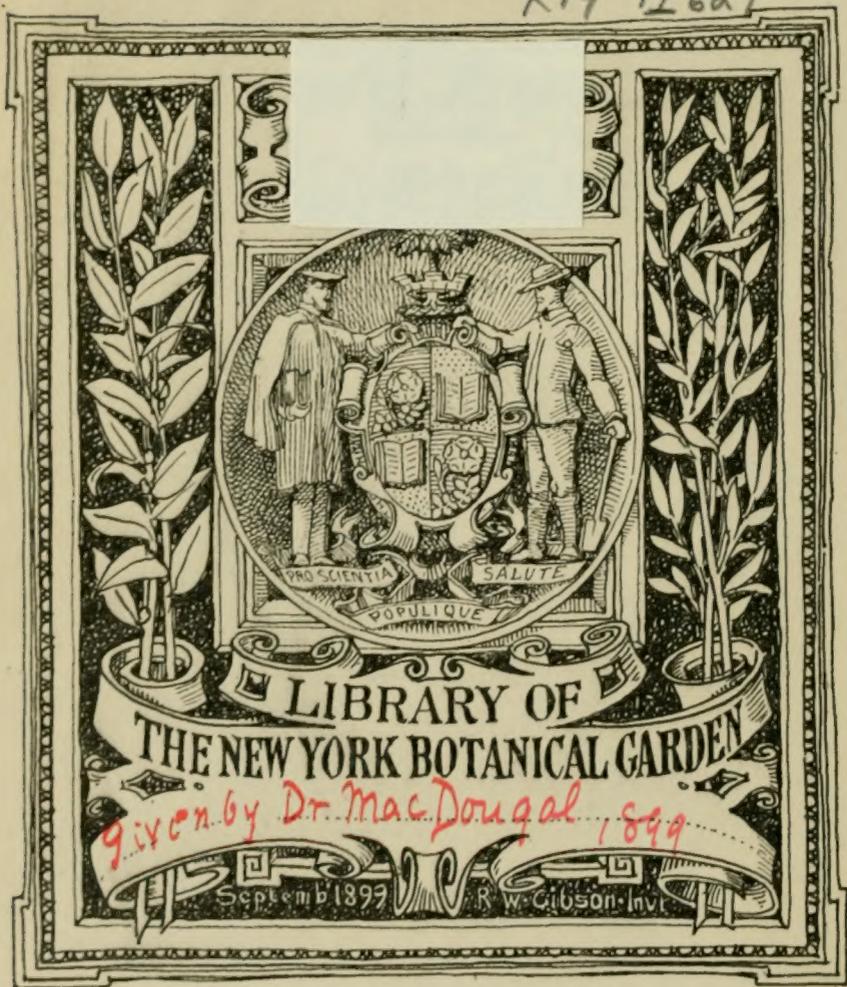
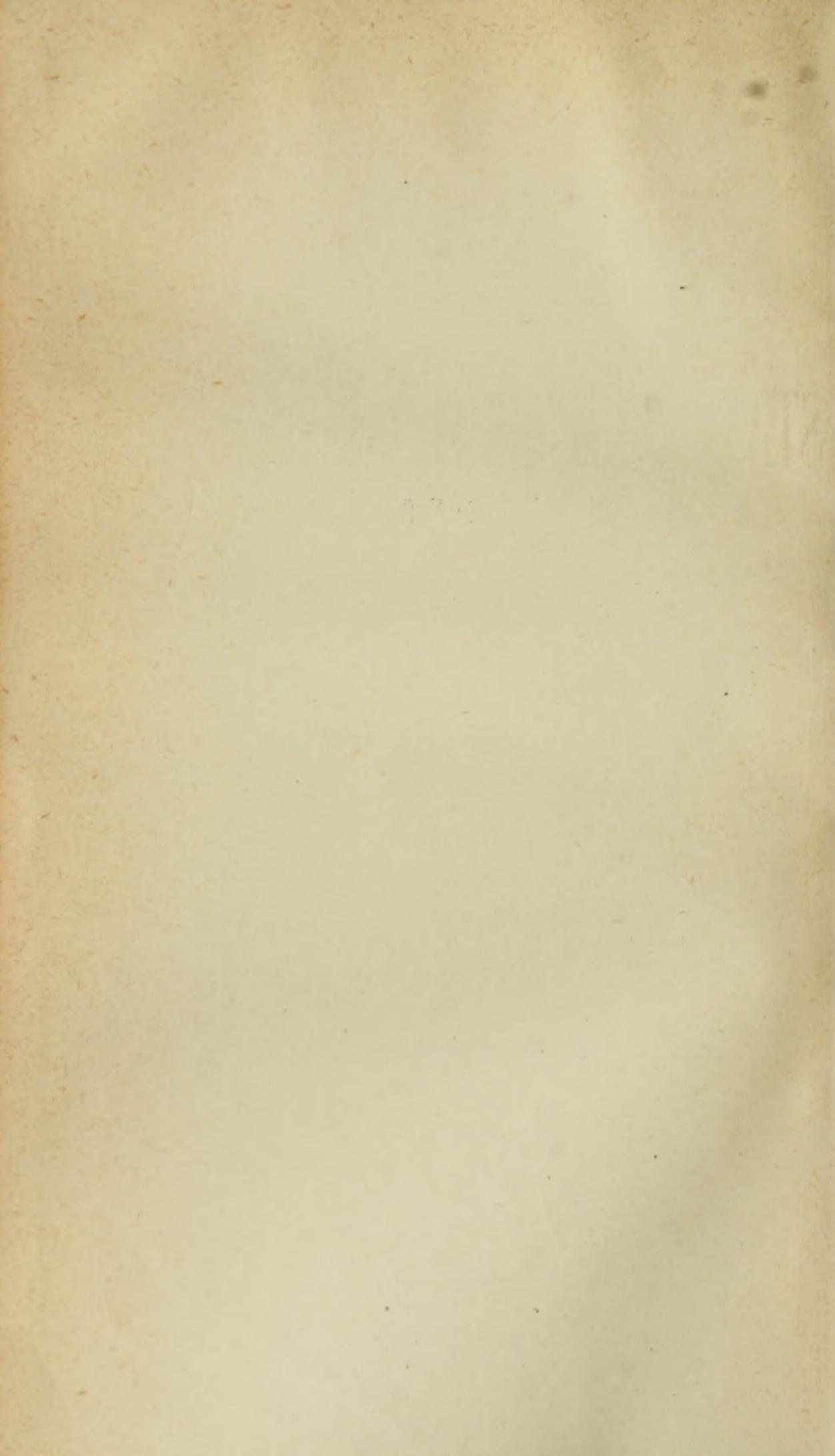
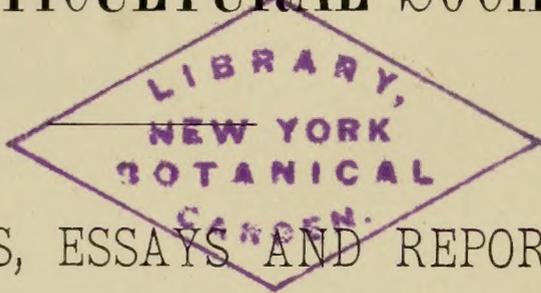


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TRANSACTIONS
OF THE
MINNESOTA
STATE HORTICULTURAL SOCIETY.



PROCEEDINGS, ESSAYS AND REPORTS

AT THE

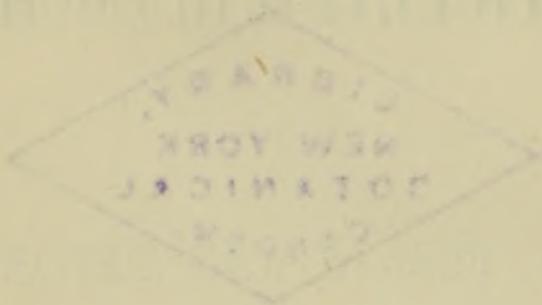
ANNUAL WINTER MEETING

Held at Minneapolis, January 18th, 19th and 20th, 1881.

PREPARED BY U. S. HOLLISTER,
SECRETARY.

ST. PETER :
J. K. MOORE, STATE PRINTER.
1881.

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OFFICERS FOR 1881.

PRESIDENT.

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

VICE PRESIDENT.

A. W. SIAS, First District.....Rochester.

S. M. EMERY, Second District.....Lake City.

G. W. FULLER, Third District.....Litchfield.

SECRETARY.

U. S. HOLLISTER.....St. Paul.

TREASURER.

M. L. TIBBETTS.....Dover Center.

STANDING COMMITTEES AND DELEGATIONS.

EXECUTIVE.

T. M. SMITH.....St. Paul.

WYMAN ELLIOT.....Minneapolis.

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

D. W. HUMPHREY.....Faribault.

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

President and Secretary, *ex-officio*.

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

Representative and Vice President Miss. Valley Horticultural Association.

DELEGATE TO MEETING OF WISCONSIN STATE HORTICULTURAL SOCIETY.

C. H. GREENMAN.....Dover Center.

DELEGATES TO MEETING OF MINNESOTA STATE AGRICULTURAL
SOCIETY.

U. S. HOLLISTER.....	St. Paul.
A. W. LATHAM.....	Excelsior.
J. M. UNDERWOOD.....	Lake City.
J. H. STEVENS.....	Minneapolis.
WYMAN ELLIOTT.....	Minneapolis.

COMMITTEE ON SEEDLING APPLES.

D. DAY.....	Farmington.
F. G. GOULD.....	Excelsior.
G. W. FULLER.....	Litchfield.
M. PEARCE.....	Minnetonka.
J. S. HARRIS.....	La Crescent.

COMMITTEE IN CHARGE OF SUMMER MEETING AT LAKE CITY.

O. GIBBS, Jr.....	Lake City.
J. M. UNDERWOOD.....	Lake City.
S. M. EMERY.....	Lake City.

COMMITTEE ON LEGISLATION.

J. T. GRIMES.....	Minneapolis.
U. S. HOLLISTER.....	St. Paul.
TRUMAN M. SMITH.....	St. Paul.
J. H. STEVENS.....	Minneapolis.
S. M. EMERY.....	Lake City.

COMMITTEE ON EXPERIMENTAL FARM.

WYMAN ELLIOTT.....	Minneapolis.
M. W. COOK.....	Rochester.
H. D. ELDRIDGE.....	Excelsior.

GENERAL FRUIT COMMITTEE.

1. L. D. MILLS.....	Garden City, Blue Earth county.
2. DR. R. W. TWITCHEL.....	Chatfield, Fillmore county.
3. WM. E. BRIMHALL.....	St. Paul, Ramsey county.
4. DITUS DAY.....	Farmington, Dakota county.
5. G. W. FULLER.....	Litchfield, Meeker county.
6. GEO. H. FISH.....	Sauk Centre, Stearns county.
7. J. C. KRAMER.....	La Crescent, Houston county.
8. J. M. NORQUIST.....	Red Wing, Goodhue county.
9. OLIVER GIBBS, Jr.....	Lake City, Wabasha county.
10. A. W. SIAS.....	Rochester, Olmsted county.
11. D. W. HUMPHREY.....	Faribault, Rice county.
12. T. G. CARTER.....	St. Peter, Nicollet county.

13. M. ERWIN MATHEWS.....Foster, Big Stone county.
14. R. M. PROBSTFIELD.....Moorhead, Clay county.
15. A. MORSE.....Austin, Mower county.
16. F. G. GOULD.....Excelsior, Hennepin county.

COMMITTEE ON NOMENCLATURE.

- WYMAN ELLIOT.....Minneapolis.
- A. W. SIAS.....Rochester.
- O. GIBBS, JR.....Lake City.

MEMBERS FOR 1881.

Abernethy, W. J	Minneapolis, Hennepin county.
Bunnell, M. C.	Lake City, Wabasha county.
Brown, H. F.	Minneapolis, Hennepin county.
Bost, Theo.	Excelsior, Hennepin county
Brimhall, Wm. E.	St. Paul, Ramsey county.
Carter, T. G.	St. Peter, Nicollet county.
Cannon, Wm.	Fort A. Lincoln, D. T.
Chute, Richard.	Minneapolis, Hennepin county.
Corp, Sidney	South Troy, Wabasha county.
Clark, C. H.	Minneapolis, Hennepin county.
Crawford, Mathew.	Cuyahoga Falls, Ohio.
Day, D.	Farmington, Dakota county.
Day, L. E.	Farmington, Dakota county.
Day, A. A.	Farmington, Dakota county.
Durnam, John.	Minneapolis, Hennepin county.
Elliott, Wyman.	Minneapolis, Hennepin county.
Eldridge, H. D.	Excelsior, Hennepin county.
Emery, S. M.	Lake City, Wabasha county.
Fuller, G. W.	Litchfield, Meeker county.
Fish, Geo. H.	Sauk Center, Stearns county.
Fawcett, Isaac.	Minneapolis, Hennepin county.
Faller, A.	Minneapolis, Hennepin county.
Fowler, Wm.	Newport, Washington county.
Greenman, C. H.	Dover Center, Olmsted county.
Hostetter, Orla	Frazee City, Becker county.
Hampton, Geo.	Hastings, Dakota county.
Gibbs, Oliver, Jr.	Lake City, Wabasha county.
Gould, F. G.	Excelsior, Hennepin county.
Grimes, J. T.	Minneapolis, Hennepin county.
Hollister, U. S.	St. Paul, Ramsey county.
Humphrey, D. W.	Faribault, Rice county.
Howe, J. H.	Minneapolis, Hennepin county.
Hendrickson, W. G.	St. Paul, Ramsey county.
Jordan, E. B.	Rochester, Olmsted county.
Kennedy, James.	Minnesota City.
Kenney, Seth H.	Morristown, Rice county.
Knaupheide, R.	St. Paul, Ramsey county.
Lyon, Wm.	Minneapolis, Hennepin county.
Lowell, H. E.	Washburne, Hennepin county.

Latham, A. W.....	Excelsior, Hennedin county.
Martin, Henry.....	Mason City, Iowa.
McHenry, Wm.....	St. Charles, Winona county.
Mendenhall, R. J.....	Minneapolis, Hennepin county.
Neill, Rev. E. D.....	Minneapolis, Hennepin county.
Norquist, J.....	Red Wing, Goodhue county.
Pearce, M.....	Minnetonka, Hennepin county.
Porter, Prof. Edward D.....	Minneapolis, Hennepin county.
Porter, J. F.....	Red Wing, Goodhue county.
Smith, T. M.....	St. Paul, Ramsey county.
Sias, A. W.....	Rochester, Olmsted county.
Thompson, Josiah.....	Minneapolis, Hennepin county.
Tyler, L. O.....	Minneapolis, Hennepin county.
Underwood, J. M.....	Lake City, Wabasha county.
Underwood, Anna L.....	Lake City, Wabasha county.
Tibbetts, M. L.....	Dover Center, Olmsted county.
Whipple, K. H.....	Minnetonka, Hennepin county.
Wernlie, J.....	Lemars, Iowa.
Smith, Caleb.....	Farmington, Minn.
Turnbull, John.....	La Crescent, Houston county.

HONORARY MEMBERS.

Miss Hortense Share.....	Rosemount, Minn.....	elected 1881
Mrs. C. O. Van Cleve.....	Minneapolis, Minn.....	elected 1881
Mrs. L. E. P. Sprague.....	Minneapolis, Hennepin county,	elected 1881
Mrs. Atwater.....	Minneapolis, Hennepin county,	elected 1881
Peffer, Geo. P.....	Pewaukee, Wis.....	elected 1881

LIFE MEMBERS.

Mrs. Wm. Paist.....	Hersey, Minn. .
Col. J. H. Stevens.....	Minneapolis.
J. S. Harris.....	La Crescent.
Chas. Y. Lacy.....	Ft. Benton, M. T.

PROCEEDINGS
 AT THE
 WINTER MEETING,

HELD AT MINNEAPOLIS, TUESDAY, WEDNESDAY AND THURSDAY,
 JANUARY 18, 19 and 20, 1881.

PROGRAMME.

TUESDAY MORNING—2 O'CLOCK.

Opening exercises. Payment of membership, dues, &c.

TUESDAY AFTERNOON.

1. Address by the President, J. T. Grimes, of Minneapolis.
2. Appointment of the Committees on the subjects of the address.
3. Discussion: What is the experience the past season with new varieties of Fruits?
4. Appointing committees on articles on exhibition, on final resolutions and auditing committee.

TUESDAY EVENING.

1. Strawberry Culture for Market: paper by Mathew Crawford, Cuyahoga Falls, Ohio.
2. Discussion on same.
3. Apple Trees and Climate: paper by J. W. Boxell, Valley Creek, Minn.
4. Discussion on same and the effect of the winter of 1879 and 1880 on fruit growing.

WEDNESDAY MORNING.

1. Grape Culture; paper by John S. Harris of La Crescent.
2. Discussion on same, and the botany of Minnesota forestry and its relation to fruit culture.

3. The Improvement of Crab Trees by Top Grafting; paper by Oliver Gibbs, Jr., Lake City.
4. Discussion on same, and do trees have any return flow of sap from the limbs downward?

WEDNESDAY AFTERNOON.

1. Report of Committee on Horticultural Literature.—R. J. Mendenhall, Minneapolis; T. G. Carter, St. Peter; J. S. Harris, La Crescent. Discussion on same.
2. Report of Committee on Russian Apples. J. T. Grimes, Minneapolis; E. H. S. Dart, Owatonna; J. M. Underwood, Lake City; A. W. Sias, Rochester; A. W. Latham, Excelsior. Discussion on same.
3. Report of Committee on Seedling Apples.—D. Day, Farmington; F. G. Excelsior; M. Pierce, Rochester; J. S. Harris, La Crescent; G. W. Fuller, Litchfield. Discussion on same.
4. Report of Committee on Taxing Nursery Stock.—G. W. Fuller, Litchfield; E. H. S. Dart, Owatonna; A. W. Sias, Rochester. Discussion on same.
5. Report of Committee on Experimental Farms.—Wyman Elliot, Minneapolis; M. W. Cook, Rochester; H. D. Eldridge, Excelsior. Discussion on same.

WEDNESDAY EVENING.

1. Bugs.—Paper by R. J. Mendenhall, Minneapolis.
2. Discussion on same.
3. The Culture of Flowers in Doors and Out.—Paper by Miss Hortense Share, Rosemount.
4. Discussion same.
5. Report of General Fruit Committee.—L. D. Mills, Garden City, Blue Earth county; O. D. Storrs, Winsted, McLeod county; Dr. R. W. Twitchel, Chatfield, Fillmore county; Wm. E. Brimhall, St. Paul, Ramsey county; Ditus Day, Farmington, Dakota county; G. W. Fuller, Litchfield, Meeker county; Geo. H. Fish, Sauk Centre, Stearns county; J. M. Brown, La Crescent, Houston county; J. M. Norquist, Red Wing, Goodhue county; Oliver Gibbs, Jr., Lake City, Wabasha county; E. B. Jordan, Rochester, Olmsted county; D. W. Humphrey, Faribault, Rice county; T. G. Carter, St. Peter, Nicollet county; M. Erwin Mathews, Foster, Big Stone county; R. M. Probstfield, Moorhead, Clay county; A. Morse, Austin, Mower county. F. G. Gould, Excelsior, Hennepin county. Discussion on same.

THURSDAY MORNING.

1. Evergreens about our Homes as a Source of Pleasure and Profit.—Paper by D. W. Humphrey, of Faribault.
2. Selection, Planting and Care of Evergreens and their Value as Wind-breaks for Protection of Farm Buildings and Orchards.—Paper by O. Gibbs, Lake City.
3. Discussion of above papers.
4. Reports of Secretary and Treasurer.
5. Appointing committees.
6. Election of officers by ballot without nomination.

THURSDAY AFTERNOON.

1. Need of popular Education in Horticulture —A Contributed Paper for Discussion.

2. Report on Horticultural Exhibit, Mississippi Valley Horticultural Association, St. Louis, by President J. T. Grimes.

3. Review of same and discussion on the following questions: (1.) Winter protection and what fruits need it, and what are the best methods. (2.) Cultivation of grass in orchards; under what circumstances should each be practiced. (3.) Shall this society offer a list of hardy, ornamental trees, shrubs and plants?

THURSDAY EVENING.

1. Report of delegates to the Wisconsin State Horticultural Meeting.—J. M. Underwood, Lake City; E. B. Jordan, Rochester.

2. Discussion on same.

3. Miscellaneous business. Locating next annual meeting, etc., etc.

4. Report of all committees on current meeting.

5. Report of committee on final resolutions.

The following questions will come up for discussion at any time during the meeting when opportunity occurs.

1. Is the drying and canning of fruits beneficial or otherwise to fruit growers?

2. What is the comparative value of wood ashes, lime, plaster, and salt as fertilizers for fruit trees?

3. Which is the better way to embellish small places, by using hardy shrubs and perennial plants, or by the use of what are known as bedding plants?

4. Is there any new bedding plants for lawn decoration of superior merit?

5. Is there any new hardy ornamental shrub to be recommended for Minnesota?

6. Is there any new hardy ornamental tree to be recommended for Minnesota?

TUESDAY MORNING.

The annual convention of the State Horticultural Society met in pursuance to notice in the City Hall, in this city, yesterday, at 10 A. M., J. T. Grimes, Esq., of Hennepin county, in the chair. A beautiful and appropriate composition, "Consider the Lilies," was rendered by Mrs. A. C. Dewitt, in a charming manner, when Rev. Dr. E. D. Neill offered an impressive prayer. President Grimes then introduced to the society Mr. A. B. Nettleton, of the Tribune, who, in behalf of the citizens of Minneapolis, extended the hospitalities of the city to the members of the society in the following words:

THE WELCOME.

Gentlemen of the State Horticultural Society: It has been made my pleasant duty to extend to you, on behalf of the citizens of Minneapolis, a hearty and old-fashioned welcome. You are most cordially welcome, not only to the city in which we take a pardonable pride, but also to the homes and firesides of her people. I discharge this duty with the greater pleasure because I have a personal, sincere and abiding belief in the great importance of the work with which you are identified. If he is a benefactor of his race who causes two blades of grass to grow where but one grew before, what shall we say of the men who, with tireless patience and intelligent zeal, study the capabilities of our soil, and the capabilities of a climate like that of Minnesota, and urge nature to bring forth in abundance those products which, without urging she would rigorously withhold from man? You, gentlemen, are certainly benefactors of that portion of the human race occupying this new northwest.

Your president has casually mentioned railroads. It is my belief that the men who are conspicuously identified with these and kindred great commercial undertakings—enterprises that impress the imagination with their magnitude—get an undue share of credit in connection with our material progress. The welfare and prosperity of a community, of a State, of a nation, rest, after all, upon the persistent and modest labors of such as you—men who work for the future as well as the present, in subduing the forces and possibilities of nature to subserve the needs of the human family. Again commending you to the hospitality of our citizens, and trusting that your deliberations may result as profitably as you could wish, I will occupy no more of your time.

THE RESPONSE.

In response to which the society, through John S. Harris, of Houston county, replied.

Mr. President, and people of Minneapolis, through their representative, Gen. Nettleton: We accept the welcome extended, and appreciate it, not so much because it comes from a people proverbial throughout the land for hospitality, but because we feel that it is the spontaneous expression of a people peculiar for their love of the good and beautiful; who have the welfare of this State at heart; have confidence in the State Horticultural Society, and are in sympathy with our labors. Our society was organized in the dark days, when it was believed by almost everyone that whatever other advantages our State possessed it could never be made to produce good fruit. Twelve or fifteen years since, after three

days canvassing among the multitudes in attendance at the State Fair, held in our beautiful neighboring city of Rochester, but twelve persons could be found who could be induced to enter into the organization of a fruit-growing association. The organization was affected and the State Horticultural Society still lives and has become a power in the land. Since its organization it has seen many dark hours. In rotating our meetings around there was a want of sympathy and concentrated effort.

Years ago we were invited to hold a meeting in your beautiful city. We found it the pride of Minnesota. We found here beautiful gardens, conservatories and green houses, and a people who had faith in us, and who extended to us a cordial welcome. This gave us hope, and lent a new impetus to the society. We have met here several times since, and each time secured a like welcome. We have seen your growth and prosperity, and rejoice in it. Our mission is a great one. It is to clothe the vast prairies south and west of us with forests, in which shall nestle beautiful homes, and the orchards and gardens with luscious fruits and flowers. The forests to break off the fierce blizzards that now chill the very marrow of our hardy pioneers, and give us home surroundings that shall make our Minnesota the most desirable of all the States for civilized man to dwell in. Again I say you have our most hearty thanks for the welcome we have received, and we will try to do you good.

A. W. Sias, of Olmsted county, moved that the society now take up for discussion and revision the list of evergreens suitable for cultivation in Minnesota, to which Col. Stevens suggested that the matter be laid over for a future session. The motion was then disposed of by referring it to a special committee, consisting of A. W. Sias, of Olmsted county; Oliver Gibbs, of Wabasha county, and George W. Fuller, of Meeker county, with instructions to report a list for consideration at a future session.

President Grimes introduced Prof. Edward D. Porter, the recently elected professor of the theory and practice of agriculture in the State University, who responded in a few words, placing himself squarely on a platform of progressive agriculture and horticulture for Minnesota.

Upon motion of R. J. Mendenhall it was decided to hold three daily meetings, beginning 10 A. M., 2 and 7 P. M.

Geo. P. Peffer, the veteran horticulturist of Wisconsin, was introduced. He referred to our climate, and wondered if we could grow apples. He came to our meeting to see apples grown on trees that had withstood a temperature of 42° below zero during the memorable winter of 1879 and 1880. He thought the Russian varieties best adapted to high latitudes.

He reported that the Duchess of Oldenburg had withstood 42 below zero, the Tetofsky 54°, the Alexander 40°, Red Astruchan 30°. The Transcendent crab had killed at 51° when the Tetofsky had stood it unharmed.

In answer to questions regarding the hardiness of the Pewaukee and Walbridge, he answered that they had stood through a temperature of 36° below zero. Thinks the Wealthy as hardy as the Duchess of Oldenburgh, and very desirable for Wisconsin and Minnesota.

He remarked that our most reliable resource from which to expect hardy apples was in the growth of seedlings.

Of the long list of so called hardy apple trees he found but very few that he could depend on, even at his sheltered location, at Pewaukee Wis.

TUESDAY AFTERNOON.

Upon motion of Mr. Gibbs, a committee was appointed to present a report on hardy ornamental trees and shrubs. The committee as follows: O. Gibbs, R. J. Mendenhall, M. Pearce.

ADDRESS OF PREST. J. T. GRIMES.

Ladies and Gentlemen of Minneapolis, Fellow Members of the Minnesota State Horticultural Society: At our last annual meeting, you remember our great motto, "Luceat," meaning to light, or may there be light, to lighten as the sun, while on the opposite side of the hall hung another motto, which was even more than a motto, of exquisite workmanship, composed of the fronds of South American ferns, the sentiment of which if properly analyzed would contain more than volumes in itself: "Deeds are fruits, words but leaves." This rare production of art's choice handiwork was kindly contributed by Prof. Knerr, principal of the high school of Minneapolis.

As horticulturists let us invoke light as the governing principal of action in all knowledge, science and experience. Knowledge is acquired; it is chiefly learned from books, or from the teachings of others, and whether the immediate offspring of discovery, or the legitimate issue of science, it must rest upon facts. It is the basis of all intellectual action, the lever of power, and controls air, earth, fire and flood, and moves the world.

In horticulture, it defines the genera of plants, classifying them into families, species and sub-species, which in their different genus or natural structure, cannot be crossed or hybridized no more than go-betweens, who bushwhack the country from year to year, dealing in worthless rubbish false to name. If nurserymen must send out agents, why not compel them by law to give a written guarantee to protect their customers from fraud, making it a misdemeanor amenable to the laws? But the rogues are always out of the way when wanted; they never operate in one place long enough for the evidence of their guilt to come to light; and while we would be looking for them in Minnesota they would be plying their vocation successfully in some other state. How are we to know

the guilty parties or to fix the responsibility of fraud in selling trees? This is a problem that would be difficult to solve at law. Perhaps it would be better to keep an old shot-gun at hand to point out such offenders where the law would fail. It is a well-known fact that those tree-dealers, who pretend to represent nurseries at a distance, and carrying with them samples of fruits in glass that magnify to double the size, and nothing short of the best thing out, do outsell our home nurseries at a distance, even at their own doors and obtain better prices for the same class of trees. We are in favor of progressive and scientific horticulture, of disseminating new and improved varieties of fruits and plants; but unless we see such new fruits endorsed by better authority than the tree-peddler, we had better stick to the well-tried varieties. We are aware that our advice cannot reach the persons whom we desire to benefit and protect for the simple reason that they ignore all horticultural experience. Animals or birds of different species can mingle and partake of one common nature notwithstanding Darwin has attempted to prove that man's original was a monkey; but as his reasoning faculties developed he saw no use for a tail and dropped it. Other professors wisely assert that the negro is of a different species from the white man from the fact, he has not the same number of bones.

In case the species could be blended together by amalgamation, what becomes of the odd bones? Nature no doubt is willing to accommodate herself if all the parts agree. But what would you think of such theories in the practice of horticulture? It is evident.

If such be true, then false are nature's laws
 And man may set aside the first great cause;
 What signifies if even courts ordain
 To unsex a Belmont? Still the sex remain.

But you inquire from whence come those beautiful flowers that so far eclipse the gardens of our youth, when our mothers took us by the hand and led us along the well-kept walks, admiring with rapturous delight each opening bud and flower. We also remember that something was said in our ears about the celestial gardens in the paradise above. Or you inquire how it is that we now enjoy the luscious fruits of the vine, while our fathers were privileged to eat nothing but sour grapes? Our orchard products too have changed from those old astringent sour seedlings, that would now put the blush upon a well-bred crab, to the luscious fruit we see piled up in pyramids at our fairs, as if intended especially to tempt us, not to steal but to plant. I answer, science has found her votaries in nature's laws. It had been said that he who can make two blades of grass grow where only one grew before is a public benefactor. What may be said of those who have brought our flowers and fruits up to their present standard of beauty and excellence? Whose lives have been spent in the pursuit of horticultural knowledge until their heads have become white as the driven snow? Some of them still remain with us to carry on their life-work toward perfection, while others have been transplanted to a more congenial clime, where perpetual spring is decked in regal robes of flowers, and the trees yield their fruits every month in the year. Have they not left us an heritage more valuable than the mines of Golconda or the gold of California? And what may we yet expect in the developments that will be made in horticultural science when nature's ways are more perfectly understood.

If I should revert to my first experience in obtaining fruit, it might form a good lesson to those who are about to embark in fruit culture. When I came

to Minnesota in 1855 I found no fruit except the strawberry and wild plum, and they were indigenous to the country. Believing that a high state of civilization could not be maintained in the absence of fruits I concluded not to remain unless I could grow enough for my own use, at least. The next spring I procured a lot of currant cuttings from Indiana, and also put out a strawberry-bed which did well. I also visited friend Ford's nursery near St. Paul, with the intention of planting out an orchard, but his trees looked so badly weather-beaten that I did not purchase, indeed he honestly told me that the winter had been unusually severe, and he believed that his trees had gone back on him, which I believe was the case. A while after a man whom we will call Ferkins, a veritable tree peddler, from Rochester, N. Y., came along loaded down with plate-books and other representation of fine fruits that certainly looked delicious enough to tempt the palates of the gods. I thought that my coveted opportunity was at hand, and as I did not know much about the fruits that would be suitable for this latitude, the agent in a confidential way very kindly assisted in making out a list which he claimed was perfectly hardy in Canada and everywhere else, so I gave my order for \$60 worth of trees, which was all my limited means would allow. As I was very anxious for fruits we put down a large proportion of dwarf apples and pears, which he said would come into immediate bearing. We next made out a list of standard apples, pears, cherries, quinces and plums. In due time the trees arrived in good condition and never were trees handled more tenderly or planted out with greater care. I believe they all grew, and I took great pride in cultivating and showing them to my neighbors; indeed, I almost idolized them on Sundays. But alas! the sum of earthly bliss in those trees was short, for the next spring found half of them dead and the balance holding on very feebly to the thread of life. It now required a great stretch of faith in fruit growing to go forward and fill up the broken ranks. I believed I should not have done it, but I did not like to be conquered. Ferkins, however, introduced the transcendent crab and also distributed a good many duchess for which we will give him credit. The next one that came along was ———— selling Concord and Delaware grape-vines and I struck a bargain with him, but the vines all turned out to be Clintons. I learned afterwards that he picked them up at an old nursery and really did not know what they were, and so concluded that they might as well be Concords and Delawares as anything else. Those vines still live and I give him credit for an accidental good thing. Our success with standard apples had not been very flattering, and we were beginning to turn our attention to the larger varieties of crabs, when another tree-peddler turned up whom we will call "Ole Hicory," not the general (peace be to his memory), for he would have sworn by the Eternal that such was treason to all known laws in horticulture. But this man was selling crabs. I looked over his list very cautiously, not intending to be imposed upon again. He claimed to represent a nursery in Wisconsin that was making this kind of stock a specialty. We had the transcendent, hyslop and some varieties of Siberians, but he had others very much superior, which could not be obtained elsewhere. The soulard, he said, was very much like the quince in size, quality and flavor; the Tetofsky was recommended as a very fine large dessert crab and an excellent keeper, while the mammoth yellow was about twice the size of the transcendent, much better in quality and a prolific bearer. Of course he was glad to sell the ordinary Siberians at a low price, but the aforesaid varieties were a wonderful acquisition and commanded

a very high price. I concluded they must be something much better than I had seen, and could lose nothing by ordering a hundred trees. They came, not as my order specified, for the Tetofskys were entirely left out, and only ten soulards arrived, but the number was made up of mammoth yellow, which he now said was really the best of all. The fault, he said, was with Sabin, who had taken more orders than he had trees to fill. I concluded to take the soulards and fifty of the latter, which when they came into bearing proved to be nothing but the little golden beauty, of which I had already a superabundance. Of the soulard I leave those acquainted with it to decide. I now came to the conclusion, to let all tree-peddlers severely alone. Nurserymen generally have at stake a reputation upon which their success in business depends. Then why should we patronize those brazen-faced, smooth-tongued organizations, and persist in refusing to read anything on the subject of fruit culture, thus throwing open the door to that very class who are close observers and ever ready to impose upon our ignorance and credulity.

