of Fairbault, where there are many evergreen hedges, both of spruce and arbor vitæ—some of the finest to be seen in the United States.

Following is the report of Mr. Sias, delegate to the Northern Iowa Horticultural Society :

NORTHERN IOWA HORTICULTURAL SOCIETY.

By A. W. Sias, Rochester.

The Northern Iowa Horticultural Society held their fourth annual meeting at Nora Springs, Floyd county, Dec. 19 and 20, 1888. President W. C. Haviland, of Fort Dodge, being absent, Vice President R. P. Speer, of Cedar Falls, presided.

The speech of welcome by the Rev. Mr. Kent was eloquent and witty, while the response by H. W. Lathrop, Ex-President of the state society, Iowa City, was rich and good. The attendance was good throughout, and the free entertainment given by the people of Nora Springs, was first class in every respect. The fruit exhibit far exceeded my expectation. J. S. B. Thompson, of Grundy Centre, Iowa, exhibited fifty-three varieties of apples, forty-one of which were seedlings, which made a grand display. C. G. Patten exhibited thirty-three varieties, seventeen of which were seedlings, fourteen Russians and two German sorts. His

seedling Duchess No. 3 he regards the best. I can testify to its fine appearance and quality. Mr. John Harroon, of Newport, Iowa, formerly of Olmsted county, Minn., also made a creditable showing of apples, as did many others. When President C. G. Patten of the state society, and Prof. J. L. Budd, of Ames, met in debate, it reminded me of the old saying, viz.: "When Greek meets Greek, then comes the tug of war." And as each party handled his part so skillfully, that the last speaker was invariably ahead, it also reminded me of the words of Gen. Washington — "To be prepared for war is one of the most effectual means of preserving peace."

I have been somewhat discontented in Minnesota since my return from Iowa, to think that the young people down there are so much ahead of ours in horticultural work. They turned out nobly at Nora Springs and vicinity, both ladies and gentlemen, and entertained us splendidly with music and declamations. The hard winters and summer droughts have killed off the trees there nearly as bad as with us, and they are just about as much at a loss to know what to recommend for general cultivation as we are. I had the pleasure of meeting Mr. Geo. Van Houghton, of Lenox, secretary of the state society, and Mr. John C. Ferris, secretary and treasurer of the northern society, at Mr. Edson Gaylord's before the opening of the meeting. Mr. Van Houghton is not a stenographer but one of the most rapid writers I ever met, and a good talker. Mr. Ferris is also a good worker, and understands his business. Iowa is considerably ahead of Minnesota in her horticultural work, largely owing to the fact that the state gives her state society \$1,500 a year more than we get, which enables them to keep up many more societies than we have, and to keep them in a much better running order.

One of the most efficient, energetic workers in the good cause of horticulture in Floyd county, is Edson Gaylord of Nora Springs. He exhibited a large number of botanical specimens of native wood, and of fruit trees, to illustrate his address on the subject of Sunscald. Mr. Gaylord kindly presented the same subject to the Southern Minnesota Horticultural Society, on the second day of the present month, and I am in hopes it will get into our next report. I am convinced that whoever follows Mr. Gaylord's plan of planting and caring for fruit trees, will surely reap an abundant harvest, right here in Minnesota, as all intelligent horticulturists know that we are several degrees south of the north line of the apple belt.

In conclusion I will state that no gardener can rub against such live men as C. G. Patten, Prof. J. L. Budd, R. P. Speer, H. W. Lathrop, Edson Gaylord, Geo. Van Houghton, J. C. Ferris, N. A. and E. M. Reeves, and many other good men that we met at Nora Springs last month for the first time, without learning something to his lasting benefit.

On motion of Col. Stevens, Mr. Smith was elected a delegate to the meeting of the Wisconsin society to be held at Madison in February.

Mr. Smith called attention to the reduction of rates of freight on nursery stock, and said it had been secured largely through efforts of members of the American Nurserymen's Association and the personal efforts of S. M. Emery, of Lake City.

A vote of thanks was given Mr. Emery for his efforts in this direction.

Mr. Harris, from the committee on nomenclature, recommended that hereafter in the transactions when the Early Princess strawberry is mentioned it be referred to as Princess. The name given to the variety might convey an erroneous impression as to its being an early variety.

Mr. Harris, from the committee on classification of fruits, presented the following:

Your committee would respectfully report, that after a careful examination of the catalogues of fruits, as made up by the American Pomological Society and the societies of various states, we have come to the conclusion that this is one of the most essential things for the promotion of horticulture in the Northwest, in order that our fruits may be properly catalogued and classified, on a similar plan to that adopted by the Michigan society, and the report placed within the reach of members of this Society; and we would respectfully recommend that such catalogue be prepared for publication, and the executive committee be instructed to make the necessary arrangements for so doing.

On motion of Mr. Underwood the report was adopted.

Mr. Wilcox, from the committee on constitution presented the following, which was adopted:

Any person may become a member by paying to the secretary or treasurer an annual fee of one dollar, or a life member by the payment of ten dollars, provided that life members may pay the fee of ten dollars in two equal annual payments of five dollars each.

Local or county horticultural societies and kindred organizations may become auxiliary to this Society, and their members entitled to all the rights and

privileges of membership, by sending three delegates, furnishing a list of members and a report of the proceedings thereof to this Society at its annual winter meeting.

Honorary members, for a time stated or for life, may be elected at any annual meeting by a two-thirds vote of the Society.

Mr. Harris presented the following report on Entomology:

REPORT OF COMMITTEE ON ENTOMOLOGY.

By J. S. Harris, La Crescent.

Mr. President and Gentlemen :

I find my name appears as a member of the committee on entomology and suppose that a report is expected at this meeting. I have not very much of interest to report.

In the year 1888 some species of bugs have been as festive as of yore; others seem to have taken a partial lay off to recuperate, or perhaps to prepare a protest to wise members of our legislature against the extravagance of providing for a state entomologist, or possibly it might have been presidential year with them and they have neglected business in order to get the biggest bugs into office. Nevertheless a few of them have put in good time.

The canker worm (*Chalasa vernata*) were not nearly as numerous as they had been for a few seasons just preceding, and they did but very little injury to our apple trees. This fact should not throw us off our guard or decrease our watchfulness. This insect is subject to attacks from many enemies or it might soon get beyond human control. I presume the drought of last year (1887) caused a scarcity of food for the birds and that they preyed upon them more than usual during the season.

The American tent caterpillar (*Clisocampa Americana*) which was so plentiful in 1886 and 1887, preying upon almost every kind of tree and shrub, was scarcely observed last year. I do not know that any bird feeds upon it; they may possibly in seasons of scarcity. (For a fuller description see Vol. 15, page 366.)

The white grub larva of the May beetle has been very destructive to strawberry plantations in portions of the state.

Cabbages were considerably infested with worms of at least

four species, viz.: larva of European butterfly, cabbage plusia, zebra caterpillar and a smaller one that I have not had time to look up. The European butterfly was not as plentiful as in past years; in fact early in the season they were rare, and we are led to hope that some parasite is doing effective work toward their subjugation. The plusia was the most plentiful of the four.

A new insect committed depredations upon strawberry plants at La Crescent, eating the leaves entirely away except the ribs, causing considerable destruction. Small flea beetles were found upon the plants and the mischief is laid to them; but so far no investigation has taken place. As a rule potato beetles did not do so much damage as usual. This report is from Southeast Minnesota.

The following report was made by Mr. Harris:

THE SOUTHERN MINNESOTA FAIR.

The above fair was held at Rochester the first week in September, during the week preceding the state fair, and in most departments was a marked success, especially so in the horticultural department. The floral exhibit filled the entire centre of the main exhibition hall, and was one of the most beautiful and attractive features in the building. The competitive entries numbered eighty-two. Smith & Darling, commercial florists of Winona, were the most extensive exhibitors. Their plants were healthy and well grown, and the collection embraced the rarest and most popular of Flora's bright gems. The place and manner in which they were arranged for display added greatly to their attraction and conspicuity. H. W. Stedman, Mrs. J. Hyde and D. C. Dewitt of Rochester, all made extensive and very complete exhibits of collections. Mrs. M. Luther, Mrs. C. A. Whited, Mrs. H. Stern, Mrs. Neiston, Smith, Cook, and others, made fine displays in specialties. The collections and displays of apples were fine, but being shown in a low, unattractive, poorly lighted building, cramped for room, for an artistic display, more than half the value as an object lesson and telling feature of the fair, was lost. The number of entries in the apple department was one hundred and seventy-two, including six large and complete collections. The exhibitors of collections were A. W. Sias, Rochester; Wm. Somerville, Viola; E. H. S.