Blight.

Blight in orchard trees has been the subject of close investigation by some of the most thoroughly scientific men, but the exact cause has not yet been discovered, or an effectual remedy provided. Prof. Burrell, of the Illinois Industrial University, claims that it is not only contagious, but can easily be transferred by inoculation. The past winter was unusually severe and has severely injured the vitality of many of our orchard trees. With the first hot, showery days of summer, blight sets in, quite severe in many places, but did not spread to so great an extent as it has done in former years. From my own observation I have come to the conclusion that electricity and humidity have something to do in originating it. Last year I fenced in a plum orchard for a calf pasture, using common fencing wire, and fastening it with staples to a row of transcendant apple trees on one side, and plum trees and lombardy poplars on the other sides. Those apple trees remained entirely free from blight, while all the other transcendants in my grounds were more or less affected. As Col. Sellers says, "there's millions in it," but until we have more conclusive evidence of its efficacy better keep it a profound secret.

"Tell it not in Gath, tell it not in the streets of Askalon," for once the lightning-rod peddlers get hold of it, we should not be able to get off with anything short of a lightning-rod to every apple tree. When I built my dwelling house, how they all found it out I do not know, but they came from far and near—from St. Paul, Shakopee, Stillwater, Minneapolis, and I don't know where, each with something different and far better than anything that had preceeded it or was likely to follow, drawing the lightning from the very clouds and laying it harmless at our feet, in a way that would have astonished a Franklin and put his kite to shame. But strange as it may seem, each rod had some particular virtues which were patented and endorsed by all scientific men. There was the round rod, the square rod, the flat rod, the hollow rod and the twisted rod, with as many different kinds of points. Now I had but little faith in lightning-rods, and the insurance agent said that I had better keep them off the building, for in nine cases out of ten they do more harm than good. But I found that I must yield to the inevitable, so I had them put up, and am pleased to say that they have been a complete protection against lightning-rod peddlers.

Our Work.

We will now turn our attention more directly to the work before us. Our organization as a society has been in successful operation for the past fourteen years, growing in strength from year to year, and is now in better working condition than ever before as the results of our influence and labors fully demonstrate. I need not tell you of the perseverance and self-sacrifice that we have endured in the promotion of horticulture. Some of the members have been willing at all times to put their hands down into the very bottom of their pockets to meet the expenses necessary in collecting, forwarding and placing our fruits in competition with those of other states; and I am proud to say that some of the highest premiums have been awarded to our young and growing State. It has been necessary to our very existence that we should exercise the strictest economy; suffering no indebtedness (except that of gratitude) to rise above our heads. Our secretary and other officers have done a vast amount of work without any pecuniary compensation or expectation of reward. Is it expected that we shall continue in this way? Is it just? Shall we be able to find another secretary that is willing to perform the duties as Prof. Lacy has done? Has not the time come when it will be proper for us, in view of the work we have done, to ask the legislature to grant us a liberal annual appropriation? The publication of our transactions was one step in the right direction. Let wisdom dictate the next. Once set aside the influence of horticulture, and what becomes of the attractions that twine around our homes and bind together the family tie, within the social circle, those homes of intelligence and worth, the pride and glory of our country? It is for the interest of the state to foster and make our work as effectual as possible. This cannot be done without an appropriation. Other western states have already taken the initiative steps. The Wisconsin society receives \$600 annually, Iowa \$1,000, Illinois \$2,000, Michigan \$2,200 and Kansas \$2,500. I think it would be advisable for this society to appoint a committee to confer with the legislature upon the subject. It may be said that our legislature has already done something to promote horticulture. True, they have devised a little scheme in an experimental way, a lottery, if you please, with a manager appointed at a salary of \$1,000 a year, to direct the spirits, to invoke the gods, to shower down the golden fruits into the lap of Pomona; but the whole thing is governed by chance in opposition to science, and without much regard to system or intelligence. Is not every nurseryman within the state pursuing an experimental work of the same kind with as satisfactory results? Then why not in justice allow each the same compensation to assist in carrying it on? Or, what would still be better, increase the chances and place all upon one common level, giving the \$1,000 to him who could produce a new apple of superior excellence and merit that would meet the approval of this society for general cultivation after five years trial in the different parts of the State.

College Farm.

The experimental farm at the agricultural college seems to be the best place to carry on an experimental orchard, but in looking it over I see no suitable ground, it being composed mostly of marsh or sand-banks unsuitable for even agricultural purposes.

The Cane Growers' Association.

There is another subject remotely allied to horticulture to which I will direct your attention. Last winter a resolution was passed at the meeting of the Amber Cane Growers' Association and a committee appointed to confer with a like committee from our society, to be appointed at this meeting, if such is your pleasure, in view of re-organizing the two societies together for mutual aid and protection. Ever since the first amber cane syrup was made, Kenney and others have met with us and exhibited their products upon our tables. And since they have formed a society of their own, they still continue to hold their meetings at the same time and place where ours are held. We are "entreated not to leave or forsake them or prevent them from following us. Where we have gone they have gone, where we have lodged they have lodged, their people have been our people, and their God our God;" they have courted us and we have courted them, and the courtship has been very sweet indeed, and now they send a committee to ask us to join with them in wedlock, that the issue may be legitimate. Perhaps after all love is blind, and we had better refer our case to the judgment of wiser and older heads. The cane interest, next to that of horticulture, is of vast and growing importance to the State, and to facilitate its rapid development the transactions of the society should also be published by the State.

Mississippi Valley Horticultural Society.

I will also call your attention to a society recently formed in the great Mississippi valley, which has for its object the promotion of horticulture in all its branches. This society is in no way intended to take the place of the old United States Pomological Society, of which the venerable Marshal P. Wilder, of Boston, has so long been the honored president, but is the natural outgrowth of a country whose resources are unlimited. As an organization it is intended to serve more directly the interests of pomology, forestry and floriculture in that vast district of country implied in the name: the Mississippi Valley Horticultural Society. A preliminary convention composed of delegates from all the western states was held in St. Louis on the 8th day of September last, and after fully discussing the subject, a committee to report a plan of permanent organization was appointed as follows: Parker Earle, of Illinois; Dr. J. A. Warden, of Ohio; O. M. Wiggen, of New Orleans; George Y. Johnson, of Kansas, and one member from Minnesota. After due deliberation this committee reported a constitution and permanent officers were elected, consisting of a president, first vice-president, secretary and treasurer.

You will notice that according to article 3 each state society is entitled to elect one vice-president, whose duty will be more particularly that of an executive committee in regard to the horticultural interests of their respective states. I have been requested to bring this matter before you and report your action to the secretary.

Commissioner of Agriculture.

The Ohio State Horticultural Society, at their meeting in December last, passed a resolution asking that the commissioner of agriculture under the new regime be chosen from the great agricultural region of the west, and that he shall be a practical business man as well as one both scientifically and practi-

ally acquainted with agriculture and horticulture. I have communications asking us to recommend ex-Gov. Robert W. Furnas, president of the State Horticultural and also of the Agricultural Society of Nebraska, as a man in every way qualified for the office of United States commissioner of agriculture. I understand that Gov. Furnas is a candidate for the office. He is a man of great ability as a farmer and nurseryman, and if the present incumbent should be retired I do not suppose we could find a better man for the position, or a truer friend to our interests.

Insects.

I have looked with great concern upon the ravages of insects during the last three years, and the question naturally arises, what is to be done? We may protect a few choice trees or plants, but if destructive insects continue to multiply, what is to become of our forests, orchards, nurseries, gardens, grains and grasses? The past year has found the chinch-bug in the southeastern part of the state so numerous that the yield of wheat was reduced in many instances to from four to six bushels per acre. What is to prevent them from extending their depredations? Almost every plant has insect enemies, and any agency that will check or destroy them is a friend to man. I know of nothing so effectual as the

Birds.

I doubt if we can well spare any of them. Even the black-bird which has been considered a pirate among birds, with no rights that anybody was bound to respect, has some redeeming qualities that will, upon better acquaintance, bear investigation. Last spring a colony of them nested in my evergreens, and, during the time they were rearing their young, were destroying worms and insects. Even the tent caterpillar which few birds molest, could not escape the vigilance of their keen eyes and sharp bills. But as soon as their young were fledged they migrated to my next neighbor's farm along the creek, and very soon my friend Brown came to inquire if I had a shot-gun to loan for those cursed black-birds were annoying him very much. Of course I had, and I heard him banging away at those birds for more than a month. I hope there is enough of them left to form a colony around me next year and then if they go away and annoy my friend, why they must take care of themselves. Could we keep a just debt and credit account with the birds the balance no doubt would be largely against us saying nothing about damage for the ill-treatment they receive at our hands. If we should advise stringent laws for their protection, the answer would be, that those which we now have are not enforced and every boy and loafer that can shoulder a gun is privileged to shoot them immediately. What wonder then if the earth is cursed for man's sake? And now let me say, once destroy the birds and insects would multiply to that extent that man would have little left to do but fold his arms and view his own destruction, helpless and alone. There was a time at creation's morn when birds could talk as well as sing and all the beasts of the field as well as man held common converse with their Maker. But the lion has crouched down in his lair, the foxes have entered their holes and the serpent still crawls beneath the grass, while the little birds that never sinned soar high toward heaven with songs of praise to the

great Creator's name. And who of us to-day is prepared to say that they are not now singing in our very ears the same songs and the same tunes that the angels use in making melody around the throne of God? Yonder bright luminary that rises so majestically above this world of ours, dispensing light, heat, life and blessings to every creature, plant or thing beneath the circuit of his course, to you and I must soon go down, beneath the closing gates of heaven, and then, we shall see.

At the close of the address a vote of thanks was tendered President Grimes and a copy of the same requested for publication.

Upon motion of Mr. Latham, a committee of four were appointed upon the subject of the president's address, as follows: A. W. Latham, O. Gibbs, Jr., G. W. Fuller, A. W. Sias.

On motion of Mr. Harris the report of the general fruit committee was taken up.

G. W. Fuller reported that his county had but little fruit and that he had but little to report. Thought the severe winter of '79 and '80 did more damage in sheltered timbered situations than on open prairie. He had a good crop of apples, especially of Transcendants and Wealthy. Thinks the Duchess of Oldenburg and Wealthy are the only apples that can be relied on in Meeker county. Has a few early Strawberry and Meader's Winter. Thinks the Tetofsky not hardy in Meeker county.

Mr. Harris reported for Houston county as follows:

LACRESCENT, MINN., Jan. 18, 1881.

Secretary of Minnesota State Horticultural Society.

In the absence of the member of the general fruit committee for this district it devolves upon me to furnish a report for Houston county, for 1881, which I will do as briefly as I can, taking the various fruits grown in their order of ripening:

First Strawberries.

The crop of this fruit was very light (less than a half crop) and of a very inferior quality. The cause may be attributed to the absence of snow during a part of the winter, and a consequent partial winter killing of the vines and also the condition of the plants before winter set in, they having started into growth late in the autumn, some of them even coming into bud and blossom. They were also injured by the great storm that visit us in June. The variety suffering the most was Wilson's Albany; the variety fruiting the best, Chas. Downing. Newer varieties on trial were generally a failure, and more so than the Sharpless.

Raspberry.

Blackcaps were usually less than a half crop; the reds nearly a total failure.

Principal cause believed to be winter killing. The Gregg, a new black cap on trial, produced a few very fine berries, but the canes did not endure the previous winter as well as the Doolittle or Seneca.

Currants.

Owing to the low price this fruit has commanded in our market for a few years (the price in LaCrosse being 75 to 90 cents per bushel) their cultivation is being neglected and the bushes are left to fight their way with grass and weeds. Their yield was good but the quality not up to the usual standard.

Red Cherries.

These were a failure. Trees blossomed full but dropped most of the fruit before ripe.

Blackberries.

This fruit is not very generally cultivated, most people looking to the woods and fence lines for a supply of small, hard fruit. The wild were mostly ruined by drouth. The Kitating froze nearly to the ground, and consequently fruited but little. The few small plantations of Snyder came through the winter all right and produced an immense crop of fruit. Towards the last of the season they were very small, owing to the drouth. This is the only variety that has thus far given any promise of succeeding with us. It is a first rate fruit, but only medium in size.

Plums.

The culture of the tame plum is mostly abandoned. Occasionally our farmer friends purchase a few rare varieties to accommodate traveling agents, but they all go up in smoke. The native is found under cultivation in most of our gardens and some of the varieties are fine. Crop immense.

Grapes.

Of this fruit the crop the largest and best we have ever raised. The vines were unusually healthy and mostly free from insects. The crop in Houston county is estimated at over fifty tons, of which about fifteen were produced in LaCrescent, about fifteen in Hokah, twenty in Brownsdale. Of this quantity about twenty tons were sold in LaCrosse, ten to fifteen tons manufactured into wine and the remainder found a home market in our various small villages. The variety succeeding the best and most extensively grown is the Concord; the Clinton is grown in some vineyards for wine. A good variety that ripens earlier and one that will keep longer than the Concord is much desired to lengthen the season.

Apples.

Apparently apple trees were not materially injured by the previous winter.

which is a little surprising, as the buds started the previous fall. They blossomed unusually full and gave promise of a heavy crop of fruit, but the promise was not fully realized. Hail storms, high winds, and unfavorable weather gave them a severe thinning, the Duchess suffering about the worst. Besides untoward circumstances, the apple worm made an assessment for a large share. Notwithstanding all these unfavorable circumstances the crop was considerable. Of Duchess of Oldenburg enough were raised to supply the home market during their season. We also had about enough of the Fall Stripe and Haas but of winter varieties not nearly enough for home consumption. Siberians were so plenty that no market could be found for them. The Transcendant still remains the most profitable variety for market. We do not think it economy to plant very largely of Siberians.

The Walbridge continues to promise well.

JOHN S. HARRIS.

J. M. Norquist reported from Goodhue county that he had good success with grapes and crabs, but that strawberries were not more than half a crop. Of grapes he grew principally Concord and Delaware. Reported Worden's Seedling doing well with him, though it dropped a little from the stem.

Of his strawberries the green Prolific and Chas. Downing did best. His Wilson's had winter killed badly.

In answer to questions, he replied that he planted his grapes 8x8 feet and trained to trellises five feet high. Grew twenty pounds of Concord to the vine. Covers in winter with earth. Reported the Tetofski and Duchess apples doing well with him; said the Worden grape was a week earlier than the Concord; has 800 vines in bearing, young and old, that averaged 7 pounds to the vine. Has the Janesville; thinks it very hardy and as early as the Worden or Champion; has tested twenty-one sorts of grapes and only retains for general cultivation the Concord, Delawares, Janesville and Worden. Location high and dry; soil, sand and clay. Reports the Brighton as mildewing on his grounds.

O. Gibbs, Jr., of Lake City, reports for Wabasha county:

The past year has been somewhat anomalous in its influence on fruit culture. It opened with one of the most trying spells of weather ever known in the Northwest. From Christmas to New Years there was a range of temperature of over 80° from cold to heat, with violent alternations, beginning at 40° below and running to 46° above zero. There was no root-killing of trees, but the strain upon the parts above ground was most severe. Its effects in discolored wood, stunted growth and imperfect fruiting have shown themselves plainly everywhere—far worse in the valleys than on the high lands.

It is a pleasure however, to be able to report that some of the varieties of apples recommended by our society for general cultivation have stood the test remarkably well, and that others, on the experimental list, have come through the

season with increased reputation. The Wealthy of all ages here has grown vigorously from the terminal buds. As a general thing it has shown no external signs of injury, and has blossomed and matured its fruit in abundance. We find it just coming into bearing in almost every school district. The oldest trees we have of this variety are about fourteen years from the graft, and they are all sound. There is some complaint of the blight in the Wealthy, but I have not found it in a single instance except where it was contiguous to Transcendent or Siberian crabs, and there evidently due to contagion. Several years ago, the late Dr. Jewell, founder of what is now known as the Jewell Nursery, of Lake City, came to the conclusion that the blight was communicated from the Transcendents and Siberians. He caused them to be removed from his grounds, root and branch, and forbid the premises thereafter. Since then the Nursery with over 6000 orchard trees and its large growth of young stock has been substantially free from blight—at least with nothing of it beyond easy control.

The Duchess has borne a fair crop of fruit—not as heavy as last year, but enough to show that it still holds its place on the iron-clad list; while the Tetofski has gone back on itself. It has made but little growth, and has looked sickly all over. I have seen no trees of it bearing well this year, except some stem-budded ones on the place of Robert Smithson, of Goodhue county. I notice from the Iowa reports that the Tetofski does best there on low lands or where top-worked. Tracing down the apple list, as arranged in our transactions, we find the Haas in orchards looking very sick. It had just recovered from the effects of the winter of 1873, and was beginning to bear well and look like a paying tree, when last winter caught it again in its overgrown, unripened new wood, and now it is “down, quite down” again. What growth it has made has been in sprouts low down in the tops, and there has been but little fruit on it. I am afraid we must bid the Haas “good-night,” unless for top-working on the Transcendent. Of what use is it to cling to a tree that sickens like this in every hard winter? Price's Sweet is another sort that looks badly as an orchard tree. It appears that we have no reliable hardy sweet apples on the standard list. However, the Beecher Sweet, Hybrid, is beautiful, hardy, prolific and good, and for that we who have a sweet tooth, may well give thanks. Saxton does not amount to much. The old St. Lawrence trees look well. Mr. G. A. Cook, the veteran of Cook's Valley in this county, has one twenty years old or more, that bore him over 800 perfect apples in 1879.

A few Plum Ciders of the old plantings are to be seen. One standing on the farm of Baker Harrison near Lake City, without any shelter, and by the road side, furnished its owner with three barrels of handsome fruit this season, after supplying the tramps and harvesters till the middle of September. Utter's Red is in fairly good condition, and bearing medium crops. This is the handsomest apple we have except the Wealthy, and quality the very best. We find the old Fameuse entirely convalescent from 1873, and carrying a large crop of apples wherever seen, and looking unharmed by last winter. This sort seems to grow hardy with age. Tallman Sweet is a little off. White Astrachan is bearing some, and looking as well as most trees of its class. The Wallbridge is thrifty in young stock, fair in the oldest orchard trees and very sound and productive in grafts on the crab. The other varieties of standard trees on our list, I have not had an opportunity of seeing; though a good report is heard concerning those originated by Mr. I. N. Rollins of Elgin, in this county, which will no doubt be reported on by other members of the fruit committee.

There are a number of new seedlings on trial here, which are likely to be heard from hereafter.

One of the most puzzling things about apples in this district is the good condition of isolated trees of some of the old sorts I have named, standing as survivors in rows where so many others, twenty to one probably, of same sorts have failed—gone down “to lie in cold obstruction and to rot,” early victims of our savage climate. What made one hardy and the other tender? Did it happen to be grafted on a hardier stock than its associates and congeners, or what is the reason? The instances are numerous, and seem to be worthy of study. I shall have great respect for any pomologist who will give a scientific explanation of this, and show us how to make other trees of the same sorts do as well as these surviving veterans.

It is a painful duty to report upon the common crabs, the Transcendents, Hyslops and Siberians in this district. They all seem to be going to destruction with the summer blight. Some of them may be saved by top grafting into Wealthy and other sorts, but there are many beyond recovery. Is it not about time they were removed from our list? What one of us would plant them except for stocks for top-grafting. The Hybrids, or improved crabs, are coming into bearing in various orchards and doing themselves great credit—at least some varieties of them—those that appear to be non-blighters. Those giving the best results are the Early Strawberry, Whitney No. 20, Conical, Hesper Blush, Beecher Sweet, Angular, Maiden Blush and Minnesota. Of these I have seen many handsome orchard trees bearing heavily, and they are all good eating apples. The Whitney No. 20 is beginning to bear with us. It is twice the size of Transcendent, beautiful color and finish, handsome shape and first-rate dessert fruit—a delightful apple to raise or use. No wonder it is growing famous, and the trees in demand for shipment even to Europe. The Minnesota, for the first time with us, is bearing heavily. We have now no fears but that this will add the virtue of good cropping to its acknowledged excellence as an orchard tree. Its quality and keeping habits are good. The gale of September 16, had all our apples on the ground except Wallbridge, which will stay on the tree till grown useful, wind or no wind; yet the Minnesotas have kept from that time till now in good condition, as you will see by the samples placed on exhibition here. In favorable seasons it must be a fair keeping early winter apple.

Grapes have fruited well. The Janesville sustains its reputation for earliness, and its quality improves upon acquaintance.

Strawberries—an off year, no results sufficient for a fair test of new varieties, and nothing worth reporting except that the vines are full of chintz bugs. Whether they will depart in the spring, or stay for mischief, nobody seems to have any means of prophesying. I have dusted mine all over heavily with wood hoping the bugs will dislike it and either succumb or leave.

Raspberries were nearly all killed to the ground. Senecas stood the best of any. No rust except on Doolittles. There is no sort safe for open field culture without covering.

Blackberries—nothing doing except trials of Snyders. Those who have these are covering them at present for winter protection.

Currants—short crop. Much complaint of the worm that measureth.

Plums—good showing from Forest Garden, Weaver and DeSoto—excellent quality and abundant crops. The Weaver being the perfect free-stone, is very popular. They grow well grafted on our common wild plums.

Cherries—The Early Richmonds came through the winter in good condition. No winter but that of 1872-3 has ever killed this variety in our district, and as we know that it suffered then severely as far south as Chicago, and being replanted the orchards of them have since done well, there is good reason to hope that we can raise good cherries here after all.

Pears—The Flemish Beauty is found looking well in favorable situations, and bearing some fruit. It seems to do best on moist ground and on the northerly slope of the river bluffs. If we can control the blight by the lime and sulphur white-wash, or by any other method, we may yet raise pears.

The present winter has been very favorable for trees; cold, but no sudden changes, up to date.

Varieties of apples presented with this report for exhibition, are the Wealthy, Haas, Utter's Red, Tallman Sweet, Dorchester, Russet, Minnesota, Walbridge—all picked in September, and preserved by wrapping in paper.

Respectfully submitted by OLLIVER GIBBS, JR.

Lake City, January 15, 1881.

F. L. Gould reports for Hennepin county:

The Strawberry a failure. Thinks the damage was done in fall and early winter.

The Raspberry a short crop, both of the black and red. Attributes their failure to injury in the fall, the wood making late growth and not ripening well. Killed below the snow line clear to the ground.

Had as many Crabs as usual, but inferior in size, the same being true of apples.

G. H. Fish reports for Stearns county, that the extreme cold of the winter of 1879-80 was very disastrous, but not uniform in results. Very few trees uninjured.

Hardly any standard apples have yet been fruited in his county. The Transcendant and Hyslop crabs planted by the early settlers have done well.

Mr. Matthews as general fruit committee from Big Stone county, having no fruit report to make, submitted the following letter in answer to questions relating to the hardness of *Catalpa Speciosa* on his grounds.

FOSTER, Minnesota, January 11, 1881.

U. S. Hollister, Secretary State Horticultural Society:

DEAR SIR: In reply to yours, requesting information as to the *Catalpas* growing on my place, I respectfully report:

In the spring of 1879 I received from Robt. Douglas & Sons, of Waukegan, Illinois, ten *Catalpa Speciosa* from 8 to 10 inches high.

They came by mail, were delayed on the road and were damaged. Nine of them were alive to the tips. Some of them started from the root, and some from buds, all lived. The greatest growth during 1879 was twenty-three inches.

In the spring of 1880 I found that they had froze back one-third of the new wood.

Through the advice of Col. J. H. Stevens of Minneapolis, in order to test their merit as to hardiness, I hoed all grass and weeds from the roots in the fall of 1879. My plan is to protect from the northwest winds by timber. The last summer without much cultivation, some of them made a growth of nearly four feet. I think they grow too late in the season to mature all the wood, but they branch liberally, and when cut back seem to do well and the wounds heal quickly.

I would not hesitate to plant them on a tree claim in this country, provided they could have the shelter of other growing trees.

The cottonwood is the only tree that made a greater growth than the Catalpa.

I have experimented last season with cottonwood seed. This seed does best self sown, but will grow if sown before a shower in damp weather. I have crab apples in bearing, also the wild Raspberry which do better here than the cultivated ones.

DISCUSSION.

QUESTION. Condition of the apple wood now?

Mr. Harris thinks it is bad, said the trees were cracked or split, and the sap oozing out on warm days; thinks though that the wood is well ripened.

Mr. Pearce said that it was of little importance if the trees were split, and was no sign of permanent injury to the tree. Said the bark of all green trees was liable to split.

J. M. Underwood disagreed with Mr. Pearce, thought the cracking caused by the severe weather, and that the trees had suffered material injury, and asked why it was that trees with well ripened wood were injured last winter just as bad as those with poorly ripened wood?

Prof. Porter preferred to listen rather than give his views, as he was unfamiliar with soil and culture. He thought, however, that theories should be left and facts investigated. The cause of winter-killing is the expansion and rupture of the cells by frost, and when the sap had ceased running no great expansion can take place and danger will not be so great. Some plants possess the power to resist this freezing. Peach trees will freeze at 20 degrees below; at 8 and 10 degrees below, the fruit and bearing wood is destroyed. If the bearing wood has ripened thoroughly the tree can support severe cold. Different trees can stand different degrees of cold. The germ of the fruit is often killed as this year in Delaware. Professor Porter stated that the Delaware peach crop will be a *total failure*, buds, germs and bearing wood having been totally destroyed; in all the years of the

professor's experience no such cold has been known. When a sudden change occurs from cold to heat whole orchards have been destroyed, the trees losing their bark on the side on which the sun strikes the tree. Mr. Latham inquired what the chemical process was that takes place when the tree is killed.

Prof. Porter explained that the transfusion of sap from one cell to another ceases when the walls are ruptured. The flow of the sap has generally ceased, the growth has matured, and but little sap remains in the cells, the exhaustion of which is not sufficient to kill the tree. *Why* vitality is destroyed by a low temperature is an unsolved question.

Mr. Harris stated that after warm weather started the sap, 10 degrees below zero killed the trees dead, confirming Prof. Porter's theory of the crude sap rising under the influence of warm weather and freezing in the cell.

Mr. Underwood thinks that the cold forces the sap out of the tree and leaves them nothing to subsist on. There are many reasons for trees dying. Bark-bursting is always accompanied by sudden changes. The unripened and unprepared condition of the tree has something to do with it.

Mr. Howe thinks that the bark bursting is caused by extremes of heat on different sides of the tree, meaning in fact, the same thing as the previous speaker.

Mr. Gibbs thought there was a close resemblance between animal and vegetable physiology.

Which was Prof. Porter's opinion.

Mr. Harris thinks the result is that we must get hardy varieties. We are working in the right direction. We have some and hope soon to have others to nail to:

Mr. H. presents a resolution asking for the preparation of a directory of professional nurserymen, florists and seedsmen, and their agents, of Minnesota, doing a legitimate business and publish them in the transaction of the meeting, which was lost.

Prof. Porter requested the society to hold their Thursday morning session at the university chapel, at 10 o'clock, which invitation was accepted.

Discussion then ensued on Mr. Harris' resolution, which after much emendation was lost.

The chair then appointed committees on articles on exhibition, on final resolutions, and auditing committee.

On Articles on Exhibition—Messrs. Fuller, Pearce and Howe.

On final Resolutions—Messrs. Harris, Latham and Underwood.

Auditing Committee—Messrs. Gould, Eldridge and Emery.

By request A. W. Sias was placed on committee on hardy ornamental shrubs and trees.

Mr. Harris inquired as to the Sharpless strawberry.

Mr. Elliot's experience showed that the plants potted late did better than those rooted in the soil. Wilson's were killed. The Sharpless should not be called a tender plant. In good drainage Wilson's did well. Sharpless promises well.

TUESDAY EVENING.

STRAWBERRY CULTURE.

Mr. Mathew Crawford, of Cuyahoga Falls, Ohio, submitted a paper on "Strawberry Culture for Market," which was read by the secretary, as follows:

Strawberry culture is an important industry, supplying a want felt by nearly every person in this broad country, and furnishing a delightful employment to thousands who might not otherwise earn anything. When we consider that forty years ago scarcely any cultivated strawberries were found in the market, and then see the magnitude of the business at the present time, we naturally inquire why so many engage in it.

This fruit possesses so many desirable qualities that it commends itself to every one, and at the same time is perfectly harmless. Until the advent of the Wilson, in '57, it was a luxury to be enjoyed by the few; now it is indispensable in nearly every family. While the market may sometimes be overstocked for a day or two, with the common kinds, the demand for first-class berries has never been supplied. When well grown, it is not only cheerfully bought and paid for but eagerly sought.

Everything connected with its culture is pleasant. There is no hard work attending it. It occupies the ground but a short time, removes almost nothing from it and leaves it in good condition for the following crop. While all other fruits have their favorite localities, outside of which they cannot be grown at a profit, this flourishes on almost any soil and in any climate where one cares to live. It requires but little capital and its cultivation is easily learned. It has but few enemies and is one of the surest crops grown. I have cultivated it twenty-five years without a failure. It brings in a large amount from a small piece of ground, and may be grown in connection with other crops at very little cost. But yet, although its culture offers so many inducements, only those who have had some experience, and who live within a reasonable distance of a good market or railroad station, should engage in it extensively.

As our success depends to a great extent on the mode of culture adopted, it may be well to consider the methods of some of our leading growers:

Mr. Knox, the "Strawberry King," of Pittsburg, was very successful, and his plan was to set the plants eighteen inches apart each way, cut off all runners and cultivate with the hoe, keeping the ground mulched after the first summer. He took from three to five crops from the same bed and his berries were of the very best. From a single picking of the Jucunda, he sent a hundred bushels to New York and the same quantity to Philadelphia, which brought him fifty cents a quart at wholesale, besides retailing a large quantity in Pittsburg the same day. His soil was heavy clay, and very rich. His mode was especially adapted to the foreign sorts, and his greatest success was with Jucunda, Triomphe de Gand, Trollope's Victoria, and Kittley's Goliath, all foreign. The objections to it are that a great amount of labor is required before any returns come in, that plants in hills are more liable to be winter-killed and that when the ground is occupied for several consecutive years, the enemies of the strawberry—which are more numerous now than in Mr. Knox's day—are multiplied.

Peter Henderson, of New York, cultivates with remarkable success as follows: Ground that has been heavily manured for previous crops is well prepared in August, three inches of well rotted stable manure worked into the surface, and potted plants of the large varieties are set two feet apart each way. They receive the best of care, every runner being cut off, and the whole bed carefully covered in the winter. After bearing in June they are plowed under. The finest fruit is grown in this way.

Mr. Henderson has an army of skilled workmen; his work is done in the best manner, and his home market is the best in the country, and extra fine fruit brings a great price. While his plan may be a success with him, there are but few men over the country who would find it profitable to put 400 loads of manure and 11,000 potted plants to the acre.

We often see it recommended, especially for garden culture, to lay the ground off in beds four feet wide, with paths a foot wide between, and set three rows of plants on each bed, one foot apart in the row, keeping all runners off. This would require about 25,000 plants to the acre, and a great amount of work to accomplish what can be done much cheaper.

The plan most common on the light sand of New Jersey, where such immense quantities are grown, is to have the rows four feet apart, and set the plants twelve inches in the row, let them run, and cultivate with a horse, narrowing the cultivator as the strips of plants get wider. This, however, leaves the plants so thick that they can not properly develop, and the best fruit is never produced in this way.

J. M. Smith, of Green Bay, Wis., is certainly one of the most successful growers in the west. His plan is as follows:

"Mark off the bed in rows two feet apart, and set the plants from twelve to fifteen inches in the row. Let each plant send out six runners, forming a semi-circle on each side of the parent plant, and about six inches from it. This will leave an alley one foot in width to walk in. Cut off all other runners, and keep the whole season's growth in these plants."

This will necessitate a good deal of labor, but if the season should be moist, and the ground deep and rich, an immense crop would be produced. On the other hand, if there should be but little rain, or if the ground should be only

moderately fertile, plants standing so thick could produce only small berries, especially after one picking. It is said that Mr. Smith has raised 400 bushels to the acre.

Under whatever condition the strawberry is grown, its wants are always the same, and success will follow in proportion as these wants are supplied. The ground should be rich, cool and moist, but not wet. It should be thoroughly pulverized to a good depth, keeping the best soil on the surface. The plants should have room to develop, and must have the ground all to themselves from the time the surface roots form in the fall until the berries are ripe in June.