Dartt, Owatonna; C. H. Greenman, Chatfield; R. C. Keil, Rochester; Sidney Corp, Hammondsford. The entries on single plates numbered one hundred and fifty-six, and the principal contestants were Messrs. Sias, Dartt, Somerville, Krahler, Keil, Greenman, Hoag, Newton, Ottman, Pond, Farrier and McHenry. The fruit filled about six hundred plates, and was very fairly colored and free from marks of insects or worms.

In greatest number of varieties by professionals, Mr. Sias seemed to be in the lead. As an amateur, Mr. Somerville outstripped all competitors, having a number of well grown Russian varieties. His exhibit was a centre of universal interest. Mr. Keil's collection was a large one, but included a considerable number of varieties that were unnamed. In Mr. Somerville's collection of Russians we noticed the Green Streaked, a variety about the size of the St. Lawrence, Russian Wax, a good eating fruit of beautiful appearance, Golden White, White Pigeon, Red Black, Yellow Transparent, Green Selonka, and others; C. H. Greenman had about a dozen varieties of Russians, several of them of fair to good quality. Sidney Corp had fine specimens of the McMahan White, Wealthy and a few Russians. J. W. Hart showed the three varieties of Brett Seedlings, Hart, Brett and May. The quality and the appearance of the fruit was good. The exhibition of vegetables was not quite equal to that of some previous years, but in some departments was excellent. There was a noted absence of mammoth pumpkins and squashes.

Before closing we desire to make brief mention of a feature in this fair that to us was a new departure, both novel and instructive. This was found in the school exhibit and we think will prove to be a valuable educator. It was a very complete collection of garden, grain and field seeds, put up in small glass bottles, plainly and correctly labeled and four sets of the woods of Minnesota correctly named and tastefully arranged to show the bark and grain; also some collections of the rocks, pebbles, etc., of Southern Minnesota. These exhibits were made by children of different school districts and were called out by offers of prizes to the ones having the best. We predict that some who assisted in getting up those collections will grow up to be good and useful citizens and return to the world many times the value expended in those premiums.

Mr. Wilcox offered the following resolution which was adopted:

Resolved, That members of the Executive Committee be allowed mileage and traveling expenses and authorized to expend such sums from money in the treasury in carrying on the work of the Society as its interests may require.

The salary of the President for the ensuing year shall be fixed at \$25; of the Secretary, \$500, and of the Treasurer, \$25; that the vice presidents be allowed their traveling expenses.

Mr. Barrett, from the committee on final resolutions, reported as follows, which was adopted:

FINAL RESOLUTIONS.

Resolved, That the thanks of the members of the State Horticultural Society are due, and are heartily tendered to the generous citizens of Minneapolis, for their hospitable entertainment and courtesies extended to, and comforts enjoyed by us, during the present session.

Resolved, That our thanks are due to the following railroad companies for returning us to our homes at reduced rates of fare—viz.: Chicago, St. Paul & Kansas City; Wisconsin Central; Chicago, St. Paul, Minneapolis & Omaha; Chicago, Milwaukee & St. Paul; St. Paul & Duluth; St. Paul, Minneapolis & Manitoba; Minneapolis, Sault Ste. Marie & Atlantic; Northern Pacific; Minneapolis & St. Louis, and the Burlington & Northern.

Resolved, That this Society is extremely grateful to Prof. W. H. Ragan, of Greencastle, Indiana, the distinguished horticulturist and secretary of the American Horticultural Society; to Mrs. V. H. Campbell, and A. J. Philips, of Wisconsin; to Elmer Reeves, of Waverly, Iowa; to Thomas Frankland, of Stonewall, Manitoba, and to C. C. Bell, of Boonville, secretary of the Missouri Central Horticultural Society, for their attendance during our session; assuring them that we have received useful stores of information from their wise instruction during our deliberations.

Resolved, That the thanks of this Society are hereby tendered to the papers of the twin cities that have so faithfully reported the proceedings of the Society during our session.

Prof. Ragan. Mr. President, through your action this forenoon you have highly honored certain wandering stars who have been in your midst and enjoying your hospitalities during this week, in which number I presume I am included. For this honor and the one now proposed by these resolutions, I feel highly grateful toward you. During the four days I have spent with you I must say that I have enjoyed this privilege as highly as on any similar occasion within my memory, and it has been my privilege to attend horticultural gatherings for the last thirty years. I have attended meetings of this character in numerous states, and as a state organization, I must say, Mr. President,

without especial flattery to you or to your people, that none have been conducted more ably; none have included more interesting discussions and papers than have the meetings of this week. I shall ever esteem it as a high privilege that I have been enjoying this past week among you. I shall return to my home feeling that I have been benefited by being in your midst. Of one session especially, I wish to speak. I must say that on yesterday evening your entertainment in this hall was worthy of an audience of thousands. People have often paid door fees to attend literary entertainments, simply viewed as such, that were not equal to your entertainment in this hall last evening. I thank you again for the honor you have shown me.

President Elliot. Speaking for the members of our association, we feel that we have been greatly honored by the presence of these friends that have come here; that have come from the east, from the north and from the south. We have not only been instructed, but have been helped by their presence, and feel it will add increased interest to our organization.

Mr. Grimes. I would suggest that this Society send two delegates to the next meeting of the American Horticultural Society, to be held in Texas, one to bear his own expenses.

Col. Stevens. I should object to that. I should hate to go with my expenses paid, while my friend Grimes was able to defray his own expenses.

Prof. Ragan said as the matter had been mentioned, he would say that he hoped all would consider themselves as delegates and invited to that meeting; it would be second to no other, unless perhaps, the one held in California. The citizens of Texas were making arrangements for the meeting, which would be held in February, 1890. He had already been in correspondence with parties interested concerning the arrangements for the meeting.

President Elliot. Friends, we are about to close our annual session, and I hope that you all have been paid for your coming here and taking part in this meeting and in these discussions. I hope that when you go home you will not lay down your enthusiasm, nor let the work lag for want of your support. We desire that everyone should feel that he has something to work for in this great Northwest, in the line of horticulture. We hope you will all come again next year feeling that it has been a profitable one, and that you may have made greater progress than in any preceding year. We want you to feel that you have been guided and directed aright by those you have placed in charge, and that

they have the interest of the Society at heart, and that they are with you at work in the same cause. We know that many of us have large interests to look after, besides our own horticultural work, and it takes very much of our time. We hope that you will bear with us if we do not always do just as you think we ought to. Sometimes our task seems to be burdensome, but we feel that on the whole, it pays us well for the time and money that we spend in this character of work. If we do not reap the benefit ourselves, perhaps others will; future generations may derive some good from our work, and feel that we did not live and work in vain in our time. We may possibly give some aid to others in this good cause in which we are all striving to become more enlightened.

In regard to the work of legislation before the committee, I wish to ask each and everyone who may have suggestions to make to put them in writing and forward them to the committee, so they may know what your wishes are. And wherever you can put in a word for our Society, we hope you will do so and not say you have no interest in our work. Every new member that you can get will add so much more to the interest of the cause. The work committed to us to do in this life, we should do with all our might, and we trust it will be done faithfully and well. Some of our members have spent a good deal of time in this work without receiving any pecuniary compensation or reward, but I hope and trust that you will continue to do all in your power to forward the interests of this Society.

Mr. Frankland. Mr. President, in looking around the room I have felt myself a privileged member of your Society. I did not expect to receive such kindly treatment at your hands, although I have traveled a good many miles, and came from beyond the boundary to attend this meeting. I came to learn, and desire to return my thanks to this Society for giving me such very kind and useful instruction. I have been amply repaid for my visit; and if at another time I can make the necessary arrangements, I shall be very happy to visit Minneapolis, or some other place where your Society may meet again.

Mr. Reeves. I wish to thank the members of the Horticultural Society for courtesies shown me and for honors conferred, both on my account and the state I have the honor to represent. I hope that any who can do so, will visit the Iowa society whenever you have the opportunity, and I wish to give you a cordial invitation to attend the next meeting of the Northern Iowa hor-

gricultural society, to be held next December, at Waverly. That is my home, and those who can honor us with their presence at that time will be welcome, and we will try and entertain you as well as you have me during the present session.

Mr. Philips. I want to thank the members of this Society for the courtesy it has extended to your delegates from Wisconsin. I feel that I am indebted to this Society in many ways. When I go out and find my top-worked Wealthy trees doing so nicely, I feel somewhat encouraged. They were top-worked on Virginia crab, and were some my friend Mr. Grimes, sent me; when I see them I always think of him. When I see the Orange and Minnesota hybrids, I think of my lamented friend, Mr. Jewell, who gave me almost my first instructions in orcharding. And as far as that is concerned, I think of you people almost as often as I do of the horticulturists of our own state. Our two states are only divided by the Mississippi river, and we feel where I live, that anything that you may have in Minnesota, that is hardy enough to endure this cold weather of 40° or 45° below—any of the new seedlings or Russians, which you are all looking for so anxiously—which will help you out will also help us out.

I have been charged by the fruit men as being down on the Russians; I am not. I have advised people when they invest in them, to go carefully, and to be sure they were right. As soon as we recommend anything to be strictly ironclad, we will very soon find all the tree peddlers supplied with them. A tree peddler called on me last summer, and said the Hibernial was a good tree, when I asked him about it. He said he had seen it in Minnesota. I took him out and showed him a tree and asked him what he called it, but he could not tell me. I told him that it was the Hibernial. I want to thank you for the kindness we have received, and in the language that has often been expressed, hope you will still go on and prosper.

On motion of Col. Stevens, the meeting then adjourned *sine die*.

All the meetings of the Society were well attended and much interest was manifested in the discussions had and papers read. The following is from *Farm, Stock and Home*:

“The meeting was characterized by many as the best ever held by the Society. The proceedings were extremely pleasant and harmonious; the papers read were terse, brief and practical. The discussions were earnest and able, and the value of the suggestions and information given and received is past all computation.”

Owing to the fact that a number of papers are published which were not upon the regular program, we are compelled to omit a number of interesting papers read before the Southern Minnesota Horticultural Society and the McLeod County Horticultural Society, besides many editorial clippings of considerable interest. We have exceeded the limit of space usually given to the routine report and we make this statement in explanation of the omission of the secretary's portfolio. We shall, however, make room for two or three reports and papers which should appear in this number.

MINNESOTA STATE BEE ASSOCIATION.

On the seventeenth of January last the Minnesota State Bee Association was organized by several of the leading bee keepers of the state, who were in attendance at the State Horticultural Society. The officers elected were: President, L. H. Wilcox, Hastings; vice president, Wm. Danforth, Red Wing; secretary, Wm. Urie, Minneapolis; treasurer, J. G. Bass, St. Paul. Executive committee, B. Taylor, Wm. Dwyer, J. G. Bass. The secretary writes:

“This association is organized for the purpose of bringing all the bee keepers and others who are interested in apiary culture together, for their mutual instruction and improvement regarding methods of managing bees, and other things that may be to the advantage of them and to those about to engage in the business. The first meeting will be held at the experimental farm the same day the horticultural society meets, of which due notice will be given.”

It is hoped that all who are interested in bees, either as professionals or amateurs, will send their names to the secretary, and lend their co-operation to this movement. *Farm, Stock and Home* heartily welcomes this evidence of an increasing interest in the refining and instructive industry of honey production, and it hopes to see the association have a large and active membership. It also hopes that the music of busily working bees will be much less rare in the Northwest.— *Farm, Stock and Home*.

The following brief biographical notice is from the pen of Col. J. H. Stevens, who has been an intimate friend of Col. Robertson since his arrival in Minnesota:

COL. DANIEL A. ROBERTSON

Was the first president and one of the principal founders of the Minnesota State Horticultural Society, a very good likeness of whom appears in frontispiece (furnished at the special instance of the committee on publication), has led a useful and eventful life. Born in Philadelphia, Penn., May 15, 1813, at the age of eighteen years he went to New York, in which city he pursued various studies including the law. From New York he removed to Ohio, where he was admitted to the bar in 1839. He became interested in journalism and at one time was the editor of the Cincinnati *Enquirer*, associated with Chas. Brough; subsequently he edited the Mount Vernon *Banner*. In the meantime he gave much attention to pomology and horticulture; becoming familiar with the habits, propagation and growth of fruit, as well as forest, shade and ornamental trees and shrubbery at his farm adjoining the city of Lancaster. In 1845 he was appointed United States marshal for Ohio, holding the office for four years. In 1850 he represented Fairfield county in that state in the constitutional convention, but resigned after the summer term and came to Minnesota in the autumn of that year. Soon after his arrival in St. Paul he established the Minnesota *Democrat*. Under his able management it became one of the leading journals in the Northwest. In 1856 he visited Europe; during his absence abroad he studied various scientific subjects connected with horticulture. After his return to St. Paul he was elected a member of the house of representatives of the state legislature. He was instrumental in organizing the "Legislative Farmers' Club" during the session of 1859-60, which was fraught with much moment to the state. In 1860 he was elected mayor of St. Paul; sheriff of Ramsey county 1863; re-elected in 1865 and 1867. He organized the first working Grange of Patrons of Husbandry in the United States at St. Paul. He was the first professor of agriculture in the state university. His lectures were useful and instructive. He introduced the Russian apple into the Northwest. For the past few years he has spent much time in Europe, bestowing attention to climatology and various scientific subjects that are of interest to agriculturists and others in this country. Several years since he established the Minnesota *Monthly* in St. Paul, in the interest of the horticulturists and farmers of the state. He has lent a helping hand in almost everything that would benefit the people of the Northwest. The "fruit" of his labor in Europe will be published in the near future.

The Committee on Obituary presented the following report :

IN MEMORIAM.

ROBERT HALE.

The Society, since its last annual meeting, has sustained a great loss in the death of one of its most honored members—that of Robert Hale, Esq., late secretary of the board of trade of this city. Mr. Hale was born in the little village of Boscawen, N. H., Oct. 1, 1815, and died at Minneapolis, June 28, 1888. He came to this city in 1871, and resided here constantly up to the time of his death. In relation to his eventful life, a committee appointed by the board of trade from its members, in its report says :

“A life surpassing in all the excellencies and virtues which adorn the highest type of a broad, a sturdy, and a noble manhood, a life as pure as the golden sunbeams which warm the earth and as tender and sweet as the fragrant flowers which turn their beautiful faces to the morning sky, has passed suddenly away and brought us here with our hearts in grief and mourning to-day. Your committee do not feel competent to eulogize Robert Hale. He was truly a most remarkable man. His whole life was a record of worthy and honorable action. From his boyhood to that hour when he so suddenly fell at our feet, no single action of his life ever tarnished the perfect brightness of his personal honor. In every relation of life he seemed, indeed, a perfect man. No impure thought could find a place in his mind; no mean or selfish purpose could find a corner in his pure heart; and no unworthy object or cause could command his obedience or support. He loved his fellow men; he loved this our city in which he lived, and died; he loved his associates in this board. He loved and was ever true and faithful to his friends, and he loved and worshiped God. He was a perfect husband and father, and he made his home and family as happy as human love and affection can make a home. To his neighbors he was kind, and to all he was courteous and considerate. To the young he was the giver of kind and useful advice and encouragement; to the busy man of affairs he was a careful and prudent counsellor, and those who walked beside him in the soft sunshine of life's afternoon he lifted up and made joyous by the inspiration of his own unflinching, loving faith. Wherever he went among men, and

especially upon those who were blessed by the possession of his beautiful friendship, his kindly and sympathetic greetings fell like a benison, and drew to him their loving regard and confidence. The great value of Mr. Hale's services to this board, through it to the city of Minneapolis, can not well be estimated. Enthusiastically loyal to every interest of our city, and faithfully devoting himself to her service as secretary of the board of trade, he contributed largely to the many valuable results which have been secured for the city through its instrumentality."

Your committee wish to add to the above, that he was fond of horticulture. His beautiful grounds in this city were adorned with choice flowers. He delighted in experimenting with such fruit as could be grown in this state. His garden always excelled in vegetables of every description. He greatly enjoyed our meetings, seldom, however, taking part in them, but at our last annual meeting was prevailed upon to furnish a valuable paper, which he read before the Society.

In conclusion, your committee would respectfully suggest that this report be spread upon the records of the Society.

Respectfully submitted,

JOHN H. STEVENS,

JOHN S. HARRIS,

S. D. HILLMAN,

Obituary Committee.

HON. J. H. BROWN.

It gives us pain to chronicle the death of Hon. John H. Brown, which occurred June 18, 1888. Returning alone from Dawson to his home in Providence in a thunder storm he was struck by lightning and instantly killed.

Mr. Brown, was born Dec. 31, 1818, in Sullivan Co., N. Y., the fourth in a family of eleven children. When about ten years of age the family removed to Cortland county remaining three years, thence removing to Loraine county, Ohio. In 1837 they removed to La Salle county, Ills., and two years later to De Kalb county. In 1844 he was married to Miss Calista Sandborn, daughter of a near neighbor, and purchased a farm close by, turning his attention for the next few years to agriculture and the raising of fruits in which he was very successful. In 1856, his health failing, Mr. Brown decided to remove to Minnesota, coming to Pleasant Grove. He embarked in mercantile

business but the hard times of 1857-8 forced him to discontinue, and removing to Rochester he continued in business until 1870.