Our aim should be to produce the finest fruit possible at the least cost, and where land is cheap and labor dear, the following plan will commend itself:

Early in the spring select ground that has been under cultivation for at least two years, so as to avoid the white grub, which is nearly always found in sod. If the soil has been heavily manured in the mean time, so much the better. If not, apply a good coating after the ground is plowed, and harrow it in. If manure can not be had, 500 pounds of bone-dust and 40 bushels of unleached wood-ashes to the acre may be used instead.

After preparing the land, mark it out in straight rows four feet apart, and set the plants two feet apart in the row. This will require between five and six thousand plants to the acre. In taking up plants, use only last year's runners, rejecting those with black roots.

Trim off the dead leaves and runners, shorten the roots to three or four inches, and wash all the dirt off lest the larvæ of the crown borer or other injurious insects be carried to the new bed. Set the plants so that the crown will be level with the surface, but not covered, and press the earth firmly about the roots. It is important that the plants be kept from drying while out of the ground. When taking them to the fields to plant, put them in a pail with water sufficient to cover the roots, taking each one out as needed. The soil adheres to the wet roots and no further watering is necessary. Every one should raise his own plants if possible, so as to have them when wanted.

At the proper time, plant sweet or early field corn, in the rows with the plants—the hills four feet apart. This will injure the plants little or none, and the shade will be beneficial rather than otherwise, in the summer. The corn will pay all the expense the first year. All runners and blossoms should be cut off as soon as they appear, so as to let the plants get strong before any draft is made on them. About the last of July, when the plants have gained strength, and are sending out several runners at a time, they may be allowed to grow and cover the ground. Cultivation with a horse must then be discontinued, and if it has been well done up to this time, but few weeds will appear afterward. When the weather becomes cool and moist in the fall, the whole bed may be gone over with the hoe, and all weeds removed, after which the ground should not be disturbed to any depth.

The strawberry sends out new roots near the surface in the fall, and if they are cut or broken, either then or in the spring, the crop will be diminished accordingly. The want of proper covering in the winter, allowing the roots to be wrenched and broken by the frost, has the same effect.

Whether the corn is sold green or allowed to ripen, the stalks should be left uncut, as they not only shelter the plants in winter, but prevent the covering from blowing off. In many parts of the country this is an important item.

Early in the winter, cover the whole surface to the depth of an inch or two

with litter of some kind. Horse manure, with plenty of straw in it is first rate. Cut straw is excellent, and need not be removed in the spring. Evergreen boughs, corn stalks, swamp hay, rotted sawdust, tanbark or leaves, if they can be kept on—anything that will shade the ground, and prevent it from thawing every bright day, will answer.

When growth commences in the spring, and the freezing nights are past, the bed may be uncovered, if the covering is such that the plants can not push through it. Paths eighteen inches wide should be made between the rows. If plants are needed, they should be taken up in narrow strips, and those on each side shaved off with the hoe, so as not to injure the roots of those left to bear. If the plants are then over the bed, the spaces between them must be covered with a mulch—the paths also—to keep the ground moist and the fruit clean. A good mulching will sometimes double the crop. Let no deep stirring be given in the spring. Small weeds will do but little harm till the fruit is ripe. Large ones may be shaved off with the hoe, or pulled up by hand.

In regard to picking and marketing, get everything ready as far as possible before the berries ripen. Engage your pickers, women first, then girls, and last boys. In picking leave out the small berries. They add but little to the measure, while they injure the appearance of all the rest.

As soon as the last of the berries are picked, plow up the bed and plant some late crop. In this way three crops can be taken from the soil in two years, and the enemies of the strawberry are destroyed, instead of being left to multiply in an old neglected bed. It will cost less, in this way, to raise a new bed every year, than to clean out an old one, and put it in proper condition for bearing.

If grown as above, we have nothing to fear but drouth and late frosts. Heavy mulching will insure against the former, and leaving the beds covered late in the spring is about all we can do for the latter.

To sum up, in a few words, the principal causes of failure, are allowing the crowns to get covered by deep planting or improper cultivation, allowing the plants to bear the same season they are set, disturbing the roots late in the fall or in the spring, neglecting to cover in winter and planting unsuitable varieties.

What kinds to plant.

This is a most important point and can only be learned fully by experience, but depends mainly on our soil and marketing facilities. For large cities where the very finest fruit brings a great price, it may be advisable to grow the large varieties in preference to those more productive but of smaller size. Where no great discrimination is made, those kinds that can be produced at the least cost should be grown. If the fruit has to be sent to a distance, varieties that will bear transportation must be selected. The Wilson has been the standard market berry, and is a safe variety to plant. When well grown and fully ripe, it is a good berry, but it has been brought into disrepute by being poorly grown and marketed in an unripe condition. It succeeds in all parts of the country and is very productive when the season is favorable but diminishes in size after the first picking.

The Capt. Jack is, in my opinion, the best market berry yet introduced. It is a seedling of the Wilson, and a decided improvement on its parent. The habits of the plant are about all that could be desired—hardy, healthy, vigorous and productive, ripening up its crop in a dry time better than any other variety.

Fruit large, bright red and handsome. It has been found to succeed in all parts of the country, and is one of the firmest berries to ship,

The Glendale is a great market berry. It has every good quality that belongs to this fruit except two: high flavor and gloss. For vigor, productiveness, hardiness and size, it is among the best; and for lateness and shipping qualities it is ahead of all others. It has an immense calyx that protects it from injury by late frosts and keeps it so loose in the basket that the air can circulate among the berries. It keeps longer after being picked than any other variety with which I am acquainted. When it is to be shipped to a distance, the boxes must be well filled, for it is inclined to settle more than most sorts. It is a very profitable berry to grow in the north to send south at the close of the season.

Cumberland Triumph—One of the finest berries if not the very finest we have. It is a seedling of the Green Prolific, and larger than its parent in both plant and fruit. It is always of regular form, large size, and produced in abundance. Its quality is better than any of those named above, and for a near market or for home use it is unsurpassed. Its color is light orange scarlet—hardly dark enough for market.

The above have succeeded in all parts of the country, and if I were growing berries exclusively for market I would confine myself mainly to them.

The Sharpless is perhaps the largest berry yet introduced. The plant is a good grower, very large and fairly productive. I have found its blossoms more liable to be injured by late frosts than other sorts and its largest berries are quite uneven on the surface and rather inclined to have a white end. It is one of the latest to ripen, and its size, color and good quality will make it a favorite. It has been before the public but two years, but it is generally spoken of as one of the very best.

Longfellow—A very large, long, rich-looking and high-flavored berry. Whether on exhibition or in the bed it is a very attractive variety. Plant, dark-green, healthy and productive. It is very late and continues in bearing a long time.

Warren—One of the most promising new varieties. Fruit very large, roundish, fine color, ripens all over, of good quality and is produced in abundance. Its season is early and its fruit is ripened in a short time.

The plant is hardy and a good grower.

Through the courtesy of the originator, A. D. Webb, of Ky., I have had the above two sorts since '76, and they have done well with me.

Hervey Davis—This originated in Mass., and if I may judge from one year's fruiting, it is well worth trying. Its fruit is very large, bright red, of regular form, and in quality the very best. It is rather early, and continues but a short time in bearing. The plant is a fair grower and a good bearer.

DISCUSSION.

Mr. Pearce thought the Captain Jack a remarkable berry. Is one of the hardiest berries we know. The Glendale is very strong, stalky, and covers the fruit entirely with its leaves. The Longfellow and Warren promise well. President Grimes coincided with Mr. Pierce regarding the Captain Jack.

Mr. Tibbitts has been experimenting and thinks the opinions expressed respecting Captain Jack correct. Has some thirty varieties and considers the Glendale the best for foreign market and the Captain Jack the best for home market. Green Prolific and the Wilson are the best.

President Grimes spoke very highly of the Captain Jack. Mr. Tibbitts had fruited Sharpless one year and was well pleased with it—his soil a clay loam. Thought the Prouty seedling a good one. Col. Cheney gave good satisfaction with him on heavy soil and under complete fertilizing. With all his experience still acknowledges the Wilson as king. Thinks the Wilson and Green Prolific the two most profitable berries yet grown.

The revision of the strawberry list was now taken up.

The Counters de Horicourt was decided identical with Downers Prolific, and was stricken from the list.

Upon motion of Mr. Pearce it was decided to name a list of fine varieties for general cultivation, to rank in the order in which they were placed on the list with the following result:

1st.	Wilson's Albany,	unanimous.
2d.	Capt. Jack	7 for, 4 against.
3d.	Downer's Prolific,	10 " 0 "
4th.	Green Prolific.	10 " 1 "
5th.	Crescent Seedling	7 " 4 "

RECOMENDED FOR GENERAL TRIAL.

1st.	Seth Boyden,	6 for, 2 against.
2d.	Sharpless,	4 " 1 "

RECOMENDED FOR TRIAL BY AMATEURS.

1st.	Glendale,	7 for, 1 against.
2d.	Windsor Chief,	6 " 0 "

The following presented by Mr. Gibbs was adopted:

Staminates and Pistillates must be planted together, or with Hermorphadites for cross fertilization.

A paper styled Apple trees and climate, by J. W. Boxell, was read by the secretary and ordered printed in transactions as follows:

APPLE TREES AND CLIMATE.

Secretary Minnesota State Horticultural Society:

DEAR SIR: I have been looking over the proceedings of the meeting held at Minneapolis last January, and I find that my ground has been occupied. No-

entirely occupied by any one person, but nearly everything I intended to say, has already been well-said by different members of the Society, and can be read in the published report.

I have at least one point to make that may elicit discussion, if nothing more. I have heard it remarked by many fruitgrowers that the hardest varieties of apple trees were more injured last winter than the comparatively tender varieties. I utterly reject the theory that the low temperature at Christmas, the condition of the trees at that time, or previous to that time, or the frequent thaws later in the winter, had anything to do with this exceptional injury to hardy trees. As far as I observed, all hardy trees came through the winter well. My orchard is on limestone soil, lies high, and is exposed to a free circulation of air. To say nothing of crabs, and so called hybrids, my young Wealthy apple trees were not hurt at all. There was no perceptible change in the color of the wood, very few of the terminal buds were injured, and they made a fine growth last summer. They are not yet in bearing. My Dutchess trees were not injured, nor my Tetofskys. The wood of all other varieties of apple trees was much discolored; yet the trees were by no means ruined. The Fareuse, Golden Russet and Haas, bore some fruit, and plenty of full-sized leaves. The Red Astrachan looked well all summer, though the wood was much discolored, or colored, perhaps I should have said. The Humb cider trees blossomed, and the Ben Davis trees were full of blossoms, but these blossoms were killed by frost, the trees being in the lowest part of my orchard.

Now for my point. The frost coming about the 20th of May, when the trees were in bloom, almost ruined many of my trees. Transcendents, Hyslops and red and yellow Siberians were hurt the worst. The branches bearing blossoms were killed back from one to three feet. Many of my Transcendents that bore a heavy crop the year before, had no blossoms, and not a twig of these trees was injured. Even on the trees so badly killed, branches that had no blossoms were not hurt. Most of my Dutchess trees are loaded with apples the odd year. The even year I have but few apples. One Dutchess tree, however, was very full of blossoms last May, and the blossoms were killed and the fruit spurs were killed. The leaves on that tree were small, three or four apples that escaped were small, and the tree made scarcely any growth during the summer.

In a short time my neighbors began to say that the blight was destroying their orchards. I examined my own carefully, and examined theirs, and I found there was no blight. It was not the time for blight. These half-killed trees had no blight during the summer, though thrifty young Transcendents on cultivated land were somewhat blighted. The Ben Davis, and least hardy varieties were not very much injured. The twigs at the time, being comparatively dry, and having but little sap in them. I have had fruit blossoms killed, of course, but I never observed anything just like this before.

My theory is that the branches of the hardier and more advanced varieties, contained much more sap than the branches of the more tender varieties; and that the fruit spurs, and blossom-bearing branches contained more sap, or more delicate sap than the branches without blossoms, and that the work of nature had progressed too far from the dormant state of winter to bear the frost, which two or three weeks earlier, perhaps one week earlier, would have done little or no harm.

I will mention that young oaks in some ravines in my neighborhood, were badly injured, and a few of them entirely killed by the frost of last May, and

that some scores of dead black oaks, of the largest size for this region, are still standing in the valley of Bolles's creek, in Afton, Washington county, that were killed with frost the night of May 11th, 1878. The season at that time was unusually advanced for this latitude. Neither on that occasion, nor last May, were the young leaves on the oak trees near my orchard injured any, the ground being high.

J. W. BOXELL.

DISCUSSION.

Mr. Underwood had plenty of trees killed, as Mr. Boxell stated, but believed the trees were killed before coming into bloom at all, and that the blooming was only the last struggle for life. He selected twigs from the Haas and other hardy sorts, in December, 1879, subjected them to close inspection and pronounced them dead. The trees from which these cions were cut bloomed profusely the following spring, and died before they arrived at full leaf.

Mr. Gould stated the same fact regarding his transcendentals.

Mr. Latham said one-half of the fruit spurs on his trees were killed, not, as he believed, by the spring frosts, but by the severe winter preceeding. He said if a tree was root-killed it usually blooms, but that it would not bloom if top-killed.

Mr. Harris stated that he had root and top-killed trees both bloom, but the bloom was always late and weak.

Mr. Emery asked what would be the future life of a tree, now apparantly thrifty, but known to be black-hearted or dead in the center.

Mr. Harris replied that it depended entirely on the amount of new or green wood grown around it.

Mr. Gould said that the condition of his fruit trees last spring discouraged him, but that the result of his crop in the fall gave him new hope. Thought the experience of so disastrous a winter as the last one was a good thing; that it would compel nursery-men to pare down their list and plant fewer and better tried sorts. He disapproved the idea of multiplying sorts. Did not believe that fruit could be grown on the prairies west of the timber in Minnesota.

Mr. Carter, of St. Peter, reported his transcendentals winter killed, and hyslops suffering, and wealthy in bad condition. The conical leaved well and bore a good crop, but the wood was injured. Many of his hardiest trees were ruined. With him the trees reputed as the hardiest suffered the most damage. The wood

showed discoloration in December, 1879. His location was sheltered, and in what is known as the big woods.

WEDNESDAY MORNING.

Meeting called to order at ten o'clock.

After the usual opening exercises Mr. John S. Harris read a paper on

GRAPE CULTURE FOR MINNESOTA.

From the very earliest ages of the world the grape has been a highly esteemed fruit. From the time when Noah left the Ark, planted a vineyard and drank of the wine down to the present, its cultivation has received encouragement from nearly all civilized nations. The early settlers of America, remembering the delicious fruit and the exhilarating beverage of the old world, introduced the European vine (*vitis vinifera*) at an early day, but met with very indifferent success with it, and since then repeated attempts have been made to Americanize it, but have all alike proved futile. Next, attention was turned to the cultivation and improvement of some of the native species that were found luxurating in almost every state from Maine to Louisiana, and as they showed themselves susceptible of improvement they continued to grow into favor and receive attention until the originating of a few varieties like the Concord, Iona and others, culminating in the contagious *grape fever* which swept over our land a few years since.

The interest may have weakened a little after the fever had burned itself out but at no period in the history of its cultivation in this country has so healthy an interest existed as at the present. In the older states thousands of acres of vineyard have been planted until the aggregate is up into the millions and the fruit is beginning to be looked upon as next in value as a human food and article of commerce to the apple, which is and probably always will be the staple fruit of the middle and northern United States. Until quite recently it was hardly expected that vine growing would ever become an industry in Minnesota, but such marked success attended the efforts of Smith, Knaphoide and a few other of the old pioneers in fruit growing, as to stimulate others to give it a trial and thanks to the success and the influence of the State Horticultural Society, scores of vineyards have been planted within the past eight or ten years, and are producing fruit of great excellence for the market and home consumption, and as a result hundreds of our people are about to engage in the extensive cultivation of the grape. Not every man will make a success of it, more than they do of any other branch of horticulture. Some will not make a judicious selection of soil, location and varieties and others will not bring to bear upon it the requisite skill and attention, but grape growing is a very simple science, and with early, hardy varieties, suitable soil, favorable locality and a reasonable amount

of intelligent care, success will be the rule, and failure the exception.

Having decided to plant a vineyard, the first thought is to be bestowed upon soil and location. The grape vine will grow upon almost any kind of soil but some soils are greatly to be preferred over others. A very sandy or gravelly soil should be avoided because it does not contain enough potash lime and vegetable humus to supply the vine and perfect the fruit, and is injuriously affected by extensive drouth; equally as bad a soil would be a *deep, rich, damp, muck*; such a soil would produce a rampant growth of soft, pithy, long jointed wood, which will be subject to kill back to the roots every hard winter, and if it did survive to produce fruit, the fruit would be of a very low grade unfit either for wine or market, a little better than none, perhaps.

As far as my experience and observation extends I am led to believe that a dry clay or sandy loam rich enough to produce a fair crop of corn and having a subsoil that is not retentive of water is well adapted for the vineyard, and a soil that is composed largely of disintegrated lime and sand rock which is a marked feature of the alluvial terraces that everywhere abound among the bluffs that border the Mississippi River and its tributaries, is the very best, and the rocky clay loam upon the sides and tops of the bluffs where grass and grain cannot be profitably grown is No. 1 for grapes. A stiff clay where well drained and deeply worked may be used if no better is at hand and except in very unfavorable seasons, will give satisfactory results. It is generally conceded here that success depends fully as much upon the location as the soil. Southern, southeastern and eastern aspects are considered to be the best in this climate as ensuring a longer season for the growth and a better temperature for ripening the fruit, but if our seasons were long enough, a few of the thin leafed varieties would do better upon northern and northeastern exposures as they would be more exempt from mildew and leaf blight. It matters very little whether the surface of the soil is nearly level or a more or less steep hill-side, except in the expense of fitting the ground and the after cultivation, but where the hill-side is at hand I should choose it as being better adapted for grapes than any other crop that can be put upon it and more exempt from injury by frosts.

Preparation of the soil.

It would, to say the least, be very unwise to plant upon our new wild soil until it has been subdued and properly prepared. Where the land is sufficiently level and free from stone to admit the cheapest and best method of preparing the soil is with a strong team and plow. If the ground has already been broken up, two and perhaps one deep plowing may answer, but where the location is virgin soil the soil should first be broken and given time for rotting and afterwards given two deep plowings; this requires that the preparation should begin at least one year before the planting. At the last plowing it is a good plan to lay the land off into narrow beds by backfurlowing, leaving deep open furrows between to carry off surplus water from heavy rains.

Where too steep or rocky for using a team and plow, the soil is prepared with a mathook or spade. Where the mathook is used the laborer stands on the lower side of the ground and strikes into the bank above, hauling the loosened earth toward him, prying out, with pick or crobar, any stones that interfere, throwing them into piles upon the fresh dry ground below, to be carted off or used in the construction of terrace walls. In this manner, if proper care is used,

the soil can be stirred and mixed to a depth of 15 or 18 inches, and put in fine condition. Some of our German growers prepare the soil by trenching with a spade. They commence upon one side and throw the earth about three feet wide and two or more spades deep, which leaves an open ditch. Another strip of the same width is taken, and the surface soil is placed in the bottom of the ditch, and the lower soil upon the top, and this is continued until the whole plat is dug over, when the earth taken out of the first ditch is carted over to fill the last. This method of preparing the soil is laborious and expensive, and I think it does not pay in this country of cheap land and dear labor.

No fertilizers of any kind are required upon our virgin soil, and upon most soils application would do harm, at least for a few years.

It should be understood that where the ground has been prepared with mat-hook or spade, it ought to lie several months before the vines are planted, while where a plow is used, the last plowing may immediately precede the planting. The next operation is laying off the ground and planting the vines. The best practice is to lay off the whole vineyard at once. This is done by stretching a line upon one side where the first row is desired, and then measuring along the line. Set a small stake where each plant is desired to stand, then moving the line a sufficient distance for the next row, set the stakes, and so continue until the plat is finished.

The best distance for planting our rampant growing American varieties is rows eight feet apart, plant in the six to eight. Where the land is level the rows may run east and west or north and south, or both, but upon side-hills they should run nearly horizontal with the shape of the hill.

The most convenient tool to use in planting is a good, bright spade. A laborer passes along the row and digs a hole beside each stake, and always upon the same side of each about one foot deep and large enough to receive the roots of the plant without cramping. This is where rooted plants are to be used, but if the vineyard is to be set with cuttings, two smaller holes are dug, one each side of the stake, and all crude earth is to be thrown to one side. Separate to be rejected and better soil substituted for filling in about the plants. The planter should follow immediately after, before the soil becomes dried out, setting one vine in each hole in such a position as shall bring the top near the stake, being careful not to jam the two or more sets of roots down together, but spreading them out in their natural positions, filling around and over them good, fine soil, gently pressed down, setting the plant so low that when the hole is filled only the crown or wood shall be exposed, and if that is an inch or two below the surface level all the better. After a row is set the laborer should go back along the row, pressing the earth firmly about the plants with his feet, and afterward draw an inch or so of mellow soil over the whole to act as a mulch and prevent the surface from baking.

If cuttings are used the planter inserts one each side of the stake in such a manner as that the tops shall approach the stake and the base slant away from it, so that if both live, one may be taken up without disturbing the roots of the other. About the same care is required in filling the holes, as where the plants are used; and they should be set so deep that the top eye will be from one to two inches below the level and slanted so that the bottom will not be covered more than eight or ten inches, and the top eye should be just covered with mellow soil. In this climate planting is best done in the spring, not too early, but any time after the ground is dry and the weather warm enough so that growth

will soon commence, but the vines and cuttings should always be dug and pruned or prepared in the fall and buried in a dry bank, or packed in moss or sand and kept in a cool cellar. During the first season but one cane should be allowed to grow upon each plant, and all others kept broken out, and nothing further is required except frequent cultivating to keep weeds down and soil mellow.

In the following November the vines should be pruned and receive some protection, such as covering with evergreen boughs, leaves or corn straw, or a shovelfull of earth may be thrown over them. The first pruning is a very simple operation, being only to cut away all the season's growth but about three buds, being careful to make the cut an inch or so above the upper one. The second season after planting the ground should be kept thoroughly cultivated up to the middle of July, and unless the vines are very weak two canes are allowed to grow for one the previous year, and all other sprouts are kept down. This season it is better not to let the vines run at will, but keep them tied up to stakes. Any small poles will answer for the purpose. The vineyard will require pruning again in November or early winter, and protection as the previous year. The pruning this time is also very simple, being to cut the lowest cane down to three eyes and the upper one to six or eight. The third season, if strong two year old vines were used for planting, some fruit may be expected, and a permanent trellis may be erected, or if stakes are preferred substantial ones should be provided, and one set for each vine. In after years another will be required. To describe trellises and the various systems of training the vine would require illustrations and make this paper much too long, therefore I will leave it for the subject of another occasion.

Most people seem to prefer rooted plants for setting in the vineyard, probably thinking that they will gain time in their fruiting, but my experience has been that there is not very much gained by it, as a good cutting, planted where it is to remain, will produce a good crop about the fourth season, and the rooted plant will not be doing much before that time. The new beginner must purchase his first stock of vines, and the cost will be several times greater than that for cuttings, and the rooted plants are liable to receive a severe check in digging, transportation and transplanting. But if rooted plants are to be used, either layers or strong two year old vines are the best. Older plants lose too large a proportion of their roots in digging, and the roots of one year old plants are not matured and mostly perish. What is said above does not apply so much where a man raises his own plants and can dig and set them without exposure.

In order to avoid the expense and inconvenience of purchasing vines as well as to be certain of getting just what is wanted, every grape grower should have a nursery for growing his own plants. There are three methods of growing grape plants, viz: From seed layers and cuttings. As the seed process is only resorted to for the purpose of originating new varieties we will pass on to layering. This is a favorite method of propagating with many people on account of the nice roots produced and its simplicity and absolute certainty, and some varieties as the Delaware do not propagate well by any other. For layering the gardener at the time of the annual pruning selects and leaves such canes as will answer his purpose and as should necessarily be removed. They must be such as can be easily bent down to the ground. In the spring, or before the buds start, shallow trenches are opened, into which the branch is pegged down. A vigorous cane of the previous year's growth is usually taken. As the season advances each bud will send up a vigorous shoot which had better be kept tied

to a stake to prevent accidents. As soon as the wood begins to harden at the lower joints, mellow earth must be drawn up to them and they will immediately throw out a circle of roots near the junction with the layer, which roots greatly facilitate the growth and relieve the mother plant. When the layers are well rooted they are separated from the main plant and can be divided and taken up any time after the leaves drop, when every bud that has pushed will be found to have become a strong well rooted plant, and the roots being in a circle are in a convenient shape for replanting. Another advantage is that they may be moved with the soil attached and re-set without receiving any serious check. I seldom practice this method as it is a robbery of the parent vine and will materially affect its vigor and fruitfulness.

Cuttings for commercial purposes are usually grown from slips made of ripened wood of the last season's growth, which has been removed at the annual pruning. They are usually prepared by cutting the sound wood into lengths of 12 to 18 inches, cutting an inch above the top eye, and close below the base, tying them into convenient bundles. They are preserved over winter by packing in sand or sawdust, and placing in a cool cellar, or buried in a dry sheltered place out of door.

For the nursery grounds select a dry sandy loam, not too rich, that can be easily worked and prepared by plowing and harrowing or spading and raking open trenches 8 or 10 inches deep, and two or three feet apart, and set the cuttings along, six to eight inches apart, giving them such a slant that the top bud will not come above the surface level, and press the soil firmly about them. They will require clean culture during the season; and in case a severe drouth prevails, had better be mulched; fresh mown grass is the best material to use.

Cuttings are frequently made of green wood during the summer months, and some nurserymen are accused of growing their plants in hot beds, and a great many that are disposed of are certainly very poor trash.

Where the plants are to be raised for one's own use, or where the vineyard is to be started with cuttings it will pay to be more particular in selecting and making them, and growing the plants. Unless the wood is scarce, I never use anything but bearing wood for them, and usually take but one cutting from each branch of the prunings, and whenever any of the old wood has been removed, reserve a little of it as a heel; in fact I prefer a cutting with a heel, to the ordinary one year old plants.

I make my cuttings about eight inches long, two to four buds to each, as they are long or short jointed, cut the bottom square below a bud, not particular about the top, and tie them into bundles of forty or fifty, but all one way, and preserve over winter by placing them in a pit, top end down, and covering about six inches of fine soil over the butts, and as cold weather advances place over the whole enough litter to keep out frost. I remove the litter on the approach of spring, only replacing it on cold nights and during storms. The advantage of this practice is that the tops being down where it is cool the buds do not start and the warmth secured from the sun will cause the other end to become caloused over and frequently to emit roots, and when they are planted out it is easy to discern which will live. A variety never deteriorates by this practice, but rather improves. Single eye cuttings also make very fine plants when properly grown, but this system is hardly practical for the ordinary farmer, and we will not stop to describe it.

In conclusion, what varieties shall we grow? The well known varieties best

adapted for cultivation in this State are the Concord and Delaware for market, and the Clinton for wine. In less quantity some of the Rogers Hybrids may be grown. Among the new varieties Moor's Early and Lady are promising well. The Concord and Delaware are safe to start with, and others can be added as experience and observation may direct.

With thanks for your attention,

I am yours truly,

JOHN S. HARRIS.

DISCUSSION.

Mr. Gould thought that extraordinary care in preparing the land was not necessary. Prairie sod must, of course, be rotted, but timber land required but little preparation. Mr. Greenman was of the same opinion. Mr. Underwood thought prairie sod could be prepared in one year's time, referring to Illinois.

The secretary stated that the sod on the prairies of the west is not rotted as quickly.

Mr. Tibbitts confirmed the statement of the last speaker, urging strongly that the prairie soil be allowed to rot for two years before planting. There are exceptions to this rule but they are rare. Has seen many men disappointed after planting grapes on prairie sod of one year's rotting.

Mr. Fuller preferred three year's rotting to two.

Mr. Harris thought he had probably not allowed sufficient time to the dwellers on the prairie.

Mr. Lathan had grubbed out new timber land and planted grape vines same season, with good success. His vines were averaging 15 pounds per plant of Concord and Delawares.

Many of his Concords had grown six feet first year of planting in new freshly broken timber land sod.

Mr. Harris said he had Janesvilles planted on new sod, that had made a very slow growth.

Mr. Gould remarked that he did not think it necessary to trench land for grapes unless it was very poor. He thought new land excellent for grapes, but insisted that it should be thoroughly decomposed or pulverized before planting.

Mr. Greenman reported having planted two acres of timber land sod to grape with good success.

Mr. Harris thought we should be more explicit in using the term sod, and called the attention of the society to the fact that there was a great difference between the loose, porous, friable timber land sods, and the tough, woody, fibrous sod of the prairie.

Mr. Underwood said he could prepare prairie sod fit for planting

grape vines in one year, but on being questioned, admitted that his experience with prairie sods was in Illinois.

Mr. Tibbitts said our Minnesota prairie soil could not be rotted in one year, and thought it would require at least two years.

Mr. Fuller thought that not one man in fifty on the prairie would take sufficient care of grape vines to make anything of them under ordinary circumstances. Said there must be thorough rotting and cultivation before planting. He believed it best not to talk to frontiersmen about vines and trees, until they had been established at least three years.

Mr. Harris thought it better for the nurserymen to keep out of new countries, thinks they are a damage to the cause when they sell trees to be planted in the fresh broken prairie sod.

Mr. Underwood defended the nurserymen. He thought the farmer had lessons enough in humbugging not to be deceived. If not he proposed that nurserymen keep on humbugging the farmers until they learned something. He said some one would sell trees to men on the frontier, and that he would not take his agstns out of the field to give place to Ohio and Indiana tree peddlere.

Mr. Pearce said that if he was moving west, and did not know where he was going to locate, he would take vines and fruit trees with him, and plant as soon as he located; said that brains would make a tree grow anywhere.

Mr. McHenry cited the fact of having brought to Minn., from Ohio, a long list of fruit trees which he had planted on timber soil; gave good care, and at the end of three years, had not one of his original lot left.

He attributed this result mainly to improper selection of sorts for this climate.

Mr. Latham reported the loss of nearly all of 500 Concord and Delaware grapes in the winters of 1871 and '72. Had protected well, by covering with earth.

Mr. Peffer remarked that the winter referred to was a very extraordinary one, that many of his vines covered with earth were killed, while many, not protected at all, were unharmed.

The fall was very dry, the winter set in dry, and the ground froze up dry. In the spring there was no moisture when the ground thawed out, and the vines root killed. Thinks that freezing dry and thawing dry more injurious than excessive cold.

Mr. Gibbs remarked that successful grape culture demanded deep stirring of the soil.

He said that in open field culture, the plow would go deep

enough but for garden culture; the spade and trenching must be resorted to.

Mr. Tibbitts said he always covered his grape vines with earth for winter protection, and that he had never yet lost a crop.

Whenever he had left the vines exposed, he had invariably lost a portion of them. He had not yet seen grapes flourish in Minnesota without winter protection.

MR. GREENMAN'S PAPER.

The Cultivation of Fruits a Necessity for the Northwest.

Fruit long since ceased to be looked upon as a mere luxury for the few, and has come to be considered an essential article of food. It is hardly necessary to say that Minnesota and the entire northwest needs more of fruit as food. This want can never be fully supplied until we produce that supply at home. We are told that we may expect fruit from our orchard planting in from four to twelve years. Large numbers of trees and orchards have been planted in the northwest, for more than twice twelve years; and yet the supply is inadequate for the wants of the people. Lack of time then, is not the cause. But it lies deeper, and the remedy must be found in other directions. With the introduction of the "Iron Clads" it was hoped that the remedy had been found. The fierce winters of 72-73, and that of 75-76 and again in 79-80 many of the most *Iron* of the Iron clads went down before the polar waves and storms that swept over the country. Thirty to forty below zero was reached many times during the winter of those years. Do we not find this a prolific cause of the failure in growing a full supply of fruit for our people at home. The apple is the leading fruit, and should be used freely by every family. That apples costing from three to four dollars per barrel can be found upon the poor man's table in constant supply is simply impossible. Looking over the experience of the past, can we expect a full supply of home grown fruit from our orchards in the immediate future? Will we not find a remedy in encouraging the growing of the small fruits? Our trees must withstand the winter's blasts, while the vine and the smaller fruit plants can be safely covered and placed beyond the reach of harm. It is for us to encourage those who have already begun the work, and try to induce others to plant all the small fruits. Fifteen to twenty cents for grapes per lb., and twelve to twenty cents for the commercial quart of berries cannot find their way to the poor man's table to any great extent.

A few simple directions for planting and caring for these fruits will enable any one to grow them successfully. I will call your attention to one at this time, which will succeed here in an eminent degree. This is the grape. Here we have a fruit in great variety that is easily grown. As a rule the grape will succeed in the northwest. Our dry climate is especially adapted to the growth and perfection of this fruit. But the grape must have winter protection. This to some is a serious objection. Compensation is found, however, during the growing season, in the immunity our climate gives from many of the scourges that affect the vine and its fruit, in those sections where winter protection is not required. Our native vines are comparatively free from rot and mildew. Our

grapes, so far as quality and quantity are concerned, compare favorably with any grown in the same latitude farther east, or where the same varieties are grown. We may have the grape in season nearly as long as the apple. Carefully selected varieties will keep till spring. The interest manifested in improving the varieties by seedlings, and the extensive planting in vineyards and gardens, is most encouraging, and shows how earnestly the people desire to raise their own fruit. There are a number of requisites for the successful cultivation of grapes. They may be grown upon almost any soil that will produce a good corn crop. A southern exposure is to be preferred. This with a clay loam leaves little to be desired so far as soil and aspect is concerned. Training and pruning are indispensable; where these are neglected failure is almost sure to follow. No vine or vineyard will long continue to yield good crops of fruit without thorough cultivation. It is difficult to do this, where the vines are trained upon the ordinary trellis. Single stakes are better in this respect, but it is difficult to prune the vines properly, and usually leads to the annual renewal system of pruning. The largest bunches of grapes are found upon the shoots growing from wood of more than one year's growth. The buds are more perfectly developed upon the laterals than upon the single canes of one year's growth. The vines should be pruned so as to retain a portion of the old wood. A system of training which combines all the advantages of the single stake in cultivating the vines, as well as that of the common trellis, is desirable. I have one that is well adapted to the purposes and is not subject to the objections of either. Where the vines are trained upon the common trellis, the vines receive a good share of sunshine, while the soil is much shaded.