At this time the new town of Lac qui Parle, attracted his attention and the family removed to that place, where he pre-empted a quarter section of land one-half mile north of the village. He built a commodious and well fitted hotel and is most pleasantly remembered as its genial host and proprietor.

In 1873, at the establishment of the Lac qui Parle county agricultural society — largely through his interest and efforts — he was elected its first president.

During leisure hours he might be found planting and fostering the growth of the trees which he seemed to love, leaving them as footmarks, wherever he was. Anyone visiting Lac qui Parle cannot but remark Mr. Brown's place as it is known with its wealth of beautiful trees. The road on two sides is lined with three rows and the southeast forty acres is laid out in a delightful grove where he purposed sometime erecting home buildings, which purpose will be carried out by his daughter, Mrs. Nichols. Lac qui Parle owes much of its acquired beauty to the refined taste and industry of Mr. Brown.

The cares of hotel life proving too burdensome he sold the property in 1885, and retired to his homestead secured some years before in Providence, to make for himself and wife, as he expressed it, a home for their old age.

He was elected in the fall of 1886, representative to the state legislature, where he was honored with the chairmanship of the committee on forestry, and was an active member of the committee on public lands.

For years he was an active and interested member of the state forestry association and State Horticultural Society, and was a prime mover in such modification of the tree claim laws of the United States as should make them practical and reasonable.

At Evergreen Farm Home, as he was wont to call it, he gave full expression to his fancies, and a "home" it was indeed. Surely he solved the problem of tree planting on these bleak western prairies.

Of the large family but two brothers and two sisters survive him. His widow, and an only daughter, Mrs. Browning Nichols, Lacqui Parle, and an only son, Emslie Brown, of Plainview, have the sincere sympathy of a large circle of friends.

Under a grassy mound at Evergreen Farm, surrounded by the trees he loved so well, rests all that is mortal of the excellent citizen and honest man, John H. Brown.

MEETINGS OF THE EXECUTIVE COMMITTEE.

A meeting of the executive committee of the Society was called at the office of Dr. Elliot, No. 427 Nicollet avenue, Minneapolis, at two o'clock P. M., Feb. 27, 1889.

There were present President Elliot, the Secretary, Messrs. Latham, Underwood, and Wilcox of the committee, J. T. Grimes, E. Nagel and C. L. Smith.

The premium list, in the division under the charge of the Society, was taken up for revision, the same to be submitted to the board of the State Agricultural Society for final action and approval. This work was not completed at this session, however, and the meeting was adjourned for one week.

March 5th an adjourned meeting of the executive committee was held at the office of Dr. Elliot, at ten o'clock A. M. of that day, pursuant to previous appointment.

Present, President Elliot, and Messrs. Latham, Harris, Underwood, Brand and Wilcox, of the committee.

The revision of premium list was further considered, after which Mr. Underwood presented an outline of program for the next annual meeting of the Society. Mr. Brand suggested in assigning topics for discussion the grape, strawberry, orchard and forestry were the questions of most importance; these should be thoroughly considered.

Following is an outline of program, the same to be subject to such further revision and change as may be deemed advisable, to be made at time of summer meeting:

Monday Evening.—Organization, appointment of committees, reports of local societies, vice presidents, etc.

Tuesday Morning.—Strawberries, culture, varieties, marketing, currants and gooseberries. *Afternoon.*—Raspberries, blackberries, dewberries; culture, varieties, marketing. *Evening.*—President's address, reports of secretary and treasurer.

Wednesday Morning.—Orchards, apples, location, culture, varieties, marketing, keeping, etc. *Afternoon.*—Grapes, culture, varieties, marketing, keeping. *Evening.*—Evergreens, ornamental and shade trees, forestry.

Thursday Morning.—Green houses, flower gardens, roses, ornamental shrubbery, landscape gardening. *Afternoon.*—Election of officers; vegetables, market gardening, etc. *Evening.*—Musical and literary program.

Friday Morning.—Apiary culture and sugar. *At Noon.*—Bas-

ket picnic, toasts, songs, informal business, final resolutions, adjournment.

A list of standing committees was named as appears elsewhere.

On motion it was decided to advance the meeting one session, holding the first session on Monday evening.

On motion of Mr. Wilcox the duty of assigning topics for the apiary department was referred to state bee keeper's association.

On motion of Mr. Underwood it was decided to hold the summer meeting at the state experimental farm, near St. Anthony Park.

The matter of cataloguing fruits was discussed and on motion referred to a special committee consisting of Messrs. Wilcox, Harris and Hillman, to report at next annual meeting.

On motion the President was appointed a committee of one to invite the amber cane association to turn over the funds to the treasury of the Society.

The following bills were audited and allowed, to-wit: A. W. Latham, \$2.58, J. W. Underwood, \$5.50; J. S. Harris, \$6.35; O. F. Brand, \$3.64; L. H. Wilcox, \$5.70; C. L. Smith, delegate to Wisconsin, \$15.10.

The President and Secretary were authorized to make such changes as were deemed proper in program and to publish same in the report.

The meeting then adjourned.

REPORT OF DELEGATE TO WISCONSIN.

By J. S. Harris, La Crescent.

The one marked and important event of the year to the Wisconsin farmer is the assembling of the annual convention of the State Agricultural Society, State Horticultural Society, State Dairymen's and other kindred associations at Madison in the first week of February, each year. These have been held regularly and have continued to gain in interest and importance for a score of years.

Madison, the capital city of Wisconsin, is a beautiful and thriving little city, claims a population of 16,000, and is situated in the geographical centre of the best and most fertile farming lands of the state. The state house is one of the largest and

finest in the Northwest, furnishing ample room for the legislature, state offices, State Horticultural Society, State Agricultural Society and headquarters of the superintendent of the farmers' institutes. Everything about the capital is in harmony with the greatness, wealth and prosperity of the state, and points to the fact that agriculture is recognized as the bed rock upon which this prosperity is founded. The present meeting, February 5th - 9th, was one of the largest and most enthusiastic ever held in the state. All railroads carried delegates the round trip for a single fare, and nearly every county in the state was represented by energetic and progressive tillers of the soil.

THE HORTICULTURAL SOCIETY.

The meeting of the State Horticultural Society was formally opened on Monday evening, February 4th. The time was chiefly occupied in receiving reports from absent members and discussing the merits of popular varieties of fruit. The forenoon of Tuesday, the fifth, was chiefly taken up in the disposition of business matters and the setting up and arranging of the magnificent exhibition of fruits. The exhibition was comprised of something over 600 plates, chiefly apples, and a few vegetables. Chas. Hirschinger, Baraboo, showed 40 varieties of standard apples, 13 of seedlings and 7 of Siberians, in all 160 plates. George Jeffrey, of Milwaukee county, showed 60 varieties of standard apples, 8 of Russian, 8 of Siberian, 3 of winter pears, about 130 plates in all. Geo. P. Peffer, of Pewaukee, had about 40 varieties of standard apples, 29 of seedlings, 1 of pears and 6 of grapes. G. J. Kellogg, of Janesville, 12 varieties of apples, 6 plates of grapes and a good display of garden vegetables. James O'Zane, of Kenosha county, showed 11 varieties of very fine apples, among them some that are rarely fruited in the Northwest. F. H. Chappel, of Dane county, showed 20 varieties of standard apples and several fine seedlings. E. Wilcox, of LaCrosse county, showed 15 varieties of standard apples and several seedlings, and was awarded the first premium on seedlings and on the Wealthy. A. G. Tuttle, Baraboo, showed 15 varieties of standard apples and about the same number of Russians.

In general appearance, size and condition of the specimens, most of the fruit was very fine, a credit to the exhibitors and a valuable object lesson to the many hundreds who looked upon it; and justifies the prediction that Wisconsin is destined to become a very good apple producing state.

THE AGRICULTURAL SOCIETY.

The day sessions of the agricultural society were taken up with the revision of the premium list for the next state fair, and the reception of reports of department superintendents of the last fair. The joint convention was formally opened in the assembly chamber by the president of the agricultural society, John L. Mitchell, in an opening address in behalf of the society, welcoming the farmers of the state to the convention. He tersely enumerated the interests represented in the various departments of the society, complimented the people engaged in the various industries upon the success being achieved, pointed with commendable pride to the high position occupied by Wisconsin agriculture and extolled the people for the interest they take, each in his chosen calling, and closed with picturing the advantages of country over city life. He was followed by J. M. Smith, president of the State Horticultural Society, with an able paper upon the future of horticulture in Wisconsin. He recommended as a means for its greater and speedy advancement, the establishment of a system of experiment stations located in different parts of the state, to be under the direction and supervision of the professor of horticulture, where practical experiments may be conducted for the development of varieties of fruits and vegetables best adapted to the various localities in the state. Mr. Smith closed with a fitting reference to the progress and success of the society since its organization and complimented the old veteran workers whose efforts had contributed to that success. Mr. Smith was followed by Gov. Hoard with an eloquent address on "Agricultural Education," which was heartily received by the large audience. The evening session was closed at a late hour with an interesting paper on the "Beautiful Side of Life," by Mrs. A. J. Clarke, of Waterloo.

February 6th the capital building was full to overflowing. The forenoon sessions were held in separate rooms. Before the horticultural society the secretary, B. S. Hoxie, read his annual report. He started out with the assertion that the successes of horticulture are builded largely upon the failures of the past, and that horticulture stands for more than the planting of an apple tree. He gave a general review of the workings of the society, recommended the organization of local societies, the holding of a circuit of popular meetings where they will accomplish the most good, and the general taking of good papers that contain horticultural literature.

Local societies next presented their reports, also members of the committee on observation. Some favored planting orchards with trees worked on Siberian stock. It was shown that insect pests had been worse than usual during the last year. Small fruits had generally done well, and there remained no excuse for any farmer's family being without an ample supply of them. The election of officers resulted in the choice of J. M. Smith, president; B. S. Hoxie, secretary; Mrs. V. H. Campbell, treasurer.

The afternoon was given to joint sessions of the two societies. Papers were read by Hon. S. H. Mead, of Shell Lake, on "Property Rights of Individuals." He held that farmers of this country have it in their power to obliterate all monopolies which oppress them if they will work together in harmony and concentrate their efforts for mutual benefit. "Lights and Shadows of Farm Life," by Mrs. V. H. Campbell, was a grand effort and well received by an appreciative audience. She likened life to a picture by a master artist, who so combines light and shade as to make the result a beautiful picture, holding the shadows in life as in the picture, in order that the light and joy of life may be the more prominent and appreciated. "It is not," she said, "the profession that dignifies the laborer, but the intelligent laborer dignifies the profession and the laborer together. Farmers should be educated upon general topics as well as upon those pertaining to their calling." Hon. Mark Curtiss followed with a discussion of "County Fairs," and Senator Kennedy, of Appleton, with "Agriculture—Its Dignity, Utility and Responsibility."

At the evening session Hon. H. A. Taylor gave an eloquent address upon "Farming in Europe and Africa," reviewing it from the palmy days of old Rome, and the fall of Carthage, down to the present time. Mr. Butterfield discussed "Unsolved Problems in Agriculture," and B. S. Hoxie concluded the exercises of the day by reading a paper prepared by D. S. Goff, of Genesee, N. Y., on "Some Questions in Horticulture."

Thursday the societies held separate meetings to accommodate the legislature with a morning sitting, and all the available room in the capitol was completely occupied. Before the horticultural society A. J. Philips, of West Salem, gave an address intitled "Shall the Farmer Raise his Own Fruit?" He contended that the farmer may successfully and, in a certain sense, profitably raise all fruit needed in his family by giving vigilant attention

to the planting of trees and plants. "In this state most trees are short-lived, hence the necessity of planting some new trees every year to take the place of those that die out. Every farmer should raise some trees from seeds of hardy varieties; if they do not bear fruit good enough they may be top-worked to something better." Chas. Hirschinger of Baraboo, related his experience in raising apple trees under difficulties that would discourage any but the stoutest hearted. Starting, when a mere boy by planting some seeds, he had tried high kinds, low kinds and every method that had been advocated during the last thirty years; had many times almost come to the conclusion that fruit growing was a delusion; was still at it, and last year harvested 2,000 bushels of apples. Wm. Fox, of Baraboo, read a very exhaustive and practical paper on grape culture, after which object lessons were given in methods of grafting and budding to secure hardy trees for the orchard, by Messrs. J. A. Cotta, of Illinois, and Hatch and Plumb, of Wisconsin. Mr. Cotta had on exhibition some fine specimens of double-worked trees, which we will allude to at some other time.

At the forenoon session of the agricultural society A.L. Hatch, of Ithaca, read a paper on "Orchard and Tree Planting on the Farm and Along the Roadside." He showed very conclusively that apple growing could be made a success, pointed out the soil, location, etc., best adapted to it, and named as the most successful varieties, Duchess, Tetofsky, Wealthy, Orange Winter, and McMahon White; also of Russians, Switzer, Repka and Longfield. The subject was discussed at considerable length and the discussion showed that public sentiment was drifting in favor of tree planting. Potato culture was called up in an exhaustive paper by S. B. Harrington, of Walworth county. He gave its history from the time of its discovery, at the time of the Spanish conquest down to the present, and showed its importance as a food-producing plant; he gave the details of the most successful methods of cultivation now in vogue. During the afternoon, dehorning of cattle, profits of poultry, bogus dairy products and trotting horses were all discussed, and the bee keepers held a well-attended meeting in another room.

At the evening session J. S. Anderson, of Manitowoc, addressed the convention on the "Relation of State to the Farmer." Dr. S. M. Babcock, of the experiment station, gave a practical talk on "Milk and Butter Production." And now the weary audience were served with a rare treat by Mrs. M. E. Warren, of Fox

Lake, who compared the condition of things forty years ago with that of the present; and Mrs. Helen H. Charlton, of Brodhead, with a paper on the "Power of an Idea."

Friday, the conventions continued their sessions during the forenoon. G. P. Peffer told the farmers what he saw in California at the time of the meeting of the American Horticultural Society last year, and J. M. Smith mapped out a system of horticulture for the farmer. Before the horticultural society the causes of the failure of orchards were pointed out by J. C. Plumb, which was followed by a general discussion of blight, sun scald, insects and methods of heading them off, root killing, protection by mulching and otherwise, time for pruning, etc. At noon the convention adjourned.

Thus closed the most interesting, profitable and largely attended meeting of farmers ever held in the Northwest. The proceedings of the convention have been very fully reported and will make a volume of 1,000 pages of practical, interesting agricultural and horticultural literature—containing the experiences, observations and ideas of the most successful men of the day. The state has made ample provision for its publication and distribution. Thirteen thousand copies of the joint report will be published for general distribution among farmers, and some 3,000 copies of the transactions of each association will be bound separately in cloth for the use of its members. This is the shortest course in agriculture and the harvest festival of the year. These annual gatherings are exerting a mighty influence for good, in brightening up the ideas and uniting the farmers in a brotherly union that will be cemented closer as time rolls on.

ADDRESS OF A. W. SIAS.

DELIVERED BEFORE THE SOUTHERN MINNESOTA HORTICULTURAL MEETING HELD AT ROCHESTER,
JAN. 1 AND 2, 1889.

*Gentlemen of the Southern Minnesota Horticultural Society, and
Friends of Horticulture:*

As this is the first day of the new year 1889, I sincerely wish you a happy and prosperous year. We are informed that the very first work that was planned for man by the Maker of the

universe was horticultural work, an example showing that January 1st is none too early for this society to begin to plan its work for the coming year.

This is our first annual meeting, and I wish to congratulate you on meeting under more favorable auspices than did the State Society at theirs, held on our fair grounds in this city, Oct. 3, 1867. They had only twelve paying members on their books at that time, while we have not less than fifty-nine. The past year has been a prosperous one for our society. We have no deaths to record, while good health generally prevailed.

The apple crop was better than 1887, and the small fruits panned out finely. We enjoyed a successful and well attended summer meeting on the Fourth of July, and had a fine display of strawberries. Mr. John Bamber, a member of our executive committee, has demonstrated what but few knew before, viz., that two hundred fine strawberry plants could be produced from a single berry. The foliage on these new varieties was grand almost beyond comparison. They have not fruited yet, but we shall look for something choice when they do. In view of our high anticipations, I will recommend that you appoint a committee of three to visit the seedling strawberry beds in the vicinity of Rochester as soon as the fruit is ripe, and report at the next summer meeting. With the horticulturist in a new country like ours, poverty appears to be a blessing in disguise, and so it proved to be in my case. When I began my experimental work on College hill, I was anxious to stock up well on young evergreens of all sorts that had any show at all to succeed here; as I had considerable taste for that kind of work. At that time I should have been obliged to go too far southeast for them, and like many others, should have lost heavily, no doubt. But I did muster change enough to buy several pounds of evergreen seed, and the result has been that about nine-tenths of my sales of evergreens have been my own seedlings, and from these seedlings this last Christmas, I sold trees for churches to the amount of over \$20, ranging from \$1.50 to \$3 each, and fifteen to nineteen feet high.