For a vineyard the system of training as shown by the accompanying cuts, has the advantage of exposing the vines to the heat of the sun, allowing it to shine upon nearly every foot of soil some time during the day, and is very easy of construction. No trellis is required until the third season after planting. A single stake answers every purpose up to this time.

The vines should be planted not less than eight feet apart each way. The rows should run north and south, or nearly so. Set a post at each vine. These should be seven feet above the ground. Where the vines are to be worked both ways, nail a strip of lumber, say one inch by two, at the top of the posts, the whole length of the rows. Lay off three spaces each side of the posts, one foot apart; then measure down the post, from the top, three spaces two feet apart. Stretch a wire, or nail a strip of lumber from the point on the post to that on the ridge piece. This will make three strips, one foot apart, on each side of the post. Together they form the shape of a fan. By training upon this trellis, pruning is simplified, and easily understood. The spars all being at right angles with the main cane, are easily laid down for winter protection.

The soil should be thoroughly prepared, where it is not naturally loose. Sub-soiling should be resorted to.

Good two year old vines are best, and should be set eight or ten inches deep. Roots well spread out. Press the soil tightly upon the roots, for one or two inches, filling the hole with loose dirt. Do not tread the top soil, as this prevents the dews and rain from reaching the roots. A light mulching at the time of planting often proves of great benefit. At the fall pruning cut to three buds.

The second year train a single cane, cut this cane back to two feet or less after the leaves have fallen. The third season train to a stake again, and at the fall

pruning the vine will appear as shown by fig. one. Well developed buds are essential to produce large bunches. Summer pruning, or rather pinching, will secure these. The cane shown in fig. one will produce a shoot from each bud, upon which two or three clusters of grapes will set. Pinch off the end of each shoot two or three joints beyond the last bunch of fruit; laterals will start, pinch these off after two leaves have formed, with the exception of one or two of topmost ones, these will act as a safety valve and prevent the pushing of the next season's fruit buds; these shoots are to be tied to the ridge piece. To allow a large growth of shoots the most of the summer and then slash them off is all wrong, damaging both fruit and vine. Early pinching is beneficial to both; at the end of the season it will appear as shown in fig. two. This vine when pruned is represented by fig. three. The following season two shoots will grow from each of the spurs, which are to be treated the same as the previous year. In after pruning leave only one shoot on each spur and cut this back to three buds again, when the vine will appear substantially the same as shown in fig. three. There are some varieties that do not readily yield to the treatment above described, yet these general principles will apply to all the varieties. The more rampant growing sorts may have a few more shoots tied to the ridge of the trellis.

A little experience with different varieties will suggest how close to pinch during the summer. Let beginners plant varieties that have been tested. Prune properly, lay down for winter and success will follow. For hardiness and early ripening the Janesville has no equal. The Delaware excels in quality, while the Worden and several of the Rogers grapes are well adapted to this latitude. I am planting freely of Worden, Wilder, Massasoit, Merrimac, Delaware and Janesville, and sparingly of nearly all the new sorts. My vineyard will embrace nearly five acres when all planted. So my faith and works go together.

DISCUSSION.

In answer to a question Mr. Greenman said he never knew mice to gnaw grape vines. Mr. Day asked if sorgho bagasse would answer as winter covering for grape vines. Prof. Porter said that he had used bagasse as covering for a choice lot of vines. He had covered two feet deep. The vines were injured and the mice had eaten the vines badly. Mr. Harris related experience when a light covering of bagasse had been very beneficial.

Mr. Smith said that for several years he had protected his vines with a light covering of strawy manure, with good results. He now practiced covering with earth. Always had bad success when the vines were left during winter without protection.

Under discussion of the theme, *The Botany of Minnesota and its relation to fruit culture*, Mr. Harris presented the following list of trees found growing as natives in Houston county, believing that the botany of that portion of the country had much to do with successful fruit culture and that forest and fruit trees must walk hand in hand.

I am somewhat inclined to believe that the botany of a country has some influence as regards its adaptability to fruit culture. The counties of Houston and Winona have an abundant supply of timber for fuel and some that is valuable for lumber and manufacturing purposes. These counties and others that are similarly wooded, have thus far proved the best for growing the apple. Being engaged in making a collection of Minnesota wood, I am able to give you a very complete list of such woods and woody plants as are growing there in their native forests. *Coniferae*. *Pine family*. In this family sub order 1, we have the *Pinus Strobus*, L. (white pine) growing isolated or in small groves in positions along the Mississippi and Root rivers and their tributaries, where fires have been able to run, and the *Larix Americana*, *Michx.* (Tamarac) only in Swamps on Pine creek. In sub order 2, *Juniperis Virginiana*, L. (Red Cedar) and *J. Communis* L. (common trailing juniper) are often met with upon the steep rocky sides of the bluffs. This family is too meager to influence soil or climate. The *Cupuliferae* (Oak family) is a numerous family, and in some of its species abounds in all sections. *quercus alba*, L., (White Oak) 2 *Quercus macrocarpa*, *Michx.* (Burr Oak) and *quercus Rubra*, L. (Red Oak) are the most common on the uplands, and as brush or small trees they often form thickets in places that were without timber, while the annual fires were suffered to run; where fires have not run they have grown to large size and have been used extensively for fencing, cord wood, staves and house logs. *quercus tinctoria* Bartram, (Black Oak) is frequently met with as a large tree, but seldom as a young growth, *quercus Prinus*, L. (swamp White Oak) is a majestic tree and was formerly abundant upon the low lands bordering the rivers. I have seen trees 4 to 5 feet in diameter and 50 feet without branches. *Quercus falcate*, *Michx.* (Spanish Oak) is plentiful on dry and sandy terraces, usually a small tree esteemed for fuel. *Corylus Americana*, *Walt* (Wild Hazel Nut) is a very common shrub, growing 4 to 8 feet high, and is spreading so rapidly as to become injurious to the pasturage. *Carpinus Americana*, L. (Blue or Water beech) is somewhat rare, but *Ostrya Virginica*, *Willd.* (Iron Wood or Thop Hornbeam) is abundant in cool and rocky situations, usually a small tree but sometimes a foot in diameter and 30 feet high.

Julgandae (walnut family). This family is represented by two *Julgans* and *Carya*. *J. Cincera* L. (bitternut) is abundant in all the valleys and at the foot of the river bluffs. *J. Nigra*, L. (black walnut) is most plenty in Root River Valley, but is occasionally seen along other streams. *Cara amara* (bitternut) is abundant in the same localities. *C. Alba* (shag-bark hickory) is plentiful upon the bluffs and side hills and is not found in other parts of the State. *Betulace* (birch family). In this family is found *Betula alba* (white birch), *B. Papprocae* (paper birch), *B. Excelsa*, Ait. (yellow birch), *B. Lenta*, L. (cherry birch), *Alnus incana* wild (speckled alder). The willow family is represented by some six or eight species of the *Salix*, only the black willow becoming a sizeable tree. *Populus grandidentata*, *Michx* (great toothed poplar), *P. tremulodes* (american aspen), *P. monilifera*, Ait. (cottonwood). The poplars are fast growing trees and the last attains to great size. Of the elm family we have two distinct types of the *Ulmus americana*, called by the common people, water and rock elm, and the *U. Flura*, (red or slippery elm) and *Celtis occidentalis* (hackberry). In the olive family is *Fraxinus americana*, L. (white ash), *F. quadrangulata* (blue ash), *F. viridis* (green ash, doubtful), *F. Sambucifolia* (black or water ash). This family with the last is more abundant on the alluvial river bottoms. In the honeysuckle family is found sparingly *symphoricarpus occidentalis* (wolf berry), *Loni-*

ceras pariflora (small honeysuckle), *Diervilla trifida* (bush honey suckle), *Sambucus canadensis*, L. (common elder), *S. Pubeus* (red berried elder), *virburnum prunifolio*, L. (black haw), *V. Lentago* (sweet viburnum), *V. dentatum* (arrow wood), *V. Opulus* (highbush cranberry). Of dog wood, *Cornus alternifolia* (Alternate leaved comd), *Cornus Sirica* (silky cornel). *C. circinota* (round leaf cornel), find places in the rocky ravines, and all wooded copses. In the currant family there is *Ribes cynosbati*, L. (wild gooseberry). *R. Lacurtre* (swamp gooseberry). *R. rotundifolium* (smooth gooseberry). *R. floridum*, L. (black currant). *Spiræa opuntifolia* (wire bark) is found in rocky ravines and hillsides and is too common to be appreciated. Among the brambles the most common are *Rubus stregonis* (wild red raspberry), *R. Occidentalis* (black cap or thimble berry), *R. rilosus* (high blackberry) and *Candensis* (low or dewberry); the thimble berry produces an abundance of fine fruit and two or more species of wild rose are abundant. Also of the rose family are *Cratægus crus gali* (cock spur thorn), *C. Cochinae* (scarlet fruited thorn). *Pyrus coronaru*, L. (american crab apple). *Ame-lanchier candensis* (shad bush), *Prunus americana* (wild red or yellow plum) forming large thickets. *P. pennsylvanica* (wild red cherry), *P. Virginica* (choke cherry), and *P. Scrotina* (wild black cherry). The *Gymnocladus candensis* (Kentucky coffee tree) sometimes grow to large size along Root river. *Ampelopes Quinquefolia* (Virginia creeper) and *Cetastus scandens* (bitter sweet) is growing plentifully on rich grounds, and with them the *Staphylia trifolia* (bladder nut) is frequently seen. The maples are chiefly confined to river valleys and sides of bluffs and are *Acer sacherinum* (sugar maple). *A. Rubrum* (soft maple) and *Neyunto aceroides* (box elder). The *Tilia americana* (basswood) is usually found along streams and in wet places. Of Sumac there is *Rhus typhena* (staghorn sumac), *R. Glabra* (common sumac), *R. Renenata* (poison sumac) and *R. Toxi. codendron* (poison ivy). The only native grape is *Vitis æstivates* (summer grape) of several varieties very abundant in the woods. The *zanthoxy lum. americana* (prickly ash) and *Enongmus atropurpureus* (waa hoo) are quite common on bottom lands and the same may be said of the *Smilax rotundifolia* (green brier) and one other of the same family. I have omitted the only other tree that has come under my notice, *Morus rubra* (red mulberry) a rare tree found near the mouth of Root river.

J. S. HARRIS.

WEDNESDAY AFTERNOON.

Meeting called to order at 2. P. M., Pres. Grimes in the chair.

The report of committee on president's address for meeting of 1880 was called and submitted as follows, which was accepted and placed on file for publication:

Mr. President and Gentlemen of the State Horticultural Society.

At the last annual meeting of our society, a committee was appointed to which was referred our president's very able address.

ordered to report at this meeting. In accordance thereof, we ask to submit the following:

1st. The address has been published and sent forth to the world as a part of the transactions of this society, and we recommend its careful perusal by every Minnesotian into whose hands it may come.

Owing to a pressure of business, they failed to report, and were continued and

2nd. We would call your attention to that portion of the document on page 96, public transactions of State Horticultural Society for 1889, alluding to nurserymen. To us it seems to be unwise and a great wrong that a class of men who are engaged in experimenting and propagating an article (viz: fruit and ornamental trees) which, in this new and untried climate, is very uncertain in its financial results, should be required to pay a direct and burdensome tax upon his growing nursery stock, while all other growing productions of the soil are allowed to go entirely free. There is no other industry pursued within this State which calls for so much skill, care and self-sacrifice, and that has done so much to beautify nature, bring comfort and happiness to the people, and enhance the value of property, and that promises so much to the future, in refinement and wealth, as horticulture, and no branch of horticulture is of so much importance to us, at the present time, as the nursery business.

Without the nurseryman to test and propagate species of trees and plants, adapted to our climate, and encourage their planting and cultivation, the time is near at hand when our fertile prairies will be considered a dreary waste, unfit for the homes of a civilized people. After the soil has become exhausted by incessant cropping with wheat, and the little available timber is consumed, the expenses and discomforts of living would be so great that the people would abandon their land, and seek a more favored clime; while with their aid, beautiful homes filled with happy and prosperous inmates, groves and forests of useful timber, orchards laden with luscious fruits, and gardens of beauty, would spring up everywhere, and blizzards and locusts will have become a dim memory of the past.

Shall we, the state horticultural society, see such wrong done, and such grand results lost forever without making a mighty effort to right the wrong, and sweep away the clouds of danger that hang over us? Nay. But in view of these facts, we recommend this society to memorialize the present honorable legislature of Minnesota, setting forth the facts as they exist, and asking for the enactment of a law exempting from taxation all nursery stock growing within the state, thus placing it upon an equality with other growing crops, and to give every reasonable encouragement to orchard and forest tree planting.

Third. Another matter alluded to in the address that should receive further notice, is horticultural literature or the dissemination of horticultural knowledge. A man is influenced and moulded in a great degree after the books and papers he reads. It is a lamentable fact that a majority of the farmers of this state have not free access to good libraries, do not get the transactions of this and other kindred societies, and that many of them do not even read an agricultural paper. The trashy novels that make up the bulk of the libraries of our day tend to raise up a generation of sharpers and idle dreamers. The hope of our state lies in its agriculture and horticulture. The greatness and grandness of agriculture and horticulture depends upon the intelligence of those who engage in its pursuit, and their intelligence can, in a great degree, be measured by the purity of their literature. No man ever rose to eminence in any other country without

first mastering the literature that pertained to it. The lawyer, physician, engineer and others have their libraries, containing books and periodicals treating upon every subject that has a bearing upon the prosperity of his calling, but how often the farmer's library contains not one single volume that sheds a ray of light upon his business. No wonder the days drag wearily by. No wonder his boys have a disgust for their father's calling and desert the old homestead. We believe that this society can do no better work than to encourage the dissemination of horticultural literature and we submit, for the adoption of this meeting, the following list of books and papers as worthy of a place in every farmer's home, viz:

1. A complete set of Transactions of Minn. State Hort. Society.
2. Warder's American Pomology.
3. Barry's Fruit Garden.
4. Downing's Fruit and Fruit Trees of America.
5. Fuller's Grape Culturist.
6. Henderson's Gardening for Profit.
7. Henderson's Practical Floriculture.
8. Bryant's Forest Tree Culturist.
9. Downing's Landscape Gardening.
10. Harris' Insects Injurious to Vegetation.
11. American Ornithology—Wilson & Bonaparte.
12. Gray's Lessons in Botany.
13. Darwin's Variation of Animals and Plants.
14. Department Report on Forestry, U. S.
15. Reports of Department of Agriculture, U. S.
16. Reports of Wisconsin and other Horticultural Societies.
17. Geological Surveys of Minnesota.
18. American Agriculturist.
19. Gardener's Monthly.
20. Rural New-Yorker and History of Horticulture in America.
21. Farmer's Review.
22. Fruit Recorder.
23. Purdy's Small Instructor.

The cost of the above books would not exceed \$50.00, and of these or a like number of periodicals about \$6.00, a sum much less than many of our farmers lose every season from a lack of just such knowledge as can be obtained from them.

Respectfully submitted.

R. J. MENDENHALL,
T. G. CARTER,
JOHN S. HARRIS,
Committee on President's Address.

DISCUSSION.

Mr. Harris said we should patronize home agricultural papers, and that Minnesota horticulturists should write for their publications. Said that the annual report of the department of agricul-

ture was very valuable, and that all farmers who could procure them should read them.

A paper entitled *The improvement of Crab trees by top grafting*, by O. Gibbs, Jr., Lake City, was read and ordered on file for publication.

The improvement of fruit trees by grafting the limbs is as old as civilization, and the process is familiar to all residents of fruit regions. In the eastern, middle and southern states, the best sorts of apples in the old orchards are called "grafted fruit," to distinguish them from the produce of the trees as they originally stood, which were all seedlings. It is no uncommon sight there to see several kinds of apples growing on the grafted limbs of the same tree, and when a new variety is to be tried, the first step is generally to graft it somewhere in the orchard. By this process a test can be made some years sooner than by growing a new tree from the root graft, as the top grafts bear fruit in two to three years' time, while the root graft is in the same period only got ready for transplanting from the nursery row, and must then have from two to five years' further growth before it will show its fruit. The grafting of common apples upon crab trees has had one general difficulty to contend with, and that was, in the beginning, the slenderer, weaker growth of the crabs, their roots, bodies and limbs not being strong enough to carry the heavier growths of the common apple. But this trouble has been lessened and in respect to some varieties almost entirely removed by the improvement in the crab varieties themselves. The Siberians grow stronger than our native crabs, and then came the Transcendants and Hislops, stronger than the original Siberians; so that now we find, by several years' trial in grafting into these, that by using the cions of certain varieties we produce a good union and assimilation, and make a sound fruitful tree with crab bodies and forks, and common apple tops.

The advantages of this method is very obvious in this northwestern country. First, it offers us an improvement of our fruits with the trees we now have. The Siberians, Transcendants and Hislops have had their day, and are no longer wanted, except in small quantities. One or two trees of each for canning or preserving, is all any family will want to use when the hybrid or improved crabs, like the Early Strawberry, Whitney and Minnesota become known.

Second, it suggests to us a means of getting rid of the summer blight, which in its serious phases is almost exclusively confined to the three sorts first named, as the sorts that are to be grafted in are not themselves bad blighters, and the crab growths are, by the process of grafting and pruning, entirely removed, and thirdly, the grafting bids fair to extend our varieties of apples in this severe climate by enabling us to use many tender sorts that upon their own bodies and forks would winter kill too badly to make them profitable. What would seem to be common sense on this very important point agrees perfectly with our observation of known facts. Here is a thrifty crab tree, sound at the root, sound in the body and sound in the forks. This condition is what we generally find until the summer blight strikes the topmost limbs and has had time to work down into the body. Now we will suppose that we have worked the crab top all off by degrees, taking one, two or three years' time to do it, according to its size, and in its place a top of limbs of the common apple all joined to the crab above its forks. We have certainly got the three weakest points of a tree per-

fectly hardy and secure—namely, roots, body and forks. Now, what do we further need in order to have the whole tree hardy? It is obvious that nothing is needed except to have the top ripen up its new growths before winter sets in. Looking at the crab, we see that it stops growing and hardens itself up for winter in good time. Something in its nature tells it that cold weather is coming and it proceeds to make itself ready for it. Its sap slows up or ceases in its flow, the cions and all parts of the season's growth of wood or bark harden up, and the first blizzards find the tree ready for them, whether they come early or late. How are the grafted limbs to keep on growing after the crab parts call a halt? They cannot do it. They stop growing with the rest of the tree and likewise harden up for winter. This of course is a theory. Now compare it with observed facts. Take the Wallbridge variety of common or standard apples as an illustration. This is an apple about the size of the Geniton, of better quality and a much longer keeper. In fact it keeps nearly until apples come again, and is fit for use in March or April. As a tree upon its own body it is thrifty, but in some of our seasons too tender. In this section it gets injured so as to produce under-sized apples in some years, and then in small crops—a variety perhaps a little hardier on the whole than the Haas—possibly not so hardy—unworthy of cultivation here except on a small scale for the sake of variety.

Well, we find this Wallbridge growing upon the crab trees, as grafts, and showing perfect hardiness after eight years' trial, extending through the two severest winters we ever had, (1873 and 1880,) bearing heavily and its fruit twice as large this year as that of the same variety on the Wallbridge tree, and much handsomer, because, being on the crab stock, it suffered less injury last winter than the Wallbridge on its own stock. Examining other sorts we find the same or similar facts to sustain the theory.

We come now to the consideration of other questions belonging to this subject. How are we to manage the tree during the process of transformation, so as to preserve its vigor, promote the proper growth of the grafts, subdue the crab growth and keep out the fire blight? Right here let it be understood, the grafting process does not guarantee success. It only makes it probable. It requires attention and care in behalf of the tree, and in some cases like other good efforts, it may fail. The worst difficulty is to keep out the fire blight. The best authorities on the blight, while differing somewhat as to its cause, agree in some methods of treatment. Keep the temperature of the new wood as low as possible during the blighting season. The top must be kept open, by pruning, to admit a free circulation of air, and the ground protected from intense heats. In the orchard of the farm connected with the Iowa Agricultural college, buckwheat was grown for three years and no blight appeared. Ashes and salt separately or together, are cooling to the surface and have been known to stop the blight. A whitewash of lime and sulphur, applied to the trunk and limbs has been much recommended of late. But the preventive generally effective during the transformation process of top grafting, is the pruning knife, or better still the fingers on tender buds and sprouts. As soon as the graft gets fairly to growing, rub or cut off all the crab buds and sprouts a foot or so below the graft. It is presumed that the grafter has already cut off all the limbs not needed to make foliage the first season. The cutting off of so many old limbs as has been done by the grafters, stimulates the vigorous growth of the sprouts from the remaining limbs and they must all be destroyed as fast as they appear. After a while

they will quit coming. The tree will learn that its crab character is played out, and after a while will second your efforts by making no new buds on the crab wood. Perhaps once a week will be often enough to examine the tree and remove the sprouts. If after all these efforts, the blight begins to make its appearance on grafts or limbs, as it may in seasons like the past one, when it takes its most malignant forms, use the pruning knife at once and be sure you cut off the end of the blighted sprout or graft not only below the external injury but far enough down to make it certain that all the affected parts, both internal and external are taken away. Here is where many people fail in pruning for the blight. They do not cut low enough. The writer had about 600 grafts inserted in thirty-one crab trees last spring—all the trees having blighted in the limbs and some in the bodies in previous years. Under the system of pruning herein described, no blight appeared on the trees until nearly all of the same kind in his neighborhood had so far blighted as to look as if a fire had run through them, and afterwards when it commenced in a few of the grafts and crab limbs, it was very slight and yielded at once to the knife.

The next spring after the top grafting has been commenced, the remaining crab limbs can be all or mostly grafted or cut away if the grafts have made a good growth the previous year, and the trees must be frequently examined during the growing season to keep off the crab sprouts that appear till they close their efforts to renew the old tops.

It will be seen from the foregoing that it is not worth while to graft into the crab except with a view of making thorough work, and as fast as possible without injury to the tree, grafting it all over. The blight cannot be controlled and kept out on any other plan: and while it continues, as it works at present, the crab trees are useless, and are likely to die altogether.

It remains only to name the sorts that do best as grafts on the crabs. The Wealthy is a perfect success and the most valuable for general top grafting. It makes a perfect union on Transcendents, growing no beetle at the point of union. The Wallbridge makes a beetle, but it is sound and considering its long keeping quality and abundant bearing, is a good sort to use. The Fameuse, Haas, Ben Davis, Tallman, Sweet and several other sorts have been tried with success in this neighborhood. The Duchess of Oldenburg is a failure upon the crab, either grafted in roots or limbs. Unless one wishes to make experiments, we would restrict our grafting to sorts that are known to do well, using the Wealthy most freely, and then with good care of the trees, we shall be likely to change our nearly useless crabs into trees that will be a good deal more satisfactory, and in some cases as good orchard trees as can be grown anywhere.

DISCUSSION.

Mr. Sias.—I agree with Mr. Gibbs on all points except that instead of being two years removing the blighted top I would make a clean job of it in one year. Mr. Eldridge top grafts Duchess on Transcendents by whip splicing. Mr. Underwood thinks the time required to change a crab tree to the finer apples by grafting depends much on the character of the tree grafted upon. He always grafts such limbs as would complete the shape of the tree if they

were allowed to grow. Cuts out one-third of what he considers the superfluous wood. Thinks he can, in two years, certainly renew the top of a tree and yet preserve its form.

Mr. Pearce said that he did not believe in cutting away all the top of a tree at once for the purpose of grafting, except in the case of small trees. With large trees he would never remove more than one-half the top in one season.

Mr. Harris inquired if a lump or beetle formed at the junction of the Duchess of Oldenburg with crab stock.

Mr. Eldridge reported that he had Duchess grafted on Transcendent crabs, and no lumps appeared. Said the lump was caused by the cion growing faster than the stock.

President Grimes said it was caused by the unequal vitality in the trees.

Mr. Tibbits stated that in cases where he had cut away the entire top in grafting, he was not troubled with blight of the cions, but where he had cut away only one-half the top the cions were destroyed by blight. He explained that this expression related to crab stock subject to blight. He had saved some cions after grafting by splitting the bark of the cion. Thinks this will prevent blight to a great extent.

Mr. Harris gave as a reason for the formation of a lump at graft juncture was because the cells differ in size and cannot assimilate.

Prof. Porter said the cells were the unit of the plant, and their multiplication the increase of growth, and that the difference in growth was owing to the primitive difference in cell structure.

The question, "Do trees draw any return flow or sap from the limbs downward, was next taken up for discussion.

Mr. Gibbs showed a very interesting example of a ligature of wire, in case of a plum tree; the growth being largest above the ligature.

He did not assert that there was a regular circulation from the top downward, though this specimen was a step of proof in that direction. Neither is he certain of general circulation from root to branch. He was in the dark as pertaining to the theory of some writers of arterial or venous circulation.

He would like to know more of this, as we cannot deny that there is circulation in some manner.

Prof. Porter admitted this to be one of the most abstruse question that horticulturists ask. He divided the wood into four portions; the heartwood, the sapwood, the present season's growth,

and the bark. That there was very little circulation in the heart-wood; that the heart of a tree might be entirely taken out, and still the tree grow on. It is now supposed that the circulation took place from cell to cell, through the wood, and that the nearer the approach to the outside the freer would be the circulation. When the sap reaches the leaf, it is partially eliminated and begins its return, assisting in laying the foundation for future buds and fruit. This process goes on as long as the plant is alive and ceases as soon as it assumes a dormant condition.

Mr. Gibbs asked if anything was known by what power the sap was returned.

Prof. Porter replied that this is governed by the natural law of endosmosis and exosmosis, by which we understand that nature does not provide for an upward flow of sap without at the same time providing for its return. He referred the members of the society to a very exhaustive paper on this subject written by Prof. Clark of Amherst college.

Mr. Emery moved the appointment of a committee on revision of the fruit lists, with the exception of the strawberry.

The president appointed as such committee, S. M. Emery, A. W. Latham, T. G. Carter.

Under order of report of committee on Russian apples, Mr. Underwood reported he had nothing to add to last year's report.

President Grimes said he would make his report with his report of the St. Louis meeting.

Mr. Sias of Rochester submitted the following report.

ROCHESTER, Minn., Jan. 17th, 1880.

Mr. President and Gentlemen of the State Horticultural Society:

With another year's experience with the new Russian varieties of the common apple, we expected to be able to give you a few items of general interest. But obstacles over which we had no control intervened to prevent, viz: when our trees were in full bloom, a severe frost cut every blossom from one-half the orchard. Then when the scattering fruit on the balance of the trees were nearly half-grown, a terrific hail-storm struck them and nearly completed the ruin. Notwithstanding these reverses, No. 68 (Early Champagne) matured about a peck of passable fruit that ripened a few days earlier than any other variety in the orchard. Ripe middle of July. Bro. Harris and others ate of this fruit July 21st and pronounced it "not hard to take." Owing to its early ripening, hardiness, good color and fine quality, it may prove valuable, providing we do not continue to be visited by late frosts, as has been the case for the past two seasons.

The next variety most worthy of notice is perhaps the 317 (White Pigeon). Size above medium, yellow, streaked with carmine, flavor neutral, season last

of August. This is one of the very best, nearly sweet, summer apples yet discovered.

304, Switzer: a beautiful apple that somewhat resembles the Red Astrachan; not as tart; season September.

382, Russian Green, an early fall fruit, of excellent quality.

470, Burr apple: yellowish white; good bearer; more acid than Duchess; fair pie apple.

264, Smelling apple. This is a beautiful red apple of excellent quality; season August.

374, Pendant Ear apple. This resembles in general appearance the Duchess of Oldenburg; is a prolific bearer, but too astringent to ever become a great favorite; season September.

170, the Revel apple, is a fine fruit, but I wish to see what another year will bring forth before describing.

The long keeping varieties that our enthusiastic *Russian* friends have been pleased to offer us for some years past, we are still looking for. We fruited thirty varieties the past season. The season of the latest of these was September. Still we are confident that there are better keepers than we have yet struck, and we live in hopes of finding them yet.

Respectfully yours,

A. W. SIAS.

Mr. Latham has sixty varieties of Russian apples. He has fruited ten sorts, mostly fall fruit. Thinks some of the Russians will yet prove valuable.

President Grimes thinks the Russian apples do better in our cold climate than further south.

Mr. Harris thought we ought not to discuss the hardiness of Russian sorts; thought that a settled point. He said that what we wanted of this variety was to produce an earlier apple than the Duchess, and a winter apple. We want a Russian good from now until spring. He thought we had better turn our attention to the production of good hardy seedlings, and let the Russian apples alone.

Mr. Sias asked about the English Pippin, said to be a Russian.

Mr. Peffer said he did not know any Russian by that name. He has a poor opinion of Russian apples generally. Said he had more faith in the Wealthy than in all the Russians in this country.

Upon the conclusion of Mr. Peffer's remarks he was elected an honorary member for five years.

The next order of business was a report of the committee on seedling apples.

Mr. Day wished to modify his report of last year. Is not so sanguine as then. Many of the trees he had faith in then were

dead now, some were bearing lightly, while some few were doing well. No written report.

Mr. Gould submitted a short verbal report. He said the trees were in such bad condition from the effects of last winter that it was yet uncertain whether those under his observation were dead or alive.

Mr. Pearce had not given his duty as a member of this committee, as close attention as he ought. He cited the case of a seedling brought from Wisconsin twenty-six years ago, that it was yet living and in good condition. The fruit was about as large as the Bellflower and much resembled that apple. He knew of another seedling winter apple that had stood sixteen years. The fruit is about the size of the little Red Romanite. He says Mr. Sias' Elgin beauty was a good one and had stood last winter's cold first-rate and that they were pretty well disseminated. The fruit, medium in size, striped, juicy, good flavor. Season, same as the Wealthy, except perhaps a little better keeper. He noted the Mann apple as a good one, the wood at present uninjured by the severe cold. Of the hybrids, he spoke highly of the Alaska.

Mr. Harris said he had not done his duty on this committee, and would leave his report much the same as last winter.

He would add to his list two seedlings grown by Mr. Meyers of St. Peter that he thought would bear watching. He said it was of more importance to look after and disseminate our seedlings now growing, than to wait, depending upon the results of the State experimental farm. He did not think we would get anything from this unless purely accidental and at all events not for fifteen years to come.

The committee on the subject of taxing nursery stock not being ready to report were given until Thursday.

The committee on experimental farm were ordered to report which they did as follows:

Your committee appointed at last annual meeting to report on the State University experimental farm located at Excelsior, respectfully submit the following:

Owing to the distance that the majority of the committee live from the farm, they did not get together to visit it and make an examination of the progress made toward the development of this new enterprise, but we append a few extracts from statements made by the superintendent of the farm to the board of regents of the State University to give you some idea of the work that is being done.

He says the losses were about one hundred trees during the last season, consisting of eight or ten varieties of long keeping winter forts that proved to be tender, even when top grafted on hardy seedlings.

Though the loss was considerable it was less than anticipated, some thirty other long keeping varieties promise well, giving assurance of the final success of this undertaking.

He has secured about forty varieties of the best apple trees that the country affords, and set these in alternate rows with the Iron-clads, but of these none but the best in quality, so that in this orchard there is nothing to adulterate, and in the hybridizing we cannot fail to produce something extra, combining more good qualities than anything yet produced. The orchard contains seven hundred and sixty trees, doing well, except in a few instances cited.

Strawberries have been set between the rows, mostly crescent seedlings and green prolific—our choice of all the strawberries, as they stand without protection, and yield the greatest abundance of fruit.

There are about five hundred grape vines set, of sixty or seventy named sorts, and about two hundred seedlings. There is also large space and plenty of vines to continue extending the grounds the next season, together with a few varieties of raspberries, blackberries and strawberries now on hand.

There are about three hundred and fifty pear trees growing mostly on mountain ash stocks, including a great many of the best varieties that could be procured, regardless of cost.

The American and European mountain ash were used as a stock to graft upon, and each variety of pear has been grafted on both of the mountain ash. The result is that every pear grafted on the European ash was killed last winter, and also many on the American ash. Several varieties on the American mountain ash have done well, making fine growth the past season, showing conclusively that some varieties of the pear can be grown when grafted on the American mountain ash, on which the cions grow as readily as on the pear stock.

The American mountain ash is a tree that stops growing early in the fall, and the pears grafted on it are also compelled to stop growing and get ready for winter.

Pears on pear roots or on European mountain ash continue to grow late in the fall, and do not ripen their wood. So strong is my faith in pear culture on American mountain ash stocks that I

have ordered a hundred to graft upon next spring, as I intend to give the matter a fair trial.

The Regents ordered a new lot of land cleared. Two acres were plowed, which will be planted in the spring with seedlings of my own growth, or with new Russian varieties, as the Regents may direct.

I think the Russian apples and pears should be thoroughly tested.

Your committee suggest that it would have been well to have specified by name, what varieties had proven tender, that the planters of the State might have known what to reject in their future planting. We feel confident from what we can learn, that the efforts being put forth by the superintendent to develop hardy, long keeping apples, will be successful.

Respectfully,

WYMAN ELLIOTT,

H. D. ELDRIDGE,

Committee.

Mr. Harris reviewed the management of the experimental farms, and condemned in strong language the unsatisfactory report of the superintendent, and said that this farm ought to be at all times subject to inspection, and all visitors entitled to courteous treatment.

He moved that the committee on experimental farms be continued, and instructed to report annually. Motion prevailed.

Mr. Gibbs referred to the report of the Iowa Agricultural society, as containing a report of the superintendent of the Minnesota experimental farm, and thought it singular that the report should be sent to Iowa, and not to the Minnesota society.

Prof. Porter promised his influence to secure a complete and full report in the future.

Paper by S. M. Emery, Lake City:

FAILURES IN HORTICULTURE.

Resolved, That failures in growing trees, ornamental shrubbery and small fruit, are owing more to ignorance in handling than to defective stock.

That our serious attention is at all invited to a consideration of the above subject, presupposes that failures are more numerous than is flattering to the nurserymen; this unfortunate fact we are compelled to admit.

Believing as we do that the evil is one that can be easily remedied by the earnest co-operation of the customer, who need but intelligently inquire into

the reasons of horticultural failures to judge the disheartening results by the inevitable law of cause and effect, to be able to grow fruit with the same surety as potatoes and wheat, with half the labor, double the profit and minus the kind offices of the Colorado beetle or the festive grasshopper. Believing this, we would wish to consider the subject fairly, painting with no high colors, or false shadings, but, to throw, if possible, some light on this vexed question. We hardly exaggerate when we say, that in Minnesota more money has been expended with less returns for nursery stock than for any other commodity—always excepting whiskey and lightning rods. A visit to almost any community will verify this statement. Numerous instances of people who have bought liberally, have nothing to show for their investments. The largest number of these, (thus duped, taken in, swindled and done for by some mercenary tree peddler, as they suppose.) is not confined to the classes one would naturally expect; as a rule, the wealthiest, most cultivated citizens are the greatest sufferers. The question, why this need be so, will be answered later. Do not draw the false inference that the planting of fruit and ornamental trees is always attended with failure. On the contrary, one need but to stroll over this enterprising city, and see with pleasure many lawns made attractive by evergreens, always beautiful, whether in fine summer contrast, with brilliant flowers, or draped with winter's garlands of fleecy snow; fine shade trees, thrifty fruit trees and tasteful shrubbery, to know that some have found the way to safely plant, and if some, we dare assert that all may do the same, feeling sure they will be rewarded for time and pains. Intelligent efforts expended in transplanting nursery stock will be successful. This is no chance game, no chimera, it is simply following the laws of nature. If these laws of nature are comprehended and obeyed in the setting out and caring for an apple tree of the proper variety, we do not think perhaps it may live, perhaps it may bear fruit we know it will, just as surely as if already each bough was heavily laden with golden crimson fruit, temptingly gleaming through the glossy leaves. It is a natural sequence; is as sure as two and two equals four.

We know if one takes a human plant, cramp it, starve it, rob it of water and sunshine, it will surely waste away and die; common sense and reason teach us that the same result and law apply to the tree or plant. If starved, cramped and kept from sunshine, it must die, or at best lead a sickly, struggling existence, "a blot upon the fair face of nature."

Let us review a little the history of horticulture in the past, in search of a reason for the so-called "bad luck," that, like an evil fate, has so persistently followed the effort of the tree-planter in this highly-favored State, until the very name of a tree agent is held in odium. We will assume that the early settler of thirty years ago little dreamed of the importance Minnesota was one day to attain; before him like a poem was spread the fair land, with its rock-crowned hills, protecting fertile valleys, through which wound crystal trout brooks, while clear limpid springs gushed from the rocks, spangling with dew the fragile fern; even the grass was greener and sweeter, and the air fuller of ozone, the skies bluer and more cloudless than in other lands; he doubtless felt it a joy to live, but could have had no comprehensive idea of the possibilities locked in reserve awaiting the key of development.

Soon experiment in agriculture showed so rich returns that a wonderful impetus was given to emigration. Men from the east, tired of enclosing tiny fields with stone walls, and whittling out nutmegs for diversion; men from the south,

fired of malaria and slavery; men from all quarters flocked to the new State, as to a veritable gold field, for homes, health and fortune; then last the eastern nurseryman, ever on the search for "fresh fields and pastures new," came down like the wolf on the fold, and, figuratively speaking, it's a wonder he left a single lamb. His canvass must have been thorough; every old settler we ever knew bought a good big bill of the Rochester nursery, (we mean Rochester, N. Y.,) and as memory brought back visions of the old apple orchard, they selected the varieties known and appreciated in the old home, supposing of course they would flourish here even as they themselves were thriving. It is probably a safe estimate that of the hundreds of thousands of trees thus distributed, not one in a thousand is to-day alive and thrifty. Many accounted for the poor success in growing, to the exposure incident to so long a trip, and by degrees home nurseries began and endeavored to propagate the same old sort, with the same result. This proved disastrous to horticultural interests, fruit tree growing became an experiment.

Some thinking men remembered that, as "there was people and people," so also there might be apple trees and apple trees, and while exotics need be kept under glass, there should be hardy trees and shrubs suited to our frigid and torrid extremes. The problem is being solved. Hardy, acclimated varieties were the "open sesame." These were picked up, here a little and there a little, largely through the efforts of this society, and its veteran members, careful experiment, diligent search and honest labor have brought forth and show with triumph to-day that Minnesota need no longer look with envy toward the orchards of her sister States. Hardy fruit trees are no longer a myth. Unfortunately public confidence is a tender plant, and when once rudely broken is almost as hard to grow as an eastern apple tree; there had been many experiments at the expense of the customer and this was not easy to forget. People grew careless on the subject, became rusty in horticultural knowledge and took the desponding view that it was hopeless to expect fruit in Minnesota. When canvassed they unwillingly signed their order, offering excuse after excuse and being compelled through sheer logic and cheek to sign the order for perhaps a beggarly dozen of trees with garden fruit in proportion. After crossing the Rubicon, repentance for the rash deed came, and a forlorn hope that maybe a beneficent providence would interpose some obstacle to delivery. In due time notice of date and place of delivery came, and not appreciating the necessity of promptness both for their own and the agent's good, they leisurely happened along, usually a few days after the appointed time, giving their stock an opportunity to lose its freshness after being removed from careful packing, unheeding the usual request to provide themselves with straw and blankets for root protection, they bring as shelter to the tender roots of their stock the hard sides and bottom of an empty wagon box. (The writer has seen an empty wheat sack brought as protection to the roots of a bill of nursery stock, containing fifty trees), and the stock is thus started out in the tender care of a man who loathes his task from the beginning. Arriving at home, after everything else has received attention, the trees are heeled in a shallow hole until a more favorable time to follow the explicit directions of the nurseryman for burying them. Oftentimes an unforeseen cold snap closes the ground, and the trees which ought to be two feet below the surface of the earth are frozen with perhaps as many inches of earth over the roots to protect them from the dangers of alternate freezing and thawing. Evergreens, costly grape vines and garden fruits all taking pot luck with the apple

trees. In the spring after seeding, corn planting, gardening, sheep shearing and the thousand and one jobs incident to farm labor have all been done, the forlorn bunch of apple brush, feebly starting out a few buds, endeavoring to do its poor best, attracts attention, and with muttered benedictions and blessings upon the head of the angel who persuaded him into the investment, they are pulled up, a few small post holes are bored in the tough prairie sod, the roots are pounded in and the funeral is over. Should a tree throw out a few sickly shoots in a dying attempt to prove that it was not wholly ungrateful for the treatment received, the cows are driven in and the wreck of what ought to have been the commencement of a promising orchard is complete, and the considerate planter is ready to have you replace them, on your next annual call, (and it serves any man exactly right who will warrant stock under any circumstances, save to be in good condition when delivered.) Should the agent inquire into the "whys and wherefores," he is curtly informed "the dummed things were dead when he got them."

Nor is the farmer always the only one to blame. There are instances too numerous for the reputation of Minnesota nurserymen, where if any of the Wealthy, Duchess or New Russians should survive this treatment, the attempt to live would develop undeniable symptoms of breeding back to Transcendent, Siberian or Hislop progenitors. Let us draw the veil over these facts: they reflect credit on none of the parties concerned.

To return to our subject, we have heard that "in the lexicon of youth there is no such word as fail." There should be no failure in horticulture. Forgetting the past, except its sad experiences dearly bought, let us go ahead with a determined purpose to bury those old misfortunes under glorious harvests of fruit. How can we do it? By making it our business. If nurserymen, by growing nothing that we do not honestly consider hardy and desirable, in being religiously careful to handle stock under its true name, by proving all things and holding fast to those varieties that are *not* good, and *not* permitting them to get out to curse the trade, and by all possible means to protect your customers. If customers or planters of trees, by making an earnest endeavor for fruit, by subscription to good horticultural literature, by a careful attendance upon the means of grace—the State Horticultural Society—by the establishment of local societies looking to the same end, by cultivating an interest in and for fruit, after doing these things, decide the varieties desirable, order them, prepare your ground thoroughly for planting, set your trees and care for them, cultivate them and feed them, as if you loved them and your heart was in the task, and in beholding the annual development of your orchard you will receive such satisfaction as will amply repay all expenditures of time, money and labor.

And now a word to both the producer and consumer of nursery stock. Why not join hands and work together for the good of the common cause. Your interests are identical; one cannot do without the other. The nurseryman's interest still continues in the tree after he has been paid for it, and it passes into other hands. His time, money and experience have been expended in producing it. His reputation as a business man is involved in its welfare. If the planter does not do his duty in bestowing proper care and attention after it becomes his property, he is doing his neighbor *wrong*. Let us, by united effort advance this noble work. Do not be discouraged because of first failures, and the continued existence of imposters: "By their fruits ye shall know them." Know of whom you buy and what you buy; continue your labors. Do not be weary in well

doing, until every farm in our glorious State can boast its thrifty orchard, and tasteful lawn or yard, while health smiles triumphantly from lucious berries and grapes: then indeed, the happy farmer may set him down under his own vine and fruit tree and find rest.

WEDNESDAY EVENING.

Meeting called to order at 7 p. m. president Grimes in the chair. The committee on the revision of the fruit list, made the following report:

Apples.

The following list adopted as recommended without discussion. For general planting, Wealthy, Duchess of Oldenburg. For planting in limited quantities in eastern central Minnesota, Tetofski, Haas.

For planting in limited quantities in southern, eastern Minnesota, Tetofski, Haas, Plumb's Cider, Fameuse, St. Lawrence, Walbridge.

Crabs.

The committee present the following for general planting: Transcendent, Hyslop, Beaches Sweet, Orange, Early Strawberry, Whitney No. 20, and Minnesota.

Upon motion to strike the Transcendent and Hyslop from the list the following facts were elicited:

Mr. Bunnel said he had traveled pretty thoroughly over Ramsey, Dakota and Washington counties engaged in selling trees.

He found the question of blight a very serious one, and thought the trees named in the resolution should be dropped from the list on account of their tendency to blight.

Mr. Pearce remarked that he thought the Transcendent the cause of blight on nearly all other trees.

Mr. Tibbetts would strike the Transcendent from the list on account of its great tendency to blight and he also condemned the Orange for the same reason.

Mr. Underwood was not aware that the Orange would blight. Thought it might do so under close proximity to blighting trees.

Mr. Gould thought the Transcendent had many good points and would plant it.

Mr. Latham said the Transcendent was the best crab on the entire list for his location.

Mr. Fuller thought the Transcendent had had its day in the older settled portions of the State, but in the newer portions and in the extreme north it was yet needed.

Mr. Pearce said that Whitney's No. 20 and Power's large red were both as good trees and as good fruit as the Transcendent, and that they were not at all liable to blight.

The question was called, and the Transcendent and Hyslop were stricken from the list by a vote of fourteen for, and ten against.

The list for general cultivation was then adopted as follows:

Beaches Sweet, Orange, Early Strawberry, Whitney's No. 20, and Minnesota.

The motion to place the Transcendent upon the list for planting in localities where not subject to blight, prevailed, seventeen for, fourteen against.

For planting in limited quantities, the committee recommended Conical, Hesper Blush, Virginia, which report was adopted.

As varieties quite exempt from blight, the committee presented Orange, Beaches Sweet, Conical, Whitney's No. 20, Minnesota, Early Strawberry, which were accepted.

As liable to blight, Transcendent.

GRAPES—GENERAL PLANTING.

Concord, Delaware and Janesville. The Janesville recommended especially for its earliness, adopted.

For planting in limited quantities, Worden, Champion, Rogers No. 15 and 19, Brighton and Lady, adopted.

Moore's Early recommended for trial.

RASPBERRIES—GENERAL PLANTING.

Black Caps. Doolittle, Seneca, Mammoth Cluster.

Red. Philadelphia, Turner. Adopted.

CURRANTS.

Red. Red Dutch, Victoria.

White. White Grape.
Black. Black Naples. Adopted.

GOOSEBERRIES.

Houghton's Seedling, American. Adopted.

NATIVE PLUMS—FOR GENERAL CULTIVATION.

Harrison's Peach, Forest Garden, Warner, DeSoto. Adopted.

A. W. LATHAM,

S. M. EMERY,

T. G. CARTER,

Committee.

R. E. MENDENHALL'S PAPER—ENTOMOLOGY.

Mr. President and Members of the Horticultural Society.

My entomological observations during the past summer were necessarily somewhat limited, but in recalling them I find that Minnesota has reason for deep gratitude to the Giver of all good for the comparative immunity which she enjoyed from the ravages of destructive insects. No omnivorous swarms of locusts from the west nor hungry army-worms from the east invaded our borders. Our small grain was not blighted by the Hessian fly nor our corn by the grub and boll worm. It is true that the chinch bug made its appearance in considerable numbers in the south-eastern part of the State, and caused farmers some anxiety but the frequent rains of the month of June drowned out the young bugs and prevented any serious damage from that cause, except in some localities.

Still, favored as we were, it was not prudent to withdraw our attention altogether from our small, six legged foes. There are some insects, such as the White Grub, the potato beetle, the various cut-worms, borers, etc., which, like the "poor" are "always with us." Against these (not the "poor" but the "bugs") a sort of "guerilla" warfare must be kept up from spring until the autumn frosts force them into winter quarters.

In previous papers read before this association I have given descriptions of a considerable number of these destructive species, but I have by no means completed the catalogue. Many pernicious "natives" as well as several "distinguished foreigners," which have already arrived or may be shortly expected, have yet to sit for their portraits. Among the former are a few insects especially injurious to pumpkins, squashes, melons and cucumbers, and at the head of the list we will place our familiar acquaintance, the squash bug, (*Coreus tritici DeGur.*) This pest occurs wherever squashes of any variety are cultivated, and singular enough, confines its ravages to these particular plants. It is a genuine "bug" and in its perfect form is about a half inch in length, of a flattened, oblong shape and a dull black color, with spots of ochre on the outer edges of the wings. Underneath it is a dull yellow color. The antennæ are gradually enlarged toward the free ends and the tips of the wing covers—as with all bugs

of the sub-order *Heteroptera*—are membranous and transparent. The mouth-parts are modified into a strong jointed beak with which it punctures the stems and leaves of the plant and extracts the sap. When crushed or even handled it gives forth a rank, sickish sweet odor, only a little less disagreeable than that of the chinch bug, or its other wingless relative, the bed-bug.

The mature bugs seek shelter during winter, under the loose bark of trees and in cracks of buildings and fences and are warmed into activity in the spring about the time that the squash vines have begun to grow. If sought for at this time, the bugs will be found in pairs on the ground, or on the under sides of the leaves and as they are quite sluggish, are easily killed. The females lay their eggs at night on the under surfaces of the leaves and in a few days the young bugs hatch out and begin their work of destruction. The transformations of the true bugs are not so marked as in most other orders of insects. The larvæ of this specie do not differ much in structure from the parent insect except in lacking the wings and in their size and paler color. They remain at first huddled together, their innumerable punctures causing the leaf upon which they are congregated to curl up and wither, when they betake themselves to a fresh one. Sometimes they cluster around the stem and by absorbing the sap from the main vessels, soon kill the plant outright. The best preventative is to search for and kill the old bugs in the spring and to crush the egg masses wherever found. Salt, ashes, and lime are considered remedies to some extent. A correspondent of one of our agricultural papers says that a table-spoonful of salt-peter dissolved in a pailful of water and used as a drench for the vines has been found a complete remedy for the bugs and acts at the same time as a fertilizer to the plant.

There is another insect which does not confine its ravages to squashes, but feeds with equal greediness on all plants of the Gourd family and several others beside. This is the so-called striped bug, (*Diabrotica vittata*, *Fabr.*). It is not, however, a "bug" at all, but a handsome little beetle of a glossy, greenish-yellow color, with a black head and three broad, black stripes down the back. It occurs in all parts of the country and annually destroys a large percentage of the cucumber, melon and squash crop. It hibernates, mostly, in the pupa state, and appears very early in the spring; ready to cut off the first tiny sprouts of our vines. The eggs are laid around the roots of the plants and those of the latter that survive the voracity of the perfect insects, are very liable to die later on of root disease, caused by the gnawings and borings of the larvæ, small, white grubs, which, when full grown, change to pupæ in the earth. There are several generations in a season and the beetles being quite long-lived, one can usually find the insect in all its stages from June to September. The applications that have been found most effective are a mixture of Paris green and flour, such as is used for the Potato beetle, also ashes and air slacked lime. There is no record of experiments made on this insect with the new Pyrethrum powder nor with London purple, but they will no doubt prove good remedies.

Two species of clear-winged moths are also serious enemies of the same family of plants.

One of these, the Eastern Squash Borer, (*Egeria curcubitæ*, *Harris*) is, in its perfect state, a beautiful orange-colored moth, with transparent under-wings and a metallic blue-green body, with the legs tufted with orange colored hairs. The larvæ are thick, white caterpillars, and are found late in summer boring the stalks of the plants and suddenly killing the vine. The borer usually deserts the vine when full grown and encloses itself in an earthen cell before

changing to chrysalis. It occasionally transforms within the hollowed out stalk. The only method of keeping this insect in check is to pull up and burn the diseased vines.

A closely related pest is the Pickle worm, (*Phakellura nitidalis*, Cramer). This is a slender, soft, greenish-white caterpillar, dotted with heavy black spots from which proceed soft hairs. It is found inside the fruit of squashes, melons and cucumbers that are ready for the table, and when abundant is very annoying to house keepers, who are disgusted by having it crawl out of the squashes that they are preparing for the pot, or by finding slices of worm among the melons or cucumbers that are ready to be set on the table. Cucumbers of a size for pickling are often badly infested while appearing perfectly sound.

When left to themselves the worms forsake the fruit as soon as full grown and enclose themselves in a frail cocoon within a crumpled leaf and change to a slender brown chrysalis from which the handsome moths issue in a week or ten days. The moth is of an indescent golden-brown color with a large transparent spot in each of the front wings while the hind wings are clear except for a broad border of brown. The only known remedy is to search for and destroy the infested fruit and burn the vines in the fall.

In conclusion I wish to call attention to two or three new insect powders which have been brought before the public within the last year or two.

Professional entomologists, as a rule, are much more successful in raising insects "by hand" than in finding out ways and means for getting rid of them. But the present entomologist of the Dept. of Agriculture and the members of the Entomological Commission have devoted a great deal of attention to the subject of insecticides and the best methods of applying them, and have made some valuable discoveries.

At the head of all insecticides for general use and safety must be placed the Pyrethrum powders called "California Buhach," "Dalmatian Insect powder" or "Persian Insect powder." It is made from the dried and ground flowers of various species of *Pyrethrum* or Feverfew, which grow in southeastern Europe and Asia, and have been in use for ages in those countries as remedies for household pests.

The powder was also exported to some extent, and has been for many years offered for sale by our druggists, under the name of Persian Insect Powder. But besides being much adulterated, it was too expensive except for limited use.

Some years ago a Mr. Milco, a native of Dalmatia, introduced the cultivation of the Pyrethrum into California, and is already supplying the market with a very superior article of the powder, which he calls "Buhach." The experiments of Prof. Riley and others have demonstrated its efficiency upon the cotton worm of the South, and upon many other destructive caterpillars. It is a perfect remedy for *Aphididae* or plant lice, of all species, and for many other green-house pests; and no other preparation will so speedily kill the house fly, the mosquito and other gnats.

Another new insect powder is the London Purple. This is of arsenious nature and is a deposit obtained in the manufacture of aniline dyes. It is far less poisonous than Paris green and equally effectual against such insects as require severe treatment, and at the same time is much cheaper. In applying it, it must be mixed in a large proportion of flour or plaster—1 part Purple to 10 or 12 parts flour. It may also be used in liquid suspension.

Some other remedies of more limited application might be mentioned, but I have already exceeded the self-imposed limits of this paper.

At the conclusion of Mr. Mendenhall's paper, a vote of thanks was tendered the gentleman for his valuable contribution, and the paper ordered on file for publication.

Under the consideration of Entomological subjects, Mr. Harris presented two papers on entomology, as follows:

INSECT DEPREDATION IN SOUTHEASTERN MINNESOTA.

In southeastern Minnesota during the past season the most extensive ravages by insects have been by three distinct species of Caterpillars (*Pieris rapeo* *Pieris protodice* and *Plusia crucea*) upon the cabbages, and the apple worm larva of the codling moth upon the apples. The first named (*Pieris rapeo*) or European cabbage butterfly is creating the most alarm, perhaps from the bad name which precedes it, but probably because it is the most destructive of the three. It not only works upon the leaves, but into the heart of the cabbage. The history of this insect is that it is the greatest scourge known to the cabbage growers of Europe, and that it was first landed from Europe in the egg state on some cabbage leaves thrown out from a vessel at Quebec, in 1856-7. However I believe that Dr. Fitch takes exception to the manner of its being landed, saying it could not have been in the egg state, but in the larva, which is doubtless correct, as the eggs hatch in about one week after they are deposited upon the leaves. In 1864 it is reported as not having extended more than 40 miles from that point. In 1866 it had found its way into New Hampshire and Vermont, and in 1870 it appears in the cabbage fields of Long Island and New Jersey and other points adjacent to New York. In 1877 it had reached Chicago, and in 1878 was brought to La Crosse, Wis., on early cabbage consigned to some enterprising grocerymen who deal extensively in early vegetables of foreign growth. No noticeable damage was done by them that season and not very serious the next, except to the late plantings, but last year the butterflies appeared in great numbers before the early plants were removed from the seed beds and continued to increase in countless numbers during the whole summer.

The male butterfly is yellowish white with black tips and one black spot on each upper wing, while the female has two and sometimes three spots upon the wings. The females deposit their small white eggs (they soon turn yellow) one to three or four in a place, on the under side of the leaves of cabbage or cauliflower; for the first brood, sometime in May, and the eggs hatch out in a few days into a green caterpillar, covered with minute black dots and a yellowish shaded stripe down the back and a row of dullish yellow spots down the sides, which caterpillars immediately commence feeding voraciously upon the leaves. I am not able to state the exact time required to bring the caterpillars through its different stages of growth and transformations until it merges into the perfect butterfly, but am satisfied that three broods were with us last summer, and the last one is now passing the winter in the chrysalis state, hung up to fences, trees, brush, and hidden away under any rubbish available for protection, and I have noticed them under the eaves and cornice of building, awaiting the opening of spring that they may come forth the beautiful butterfly, to flutter around a few days, perfecting their arrangements to despoil our cabbage another season. Unless this severe winter should deplete their numbers, there will be a desper-

ate struggle next summer with the gardeners for possession of the *krout*, for there is a great scarcity of birds with us this winter to pick up any that are not hidden out of their reach. No certain remedy has yet been found for them. Dr. Fitch recommends as the most effectual means of destroying them, the employment of children to capture the butterflies in a gauze net as they come around the cabbage patch, and entrapping the pupa under boards placed purposely near the plants, and elevated two or three inches above the earth. These boards should be examined every week and the pupa underneath destroyed. By this practice we saved our early and medium early cabbage from any serious damage, but they came in upon us in such hordes from neighboring plantations, that they nearly ruined the late crop. Prof. A. J. Cook, entomologist of Michigan Pomological society, recommends in addition, for the early brood hand picking both of the small yellow eggs and later of the larva or caterpillar, also as a quicker method, to syringe the cabbage with a strong, hot solution of whale oil soap.

The Southern Cabbage Butterfly (*Pieris protodice*,) was also probably introduced by shipping in early cabbage from the South. It bears a striking resemblance to the European, and feeds as voraciously but does not usually bore into the heart of the cabbage. The wings of the butterfly are nearly white, with much larger, longer and varied markings than the rapea, (we found some specimens fully half black,) and the round black spots are not so distinctly marked. The larva is a green caterpillar and its transformations are similar to the other, and the same remedies would apply.

The other caterpillar which I found described by Riley as (*Plusia Crasiæ*), cabbage plusia, was not noticed until about midsummer. It first attracted our attention by its somewhat larger size and disposition to be more alert than the others. A closer examination showed that beside the six true legs near the head, it had only six abdominal legs placed well back and therefore is a semi-looper or half span worm. When full grown it weaves a thin, long cocoon between the leaves of the plant upon which it is feeding, where it changes to a chrysalis, and in a few days there issues from it, not a butterfly, but a moth. "The moth has the fore wings dark gray, tinged with brown, with a bright, silvery interrogation-like mark in the middle part of each wing. The male differs from the female in having a tuft of golden hairs on each side of the abdomen toward the tip." (Riley.)

As I have rarely seen the moth flying in day time, I think it is nocturnal in its habits and therefore will be more difficult to capture when in its perfect state, therefore the remedy would be hand picking of the caterpillars and cocoons. Such destructive pests call for stringent measures for protection from every gardener, and it is to be hoped that a perfect remedy may result from some one of the many experiments tried. Among our bird friends, the quail would be the most efficient help, but as they are a game bird, sportsmen enter our fields and keep them nearly annihilated.

I have never known the apple worm larva of the Codling Moth (*Carpocapsa pomonella*,) so destructive to our fruit as during the last year. The apples and crabs were so badly infested that more than one half of the crop fell to the ground before being fully ripe, and the remainder required considerable assorting to make it saleable. While it was noticeable that the fruit brought to our markets from Michigan was unusually fair and exempt from the worm, perhaps the short crop of the previous year had something to do with the exemp-

tion, but the principal cause may be credited to the fact that in no state in the Union has more intelligent and persistent effort been made to prevent its ravages. Their Agricultural and Horticultural Journals and their Pomological Society through their transactions have kept the simple methods of fighting the pests continually before the people. In that State they have one of the best Agricultural Colleges in the west, and the professor (Beal) has taken very particular pains to make the results of his experiments known. His experiments have demonstrated that the best remedy is paper bands kept around the trees from June to August, examining them and destroying the pupa every nine days after the first appearance of the worms. He says the expense in an orchard of 250 trees is about four cents per tree. Were every fruit grower to practice this, in a thort time wormy apples would rarely be found. The best paper for this purpose is such as is used in the manufacture of flour sacks. The bands should be about three double and long enough to go around the tree and lap a little to receive a tack to hold them in place. Hay bands, woolen rags and various other materials will answer the same purpose but are not as convenient to examine and readjust. Where swine and sheep have access to the orchard, they assist very much in destroying the worms and picking up the affected fruit; and feeding it to stock or scalding destroys multitudes of them. Unless they are headed off, we cannot hope for any great success in growing apples.

It is a startling fact that insects injurious to our crops are increasing very rapidly, and new species are continually being introduced from other countries, and that some preventive measures ought to be taken to stay their progress. The science of entomology is but little understood by the great mass of our farmers. It should be a branch taught in every school. Cabinets of insects should be established and maintained at the State University and all the higher schools, and our Legislature could do no wiser act than to provide for the appointment of a state entomologist, and the publication and distribution of information upon the subject. If the State is now so poverty-stricken that it cannot afford measures to protect the people in their interests, what will it be when our fields no longer yield their fruits and grain because of bugs and worms? If so poor, better far to reduce the numbers of the Legislature one-half, and devote the amount saved to some purpose that will be of lasting good to the people.

Ordered on file for publication.

New Rose Beetles. (Armiyus Fulleri.)

Within a few years a new or previously unknown insect has made its appearance in the vicinity of New York, which is creating some alarm among those who grow roses and other plants extensively for winter blooming and cut flowers. The first public notice of it was made in 1875 or 1876, in the proceedings of the American Philosophical Society, where it is given the name of *armiuyus Fulleri* in honor of the distinguished horticulturalist, A. S. Fuller, who first noticed it as being destructive to plants. The perfect insect is a snout beetle about one-third of an inch in length and of a dirty gray color. The beetles feed only in the night and shun the light in day time, hiding among the leaves, clinging close to the branches or in some fork where they are not readily observed. If disturbed they usually drop to the ground, draw up their legs and remain motionless for some time, their color preventing them from being observed. They

feed only upon the leaves of the plants, and seem to prefer the foliage of the rose. *Camelia*, *Abutilon*, *azalia*, orange and *hydrangea* to most other plants. But the greatest injury, however, is done by the larva, which feeds upon the roots of plants and being out of sight their presence is often unsuspected until the plants are ruined. They are not only destructive to the rose but equally so to *azalias*, *camelias*, *castin*, *geranium*, *pelargonium*, and many other plants entirely depriving them of their roots.

I first discovered them in my green house in a pot of cactus that was deposited with me to keep over winter. I noticed that towards spring it began to shrivel and droop, and no amount of care or water would restore it. I proceeded to re-pot it, and that every root was eaten away and that the soil had lost its tenacity, and contained thirty or forty whiteish colored maggots. These I supposed at the time were only the common white gnats of our gardens, and gave them no farther attention at the time. Some years afterward I discovered more of them when repotting some old plants of stock *geraniums*; a closer examination led me to suspect that they were the larva of some insect heretofore unknown to me, and I immediately commenced an examination. After searching every treatise upon entomology that I could get hold of, and finding nothing by which I could locate the perfect insect, I secured a number of the larva, placed them in soil in a large tumbler kept covered to prevent their escape, I supplied them with fresh roots to feed upon. The experiment was commenced in February, and in April I was rewarded with the appearance of three specimens of snout beetle, such as I had sometimes seen feeding upon the leaves of *abutilons* and roses. The same year (1877), the *Gardener's Monthly* published on page 263, an article from Peter Henderson headed a new rose bug, describing this insect and the injury it was doing in the green houses about New York. In 1878 C. V. Riley took the study of this insect in hand, and its habits are becoming better known, for full description habits, &c., see report of Entomologists in report department Agriculture for 1878. It is probable that the *Arumijus* is more generally present and is doing more damage in the green houses of the west than is generally supposed. It is well for those who keep flowers to be on the watch for it, picking off and destroying the beetle whenever found. As no remedy is known that would affect the larva in their work, whenever their presence is suspected, the plants should be immediately repotted into fresh soil, care being taken to remove that in which they have grown, entirely from the roots. It is hoped that this insect will confine itself to plants kept in the house and conservatory, otherwise it would become one of the greatest pests of the country. The beetles are very tenacious of life and may be transported to all parts of the country without food. I have kept them alive in bottles several weeks without feeding.

June 17th, 1881.

JOHN S. HARRIS,
La Cressent, Minn.

DISCUSSION.

Mr. Peffer reported ravages of the cabbage worm in Wisconsin. He had caught the white millers and saved the crop for two years, but last season he had only been able to save his early cabbages. Thinks we cannot get rid of them except to let them have their

run until some parasite destroys them. Poultry or birds will not eat the worms.

Prof. Porter said he had fought the cabbage worm for five years. He had succeeded in saving the cabbages by catching the butterfly. Had offered a prize per hundred for all the little white butterflies brought him, and the children were thus induced to catch great numbers. He had tried all known remedies, but they all failed the first year of trial. The second year he had used hot water—boiling when put in the watering pot, and from 170 to 190 degrees when applied to the plants. Cautioned the members against using London purple, as it was nearly an impalpable powder, floating in the air—poisonous when inhaled. He would not use it with flour or gypsum; advised using it in solution with water, and applying with watering pot.

Meeting adjourned until Thursday morning at ten o'clock, to meet in the chapel of the State University.

THURSDAY MORNING.

By invitation of President Folwell, of the State University, the forenoon session of the society convened in the chapel of the University.

The session opened by music and song. Rev. Mr. Fuller, of the Horticultural Society, read a passage from the scripture, commented intelligently thereon, and followed with prayer.

President Folwell announced to the students assembled the presence of the Minnesota State Horticultural Society, and welcomed the members to the University. He said our work was a noble one, and ranked with the most important productive industries of the State, and that it should be fostered by all classes.

President Grimes responded by giving a short synopsis of the objects of the Horticultural Society, its usefulness, refining influence, etc. Said he was too full of horticulture to think of anything else, and should confine his remarks strictly to this subject, which he did. He drew a similitude picture, styling the students as trees, formed, budded, sorted and labeled, corresponding to ages,

habits and value. He referred to blight and illustrated how the animate as well as the inanimate could be affected with this disease.