I would like to emphasize this word seedling. You can hardly indulge in them too much — seedlings of all descriptions.

* * * * *

In conclusion, allow me to remind you of what you all know to be a fact, viz.: That it is only by persistent and united effort that we can accomplish much through this society, while by this, it is

possible for us to astonish ourselves, and the horticultural world. We are informed that ancient Babylon by united effort, built the "hanging gardens" that gained the reputation of being one of the seven wonders of the world, all on about four acres of land. If this is true, what may we not hope to accomplish with the whole fertile field of Southern Minnesota at our disposal, providing we lay aside petty jealousies and selfishness, and unite in doing our "level best."

The following paper was read at the meeting at Rochester:

EVERGREENS OF WESTERN ONTARIO.

By D. W. Beadle, St. Catherines, Ontario.

The species of evergreen that is most abundant in the western part of the Province of Ontario is the White Pine, *Pinus strobus*. It grows chiefly on dry sandy soils, and is one of our valuable timber trees. It has not been planted as an ornamental tree to any extent, and only in one instance within the writer's knowledge as a windbreak or shelter belt. When grown singly in the open ground, it is by no means wanting in attractiveness. The branches form regular strata one above the other, and the play of light and shade, the shade deepening as the density of the foliage increases until the green becomes almost black, produces an effect that is not without a certain grandeur. It is not a tree for city lots or suburban lawns, but for country residences, where the size of the lawn is in keeping with the majestic sweep of its branches.

The Red Pine, *Pinus resinosa*, is very abundant in the northern counties. I have never seen it used as an ornamental tree, and its habit makes it unsuitable for small grounds, but in parks of considerable size it could be planted with good effect. The beautiful red color of the bark, which gives it its name, contrasts finely with the long dark green foliage.

The Gray Pine, *Pinus banksiana*, I have never seen, though it is said to be abundant in the vicinity of Hudson's Bay. Loudon says of it that as an ornamental tree it is one of the most interesting "from the graceful manner in which it throws about its long, flexible branches, which are generally covered throughout their whole length with twisted, glaucous-green leaves, with here and there a whorl of curiously hooked horn-like cones."

The Hemlock Spruce, *Abies canadensis*, is also found in considerable quantity. In my estimation it is the most beautiful evergreen tree of our temperate climate, either native or foreign. Had it been brought from some foreign country, doubtless it would long before this have been extensively planted and our horticultural and arboricultural publications would have been filled with its praises. We venture to affirm that there is not another evergreen that will thrive in this latitude that can equal it in elegance and gracefulness; and yet it has been seldom planted for ornamental purposes. The upper and under sides of the leaves are in marked contrast, and when the tree is swayed by the wind, the foliage presents a pleasing play of light and shade.

The Balsam Fir, *Abies balsamea*, is also quite common, especially in the northern parts of this province. While young it is very handsome, and for a number of years is a very ornamental tree, but unfortunately as it reaches maturity the lower limbs lose their foliage and gradually die, giving to the tree a very unsightly appearance.

The Black Spruce, *Abies nigra*, also seems to be most at home in the northern counties. When growing in deep alluvial bottoms it makes a handsome tree, but like the balsam fir, it grows unsightly with age.

The American Arborvitæ, *Thuja occidentalis*, grows abundantly in moist places. This evergreen is well adapted for planting in grounds of quite moderate dimensions, as a hedge plant. It is very patient under the knife and can be trimmed into any desired form. On account of our winter snows, it is important that when used as a hedge it be trimmed to a steep slope.

The Red Cedar, *Juniperus virginiana*, is most abundant in the southern counties. It has not been much used in ornamental planting, but is well adapted for that purpose on grounds of considerable size, inasmuch as the trees take on a great variety of form and give a very picturesque effect to the landscape. It has been used to some extent for hedging, but so far as my observation extends the result has not been satisfactory; the trees do not seem to bear being planted so close together.

The Common Juniper, *Juniperus communis*, also varies greatly in its habit of growth, and might be used with good effect in landscape gardening, but like the red cedar does not bear being crowded, or planted so close as would be necessary in making a hedge.

The Prostrate Juniper, *Juniperus prostrata*, is a very pretty trailing evergreen, of a dark green color, that might be used with good effect in ornamental planting. It is quite abundant in some parts of Ontario, particularly, as I am informed, along the shores of Lake Huron.

The White cedar, *Cupressus thyoides*, I do not know that this tree is found in Canada. If it is it will be only in the southern portions, and in low, marshy ground. It is not probable that it will be much used for ornamentation except it be for making hedges. It has been used in the State of New Jersey for this purpose with excellent results.

The American yew, *Taxus baccata var. Canadensis*, is a very pretty small evergreen when grown in cultivated ground, and can be pruned into any shape. The foliage is dark green, of a somewhat sombre hue. The seed is naked and is borne singly in a berry-like, pulpy, cup-shaped disc. Though not so abundant as those already mentioned, it is by no means uncommon, and is generally known under the name of ground hemlock.

These constitute the most noticeable of our evergreen trees. They are all hardy and should all endure your climate so far as cold, even extreme cold, would effect them. The fact that they are native American trees is against their being planted by Americans, because, I suppose, it is not fashionable.

After a time a better sentiment will prevail, and gentlemen of wealth and good sense will be able to recognize the beauty of our native trees and their adaptation to American soil and climate, and will plant them, thereby securing permanent embellishment to their estates.

LETTER FROM MR. HILLMAN.

MINNEAPOLIS, MINN., Dec. 26, 1888.

A. W. Sias, *President Southern Minnesota Horticultural Society.*

DEAR SIR: Your favor of recent date is received, asking me to contribute a paper for your next annual meeting, now near at hand. In reply would say I have little spare time at present in which to tell what I know of horticulture. My experience, as you know, has been somewhat limited in the æsthetic art—perhaps more theoretical than practical—and yet I was early taught of the mysteries and beauties of vegetables, fruits and flowers. I think it was Daniel Webster once said something to

the effect "that he never could get the hang of a scythe and always thought it hung best from the limb of a tree;" and although he was reared on a farm he soon forgot to a large extent the character of his early training.

* * * * *

We have from time to time had occasion to visit a number of orchards in Olmsted county which appeared to be well laden with fruit; and it has often been a source of gratification to note all the sure indications of steady progress being made in the production of choice and hardy varieties. We do not doubt there are in your county many favorable situations to be found where with proper care and attention, an orchard might be made highly remunerative.

The difficulties to be encountered in fruit growing in this state are by no means insurmountable, but the experience of the past, repeated and numerous disasters and failures, admonish us that there are obstacles to be overcome, or guarded against, if anyone would meet with any marked degree of success and profit in the industry. There must of course be intelligent culture and the exercise of watchfulness and care at every step.

Prof. Budd, of Iowa, has given some valuable suggestions on this subject. He says: "A tree that will endure our test winters well must maintain perfect foliage during our hot, changeable summers, and must be as determined of habit of ripening its wood as the box elder or hickory, and must have a cell structure practically incapable of freezing." He further states: "We absolutely can not expect to produce a seedling hardy enough to endure our test winters when in bearing, unless it shows in leaf, bark and wood cell its descent from the crabs or Russians."

If the position taken upon this subject by our best authorities be correct, we have at once a ready solution for the cause of many of the discouraging failures and drawbacks of the past. It would seem to be very clearly demonstrated that the old and common methods, and careless, thoughtless, hap-hazard system of orcharding, so generally practiced heretofore, must be abandoned altogether in the future. In order to succeed with orcharding in Minnesota attention must be given to the character of the soil, location or exposure, drainage, selection of varieties, methods of training, pruning, protection, etc. All these matters of detail will be investigated patiently and thoughtfully, if one is really in earnest to attain the highest measure of success. And we might add in this connection, we have grave doubts if much

encouragement can be found by farmers and fruit growers of this state in any easier or less painstaking methods.

It is well known that many of our careful growers have from time to time produced abundant crops of apples, that as to size and excellence of quality were unsurpassed by productions of orchardists of other sections in the East or South. And it has also been demonstrated that we have here a number of hardy kinds that have sufficient merit to recommend them for general introduction and cultivation, at least for trial. Of course it must be borne in mind that one must get his trees from hardy stocks and such as will be found when fruiting, true to name. Some of the new Russians are yielding satisfactory returns, and those that have been tested will prove more satisfactory than mere experiments with semi-hardy and unknown varieties.