His address was inimitable in matter and manner, earnest, truthful, convincing, humorous, and a happy one in every particular. It was loudly applauded by the students and by his brother horticulturists.

President Folwell introduced Prof. Porter, the recently elected professor of the theory and practice of agriculture in the University.

Prof. Porter responded briefly.

The report of the committee on finances was made and adopted, showing a balance on hand of \$33.71, exclusive of receipts of the present meeting.

MRS. ATWATER'S PAPER—THE WINTER TREATMENT OF ROSES.

The most prominent idea which presents itself in connection with the culture of roses in this country is that of the difficulty of keeping them in good condition through our long severe winters. All roses, except the Briars, Sweet, Scotch and Yellow and the homely old Cinnamon, must be heavily covered to winter safely. At what time to cover, what material to cover with, and how much or how little to use, are questions therefore of the first importance and of no little perplexity and difficulty.

In my early experience I began with the use of the garden refuse such as petunia, potato and tomato vines, trusting to the snow to supply deficiencies, but in three out of four winters the snow was a fraud, and the consequence was that June roses barely survived and Hybrid Perpetuals died, root and branch. I next tried leaves, with much the same results.

My third experiment was two-fold. I covered part of my roses with garden soil, and part with coarse manure from the horse stable. The earth covering was satisfactory wherever it remained intact, but in the absence of snow it cracked and crumbled away, leaving the branches lying uppermost, exposed to the cold weather of March, which was not infrequently as severe as any during the winter. The unsightly mantle of manure proved the most gratifying in its general results, and I have depended on it solely for the last twenty years, with fair average success.

As to the amount of covering, it is safe to be exceedingly generous. One can hardly err in this direction.

The question of time is, as every rose culturist in this country well knows, one of extreme perplexity. I have covered at varying dates between the 25th of October and the 15th of December. When one played croquet on the lawn the 10th of December, it was a good time to cover plants then; but in the following season, when the mercury went to flirting with the twenties below zero the last of October, it was anything but *good* to have the branches snap short off on attempting to lay them down, and to be compelled to leave them unprotected. Fortunately in this case, a deep snow fell previous to the severest cold period, and sufficient fell all through the winter to save the roses from utter destruction.

But, at the best, the developments of spring were anything but pleasant. June roses were killed to within two feet of the ground; all the hybrids quite to the ground, and many killed outright.

On the other hand, I have had my roses several times severely injured by heating when they were not covered until the 10th of November. With this wide margin how is one to fix upon the best time? Taking the seasons "by and large," it is probably a reasonably safe plan to peg down roses about the last of October, and cover *accordiag to circumstances*, lightly at first, reserving the main amount until severe cold weather sets in, with the precautionary measure of having the material at hand in an available condition and not in a frozen impenetrable mass in the stable yard.

Time of Planting.

I have a strong prejudice against fall planting. June roses may, with extra care, be planted with tolerable success at this season, but to try it with Hybrid Perpetuals, especially those brought from the east, is thorough nonsense. The opinions on this point of our most skillful amateur florists and of some of our best professional ones, and which, like my own, rest on a basis of personal experiments and long experience, coincide fully with mine, that the Hybrid Perpetuals require a season's growth to establish the favorable conditions necessary to resist the severe and long-continued cold weather of this climate. Our usually very dry autumn weather is also a serious obstacle in the way of planting at this season.

As to transplanting from our own gardens, if it is done with a prudent provision of a possible 30-degrees-below-zero condition of affairs, it must take place when most of the hybrids are in active growth, and, in the case of the fine fall bloomers, when they are in bud and flower, and any goose knows better than that.

Pruning.

In early spring, with all the Junes and Hybrids, I leave every inch of wood that is not winter killed. Immediately after the blooming season of the Junes is over, I remove all the old wood that is needful, thus securing all the strength for the new ground shoots, of which I permit only a moderate number to remain—not more than four or five at most.

If this old wood were cut out in the spring a vast amount of bloom would be lost for no good purpose that I could ever discover. The same process holds good for hybrids, except that if the old wood is vigorous and inclines to throw out rich blooming shoots, it may well be left, cutting back only to where a strong bud breaks. After the new stalks have bloomed I cut them back half or two-thirds, and if the season is favorable and they bloom well again, I repeat the pruning process twice, getting thereby a fair crop of roses in September.

Teas, Bourbons and Bengals can scarcely be pruned too closely both in the spring and after blooming. The pretty wandering Noisettes shrink from the knife, and are best left to grow and bloom at their own sweet will.

Fertilizers and Cultivation.

My roses grow in a light soil with much sand, to which has been added every spring more or less well rotted stable manure, with occasionally a supply of leaf mould from the woods. For steady summer diet they get the soap-suds from the wash every week. This is not applied on the surface to run off in unsightly streams into the paths, but a slight trench is dug around each bush so that not a drop of the fertilizing draught is lost, and the soil smoothed back again. This may seem like hard work and taking a good deal of time, but with a man to carry the water, it is all easily and quickly done, and the return is a hundred-fold both in growth and bloom.

In addition to this, a barrel of liquid manure is kept on hand, and a small quantity, largely diluted, is applied about once a week to the Teas, Bourbons and Noisettes. (The soap-suds does not usually hold out beyond the Hybrids and Junes.) The liquid manure should be used sparingly in hot weather, and in very dry weather not at all, unless daily and plentiful watering is done.

The rich yellow clay found in various places about here, is an excellent ingredient in the soil for roses. A third or even half of this thoroughly incorporated with the soil, will produce most gratifying results. But after all, the hoe is the great fertilizer. Let hoeing be done like voting, "early and often," day in and day out, be it hot or cold, wet or dry, and it will prove of infinitely more value than countless loads of manure without it. Ladies can be quite independent of help in this business, if they will take care to get the right kind of implement. A lady's hoe should have a long, light, slender handle of tough wood, and a thin blade not more than three by five inches in size, securely riveted to the handle. This should be kept sharp, and not only free from rust, but clean and polished, for which purpose a bit of sand-paper should always have a place in the garden work-basket. With this light instrument a vast amount of tilling work can be done, by taking only a half hour of a morning, and it need not be tiring even to a delicate person. It is a most delightful and healthful exercise, to say nothing of the benefit of the pure air, and the smell of the freshly stirred earth.

Busybodies, pro and con.

By the time the roses are half leaved out in the spring, busybody No. 1 appears in the shape of a slug that eats away the under surface of the leaves. It shows a marked preference for the Hybrids but by no means neglects the others. Its fecundity is most marvelous, its appetite insatiable, and its active and ceaseless devotion to business might, like that of the "busy bee," point a moral for the edification of mankind. The work of this pest is so rapid and destructive that, unless speedily gotten rid of, it is good-bye to the roses. Busybody, con, must now attack it with a strong solution of tobacco, and sprinkle the bushes freely with it, until the depredations cease. Two applications are usually sufficient.

This victory is no sooner achieved than foe No. 2 begins his annoying work. He folds the young leaves together, and then, shyly eating out at one end, he pounces on the young blossom buds, and, if not discovered, his morning repast is fatal to the whole cluster of buds. No tobacco suffices for this hateful pest. He lies perched in his leaf-cot, provokingly indifferent to the narcotic deluge,

quite safe until his enemy, taking a morning or evening walk, spies out the folded leaf, and by a slight pressure between the fingers, puts an end to the mischief. Unfortunately this pest is, like Susan Nipper, a "permanency." He abides, generation after generation, an unwelcome guest all the season through, and his weary and baffled human enemy sadly reflects that the price of roses, like that of liberty, is "eternal vigilance."

The destructive rose-bug of the east is, I believe, still a stranger here.

Varieties and their Qualities.

Although a large number of June roses may not be desirable, some are really indispensable in a good collection. Madame Plantier, the queen of whites, is invaluable. It gives *every* year a full crop of remarkably perfect blooms, remains in bloom from three to five weeks, and is one of the most reliable winter keepers. The white Provence, Unique is equally desirable, and is also an excellent pillar rose. The flower is at first tinted flesh color, but becomes snow white, very lovely and graceful, and is deliciously fragrant. Madame Hardy is also a good white rose.

There is perhaps no better pink rose than the Chancelier d' Angleterre. It is a first class winter keeper. The flower is large, of fine form, of the *true rose* color, and very fragrant.

Garibaldi keeps well, and is a profuse bloomer: the color about as nearly a scarlet as a rose ever is.

Henderson's Peerless is a poor color, but its unique symmetry of growth and its lavish wealth of finely formed flowers, make it interesting. It keeps fairly well. The Sweet Briar, White Scotch and Yellow Harrison also deserve a place among the Junes, the latter especially, a gem among early roses. In fact, does any rose excel it in attractive qualities? It is perfectly hardy, its habit of growth is strikingly graceful, its foliage is small and delicate and, as well as the flower, is almost as aromatic as the Sweet Briar, and it blooms in extravagant profusion. My offers of gift of this rose have once or twice been rejected with scorn, but to myself, nothing in spring is more lovely than its long graceful branches, wreaths of shining emerald set with gems of that pale, pure yellow which so finely blends and harmonizes with the soft, tender green of the early verdure of spring.

Geo. the 4th and Auretii are good dark roses, and are easily kept.

I am sorry to say that I do not succeed in keeping Queen of the Prairie and Baltimore Belle successfully through the winter. It has seemed to me that, making as they do, a rampant growth late in the season, the wood does not mature sufficiently to resist the unnatural conditions of covering and intense cold. But I am not a bit conceited about this theory, and am loth to parade it in view of the fact that one, and perhaps more of this city, does keep both these roses through the winter perfectly well, and gets plenty of flowers.

In my mortifying failure I console myself with the fact that Nicollet Island is warmer than the main land.

The Baltimore Belle is such a darling with its peculiar urn-shaped buds, their exquisite color and tea fragrance, that if one saves only a few short stems it pays well for any trouble, but the Queen is worthless except long vines can be preserved. As I cannot do this I am fain to say that "the game is not worth the candle."

Of June Moss Roses my experience has also been unfortunate. For once, duped by the specious falsehoods of a peripatetic rose dealer, I bought and paid dearly for a variety of mosses—red, yellow, pink, and white, and, as I richly deserved, the whole collection proved an unmitigated fraud. Some “remain to this day” but are absolutely worthless. White mosses are bound to be frauds for they always *will* show red in the bud, and the bud is all we want of a moss. There is one moss, however, of which I can speak with thorough respect. It is a real veteran and perhaps I may be pardoned for giving its history. It was brought from New England to Rochester, N. Y. by one of the oldest settlers of that city, and in 1835 came into possession of a friend of mine, who, in '57 divided the old root to bring part of it to Minnesota. It was first planted in my garden, then removed to another, but in '61 came back to me, and from that year to this it has not once failed to produce a full bearing of buds of extraordinary perfection and beauty. These are richly mossed, of the loveliest shade of carmine, and have the excellent quality of growing mostly on single stems, so that in cutting no immature buds are sacrificed, and the blooming season is thus prolonged far beyond that of any other June rose. The fully opened rose is also exceptionally lovely. It is an unequalled winter keeper, maturing its wood so perfectly that buds break from the very tips of the shoots.

New varieties of the Hybrid Perpetuals have been produced so rapidly of late years, that it is difficult to keep account of them or to make a judicious selection from so large a number. I added a large number of the new ones to my collection in the spring of '79, of which Hippolyte Jamain, Jean Loupert, Emma All and Countess of Lerenyé bloomed and were excellent in form and color, but the plants were small and all without an exception succumbed to the polar cold of last winter. Small blame to them when the mercury went down out of sight. It is a matter of surprise that the old ones survived, but nearly all struggled through, and produced, not an abundant, but a fair harvest of blossoms.

Gen. Jaquenminot is a dear old hero, just a trifle sensitive to the cold, but returning a hundredfold in its glorious roses for the extra care bestowed. It grows standing and is seldom without buds from June till frost. Dr. Arnold, Duchesse de Marny and Denvil de Prince Albert are about the same color and are fairly good. Gen. Washington is an excellent winter keeper and a constant bloomer. The roses are very large and remain without fading longer than any other rose. Triomphie del Exposition, Louvenis de Count Cavour and Souvenir de la Reine d'Angleterve are magnificent roses. It is rather hard to drag the Count through the winter, but one of its grand flowers pays for all trouble. The same may be said of Caroline de Lansal and Auguste Mie, and of the former that it also is a very shy bloomer, but the sight of one of its exquisite roses blinds the infatuated rose lover to all defects. Auguste Mie is a peerless rose. It is one of the best examples of the beautiful cupped form, its color is the most faultlessly lovely shade of rose-pink, and its foliage is almost as rich and delicate as that of Chromatilla or Dutchess de Brabant, but unfortunately it is a tender beauty. It *will* keep itself soft and dainty and nice to look at until the last mild breath of the Indian summer, and then fails a sure prey to the cold. It kept very well through the winters when we had heavy snows, but other seasons were fatal to it.

Salet and Sydonie are two of the most reliable roses for keeping and continual bloom, and the color of the latter is exquisitely beautiful.

Henrietta Stoor, a darker shade of the same color is no less beautiful, and is

an excellent rose in all respects. Annie de Diesback, Alfred Rougement and Baroness Rothschild are light roses, very lovely but tender and difficult to winter. John Hopper is an easy winter keeper and is a very full and handsome rose. White Queen, a perpetual rose, is hardy and a strong grower, and the rose, pure and white, is delicately lovely, but about one month is its highest average of production.

Madam Laffay, Louis and Jules Margottin, Pius the 9th, Prince Albert and Joasine Hauet are all well-trying winter keepers and good bloomers, but their color is objectionable except for garden display. In a bouquet that purple tinged red kills all other colors. The same objection applies to La Reine in some degree, but her majesty is so perfect in form, so vigorous in growth and generous in bloom, and so hardy that, though one of the oldest Hybrids, it has never been supplanted by the new varieties.

The best late blooming roses in my collection are: 1st, Salet, which indeed blooms all the time. I have had it fifteen years and have scarcely ever known a time between June and October that it has not had buds or flowers. 2nd, Gen. Washington. I have memoranda of October 12th and 20th, '79, and in the list of flowers gathered from the garden on those days, are Gen. Washington buds, and this year fine, half grown buds were killed by the frost. 3rd, Gen. Jaquemint. 4th, Madame Laffay and Sidonie.

La France was sold to me as a Hybrid Perpetual, and as such we have treated it for four years. It lived out two winters, appearing in the springs of '76 and '77 as hardy as any hybrid; but '78 and '79 were both fatal to it. As a hybrid perpetual this rose is in color, form and fragrance unexcelled. But recently, good authorities place it in a new class called hybrid teas, and no doubt correctly. Its lack of hardiness, its fine, smooth foliage and true tea rose fragrance, point plainly to a tea ancestry. We are reluctant to yield it to this family, because as a tea, it will be in no way especially distinguished, while as a hybrid perpetual it could not but take rank as the empress and queen of roses.

We owe this new development of rose hybridization to Mr. Henry Bennet, of Stapleford, England. He began in 1870 a series of ingenious experiments in the artificial fertilization of seed-bearing roses in pots and under glass, and was rewarded by finding that the Hybrid Perpetuals crossed freely with the teas and *vice versa*, and in '78 he had the honor of introducing an absolutely new type of rose. The new Hybrid combines the best qualities of both parents—the continual bloom and lovely color of the Teas with the rapid and robust growth of the Hybrid Perpetuals. La France was a chance seedling, and had been in the trade several years, but when the Hybrid Teas appeared, it was immediately classed with them.

In a climate where these roses can be left in the open ground through the winter, they will be invaluable, but *here* their superior value is problematical; for if we must keep them in pots, their increased size will be a very serious objection. This, however, shall not prevent our rejoicing exceedingly over these new and interesting roses.

It would be idle for me to attempt an enumeration of Tea roses. We have so many varieties of equal excellence as to cultivation and beauty, that one cannot go far amiss in making a selection.

In the way of their cultivation the only bugbear is the winter keeping. I lose so large a proportion every winter, even when kept in a green house, that of late I have partially adopted the plan of planting a large number of cheap young

cuttings in the spring, cultivate to the highest point, and get all the bloom possible during the season and then let them die. I freely admit that this is a rather slovenly and unsatisfactory way of doing business, but in the absence of a frost proof pit or cool green house, (either of which few amateurs here possess) I am almost sure that by this method, we realize a larger interest on our money and labor than by the old plan of keeping or rather *trying to keep* over old plants.

In closing this paper, I have only to say that I have not (as will readily be seen,) attempted a scientific treatise on roses, nor have I presumed to lay down critical or fixed rules for their cultivation, but have aimed to give simply for what it is worth, the result of my own personal experience in rose culture during a period of twenty-seven years—"only this and nothing more."

A vote of thanks was tendered Mrs. Atwater, and the lady was unanimously declared an honorary member for five years.

Mrs. Van Cleve presented the society with a fine collection of the seeds of beautiful and rare plants and trees, gathered by her on the Hiawian islands. Each subject was given a minute description, and at the close of a very interesting informal talk, the lady was tendered the thanks of the society for her valuable contribution.

The meeting adjourned until 2 P. M.

THURSDAY AFTERNOON.

The report of the committee on evergreens for planting in Minnesota was read and adopted, as follows, after a few amendments.

The list is made out and numbered in order of merit.

For General Planting.

- 1st. Scotch pine.
- 2d. Norway spruce.
- 3d. White spruce.
- 4th. Balsam fir.
- 5th. White pine; to which is added, hemlock, spruce, Austrian pine, *Am. arbor vitæ*, Siberian *arbor vitæ*, dwarf mountain pine, red cedar, blue spruce, prostrate juniper, American fir, without recommendation as to order of merit.

For Shelter Belts.

Norway spruce, white pine, Scotch pine.

For Screens and Ornamental Hedges.

Siberian arbor vitae, American arbor vitae, dwarf mountain pine.

For Low Borders.

Juniper savin, trailing juniper.

Respectfully submitted by the committee.

A. W. SIAS.

G. W. FULLER.

OLIVER GIBBS, Jr.

The committee on ornamental plants, shrubs, vines and trees reported the following list, which was adopted without amendment:

Deciduous Trees.

- 1st. Cut leaved weeping birch.
- 2d. Hard maple.
- 3d. European mountain ash.
- 4th. American mountain ash.
- 5th. Weeping mountain ash.
- 6th. European larch.

Evergreens.

Norway spruce, hemlock spruce, white spruce, balsam fir, Austrian and Scotch pine, Rocky Mountain dwarf pine, Siberian arbor vitae, juniper (Savin), red cedar (if kept pruned).

Shrubs.

Snow Ball, Tartarian Honeysuckle, Lilac (in variety), Berberry, Spirias, High bush Cranberry, Hydrangease, Syringia, Wahoo or strawberry tree, Black Haw.

Herbaceous plants.

Pœnienis in variety, Aguilgia, Dicentra Spectabilis, Perennial Phlox, in variety, Astilba Japonica, Lilly of the Valley, Bee Larkspur.

Climbers.

White clematis, Virginia Creeper.

Bulbs.

Tulips in Variety, Gladiolus in Variety.

The committee would also recommend for trial for ornamental planting, the following indigenous trees, shrubs and vines:!

Kentucky coffee tree, Hackberry, Basswood and Butternut, and also ask a trial of Catalpa Speciosa and Pyramidal Arbor Vitae."

Respectfully submitted,

GIBBS,
MENDENHALL,
PEARCE,
TYLER,
Committee.

Upon motion the president appointed a committee to present topics for discussion at the next annual meeting, as follows: S. M. Emery, C. H. Greenman, Oliver Gibbs, Jr., R. J. Mendenhall.

The Secretary's report was read, accepted and ordered published with the amendment, that the committee on legislation be requested to ask for an appropriation of \$1000 instead of \$500.

SECRETARY'S REPORT.

Mr. President and Gentlemen:

A year ago at the close of the last annual meeting, when Prof. Lacy laid down the secretary's portfolio, it was agreed between him and myself that as he had collected all the manuscript matter, entering into last year's transactions; that he should finish the editorial work, which he did.

All that your secretary found to do was to arrange the index and correct the proof sheets. That the report of the meeting is a good one and its matter well arranged, is due to the retiring secretary. Now another year's work has been completed, and we are here to place on record the hopes and failures, the experience and teachings of another little epoch in the story of Horticulture in Minnesota.

It has been said of our Minnesota climate, that the only objection to it was that the sleighing was so poor during the three months of summer.

When the records of the temperature here are placed before the horticulturalists of a more genial climate, it is a question if they couple any idea of Horticulture in any branch, with the thermometer 40° below zero, much less, do they think of a State organization composed of the lovers of fruits and flowers, and the successful growers of them too, in this cold empire of the north.

It seems to them that nature's law has forbidden the growth of her fruits and we must look to other lands to furnish floral offerings for joy or sorrow: garlands

for festivals or wreaths for graves. When winter places his icy band upon the earth, and welds it with 74 degrees of cold; it seems as though our horticultural hopes were congealed; and our pets of flowers, shrubs and trees had burst their cellular hearts with cold anguish at being left to cope with the Manitoba waves.

But spring time is "the resurrection and the life" of inanimate nature, and as the sun warms the earth, it is as prolific of green as the sunniest clime in the world and to stand in Minnesota in the latter part of the leafy month of June, or go forth in her wild fields and view nature's magnificent, uncultivated flora, you could not think that frost had ever fettered the land or chilled the soil.

Some of our fruits suffered and a few of our ornamental trees and shrubs gave up and failed to waken with the summer sun. The intense cold, instead of discouraging the sturdy horticulturists of Minnesota, has seemed to nerve them for what seems to be the perpetual fight against the elements.

Good must come out of this rough experience and the time will come when an ironclad list will defy the cold, and our people, in an abundance of fruit, will not forget the pioneer members of the Minnesota State Horticultural Society.

No society in America, with like objects in view, can present in their published transactions so valuable experience as ours. Nurserymen and amateurs, east and north, eagerly send for our published transactions as a guide in making their lists for the western market. In the matter of frost-resisting plants and trees we are the law of the whole land.

Pertaining to foreign correspondence, I have nothing to present worthy of note. The change in the address of the secretary has probably accounted for this. I have recently arranged a complete exchange list with all kindred societies in this country and Canada, and at our next meeting a more complete record of this important part of a secretary's report can be made.

There have been no meetings of the executive committee during the year, but their work is apparent in our programme through their written advice.

The Minnesota State society has now in its possession a valuable library. Of the bound and paper cover transactions, running back through a series of years, there are perhaps 3000 copies. These are constantly being called for to fill a niche in the shelf room of every public library and scientific institution in the land. As these libraries and institutions multiply, they will yet be wanted, and they will be in demand a hundred years hence. They are the archives of a noble industry, and should they be destroyed they could not be replaced. In addition to these, we have the exchange numbers of reports of kindred societies throughout this country and Canada, for a series of years. We have photographs of eminent Horticulturists, and lithographs and photographs of fine fruits. We have our centennial medallion, our certificate of exhibit that we may proudly call our diploma; all these things are of great value to us and to the State. Where are they? After a good deal of effort I found them in the basement cellar of the university strongly nailed up in rough boxes. They are now in St. Paul stored as safely as I can store them, but still in the boxes, inaccessible, doing nobody any good, because of their inaccessibility. We are doing all the work of collecting this horticultural data for nothing, and boarding ourselves, and some of us are paying for the privilege. When this association sent 119 varieties of apples to the Philadelphia exposition, it did as much to advertise the resources of our State, as much to attract immigration, as the whole moral influence of the State immigration bureau. When under the auspices of this society at our annual State exposition, we lay out a show of fruits, flowers and vegetables that no

country can show, we make an immigration document that is worth thousands of dollars per year to our young empire of the west. Except that the State publishes our transactions, we are doing all this work on an income of about \$68.00 per year, and this derived from the membership fees.

Your secretary respectfully submits whether any business man, doing the work that devolves upon the secretary, can afford to do it for the whole annual income of the society. He may do it as it is done, but it ought to be better done. The secretary's portfolio should be the motive power of the society for doing good, and it could be made so through its correspondence, if he could attend to it.

These are only preliminary words to the important subject matter. The Minnesota State Horticultural society should respectfully ask of its representatives in the legislature, for at least \$500 per year to do business on and a place in the capitol to do business in. We want a room with accommodations for our books. We want money for experiment, and to distribute the results of our experiments and to pay our men for work performed, and your secretary would respectfully suggest the appointment of a committee to prepare a bill or memorial to the legislature now in session.

The secretary would also like instruction regarding the distribution of the published transactions. Shall they be mailed to every applicant, or only members of the association? Your attention is called to another subject. This is a Horticultural society not a Nurserymen's organ.

It is poor solace to the amateur horticulturist to listen day after day to apple talk. We want diversity, or drop our name and call it the Minnesota Pomological society—crabs and hybrids. We have not a list of ornamental trees, shrubs or plants for lawn decoration. We should encourage everything pertaining to landscape architecture, and make it as much a subject for consideration as anything else. We must hear more from the florists, more from the cultivators of the annual flora. We must encourage the finer things in our Horticultural catalogue, to dress up the dry facts about crabs and hybrids.

Respectfully,

U. S. HOLLISTER.

Secretary.

The committee on the President's address of last annual meeting made their report, which was accepted. Committee discharged. (This report was not obtained by the secretary; hence, not published.)

The following members were elected as officers of the society, for the year ending Jan. 1882:

President, JOHN S. HARRIS of La Cresent,

Vice President, 1st Dist., A. W. SIAS of Rochester.

“ “ 2nd “ S. M. EMERY of Lake City,

“ “ 3rd “ G. W. FULLER of Litchfield,

Secretary, U. S. HOLLISTER of St. Paul,

Treasurer, M. L. TIBBITTS of Dover Center.

EX. COMMITTEE.

T. M. Smith St. Paul,
 Wyman Elliot, Minneapolis,
 J. M. Underwood, Lake City,
 D. W. Humphery, Fairbault.
 F. T. Gould, Excelsior,

Vice Pres. Miss. Valley Horticultural Society, and representative to that body, J. T. Grimes, Minneapolis.

Delegates to State Agricultural Society, U. S. Hollister, A. W. Latham, J. M. Underwood, John H. Stevens, Wyman Elliot.

Committee on Russian apples discontinued; Committee on Seedling apples continued, same as last year.

Delegate to Wis. State Horticultural Society, C. H. Greenman,

Upon motion it was decided to hold next annual meeting at Minneapolis, beginning third Tuesday in January, 1882.

It was decided to hold a summer or autumn meeting at Lake City, and a committee to call the same, with all authority to arrange, appointed as follows: O. Gibbs, Jr., S. M. Emery, J. M. Underwood.

The report delegate J. T. Grimes, of the Miss. Valley Horticultural Exhibit at St. Louis was read and ordered published.

REPORT OF DELEGATE TO THE MEETING OF THE MISSISSIPPI VALLEY HORTICULTURAL SOCIETY, AT ST. LOUIS, SEPT., 1880.

The grand exhibition of the Mississippi Valley Horticultural Society was held in the Merchants' Exchange in the city of St. Louis, on the 7th, 8th, 9th and 10th of September, 1880.

The exhibition opened without any marked demonstrations from the presence of city officials or other dignitaries with set speeches to give eclat to the proceedings, depending on its merits alone for patronage.

On entering the hall, the first object to attract the eye of the visitor was the magnificent pyramid of apples, representing the Egyptian obelisk recently brought to New York. The pyramid was a fac simile of the original, but only half the size. It stood over 40 feet in height above the base, requiring 32 barrels of apples in its construction. The design was chaste and beautiful in its simplicity.

The band of music occupied the platform behind a grove of beautiful exotic and native plants which almost concealed them from view. The hall throughout was profusely decorated, and in the center was a fountain arrayed in floral designs. Regarding the display of fruit, it must be said that the exhibition was complete.

Of Apples

There were about 5,000 plates. A majority of the States of the Union were represented with the products of the leading orchards. There were 15 entries for collections of a hundred varieties, 17 entries for forty varieties, 20 entries for ten varieties in a collection, and also a large number of single plates, embracing in all over 350 varieties of apples alone.

Of Grapes

There were about 1,600 plates, among them several collections of over 100 varieties each and said to be the finest collection of grapes ever shown in the United States. The most rapid progress in the development of new varieties of fruits was in this department.

Of Pears

There were about 60 entries, representing twelve different States. The finest collections were two large exhibits, one from Elwanger & Barry, of Rochester, N. Y., and J. H. Rickets, Newburg, N. Y. The display of pears was pronounced by good judges the best that has been made in the West.

The Peach

Display was very fine, but on account of the lateness of the season was not as full as it would otherwise have been.

Of Plums

Elwanger & Barry had about 40 varieties very choice. There was also a good display of native American plums, some of which are well worthy of notice and propagation.

Semi-Tropical Fruits

From southern California and Louisiana. Oranges, lemons, limes, citrons, pomegranates, bananas, soft shell almonds, Japan persimmons and olives. The greater part of these were from Geo. C. Swan, of San Diego, Cal. There seems to be almost as many varieties of oranges and lemons as are to be found in the apple collection.

Plants.

One grand feature of the exhibition and that which perhaps received the most attention, was the display of plants, which was regarded as the finest ever put up in America. It was made up of at least 1,000 varieties, without a single duplicate and all of the choicest kind.

The Exhibition.

From a horticultural stand-point, was a complete success, and too much cannot be said in its praise. Its excellence consisted not only in the quantity, quality and appearance of the exhibits, but even in the perfectness of the specimens.

States Represented by their Fruits.

□Alabama, Arkansas, California, Colorado, District of Columbia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Missouri, Mississippi, Nebraska, New York, Ohio, Tennessee, Texas, Wisconsin and Virginia.

Awards.

□The list of awards would be too lengthy to report in full. The aggregate amount was \$2,040.

The Attendance.

Although the exhibition was a grand success, the attendance was not flattering. St. Louis is evidently not a horticultural city; her citizens being engaged principally in other pursuits, devote but little time to the study of fruits and flowers. The receipts netted but little more than the expenses, and but for the liberality of Pres. Smith and Hon. Geo. Bain, who not only gave us the use of their splendid hall in the Merchants Exchange, but also guaranteed that if the receipts of the exhibition did not reach \$3,000 they would make up the deficit, the premiums could not have been made.

Object Lessons.

There is no way in which progressive horticulture can so well be taught as by object lessons; indeed, we should be unable from any description of or representation of fruits to form a correct estimate of the character or relative value of one kind to that of another, or even of the same kind when grown under different conditions of climate, soil, or cultivation. Such facts can only be drawn out by arranging the different classes and specimens of fruit before the eye, the taste, the touch and placing their merits in the scales of equal justice. At the exhibition held at St. Louis, the fruits of the frigid north and tropical south met to embrace each other, giving in one telescopic view the horticultural resources of the great Mississippi valley.

Observations and Conclusions.

First. Most of the early fruits that were sent forward to be kept in cold storage spoiled. The proper conditions for keeping was either not understood or observed.

Second. In looking over the collections of apples, I noticed that those grown south of the 42d parallel were exceedingly fine, while those grown north were

inferior to former years, probably owing to the vitality of the trees having been injured the preceding winter.

Third. I was much disappointed in the collection of Russian apples. Many were inferior to our crabs and very few good specimens among them, and so far as I have been able to learn, there are no winter varieties. The most of them ripen very early and keep but a little while. They seem to do much better north than south, but even in Minnesota very few will be found worthy of cultivation.

Fourth. The size and appearance of the apples exhibited by the different States at St. Louis as compared with the centennial exhibit was about as follows: New York, much better; Michigan, better; Virginia, about the same; Ohio, the same; Indiana, the same; Illinois, rather better; Wisconsin, much inferior; Minnesota, inferior; Iowa, inferior; Missouri, much better; Kansas, rather better; Nebraska, Texas, Kentucky and Tennessee, I believe, were not represented at the centennial, but had fine collections at St. Louis.

Contributors.

The Minnesota collection of fruits consisted of about 160 plates of apples and crab apples, and was made up principally by the following gentlemen: John S. Harris, La Crescent; A. W. Sias, Rochester; E. B. Jordan, Rochester; E. H. S. Dartt, Owatonna; Bates & Son, Rolling Stone; J. Evans, Elgin; R. L. Cottrel, Dover; W. E. Brimhall, St. Paul; L. W. Stratton, Excelsior; and J. T. Grimes, Minneapolis. In justice to the contributors, let me say that our exhibit was in every way worthy of our society and of the State we represent. Minnesota apples, well, I did not suppose they could grow such fruit up there, was the exclamation of our southern friends, and to those who imagine we are living outside the fruit limit it was a complete surprise.

J. T. GRIMES,
Delegate.

MR. GIBBS' PAPER.

EDUCATION IN HORTICULTURE.

Before the winter of 1873, orchard planting had become general throughout the settled portions of Minnesota and northwestern Wisconsin. The wide-spread havoc made that winter with fruit trees in all parts of the west, as far east as Michigan, and as far south as central Illinois, discouraged most of our people from further attempts, except upon a small scale for trial of new sorts. The signs of the times now indicate that orchard planting is to be resumed in this region. The Duchess is seen to be surviving everything, looking well and bearing annually enormous crops of fruit, where properly taken care of; the Wealthy is coming into bearing in all directions, and all ages of it showing signs of stability—the oldest being the best after several years fruiting; some of the Hybrids are gaining favor, as their vigor, good cropping and the quality of fruit are seen, of new seedlings originated here in Minnesota or in Wisconsin, of common or standard apples, there are no less than twenty varieties on the list of our State Horticultural society for trial, all evincing good qualities, some of

them long keepers, and all believed by their friends to be hardy and valuable in this climate for orchard purposes; other seedlings are being tried and well watched, each year new ones being added to the list, and unless some extraordinary catastrophe soon overtakes these sorts, it seems probable that every intelligent farmer who is permanently located is going to want trees enough within two years from now to make him an orchard to raise apples for profit as a farm crop, as they do in Illinois, Iowa, Missouri and Michigan, where all our immense supplies of market apples come from. Seeing this prospect ahead, what are the public needs in reference to it, and what should each individual be doing for his own interest? The first need is to supply of good trees of the right varieties. This the nurseries of the State will attend to. The second is an immediate and thorough posting up on the part of the people in the knowledge of the progress of Horticulture generally, but more especially in regard to the selection and care of fruit trees. Our young men are nearly all ignorant on this subject, and what is worse they do not at present realize that they need to learn; for the common idea is that it is cheaper to buy fruit than to raise it. Our old men are mostly rusty, and what they do know is much of it unavailable, because learned East or South where conditions, varieties and methods are different from what they are here. Hence, unless our people bestir themselves, two calamities, now hovering in the air, will drop down on us and result in loss impossible to estimate.

1st. Seeing the new demand for trees and taking advantage of the present general ignorance of buyers in regard to fruit trees and fruit culture, a host of tree sharks will swarm through the country and with their big smooth stories and magnified samples of impossible fruits will unload upon our people untold carloads of tender sorts, utterly unsuited, to our climate, as well as the worthless seedlings and culls of all the nurseries in Christendom—trees that ought to go to the brush pile, but which will be sold as long as they can find buyers; the same as farmers will sell their poor butter, if they have any, where anybody can be found who will take it. And

2d. A majority of those who plant orchards will, unless they post themselves in horticulture, lose a percentage of their outlay by neglect and bad culture, that will be large enough to be sorely felt in each individual case, and enormous in the aggregate of communities.

These calamities (for there is no better word to designate anything that discourages fruit culture) have been suffered here before.

One firm of tree peddlers from Ohio alone is said to have laid down nearly worthless stock in Goodhue county, amounting to \$10,000, and in Pierce county, Wisconsin, on the opposite side of the Mississippi, \$18,000, at one delivery in each county, not five hundred dollars of which could have been sold if the purchasers had possessed half as much intelligence in horticulture as they would have exercised in buying horses, seeds, implements or anything else needed on the farm. One hundred dollars would probably buy all there is left of these deliveries now in both counties, if it could be got together, and it is only about three years since it was done, and not only in the two counties named, but on the same plan and large scale in all the older settled ones of the northwest. In the present state of popular information in regard to horticulture, this thing is liable to be done over and over again. Ignorance can be circumvented, and will be made to support the rogues of trade as long as it exists. The only precaution is education. The means are cheap and within the reach of all, nor is it

difficult for any one to learn enough by reading and observation in horticulture, to protect himself from imposition, and by practice to grow successfully whatever he may intelligently purchase.

The first step the writer would recommend to every farmer or gardener is to subscribe for one good agricultural and horticultural paper and buy at least one standard book of horticulture, and as many more as they find a need for, and read up on the subject. A few dollars spent in this way will be a good investment. The next step is to organize agricultural and horticultural societies in each town for winter meetings, to compare notes, discuss varieties, and also methods of culture, and have lectures when practicable; and as soon as the growing season opens again, give the trees, plants and shrubs themselves your attention—apply what ideas you have and learn as much as possible from nature herself as she opens her book before you. Lastly, ally yourself to your State Horticultural Society, attend its meetings and obtain its transactions. There is no owner of a homestead in county or town who ever thinks of surrounding himself with trees for any purpose (and who but some pitiful wretch of an Arab does not?) but will find himself a large gainer in money, for the reasons given, by seeking knowledge through the means herein pointed out, rather than by suffering the hard but common experience of loss of his investments in trees through ignorance in selection and bad culture afterwards; while the gain he will make in the happiness and usefulness to himself and family, by enlarged knowledge of horticulture, the most delightful and the most elevating of all industrial arts will amount to a capital that no money could buy, if it were in his power to put it into the market.

MR. HUMPHREY'S PAPER.

EVERGREENS ABOUT OUR HOMES AS A SOURCE OF PLEASURE AND PROFIT.

To undertake to say anything upon this subject, or indeed any other, that has not already been said many times, would be useless. What has been said would fill volumes, what has not been said would fill but a small page. But remembering that it is line upon line and precept upon precept that is needed to stamp any good indelibly on our minds, let us have patience as well as respect for a little repetition of old ideas. Having come to the Minnesota prairies twenty-five years ago, and having gone through much more of labor, time and money than was necessary to accomplish the results finally obtained, I would gladly aid others to reach the same ends with more economy of means. I had intended to say something of the planting and care necessary to success, but as I learn that another member is to write on those points, I shall leave them to be treated by him.

In riding several hundred miles across our prairies last summer, I was struck with the possibilities afforded for beautiful, prosperous and happy homes, and could not but think how few would ever realize these conditions in anything like the degree they might. The one great need of our prairies is trees—trees for fuel, for timber and for beauty. The fuel and timber trees must, in a measure, include beauty and shelter. It is especially of these last two points I would speak. Of all trees for these purposes a due proportion of evergreens gives the

best returns. In our towns and cities we plant them to please the eye and add beauty to our grounds, and in our small yards we almost invariably put too many. Anxious to have something to show now, we either do not think of the years to come, when our trees will have become large, or we say to ourselves we will cut them out when they grow so as to crowd each other. But we don't do it. It seems a pity to cut out such beauties, and so we let our homes be darkened by a somber shade of thick evergreens within a few feet of our windows, or if at a late day we do cut away some, we delay it until the beauty of those remaining is much injured. But on our prairies and about our prairie homes we usually do just the reverse. Where there is room enough, and to spare, where the winds have unobstructed course for miles, and sweep with terrible force, evergreens are comparatively rare. I know how much the settler on the prairie has to do, and how little he generally has to do with, for the first few years, and I also know that if he only realized the great difference between a sheltered farm and home, and one exposed to the pitiless pelting of every storm and gale that blows, he would make great effort to shield himself and all that belongs to him from our tireless winds.

Without protection, on the highest roll of his farm, stand the buildings, scorching in the summer sun and shivering in the winter storm. Or if, as I am glad to say, is often done, deciduous trees are planted to add beauty to the home, yet the leafless branches with the winter's wind moaning through them, only seem to be a mere suggestion of what might be. The snow still piles in huge drifts about the door and almost blocks the way to the barn where the cattle stand shivering and so shrinking from the cold blasts that they can hardly be driven into the yard or to the well for water. Everything is uncomfortable, and even when the weather is not cold, the winds are so persistent and searching, so long continued, they tire out man and beast. Every dweller on the prairie knows, better than it can be told, of those great discomforts which arise solely from our frequent and long continued winds. They are so great that if there is a grove of however poor kind, on the farm, and in however inconvenient a place, many will build there rather than in a spot which, if sheltered, would be vastly better. We cannot escape the discomforts of the prairie entirely. They are a part of the price we pay for our fertile, easily cultivated farms. But there is surely no need of living twenty years exposed to every wind that sweeps over the plains. I know one great objection to the planting of evergreens has been the high cost. They have been considered an expensive luxury, and indeed they have been. Brought largely from other states, a few years ago, sold at high prices, carelessly handled and in a short time a large proportion showing only dry branches for the money and time invested, people became tired of trying and very likely thought they could not be made to flourish. But with all kinds as low as they can now be had by the quantity from reliable men, almost at our own doors, and the fact demonstrated that, so far from being difficult to make live they are quite as certainly transplanted with success, as deciduous trees, it would seem as if every one who owns a home or a claim might surround not only his house, but his farm, with an evergreen windbreak. One row of Norway Spruce or Scotch pines, set five feet apart, will in a few years make a wall so thick a bird can hardly fly through it. One row is better than two rows set near together, because with the two rows light and air are kept from three sides of each tree, and they really, I think, make no better protection than one row with its two sides of every tree rendered hardy by exposure to sun and air. Of

course better yet would be two rows planted a good distance, perhaps fifteen to twenty feet apart. It is a mistake to think evergreens are of slow growth. Norway pines at ten years old, with fair care, will be from fifteen to twenty feet high and spread over a diameter of eight feet, and Scotch pines will be if not as tall still heavier trees, more spreading in the top, and our white pines, which when large, are the handsomest pines we have, will be quite as tall. The first three or four years they all grow comparatively slow, especially the Norway spruce, but after that, stretch upwards surprisingly, and every year seems to double their weight.

As a source of pleasure I know of nothing in the line of tree growing that can compare with growing evergreens. They are things of beauty from the first. Winter as well as summer they gladden our eyes with their brightness, and while we are pleased to watch our apple trees and vines, and cherish a hope of sometime getting fruit from them—the hope being the largest share of fruit we do get—we are sure our evergreens will not disappoint us, but will give us just what we expect of them.

A home ornamented and protected with evergreens is beautiful, not only to the occupants but to every passer-by. We work hard to get money to spend in those ways that afford us pleasure; for the comforts, luxuries—for those things that in the aggregate we term civilization; things that distinguish us from the savages. And one of the most prominent of these is a home with pleasant surroundings. The real necessities of life are few. If we can get a high degree of pleasure without the intervention of the hard work and money, it is surely profitable for us to do so. I need not say how, like a garden in the desert, would seem such a home as I have suggested. But even in the matters of dollars and cents it pays. As a matter of profit, the shelter afforded to a farmer's cattle by a dense evergreen belt about his yards will add more to their comfort every winter, and if to their comfort, more to their weight and thrift, and more to their owner's pocket, than the cost of such protection. It surely need not be said that an animal compelled to stand all day and to eat its food in a yard exposed to wind from any quarter, can not as profitably consume and digest its hay or grain as one well sheltered. In a mild winter every one knows how much less cattle consume to keep in good condition than a severe one. A belt of evergreens about our homes and yards makes all our winters comparatively mild. Even in so favored a climate as that of Florida, it is found that the tender orange tree groves are much better, more sure to bear fruit, and less liable to injury from sudden changes in temperature, when protected from the north winds by a belt of evergreens.

Those on a prairie farm enclosed by a living belt of green, find that they can enjoy the luxury of an early garden from their sheltered spot, earlier and better small fruit. Their fields, protected from the sweeping winds, start the grain earlier in the spring and yield better crops of all kinds: their harvest is not interrupted by winds blowing the wheat from the reaper and the hay from the load, stacks are not untopped, and in the house, when a door is opened, everything is not carried away as by a whirlwind, nor is every one blown until their nerves are rasped to the last degree of irritation, and long before night become more tired than a hard day's work would make them. And if ever it was desired to sell the farm, it would be found there was a money value in it much above a bare, treeless prairie farm, and would find a much readier sale. The Director of the Botanical Garden of Harvard University says "that as a means

of direct profit it does not seem unreasonable to predict that the protection afforded to our fields by a screen of evergreens about them, would increase the profits of their cultivation fully twenty per cent."

In driving through any section of country, that which always strikes us as one of the surest indications of the prosperity of a farmer is the beauty of his place. When we see a home surrounded and tastefully ornamented with trees, of which a goodly proportion are evergreens, we immediately think there is a home of a happy and prosperous family. Children brought up in such a home will always have pleasant memories of their early days. The home they look back upon will have a local habitation and a name. Very little of the poetry of life attaches to existence on our bleak prairies. Let us add all we can to it by making our homes beautiful and homelike in every way, by so sheltering them that to every one riding over our prairies they shall seem havens of rest.

MR. GIBBS' PAPER.

EVERGREENS.

The beauty of the evergreen trees and their utility as windbreaks are generally acknowledged, but there is a common impression among the people that it is difficult to grow them. The truth is, that if they are carefully dug and afterwards handled so as to keep the roots moist and without needless exposure to the sun and air, they are as easy to transplant and make live as any of the deciduous trees. At the nurseries it is customary to immerse the roots in a mud bath as soon as taken from the ground; then the trees are boxed with a packing of wet straw or moss for shipment, or if delivered in wagons to local customers, their roots are well protected with the same material. Before they are removed from the boxes or wagons the holes should be got ready so that the roots can be placed in the ground the instant they are lifted from the packing. The same rules will apply to the preparation of soil and to the digging of the holes as to any other trees but a little more care is perhaps requisite in planting. The roots must be straitened out in their natural position, the fibrous ones carefully placed with the fingers, and covered *compactly* with the best surface soil made as fine as possible. The trees should be set very firmly, and if large ones, staked down on all sides, as they carry a good deal of sail to the wind. There is no need of putting water in the holes, but after the trees are set pour from one to three pails full of water around each, according to their size, and to prevent it from running off draw the earth into a wash-bowl shape around the trunks. Now mulch heavily with old straw or barn yard litter for at least three feet in all directions and keep the mulch good for one or two years, till you can see that the trees are well established in their new growth. Then they will take care of themselves, although of course they will be better for a thorough spading and mulching every spring.

Evergreens should always be set in the spring, *and the earlier the better*, after growing weather fairly commences.

Of course reference is made here to nursery grown trees, which are always transplanted repeatedly in order to make them throw out a mass of fibrous roots and harden their foliage to fit them for ready and hardy growth when re-

moved and transplanted. Wild stocks grow mostly to tap-root and are much more difficult to start, besides being tender from the shade in which they are accustomed to stand.

The most satisfactory trees for general planting, for both ornament and wind-break, are the Scotch pine, white pine and Norway pine. Balsam fir and white spruce are perhaps more fashionable for bowers. Arbor vitae is best for ornamental hedges and screens, and juniper savin for low borders.

It is useless to plant evergreens in ground already occupied by the roots of other trees, unless these roots are cut off for some distance and kept off till the evergreens get well advanced in their growth, and even then they will make a very slow growth at the best if the other trees are of fast growing kinds and have much the start. The failure of evergreen planting in old village lawns, by the sudden collapse often seen in July or August, after the trees have made a month or two's growth, is due mainly to this, as the shade trees are usually planted some years earliest and their roots extend throughout the premises before the evergreen planting is commenced, sapping the soil, and by their stronger growth immediately choking the young evergreens to death.

The best sizes for ordinary planting are trees from two to five feet high—say such as are classed in the trade as two to three feet or three to four feet. Larger ones can be planted safely up to eight or ten feet, and even higher, but they need more care, and these larger ones should only be handled by experts.

I doubt the propriety of farmers or any person but nurserymen or amateurs of ample means and leisure undertaking to plant out untransplanted seedling evergreens, as is sometimes recommended on account of their cheapness. They require too much shading and delicate care for the first few years for the average farmer to attend to.

It would be cheaper in the end to leave the transplanting and care of seedlings to the nurserymen, and buy them when of proper age and strength of root and top for open unprotected culture. An outlay of twenty to thirty dollars, according to the plan, will provide an evergreen windbreak for a set of farm buildings and an orchard of two hundred fruit trees, about eight feet apart is a suitable distance to plant. In ten years they will close up the line if well mulched or cultivated, and in cold, bleak winter days, going upon the leeward side of such a shelter is, as has been well said by Mr. Hollister in one of his addresses, like driving into a barn. As an instance of their rapid growth under favorable condition, I will state that the Jewell Nursery of Lake City, which was established in the year 1868, already has Norway spruce and Scotch pines nearly thirty feet high, and filling space sixteen feet in diameter.

As protections for orchards, to hold the snow and prevent root killing, also to retard the early growth and premature blossoming in the spring by keeping the earth cool and serving as a barrier to the hot south winds, as well as to save the fruit from being blown off by the summer and autumn gales before it is ripe, evergreens are invaluable in orchards, for profit, indispensable, as all the commercial apple growers in the west, are already well aware. They are the only close shelters worth planting for orchards, as their roots take up but little surface, room or strength of the soil.

Beware of fast growing deciduous trees for orchard windbreaks, such as the willows, the Lombardy poplars and the cottonwoods. Their roots run as far underground as their tops grow upward, some of them further, and absorb all the means of plant life within their reach. Such shelter as the boa constrictor gives its victim will these trees give to fruit trees. They shelter and they kill.

It has been the common practice to set them around orchards in this state, but I do not know of a single case of an orchard so sheltered several years ago, but what now presents to the owner the alternation of losing the usefulness of his fruit tree, or taking away his shelter belt. It is better to begin right and plant the evergreens, for on our western prairies shelter our fruit trees must have.

OLIVER GIBBS, JR.,

Lake City, Wabasha Co., Minn., Jan. 15, 1881.

DISCUSSION.

Mr. Greenman did not think the weight of one man sufficient to pack the ground too hard around any evergreens in transplanting, if applied at the surface.

Mr. Pearce said he would not use water in setting any tree.

Mr. Humphrey had transplanted Scotch pines, and used one pail of water to each tree.

The trees were large and the season late, the main shoots having made six inches growth, he had moved three hundred and did not lose one.

Mr. Gibbs said if the soil was just right, that water was of no use in transplanting.

Mr. Humphrey reported planting five hundred hemlocks, but did not think they were hardy. He had lost most of them.

Mr. Grimes reported his hemlocks on high ground doing well, while those on low land were not thriving. He never uses water except to puddle the hole just before planting, and after placing the tree fills in earth around the roots and rams it tight.

Mr. Humphrey said he set five hundred Norway spruce in manner described by Mr. Grimes and did not lose one.

Mr. Sias considered the hemlock perfectly hardy, and in this respect was willing to place it at the head of the list of evergreens he gave evidence of its hardiness, and made a strong plea for this tree.

The committee appointed to confer with the Cane Growers Association as to the time of meeting &c., report in favor of meeting on the third Monday in January, 1882, at 2 P. M., which report was adopted, and the time of the annual meeting, by resolutions, fixed at that time.

A committee on legislation was appointed as follows: J. T. Grimes, J. H. Stevens, S. W. Emery, Truman M. Smith and U. S. Hollister.

Meeting adjourned until 7 P. M.

THURSDAY EVENING.

Paper by Miss Hortense Share, Rosemont:

OUTDOOR AND INDOOR CULTURE OF FLOWERS.

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; vines over the doors, and draping the windows, shutting out the heat and glare of the sun, yet admitting plenty of air and light, 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 these out and from chewing the clothes hung out to dry, would be amply sufficient to cultivate a few flowers.

Sometimes in driving about the country I see at the windows of the poorest houses a few plants. These plants carefully tended, or the small flower bed, may be the one bit of poetry in the hard prosaic life of the overworked mother. Heavens! how many such there are in Minnesota!—women whose whole life is an endless round of *pots and kettles*.

Children are fond of flowers, always delighted to have a bed. Given a few seeds and a little help and encouragement, they dig and plant with a will; grow enthusiastic and very proud of their success. Their influence is humanizing and refining; a child flower-lover may be awkward and shy—coarse and rude, never. A home unbrightened by a flower must be a dreary place, a very Sahara to any one whose soul glows with a love of the beautiful in nature.

Their cultivation is so easy: give them good soil, keep out the weeds, and they more than repay in beauty and fragrance the little time bestowed. It is healthful too. After being shut up in the house the major part of these dreadful winters, (28 degrees below zero as I write!) one is sick and weak in the spring. Am glad to get out and dig in the ground all I can, which is not much at first. Last spring, when the plants wintered in the cellar were brought up for me, I looked at them and the ground to be dug, in dismay. The men were busy with the spring-work—not a boy about—they hate to dig flower-beds, anyway. As one of the hired men said, "his sisters used to make him dig their flower-beds and he spoiled them all he could!"

An end must always have a beginning. So I brought out a chair, dug a while, then rested; took an afternoon to dig one bed. Another to set out the plants, nineteen geraniums, an abutilon, lemon verbena, heliotrope, lantana, plumbago, larpentæ, chrysanthemums, &c. Had to sit down twenty-five times before I got through; they were well-planted—large holes and plenty of water—kept the roots soaking in water while digging the holes. Everything on that bed flourished; the geraniums leaved out so strong even the winds could not affect them: they bloomed continuously all summer, even after hard frost. These same geraniums have been "set out" for six years. They are like a good continued story, of which you always want a little more. Between the geraniums

white candytuft was sown at different times to keep up a succession of bloom, and made a pretty contrast with their vivid scarlet.

The previous summer this bed had a ribbon border of candytuft, white and purple. After it was done blooming, I cleared away the stalks, covered the ground with manure from the hen-house, spading it in deeply. This summer had a wide border of phlox Drummondii mixed, and the large-flowered varieties never had anything finer. The plants grew large and were strong enough to support themselves; and the bloom was superb in size, color and profusion. Bloomed long after frosts and only succumbed to snow and hard freezing.

In May I dug a bed in a rather low part of the yard that got the slops of the weekly wash. Planted in the center a row of gladioli. Poor, scrawny bulbs they were, but in that rich, *moist* soil they grew fast and bloomed superbly, some stalks being over five feet high. There was a succession of bloom: even the tiniest, driest bulbs "took heart" and bloomed, some even after the first frosts. I have long thought that ground enriched with strong manure was injurious to gladiolus bulbs, and find this opinion endorsed by no less a florist than Geo. Sack in a late number of the New York Tribune. The soil should be light and sandy, and when coming into bloom a free supply of water. In tropical islands, where they are indigenous, they bloom in the rainy season.

Put a strong stake to each bulb as soon as planted; and tie securely as needed. Take up the bulbs when the foliage turns yellow, drying them in the sun, or on airy shelves; store them in an earthen jar in a dark cellar: keep the jar uncovered. In this they do not mould but come out fresh and plump.

But I want to tell you something more about this flower-bed. On the front side of this row of bulbs sowed mignonette, this was rampant in growth, two feet high, and loaded with fragrant spikes of bloom, filling the air with sweetness and wafted in the house with every breeze. At either end, well, large clusters of Coreopsis Drummondii and C. Burrigeamun; both covered with bright blossoms, the latter looking as gay and airy as a flock of butterflies suddenly arrested; the slender stems being invisible at a short distance. Around the edge of the whole bed were Asters of the best mixed varieties. Had not time to sow seed and transplant as usual; planted as we do radishes, making a hole with a round pointed stick, dropping one seed in each. Every seed came up; the border was perfect. When coming into bloom mulched them with newly-cut grass; and once a week poured the water from the wash on the surface, so it ran under the mulch. How they grew! Many were 3 feet high; all a solid mass of bloom of many colors, from the ground up. Truffant's Peony-flowered Perfection-blood-red is the finest Aster I ever saw! Chickens and cats admire this bed too much. I bought a ball of strong twine; my brother drove stakes around this and three other beds, and we put five strands of twine around each; the light trellis-fence was ornamental, making the beds look all the neater; and they were safe from all small marauders besides, being a great saving of time and temper.

Plants that have grown out all summer, such as geraniums, abutilons, etc., I winter in the cellar. Take up carefully, trim and pack closely in boxes with three or four inches of soil in the bottom, filled up and shaken in until the roots are well covered. All the leaves drop and are removed.

Fuchsias, roses, heliotropes are watered a few times during the winter, not geraniums, it makes them sprout, nor lantanas unless they get dust dry. The cellar is perfectly dark, ventilated through an old pump stock, inserted through

the banking, projecting several feet outside and inside. This, with an upper door opening into a pantry, and a window from that into a summer kitchen, secure a current of fresh air.

Culture of House Plants.

This is an exhaustive subject, but don't be alarmed gentlemen, I am not going to tell you "all I know about it," and keep you from the discussion of Siberian apples. How I hate the whole of them, came from an apple country and cannot get up any liking for crabs. They are so astringent and sting my throat. They make beautiful jelly but I do not like it. This is heresy, all the same I honor and respect the persevering nurserymen, who have brought comparative sweetness out of much bitterness, and are trying so hard to get iron-clad apples to stand this furious climate.

Roses. With these have been quite successful in a small way. Having had one time or another many of the newer and choice varieties. Used to have a rose bed but the fowls annoyed me so much—they would reach over and snap off the buds, in spite of all barricades. In sheer desperation took to cultivating them in pots, boxes, nail and powder kegs sawn in two, four holes bored in the bottom, and a layer of charcoal to ensure good drainage and keep the soil from souring. Gave rich garden earth, mixed with one-third well-rotted cow manure; with a sprinkle of sand to keep the surface from caking; roses love a rather stiff soil. In summer they are kept outdoors where they have the sun all day, except from 11 A. M. to 3 P. M. Are watered every noon if needed, and showered at evening with rain-water. While in bud I give them weak soot-water twice a week. One pint of soot to two or three gallons of water, kept in an old jar under the bushes and filled up as used, lasted all summer without more soot. How those roses grew and bloomed! never an insect could be seen.

Pierre St. Oyr. A French rose; is a noisette; now classed with tea-roses, on account of its sweetness; has the fragrance of the old hundred leaved rose. Do we not all remember how they grew in our mother's yards years ago? How we pulled as many as we wanted—there were hundreds on every bush—it is sweet with memories. No other rose can surpass it. St. Oyr is a free bloomer. Some strong shoots having seven full-blown roses, besides a half dozen buds at one time. During the summer this little bush had over sixty roses. It is a rose which never fails me winter or summer. Color, clear bright pink.

This is a short list of roses, that, with good soil, perfect drainage, weekly showering, sunny windows, are (with me) sure to bloom in winter.

Agrippina. Color brilliant red; always in bud or bloom.

Pink Daily. An old variety and constant bloomer; worth half a dozen of some of the newer sorts.

Malmaison. A splendid rose. Color, creamy flesh, changing to fawn, large, very durable, exceedingly sweet and free blooming.

Mad Ayalia Imbert. Color, rosy buff with peach shading, fragrant tea-scent.

Laprand. Color, bright apricot yellow; free bloomer; beautiful in bud, but not when fully blown.

Geraniums do not bloom well in winter unless grown through the summer for that purpose. Cuttings started in June—all buds pinched out until late in September, then let them form, will bloom until January. Or old stocks trimmed, repotted in rich soil last of Aug., with weekly watering of manure water,

grow vigorously, soon push out buds and repay for the care given. Without such treatment, old stocks having bloomed all summer are worthless, except to go in the cellar—to set out in the spring to “continue the business.”

Fuchsias. These are my “heart’s delight.” Winter them in the cellar except *F. speciosa* which is often kept up because it will not go out of bloom. They require a very rich soil; from an old pasture is good; a little sand and ever so many rusty nails tucked in—the oxide of iron deepens the color of foliage and flower: need manure water twice a week. Had a *F. Speciosa* in a powder keg last summer, with twenty branches in bloom at once—some with from fifty to sixty bells. Have ten sorts, all choice. Not a red spider shows itself. Once on some plants from a green house had a few; soon routed them by washing the leaves, both sides, with soap suds, and showering with clear tepid water. Only improperly treated plants are infested with insects.

A moist atmosphere is imperative for most plants; a pan of water should be constantly evaporating on the stove. Never see a stand of poor, struggling plants dying by inches for want of food—air, water and cleanliness—but I want to take hold and “set them to rights.” Fresh air must be given every day, by opening a window—but the draught ought not to blow over the plants in cold weather. I used to take safely through the winter from sixty to seventy plants. Failing health admonished, and a dozen is all my strength is equal to.

These are a few sure to bloom; if not should like to know the reason why:

Abutilon, Boule de Nieve. Best white, flowering profusely.

Geraniums, pink, white and scarlet. Scented rose, nutmeg or apple for fragrance.

Linum flavum. Ought to brighten every collection. Blooms only in winter, from November to January. Shrubby stock, with smooth, shining leaves; from the axil of each is a short stem of from one to three erect, bright, lemon-colored flowers, large as a medium-sized morning glory, which they resemble in shape.

Rose, *Malmaison*. *Cuphea, Platycentra* or *Hyssopifolia*. The first has small, tubular flowers; scarlet, with white tips, always blooming and so bonny it ought to be called “Little Cheerful.” The latter, a beautiful new variety, has flowers bright lilac and very profuse.

Merumbergia gracilis. Does well in either sun or shade; flowering well.

F. Speciosa. Flings out its bells at all seasons of the year.

Mahernia odorata. This is a gem. Shrubby, woody stock; finely cut leaves; blooms only in winter, beginning in November when it is full of graceful lemon-colored bells, size of the lily of the valley, rather larger. It distills a sweet delicate fragrance. One plant perfumes a room, hence its common name “honey dew;” is capricious only in watering; must not get dry or have too much at once; if the latter, the leaves turn yellow and drop in a shower; needs repotting in the spring and constant pinching in through the summer to give a trim, compact shape.

White jasmin, *grandiflora*. Nothing can be more lovely than the purely white, starry blossoms of this choice plant. The exquisite subtle fragrance seems not of earth, but a soft breath from the distant hills of Beulah! Blooms from August until January. Not exactly a vine but needs a trellis.

For trailers, *oridis rosea*, with its profusion of delicate pink flowers, and *lobelia gracilis* with myriads of blue, white and purple flowers in endless shadings, ought to be enough to satisfy the most exacting flower lover. If one

loves plants enough to care for them well, they seem endowed with character, sentiment, individuality, and there is a *subtle something* goes from the person through the fingers—and they grow! You don't believe this? I do. Why not? Our bodies are made of the dust of the earth; our souls instinct with the breath of life from God. After all how little we know of the inscrutable processes of plant nutrition, the mysteries of vegetation. "No man can find out the work that God maketh from the beginning to the end." "Great things and unsearchable, marvellous things without number." Though a wise man think to know it, yet shall he not be able."

HORTENSE SHARE.

Rosemount, Dec. 28th, 1880.

At the conclusion of Miss Share's paper, a vote of thanks was tendered and the paper ordered on file for publication.

Mrs. L. E. P. Sprague was elected an honorary member of the society.

DISCUSSION.

The Winter Protection of Plants.

Mr. Greenman stated that, as a general rule, all grapes and strawberries needed winter protection.

Mr. Peffer said that it did not matter so much what the covering was, if loose or porous in its character, but urged strongly against too deep covering.

Mr. Tibbits covers strawberries with clean straw after the ground is frozen, but prefers to cover grape vines with earth. He said that raspberries should be partially covered. Had saved his Turneas and Black Caps by heavy fall mulching. He had covered strawberries after the snow had fallen, but was careful not to cover too deep.

Mr. McHenry cited a case in which the vines had been entirely killed by a covering of straw after snow had fallen.

Mr. Sias had covered his strawberries with sorgho bagasse as an experiment, but thought it would all have to be raked off in the spring.

Mr. Tibbits would mow strawberry beds July 10th, and as soon as dry?burn the surface to kill grass and weeds.

Mr. Emery reported that Mr. Cook burned his strawberry fields over in spring.

Mr. McHenry stated that they were injured by the process.

Mr. Gibbs thought it a dangerous experiment.

Mr. Tibbits would not burn the fields in spring.

DISCUSSION.

Cultivation of Grass in Orchards.

Mr. Peffer said he cultivated trees until they begun bearing, then sowed clover, let it remain a year, plowed it up and cultivated a year, and so kept up annual rotation with clover and cultivation. He never used grass.

Mr. Harris advocated the planting of corn among growing trees and letting the stalks stand during winter, or sowing to clover and not cutting the clover.

Mr. Peffer remarked that he covered the trunks of growing trees with paper to prevent sun-scald.

Mr. Sias reported that he had protected trees with tarred paper and killed them.

Mr. McHenry had found that whenever tarred paper touched the trees they were killed.

Mr. Storrs does not like tarred paper but prefers boards.

Under question of apples to plant, Mr. Emery thought we wanted too many sorts. Said we should find out a few of the best sorts and stick to them.

Mr. Harris said if his entire orchard was planted to Duchess and Wealthy, he could have four times as many apples as present.

He made more money out of the St. Lawrence than any other sort.

Mr. Gibbs read final resolutions as follows:

Your committee to whom was referred the preparation of final resolutions, submit the following:

Whereas this session of our Horticultural society has been marked by an unusual degree of interest by the members, and a most kindly feeling throughout the discussion of the various topics, and whereas the city of Minneapolis has fully maintained in the greetings and courtesies, extended us the hospitality it has always so generously bestowed.

Resolved. That this association fully appreciates the courtesy of the managers who have so kindly furnishrd us the rooms for our meetings, and that we tender them our thanks.

Resolved. That the committee on entertainment and the generous hospitality of the citizens deserve our warmest thanks.

Resolved. That the pleasure of this meeting has been greatly enhanced by the faculty of the University, in tending to us their chapel for our meetings, and to Mrs. Dewitt and Mr. J. W. Hinsdell in rendering choice music during our sessions.

Resolved. That we believe in the unlimited power of this association for good, and that we will each and all, give it our earnest support by personal attendance by influencing others to join, and by collecting and observing facts for discussion at our meetings.

A. W. LATHAM,
OLIVER GIBBS, JR.
J. M. UNDERWOOD.
Committee.

The committee on topics for next annual meeting report the following, which were adopted:

Apple Tree Blossoms.

- 1st. Their date of opening.
- 2d. What varieties mature simultaneously?
- 3d. What varieties are perfect and what imperfect bloomers.
- 4th. What varieties should be planted together for mutual perfection in fertilizing processes?
- 5th. What varieties have the greatest power to resist spring frosts and winds?

Paper on above, by G. P. Peffer, Pewaukee, Wis.

Blight. Cause, remedy and process of contagion. J. M. Underwood, Lake City.

Vegetables. Best plan of laying out a vegetable garden, and methods of culture, and result of experiment with new varieties of garden vegetables. Oliver Gibbs, Jr., Lake City.