There is much to be hoped for in the investigations being made from year to year by careful growers, as well as from the experiments being carried forward at our experimental and horticultural stations. The meetings being held from time to time for the purpose of eliciting useful information on these important topics is all important and in the right direction, and gives assurance for the hope that we may speedily behold the day when we shall raise a rich abundance of choice and healthful fruit.

It would afford me pleasure to attend your annual meeting were I not otherwise engaged. I trust you may have a large and very successful meeting.

Very truly yours,
S. D. HILLMAN.

ANNUAL ADDRESS, AT HUTCHINSON.

By M. Cutler, Sumter.

Members of the McLeod County Horticultural Society,

LADIES AND GENTLEMEN: We have met once more for the purpose of comparing notes and obtaining such horticultural information as will be of benefit to us in the future. We have come together under much more favorable conditions than last winter. Then it was a howling blizzard and forty or more degrees below zero; now, we are enjoying an old fashioned Indian summer.

The vicissitudes of the past season have been many, and exhibited in various ways. In our own state the farmers' prospects have been blasted by drought in one part and blighted by floods and heat in others. Jack frost ruined the corn crop of one and the grape crop of another. Still, with all these calamities, there will probably be little suffering in our state for lack of food or clothing, and we should feel thankful for what we have.

While crab apples and plums were nearly a failure in our county vegetables were fine, and there are probably more nice potatoes stored in the cellars of McLeod county than ever before.

From observation we believe there are many more failures than successes in strawberry culture. While we had a fair crop of fine berries (harvesting over 3,000 quarts for about an acre), we saw fine looking beds that produced only a few seedy buttons, and they were Crescents, one of the most productive kinds grown. The cause of failure was that no staminate or perfect blossoming kinds were set with them.

BLACKBERRIES.

My experience the past two years has convinced me that this fruit can be grown in our county with as much certainty as any other crop. I obtained my first crop of Ancient Britons this season amounting to about two hundred and twenty-five quarts and am fully convinced that the stories our Wisconsin friends have told us of their productiveness are true. Although I have seen acres of blackberries growing in a wild state I never saw bushes more heavily laden or of finer looking berries. A. G. Tuttle, of Baraboo, Wis., claims to have grown at the rate of 6,000 quarts per acre. Chas. H. Hamilton, of Ripon, Wis., is the leading grower of the Northwest having several acres under cultivation. See his valuable paper in the reports for 1886.

STATE HORTICULTURAL SOCIETY.

To those interested in horticulture no better investment can be made than to join this society and attend its meetings. For the first time I attended the last summer meeting at the state experimental farm last June, and I do not believe finer strawberries were ever exhibited. Of the new kinds, Kramer's Seedling, Lyon's Seedling, Jessie, and Bubach were very fine, and we think no one will make a mistake in investing in a few plants of

those kinds. I am pleased that McLeod county succeeded in carrying off some of the premiums.

FORESTRY.

We do not think enough interest is manifested by our farmers in the cultivation of forest trees. While we have many fine groves of willow and cottonwood trees, we believe that the value of our farms would be increased enough to many times pay for the trouble of cultivating if at least ten acres of each quarter section were set to ash, maple, evergreens, etc. We hope forest tree cultivation will be encouraged in every possible way by our citizens until there shall be many more fine groves to temper the arctic breezes that come upon us every winter. The people of this beautiful village of Hutchinson, surrounded on nearly every side by magnificent forest trees are in a condition to appreciate the benefits of forest tree preservation and cultivation.

APPLES AND PLUMS.

The prospects for successful apple culture in our county are not very promising, and until a tree is originated that can successfully run the gauntlet of jack rabbits, mice, blizzards, drought and blight, it will be more profitable to raise wheat, hogs, poultry, etc., and buy your apples. Several fine plums have been found that are of good quality and hardy, and I think you will make no mistake in purchasing a few trees of each kind recommended by our State Society.

We hope our coming together has been productive of some good, and that from the work done by this and kindred societies much interest may be awakened in the cultivation of trees, fruits and flowers.

The following interesting paper was received too late to be read at the annual meeting of the Society:

HARDY PERENNIALS.

By Mrs. Lavina Warwick, Medo.

Why is it that so few hardy perennials are cultivated? When once planted they are lasting and do not need the fine weeding and care required to grow annuals. The peony is one of the noblest and showiest of flowers, also fragrant, since we have the

Chinese varieties. I find them all entirely hardy. By having a dozen or more varieties one can have them in bloom from early May until after the Fourth of July, by having a list selected, to include early, medium and late.

Earliest of all is a variety called *Smitzii*; single, dark crimson flower; foliage resembling *Pae. tenuifolia*. Next in order comes the Old Double Red Toe Peony, that many of us remember from childhood. I find they require a trifle more care than the Chinese varieties, but when once well established, prove hardy as need be. When I first attempted to grow them here I lost a number of fall set plants, while now I save all, by putting a mulch of two or three inches of leaves over them, with a few handfuls of soil scattered over to keep the leaves in place; then I lay down a couple of sticks of fire-wood, one on each side of plant, and on these lay boards to keep the rain off during the fall and spring. About the first of May I remove boards and draw back the leaves. I am sure one will soon feel rewarded for the trouble. I have never lost a plant when treated in this way.

Next in order I have a couple of single varieties, very showy, bright red, yellow centres, that blossom one after the other. Then comes Double White, very free, full, double and showy; should be in every collection. Fragrant White; not so large a flower, pure white, pink centre and exceedingly fragrant. Then we have pink peonies, immense in size, showy and free, but can't give names of them. Perfection; a delicate, showy variety, pink and white; fragrant. Fragrans, a bright red variety, growing three and a half feet tall, double, showy and fragrant; should be in every collection. However small, after peonies are well established I seldom take the trouble to cover them in winter, unless the soil needs enriching.

In preparing the ground I find the old saying applies, that anything worth doing is worth doing well. I find this especially so with perennial flowers, for when once started they last many years. I prefer to prepare the ground before setting the plants, by adding for each plant one pail full of wood ashes, about a bushel of chip manure, also the same of stable manure; the whole thoroughly mixed with the soil by spading deeply, over and over. The bed should be raised a trifle higher than the surrounding ground that water may not stand and freeze over the plants, as many plants are lost from this cause. If there is any trouble from ants sapping the juice from peony

buds, I find one pan full of wood ashes scattered around the plants a sure remedy.

The above varieties should be planted deep enough, so the upper buds are two inches below the surface, as almost invariably those inexperienced set the plants too high, and lose them in the course of a year or two.

I find it necessary with Chinese varieties to lift the whole root; then it is an easy matter to divide them. In resetting a large plant, it is better always to divide them, as they often rot in the centre when not divided, and it is then a long time before they blossom. I always give all peonies a mulch of leaves the first winter, not so much to protect from cold as to keep the spring frosts from heaving them before they are well rooted. I find our black soil admirably adapted to their growth, for I have counted sixty-four immense blossoms and buds on one plant at one time.

The hardy Irises are long lived, with delicate, fragrant flowers. Lilies of the choice, fragrant varieties need a sandy soil, with a covering of leaves in winter. The Lemon Lily is a choice flower, with showy, delicate yellow, fragrant flowers in June; entirely hardy.

The Oriental Poppy is a desirable perennial, hardy; flowers a reddish orange, very brilliant.

The Purple Sweet Rocket is a biennial, with showy reddish purple, fragrant flowers, hardy, and will grow from seed. The different varieties of perennial phlox, which blossom from the first of August until the first of October, are entirely hardy, and their delightful fragrance and beauty make them useful at a time when flowers are scarce.

I find a good many have difficulty in getting snowballs to grow. Layering is the only way to get new plants. When in bloom I take stems of the last season's growth, bend them down and peg them fast; then cover the stem with four or five inches of soil, bending the branch up to form a top and bracing it by putting a chunk of wood against it. By the last of September we will find them a mass of fibrous roots in good condition to move; after being set out, the top must be laid over on the ground and about three pails of soil heaped upon the root, covering the stem with the exception of three or four inches of the tips. In the spring uncover and lift up the top repeating this each fall as long as you can bend the plant over; when too large to bend down they are hardy, and with good rich soil you will have no trouble in growing snowballs,

and they will blossom very early. I have nine snowballs that when only two and a half feet tall averaged just fifty-eight large blossoms apiece; they are now large and thrifty, and for the last two years have been completely covered with snowbanks, but have come out all right. Persian and common lilacs were nearly all killed from the effects of the snow. The Japanese snowball, *viburnum plicatum*, after making a good summer's growth, winter killed, with protection. Hydrangea Grandiflora I don't find very reliable here.

The Japanese Quince and Purple Fringe (smoke tree) both winter killed the first winter. Missouri Flowering Currant, when in good thrifty condition and well pruned, will be loaded with its pendant, bright yellow blossoms, filling the yard with perfume. I have one variety of Syringa, hardy and fine, although I have forgotten the name.

Our choicest roses require winter protection. I have one variety that repays the trouble, that is the Luxemborgue Moss, full double, free and fragrant, crimson. The Jack Clematis is a climbing vine of great beauty, with deep blue, velvety flowers; an abundant bloomer; also another variety of the same, called Coccinea, with small, bright vermillion red flowers; both require a good coat of leaves as a winter protection.

NOTE.—We desire to call attention to the report of the department of agriculture and of the state experiment station, recently issued by the board of regents of the University of Minnesota, as a supplement to their fifth biennial report. It contains four hundred and seventeen pages and furnishes much valuable information of interest to horticulturists and others, including Prof. Lugger's report on entomology and botany, etc., etc. Five thousand copies have been printed and all members of the Society will receive a copy of the report.—SECRETARY.

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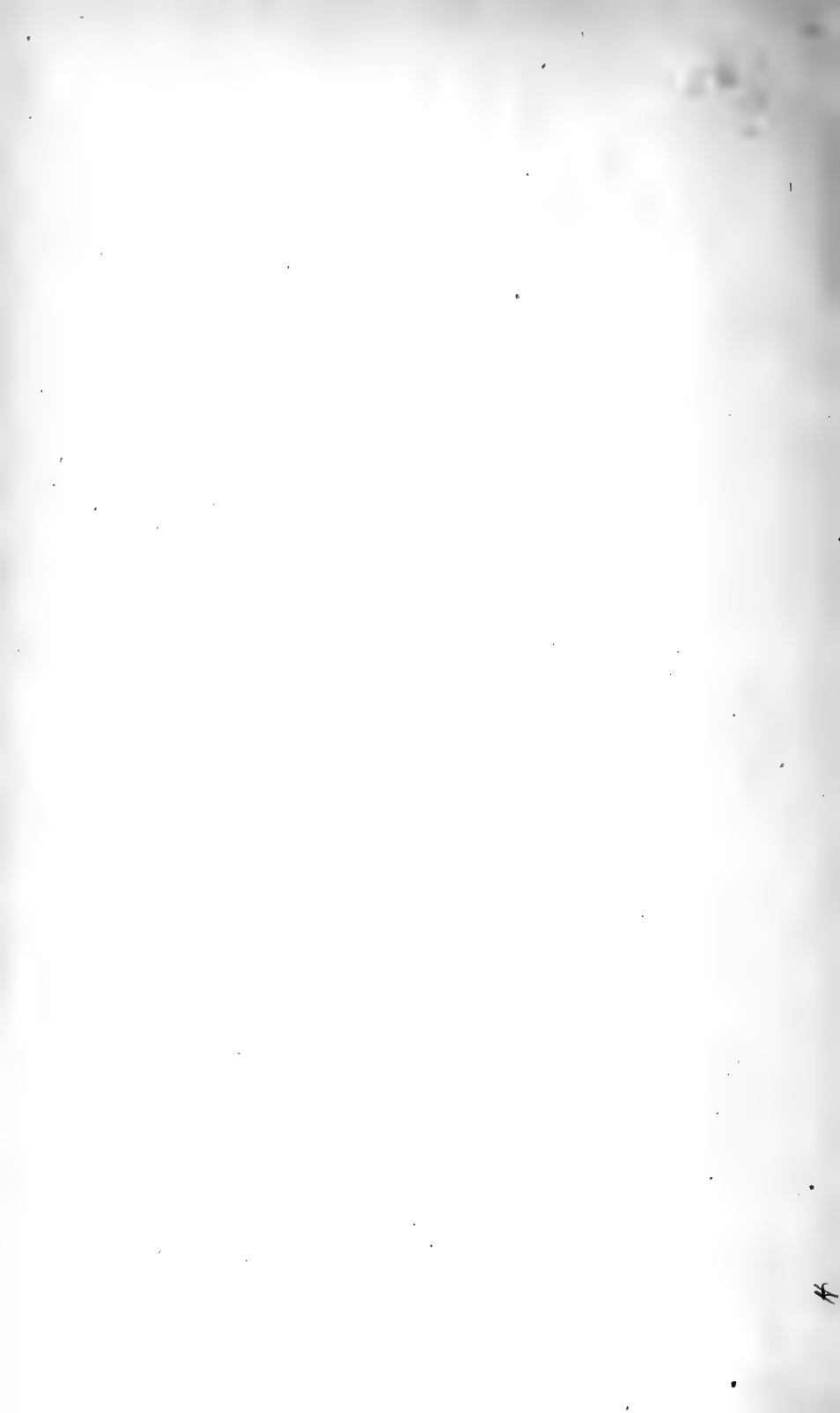
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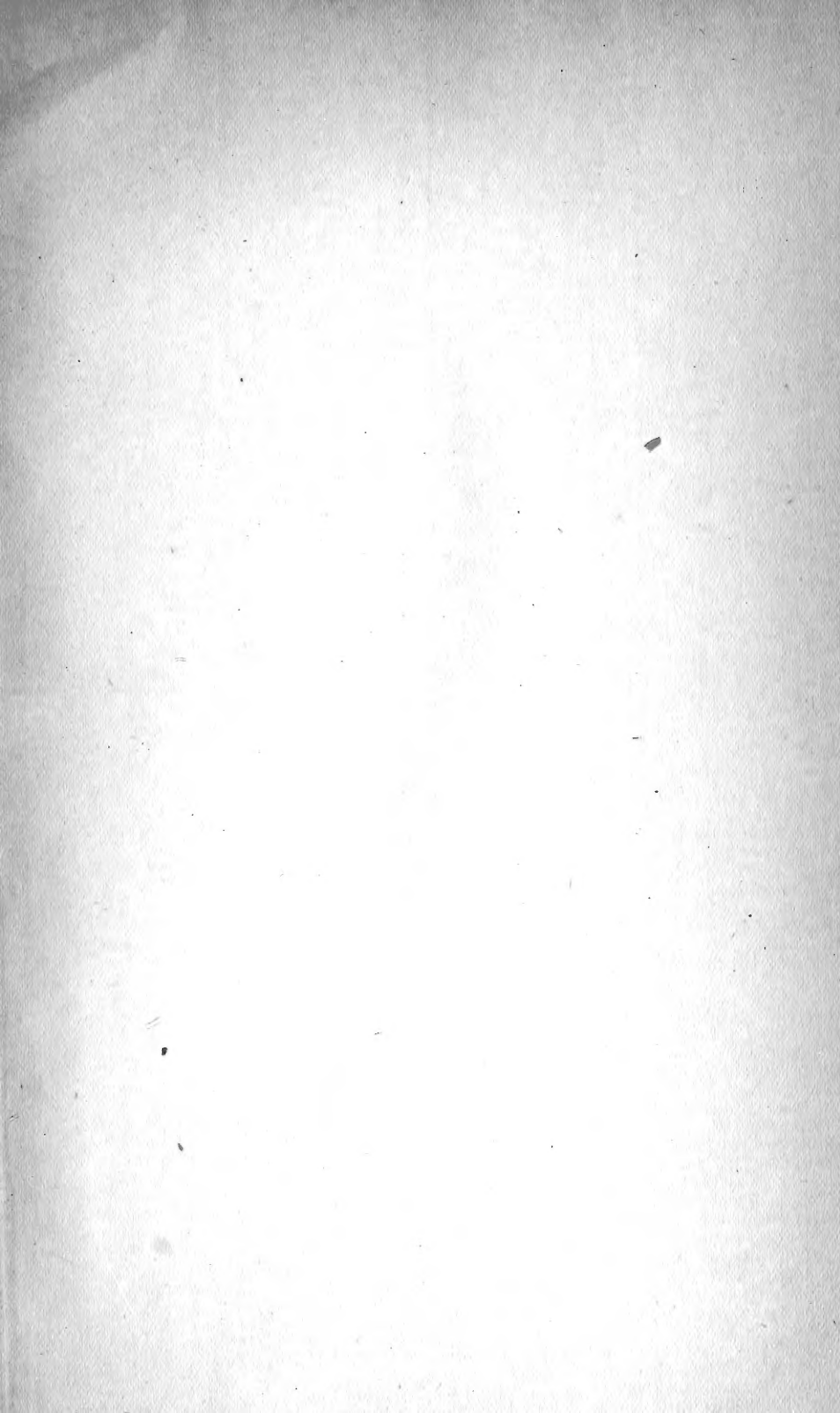














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