Timber Culture. The best way to comply with the law. What varieties of deciduous trees will grow from cuttings? S. M. Emery, Lake City.

A paper on the culture and propagation of the plum as a nursery and orchard tree; also, can plums reproduce themselves from the seed? Mr. Pearce, Minnetonka.

Essay on tulip culture.

What is the experience of the season of 1881 with new varieties of grapes and strawberries? Truman M. Smith, St. Paul.

The treatment of grape vines, whether by the annual renewal or the spur system. C. H. Greenman, Dover Center, Minn.

A paper on the circulation of the sap of trees, with blackboard illustrations. Prof. J. F. Porter, Minneapolis.

Summer cultivation and winter protection of orchards. J. T. Grimes, Minneapolis.

REPORT OF J. M. UNDERWOOD,

DELEGATE TO THE WISCONSIN STATE HORTICULTURAL SOCIETY.

It was with pleasure that I availed myself of the opportunity for attending the Wisconsin State Horticultural Society of last winter.

When the pressing duties of business have confined a man the rest of the year, it is refreshing to drop all, and give one's time for a few days to recreation of this kind to meet with those interested in the same pursuits of life and compare notes of success and failure.

The society held its annual meeting at the capitol in a commodious room on the first floor, on the door of which is inscribed: "State Horticultural Society;" adjacent to and connected by folding doors is a room for the "State Agricultural Society" which holds its annual meeting at the same time and the two together make a very desirable suit of rooms.

The meeting held during a session of the Legislature gave an opportunity for the honorable members to attend and interest themselves in the horticultural interests of the State; and it was interesting to note that the Wisconsin Legislature recognizes the importance of these interests by furnishing the society this room, and by the annual donation of the society's printing and \$600 in cash to be used as thought best in premiums to stimulate the organization and maintenance of auxiliary societies in the several congressional districts of the State.

One of the most important features of the session was the reports from these several societies—giving an account of their meetings during the year and of the fairs held during the summer. In what more pleasant or profitable way could committees spend the long winter than by holding meetings for the discussion of subjects relative to their farms, orchards, and gardens, and planning for a general display of their products at some favorable time during the summer or fall.

It is arranged now that an officer or member of the State society shall attend these summer fairs and address them on some topic of interest and also superintend the disbursement of the donation not to exceed \$100 from the State society. This \$100 is simply to form a nucleus around which the local societies is to gather a liberal amount for premiums which shall secure a large exhibition of fruits, flowers and vegetables, and a general interest in their improvement and cultivation. This, it seems to me, is a very practical way of reaching the desired development of horticulture in the different sections of the State. Each district can profit by the example of the others and vie with them for the most rapid progress, and to those who are most alive to their own interests will be awarded the crown of success.

The exhibition of fruit was very creditable, but it was evident to me that our protracted hot weather during the fall is a serious obstacle to the preservation of fruit late into winter. There were some old varieties that I had never seen and new seedlings that it is hoped will prove of value. Their list recommended is not very different from ours for southern Minnesota. A satchel of Wealthy

that I took with me were admired very much and were eagerly sought for by the members as specimens to carry home. Citrus that were cut from the fine orchard of A. J. Phillips, of West Salem, near La Crosse, were in a fine condition, and I heard no reports of such extreme and sudden changes as we experienced here in Minnesota the last of December and 1st of January.

The exercises were varied by interesting papers and discussions on subjects pertaining to farm and dairy. A valuable paper on butter making by Mr. Curtis, of Rocky Run, was particularly interesting, and if every butter-maker in our land could know and profit by his experience I don't think we would have so much wagon grease sold for butter. The discussions in detail would be too much for me to rehearse here. Any one can procure them by sending \$1.00 to the secretary, F. W. Case, Madison, and there can be no more profitable expenditure of money.

Our generous reception and care by the officers and members is a pleasant recollection, and it would be pleasant to reciprocate the courtesies shown.

Respectfully,

J. M. UNDERWOOD,

Del. to Wis. Hort. Soc.

Mr. Mendenhall moved a vote of thanks to Mr. Grimes for the very able manner in which he had represented the Minnesota State Horticultural Society at the St. Louis meeting, which was unanimously tendered the gentleman. The committee to report on taxing nursery stock report:

GENTLEMEN: The committee appointed at the last annual meeting to prepare a statement to the legislature regarding the taxing of growing nursery stock as merchandise present the following for the action of the society.

Sec. 20 of the present tax law requires that all nursery stock, whether growing or otherwise, shall be taxed as merchandise.

The injustice of this law, we think, is manifest from the following consideration:

It is the only growing crop subject to taxation. It is the most difficult one to grow.

A crop of trees requires from two to six years to mature sufficient for the market; hence each crop is subject, on an average, to four taxations, while all other crops are subject to but one.

With the exception of Illinois, Minnesota is believed to be the only state that taxes nursery stock.

In response to our inquiry from Iowa, the writer says:

"Our Legislature thinks it hard enough for our nurserymen to grow trees without taxing those who have the boldness to undertake the work."

Thus it has been left for Minnesota, the most northwestern

state in the union, the state in which the nurserymen has the most difficulties to contend against; the state which offers premiums to the tree planters, it is left to the state to tax the man who has the temerity to grow trees for the tree planter.

We feel that all that is needed is to call the attention of our legislature to this subject, and that their love of justice would prompt them to remove this burden.

G. W. FULLER,
A. W. SIAS,
Committee.

The committee on fruit, etc., on exhibition report the number of fruits not up to premium years, but very creditable considering the past severe winter.

Apples and Crabs.

Oliver Gibbs Jr., Lake City, exhibits 3 plates Minnesota Crab, 1 plate Tallman Sweet, 2 plates Walbridge, 2 plates Haas, 2 plates Russett, 1 plate Utter's Red.

H. E. Lowell shows 6 plates Wealthy, 1 plate Morrison's Seedling, 1 plate very fine unnamed sweet seedling.

A. W. Sias of Rochester, shows 1 plate Pewaukee, 1 plate Wealthy, 1 plate Walbridge, 1 plate Fameuse, also specimens of Wabasha Seedling, Minnesota Greening, Melinda, Rollins, Russett and four unknown.

John S. Harris of La Crescent, exhibits 1 plate each of Jonathan, Westfield, Seeknofurther, Northern Spy, Winter Winesap, Perry, Russett, Little Red, Romanite, Willow Twig, Walbridge and one seedling named La Crescent.

O. D. Storrs of Wright Co., shows Wealthy, Pioneer, Winstead Pippin, Walbridge, Morrison's Treasure, Minnesota, Hyslop, Pride of Minneapolis and other varieties of seedlings.

We find three specimens of Alexander very fine, but do not know who exhibits them.

Wyman Elliot of Minneapolis shows a collection of new varieties of potatoes, including Burbank's Seedling, Beauty of Hebron, Early Tennant, St. Patrick, Clark's No. 1 and 2, Chicago Seedling.

The severity of last winter and the severe winds of last autumn in many portions of the state, makes a large exhibition impossible.

G. W. FULLER,
Chairman of Committee.

REPORT OF THE OLMSTED COUNTY HORTICULTURAL SOCIETY.

The seventh annual meeting of the Olmsted County Horticultural Society was held in Good Templars' hall last Saturday afternoon, March 20, 1880. Owing to the bad state of the roads, the attendance was not as large as it should have been.

The meeting was called to order by the president, A. W. Sias, who stated that the first thing in order was the payment of membership fees.

M. W. Cook stated that there was an indebtedness of \$10, incurred at the time of the meeting of the State Horticultural Society, which had not been paid, and he moved that the membership fee be raised to fifty cents. After some discussion, the motion was carried.

The annual election of officers being next in order, the following officers were elected, viz: President, M. W. Cook; Vice President, R. Porter; Treasurer, J. Bamber; Secretary, S. D. Hillman; Assistant Secretary, G. W. Mason.

The subject for discussion before the meeting was "Winter Fruits" and Mr. Sias was called upon to open the discussion. He said he was much impressed with the lecture delivered by Prof. John before the teacher's institute Thursday evening, in which he claimed that five years time might be saved in the education of a pupil by taking the most direct course. The great object with fruit growers in Minnesota was to obtain hardy winter varieties. Instead of adopting the shortest and best method of reaching this result, many were inclined to take the longest and most expensive route. This point was illustrated by a diagram of straight and curved lines. The shortest road to success with winter fruit was by raising Minnesota seedlings; the same point might be arrived at by going around by the way of Wisconsin, Iowa, New York or Ohio, or perhaps by going still farther around by the way of Russia. Every divergence, however, from the straight line increased the expense and lessened the probabilities of success.

Mr. Sanford Niles inquired if he took the position that fruit followed the same law as corn and grain, which ripened earlier on bringing it from the north to the south.

Mr. Sias replied that he did. He quoted from the writings of Downing to sustain his position. He thought those countries that depended upon native seedlings were most successful.

Mr. R. Porter said he had been experimenting more or less for some 24 years, and he was convinced that our native seedlings were the best, and that we must rely upon our own nurserymen for a supply of the best and hardiest trees.

Mr. J. Bamber said he had been trying for the past 25 years to raise fruit in Minnesota, but he had failed to raise any winter fruit yet, unless it was the Tallman Sweet, which was not worth very much. Our dependence was in Minnesota seedlings. He had a number of trees of the Duchess variety which had the appearance of being winter killed.

J. M. Hall thought the difficulty was owing to the location of his orchard on low valley land. High ground was preferable.

Mr. Sias said nurserymen were often accused of having "an axe to grind" if they recommended varieties of their own planting, but he would submit the question whether the people were acting wisely in sending away for trees when better and cheaper trees can be found at home within their own county.

Mr. Cook said it was impossible at first to grow native seedlings successfully,

but there were now a few kinds which had been thoroughly tested and found to be reliable. He believed in getting the best and hardiest trees, whether from Russia or elsewhere. He spoke highly of the Duchess, Wealthy and the Rollins' Pippin.

Mr. Porter inquired what the latter variety was. Mr. Sias gave its history, and said it was a seedling originating with Mr. Rollins, of Elgin, from seed planted 25 years ago. He had a number of fine specimens of this fruit on exhibition, picked from the parent tree, the quality of which he desired the members to test, as well as a fine specimen of a seedling apple raised on the farm of Mr. John Williams, of Viola.

Mr. Cook inquired how the Pippin compared with the Duchess as to hardiness.

Mr. Sias said it appeared to be more hardy than the Duchess, which statement was corroborated by the views of Mr. Niles and Mr. Porter. Mr. Sias also exhibited specimens of the Russet and a seedling of his own production.

Mr. Hall exhibited a can of preserved strawberries.

It was decided to recommend the same varieties adopted by the society one year ago, to-wit: For general cultivation, Duchess, Wealthy, Elgin Beauty, Haas, and Rollin's Prolific; for trial, Rollin's Pippin, St. Lawrence, and Rollin's Russet: of the hybrid varieties, the following: Early strawberry, Orange, Meader's Winter, Beach's Sweet and Red, Hutchinson's Sweet, Maiden's Blush and Power's Crab.

Mr. Cook invited the society to hold its next meeting at his residence in the strawberry season in the month of June.

Secretary Hillman then read the following address:

MR. PRESIDENT: The Olmsted County Horticultural Society was organized seven years ago the 3d of this month; it is, therefore, now seven years of age. The society has held regular annual sessions each year since its organization; besides, a number of special meetings have been held for the discussion of topics of interest to horticulturists.

It may not be inappropriate to say a word at this time with regard to what has been and is being accomplished for the advancement of the horticultural interests of our county as well as the State at large. By doing so, and noting the progress made, we may find reasons for encouragement for the future, and profit by the lessons which time and experience have brought us in the past. One of the principal objects of our organization was the advancement of the interests of horticulture as pertaining to the production of apples as well as the cultivation of small fruit, flowers, etc.

It will be remembered, at the time of our organization we had but just passed through one of the severest and most disastrous winters ever known to the fruit growers of Minnesota and the west. In a majority of cases, as you will remember, the larger portion of our finest nurseries and orchards were thus rudely and suddenly destroyed and swept away. Nearly every tree, large or small, which was not what might be termed strictly "iron clad," was rendered utterly worthless. Nor is it at all surprising that the confidence of horticulturists in Minnesota as a fruit growing state was greatly shaken by such unexpected reverses. Their long fruit lists and their ideas of the most hardy and profitable varieties, alike met with rapid transformations. It was not a little discouraging to be compelled to commence anew to experiment, to compare notes and devise ways and means for obviating such serious disasters in the future; but our enterpris-

ing nurserymen and practical fruit-growers were equal to the task. They possessed the energy and perseverance which enabled them at once to renew their efforts, and it is not too much to say that they have been rewarded by most gratifying results. And it may not be after all an unfortunate matter that reverses were thus early experienced, since it has had the practical effect of bringing forward the most hardy as well as the most profitable varieties of apples for cultivation that could be produced.

Prior to the winters of 1872-3 there was the most reckless planting, and many seemed to entertain the idea that Minnesota was a very good state for growing all kinds of tropical plants. That winter taught us a lesson of prudence which can never be forgotten, and is worth more to us than a thousand fine-spun theories or the extravagant statements of visionary enthusiasts.

In this connection it may not be out of place to refer to the organization of the State Horticultural Society, seven years prior to that time, in October, 1866. At that time, when the horticulturists present in this city in attendance at the state fair, assembled for the first time to organize a state society, one of the enthusiastic members present exhibited no less than nineteen different varieties of apples. This was certainly a flattering exhibit for so young a state, but experience has shown that the growing of so many varieties is not necessary or profitable, or in other words, is more ornamental than useful.

It is hardly worth while for me to particularize as to the progress which has been made in the way of discovering and propagating hardy varieties; we have a few standard fall and winter varieties, the character of which seems to be fully and fairly established. Time and experience have demonstrated their value, and I need not refer to them; suffice to say that the croakers who declared they could not live in Minnesota because we could not grow fruit in abundance, have—thanks to the persevering efforts of our horticulturists—had their fears removed. It is well known that thousands of bushels of wholesome and delicious fruit are now produced in this and adjoining counties every year, and with favorable seasons the quantity of apples produced within the next two or three years will certainly be fourfold greater than ever before, and we may look forward confidently to the time when southeastern Minnesota will produce a large surplus of choice fall and winter fruit. I may emphasize the words, "choice fall and winter fruit," for every one knows that the beauty and quality of our apples are unsurpassed, and are far superior to those of a warmer climate. This feature was observed in a marked degree at the Centennial Exposition in Philadelphia some three years since. Nearly every state in the union was represented in the pomological exhibition, the exhibit from the state of Kansas, for instance, being remarkably extensive and creditable, but at the same time the apples from this state, though not so large and numerous in variety or great in quantity, were to our mind far better than those from that favored section.

The experiments being made with Minnesota seedlings are bringing to the front some of the finest specimens of fruit ever grown in any state or under any condition of soil or climate. And we would say, let the good work thus begun in an earnest spirit of emulation of the best, go on.

As I remarked at the outset, the object of our organization was and has been largely the advancement of horticulture with reference to the growth of apples and small fruit. Without enlarging upon the necessity or importance of giving attention to this subject, for the promotion of the material wealth and prosperity of our young state—which must be apparent to the dullest mind—it is plain to

be seen that the undertaking before us is not an easy task; the field of research and inquiry which is opened before us is an extensive one. Not only are we to discuss the varieties of apples which are the most profitable and hardy for general cultivation, but there are many other departments of horticulture which deserve to be carefully investigated. Among the proper subjects for discussion with regard to fruit growing, are such as these: the character of the soil best adapted to the purpose; the proper methods of planting, cultivation and protection of trees; time and manner of pruning; the diseases of fruit trees, their nature, cause and remedy; the consideration of reports given, and experiments made from time to time; all these are proper matters of interest and importance to every member of our society. The same remarks are more or less applicable to the growth or cultivation of pears, plums, cherries, strawberries, currants, grapes, forest, shade and ornamental trees, evergreens, plants and flowers.

We have an important work before us; for, if we would beautify our homes and make them the cheerful, pleasant and happy abodes of ourselves and families, we must necessarily give more attention to horticultural pursuits. Horticulture should travel hand in hand with agriculture, and we indicate very largely the degree of civilization to which we have attained by the interest we manifest in the cultivation of fruits and flowers. Some one has very appropriately said that "if he who makes two blades of grass grow where but one grew before, is a public benefactor," how much more he who covers our hillsides with rich clusters of grapes, our orchards with golden fruits, and who fills our homes with the fragrance of beautiful flowers!

On the 17th of February there was organized at Lake City "The Lake Pepin Farmer's Institute and Horticultural Society." The meeting was well attended, and a good deal of interest manifested.

The following gentlemen were elected as officers:

President—Gen. N. C. McLean, of Frontenac.

Vice-President—J. J. Beaty, of Gillford.

Secretary—S. M. Emery, of Lake City.

Treasurer—E. P. C. Fowler, of Mount Pleasant.

Executive Committee—P. H. Rahilly, of Mt. Pleasant; C. C. Lowe, of Gillford; Geo. Labbett, of Belvidere; O. Gibbs, Jr., of Lake City; R. F. Cone, of Florence.

The following address before the society, by U. S. Hollister, St. Paul, is, by special request, printed with this report:

HORTICULTURE ON THE FARM.

The term Horticulture, as applied to farm economy, has a more comprehensive meaning or more extensive application, than is usually allowed it. All the finer elements of your profession as farmers, the application of the principles of practical scientific agriculture, walk hand in hand with horticulture. The care bestowed on gardens, the necessity of the application of special fertilizers, the results obtained therefrom, together with the new and better methods of culture, and rotations of crops, first called the attention of the people to a better system

of farm culture. As the garden was the first farm so was it the first element to stimulate men to do the fair thing by mother earth. Horticulture has a civilizing or humanizing effect: it has a sanitary influence, and if properly taken in hand; has an important position in the financial economy of general agriculture. A part of the farmer's profession, then, that develops the kindlier feelings of human nature, that administers to the health and comfort of his family, and at the same time adds to the store of wealth, must attract his careful attention and be worthy of his earnest support.

I take it for granted that every farmer wishes to see his family under moral influence; wishes to see them enjoying good health; wishes them prosperity. Is there anything else of human life? And now the question arises here, how shall we make a practical application of the theory enunciated? I am not here to theorize, but will attempt to go with you to your own homes, show you what you have there, and what you might have.

Time, Midsummer. Drive out from your city in any direction, only let us go out among the prosperous or well-to-do farmers. We pass by a number of farms, some showing evidences of taste and culture, some entirely the reverse. We stop finally at one that seems to be about the average. There is an air of thrift about the place in some respects. The buildings are comfortable, the stock seems well fed and the farm implements in sufficient number to indicate extensive operations. So far all is well, but we are there as critics and are going to be a little particular. We hitch our horses to the fence because we are afraid that the hitching post won't hold. We enter the gateway—the gate of which lacks a hinge, but as our host meets us and understands the peculiarities of that gate, we get along first rate. The contour of the ground is perfect. A gentle slope from the house to the road. A hill covered with trees in the distant back ground. A profile of undulation springing out at either side. Nature did her share—let us see how our host has lent a helping hand.

A path as straight as an arrow leads from the gate to the front door, but as this is not the popular entrance, the path forks within a rod of the house and brings us to a side porch. The walk was originally laid out four feet wide, and a straight row of evergreens planted within four feet of the walk on either side; these have grown until we are compelled to walk in a narrow path, single file, to avoid their branches. Outside of these lines of evergreens the ragged relics of a few ornamental shrubs growing in the sod. The decayed remains of the fence board edgings, mark the spot when the place was new, and ambition yet had a place in the wife's heart, a flower had cheered the scene. Now, a few hardy herbaceous plants, a paucity and a dicentra keep mastery over the weeds. The evergreens show signs of horn and tooth, the flower beds the deep imprint of heavy hoof. There is a liberal expanse of lawn, but it is so thickly planted with trees that it is mown with difficulty, and the ripened Timothy and Red Top with seedless heads, present the appearance of waste to say the least. This grass plot would yield half a ton of good hay. This waste, as the waste always does, has added materially to the unsightliness of the lawn. We continue along the path and find our way to the side entrance to the house. Here is located the pump, here the wash bench, and we are obliged to walk on a row of flat stones laid down to keep our shoes from the mud of the kitchen slops. Two or three thrifty young Berkshires are nosing around, watching for a chance to upset the swill pail. They stop their rooting as we approach, throw up their heads while munching a bit of purslane or pigweed wink at us with their pig eyes, and won-

der if we are city hunters with the usual accompaniment of Pointer or Spaniel. They knew they had no business there or had no right to root that hole under the fence, and for the life of them they cannot locate that hole, when their owner whistles for Tige, and away they all scamper through the garden, among the currant bushes, over the onion bed, around and around, doing as much damage in five minutes as their black skins are worth, until finally, completely tired out, their memory suddenly returns, and they slip through the fence, and the trouble is over. While on our way to the fence to put on the necessary repairs, we find one of those calves has got loose and is deliberately eating the clothes off the line

We go to the garden to ascertain the damage, and as we are deeply interested in the horticultural features of the place, we will spend an hour there. One thing strikes us very favorably, it has the liberal allowance of at least an acre. It is fenced from fields and farm yard, and is in the same general enclosure as the house. We find the regular old fashioned arrangements of rows of currant and raspberries bushes, at intervals of a rod or so—the spaces between devoted to vegetables—this renders horse culture rather a difficult matter, and you all know what kind of hand culture these places get. Ten chances to one, you will find this man's corn field perfectly clean, while his garden is a mass of weeds. If there is a bunch of nettles on the farm you will find them growing with the currant bushes, or if a burdock ripens its seed anywhere, it will be in some corner of this farm garden. What ought to be the best arranged and most tidy as well as the most profitable plat of the farm, is really the most poorly arranged, and most slovenly and unprofitable acre on the whole estate.

We walk over the farm and find the fields well tilled, the crops looking finely, and see that nature, in the magnificent bounty of her great heart has spread a bountiful prospect for our host. It is dinner time, and while partaking of this and praising the substantial substance, and after spending an hour in the parlor, where we find books and pictures, and music and culture, we wonder more than ever why the average farmer in America pays so little attention to gardening and rural adornment and landscape architecture; or, in other words, why he ignores so completely the horticultural part of his professions.

Let us begin with farm garden. We cannot deal entirely with new plans, so we must make some radical changes in the old one. It will look like vandalism, but we expect to remain there a number of years, and may just as well go to work. First, we will decide that the vegetable garden shall have half of that acre plat, and the small fruits the other half, not mixed up as they now are, but a line shall be drawn through the center, and it shall be the boundary line of each department.

First we will dig out every currant or gooseberry bush, every raspberry cane or strawberry plant, that is found on the vegetable side of our boundary line. The ground thus cleaned, we will burn all the rubbish; cart on enough well rotted barnyard manure to entirely cover it to a depth of six inches; plow it in—plow deeply, harrow, and plow again a little deeper, harrow and roll until in thoroughly good condition to grow anything. Nearly all the garden vegetables are strong feeders, and to be produced nearest perfection must be grown on the richest soil. So arrange your garden that all the strong growing sorts, like cabbage, cauliflower, beans, peas, potatoes, sweet corn, etc., can be cultivated with a horse. Plant in season. One great secret in growing vegetables is to

plant at the proper time. Many things are valuable in proportion as you produce them early, and more especially is this so in Minnesota.

When nature distributed the fruits and vegetables over the earth, she placed those in different localities, best calculated to the needs of the people who dwelt there, and on the same principle those vegetables and fruits ripen in the season that they are most wholesome and most needed by mankind. We find the crisp and tender vegetable most satisfying and healthful in spring and early summer. We find the acids in the summer fruit an excellent panacea during the heated term of June and July; and the ripened potatoes and kindred vegetables ready to furnish the solid food for the cold of winter. To reverse the order and consume the ripened vegetables and meats that constitute our winter diet, in the summer, would render life a burden, while if we attempted to live on a diet of spring lamb and green peas, strawberries and cream, lettuce and cucumbers, with the thermometer 40° below zero, we would need a buffalo overcoat at the dinner table. Nature then in this arrangement intended that the seed should be planted in season. Those vegetables which are most satisfying in early summer or spring, such as lettuce, radishes, peas, onions, etc., never do well in this latitude, unless planted as soon as the ground is fit to work. In fact they do not thrive if planted so late as to be compelled to make their growth during the heated term.

In the time at our disposal, I cannot go farther into the details of farm gardening. The growth or culture of a single one of the most important ones would occupy as much space as we could use at this meeting. We will now glance at our fruit garden.

Whatever of discouragement we of Minnesota may encounter in the growing of apples, pears, plums and cherries, this fact is evident to every careful horticulturist; we can grow as fine currants, raspberries, grapes and strawberries, and grow them in as abundant profusion, as anywhere in our country. Even in the favored fruit region of Middle Tennessee, the currant will not grow at all, while the grape is as subject to mildew as our Transcendent crab is to blight. To the credit of that beautiful climate it can be said that the strawberry, that universal queen of the small fruits, does as well there as in Minnesota. But to return to our garden. We have half an acre of space to devote to the small fruits. One fourth of this can be profitably planted to the Red Dutch currant. These will do best planted 6x4 feet. Do not replant the old bushes you dug from the vegetable garden, but use the young, thrifty offshoots. Keep the ground well cultivated and free from grass and weeds. Mulch heavily with what is known as chip manure. This seems to be a special fertilizer for the currant. Prune out the old wood as fast as it shows signs of failure, fruiting mainly from new wood; and you will be surprised at the increased size and abundance of this healthful fruit. The same amount of space that you give the currant may be planted to the raspberry. The rows should be six feet apart, but you may plant closer in the row, say 2 to 3 feet. For details of culture, see Horticultural Reports.

It is not my purpose here to tell you just how to succeed best with all these things, but to induce you to plant and then study the proper care. I would plant these sorts, both for the sake of variety in the fruit and to prolong the season. These sorts would be the Old Do-little, Black Cap, the Mammoth Cluster and the Turner. Fifty Concord and Delaware grapes may be planted along the borders or back next the fence and they will afford all your family can use and

give away of this excellent fruit. On the remaining ground, which will be almost one eighth of an acre, plant Wilson strawberries. On this you can easily grow five hundred quarts, and if you have good luck, twice that number. From this half acre of fruit garden you can market enough each year to pay for the care of the whole acre. It has been truly said of the strawberry, that "those people who buy their fruits do not know what a strawberry is," and the same is true of the other small fruits and the vegetables. There is a dewy freshness about all these things, taken direct from your own garden, that will not follow them half way to the nearest market. This acre of ground then, will be credited with producing all the asparagus, radishes, lettuce, beets, beans, peas, sweet corn, cabbage, cauliflower, cucumbers, onions, squashes, parsnips, etc. All the currants, raspberries, grapes and strawberries your family can possibly use in a year, and some to spare.

This then makes it the most profitable acre on your farm, beside contributing largely to the health of those dependent on you, for it is a settled fact that fruits and vegetables are a hygienic necessity and that those families have the smallest doctor bills, who partake liberally of this class of food. Many of our most intelligent physicians are enthusiastic horticulturists. They recognize fully its healthful influence. We will leave the garden fully believing that if you can come to think seriously of the matter, you will immediately begin to reform your farm gardens.

Rural adornment is to me a most important subject. By this I do wish to be understood as writing for the farm only, but for any city or village lot, large enough on which to plant a tree or shrub, or locate a flower bed. It is a question that you, in this beautiful, picturesque country, should study. I do not mean that you should employ landscape architects, and with grading and filling and rolling and terracing, you should expend all the profits of your labor. Do this in proportion as you can afford it. I will simply make suggestions and lay down a few general rules, by which you will be enabled to assist nature in making the most of the material at your disposal. Within a few years popular taste has developed wonderfully in this respect. We cannot in a country as new as this, accomplish triumphs of architectural taste, but we can make our places attractive and enjoy the beauties of nature about our own homes.

The location of the house should be sufficiently back from the public road to afford an unbroken expanse of ornamental lawn in proportion to its width. On small lots it is best to place the house at one side of the center. Straight roads, straight walks and sharp angles should be avoided. The course of the walks should be graceful with easy curves, not serpentine, by which we mean that a curve is not a graceful one if it consists of a series of small curves, all tending to follow a general straight line, or as a farmer would describe an ironwood whipstock—crooked but straight. Let us have a natural sweep, first leading to the front entrance, and then passing to side entrance, around the house to the rear doors, or the road may entirely encircle the house, rejoining itself in the rear and finally leading to the stables, either directly from the rear or by rejoining the road near the main entrance and entering the barn at another gate. In any case there should be a strip of lawn between the drive or walks and the house, wide enough to accommodate a few small flower beds or ornamental shrubs. The lawn forms the basis of all ornamental grounds. By the term lawn, in this case, we mean that plat of ground about your houses usually termed door yard, front yard or house yard. Abolish these terms altogether and call them lawns.

and try and make them worthy the title. If you do not try to improve them, why, just as well call them yards, and then the front yard, the sheep yard and the cow yard, synonymous in title as they are like in appearance, enables you to illustrate the fitness of language in applying similar names to similar objects. The lawn is not only the basis of ornamental grounds, but when well kept, the most pleasing part of your miniature landscape. A smooth, closely cropped carpet of bright green, velvety grass, is in harmony with anything nature places near it. A tree, a shrub, a stump, a rock, a log, or a bit of statuary, a vase, a bed of flowers, a bird, an animal, or human being, any or all of them borrow beauty from such a carpet when standing on it. You admire it on the bank of a stream, on a city lot, about a farm house, or back among your lake hills, with your wildest or grandest scenery. Why then, not reproduce it where it will cheer you every time you enter your home gate?

The lawn must not be a dead level. All perfectly level tracts appear to be depressed in the center. Nature very seldom places a dead level spot where men care to select a site for a house. In this case then, nature assists you, as you will find she always does when you attempt to make her more beautiful; but in this attempt you must be very careful how you go to work. It is much easier to spoil a plan that nature has made attractive, than to improve it. You must study the situation very carefully, much as an artist would study a subject before committing it to canvass. He starts out to delineate that which you create when you dig and arrange and plant to produce the miniature landscape that we all do when we attempt landscape gardening on a large or small scale. It is an easy thing to do, to make a lawn. Prepare the ground as you would for a crop of corn, by which you will understand it must be thoroughly pulverized and enriched. If it has been graded to the desired profile, with the earth dug from the cellar, as is often the case, this gravelly soil must be covered with at least six inches of good soil. Do not attempt expensive grading unless you can afford it. See that the ground has good surface drainage, a fairly rounded surface and above all, no low spots where water will stand, as it would be fatal to any attempt to grow grass there.

In selecting the grass seeds to sow, care should be taken to select such as are especially adapted to the purpose. Experience has demonstrated that if but one kind is sown, no matter how abundantly the seed is used or how favorable the conditions may be, there will be times in summer when the lawn will have ripened, or appear of a dead, dull color. It will also die out in patches, to be replaced by weeds that are always ready to fill any gap in plant life. Timothy and Red Clover from their habits and nature are entirely unsuited to this use. Kentucky Blue Grass and Red Top form the basis of all good lawn mixtures. One bushel of Blue Grass, one-half bushel of Red Top, one-fourth bushel of Rye Grass, three pounds Sweet Vernal Grass and one pound White Clover, making in all twenty-eight pounds or two bushels, would be an excellent application for a half-acre lawn. Sow in early spring, harrow lightly and roll. Mow close as often as it grows to a height of four inches and by July you will have a compact growth, an even, velvety, green sward. In this manner you can secure a lawn at one tenth the cost of sodding and a better and more permanent one. The lawn grass known among seedsmen as the Central Park mixture is the best combination of grasses known for lawns in this country. It is composed of a mixture of ten of the best lawn grasses in the right proportion of close, compact

habit and some of them furnish green during all the summer. I have told you about the form and direction of the walks. How shall we lay them out?

Construction.—The cheapest way is to dig down a depth of twelve inches, the width of the walks and drains and fill with coarse gravel, rounding the surface enough to insure easy drainage. This is always dry and does not invite the growth of grass or weeds. The next consideration is that of planting. One of the greatest mistakes in the planting of ornamental grounds is in not planting with reference to the future growth of the tree. You look the ground over and think how nice a little four foot spruce would look here, or a young maple there, or an elm over yonder, and for a few years they are a pleasing addition to the lawn. But the soil in which they grow is good, and no pent up area controls their growth. They grow and spread; finally are too large to be of use except for shelter. They shut out the view, crowd you from the walks, and practically are masters of the situation.

Again, nature does not plant trees in a straight line, and I remark here that in referring to what nature does, and what nature does not, I tell you that in the arrangement of the ornamental acres that surround your home, you can do no better than to follow as a model the choice little bits of nature's landscape architecture, thrown promiscuously among your hills along your lake shore. I do not mean the tangled growth of thicket or the ordinary features of the big woods, but all of you have seen in your rambles, a little clearing, carpeted with short cropped grass, flanked with mossy rocks, or knarled oaks, with a clump or two of hazel or birch, a wild grape vine festooning an old tree, an opening through the trees disclosing a vista of far off sunshine and shadow, an effect that would be studied by the foremost landscape architect of the world, and which the wealthy owners of fine grounds in our large cities would give thousands of dollars to reproduce in their places. This is why I speak of studying nature, and applying her teachings to the embellishment of your grounds. To repeat, nature does not plant geometrically, she dispenses singly and in groups.

For lawn planting, single specimens should be the best of their kind. They should be located so that they have the appearance intended, viz: single or lone trees. Do not plant even a shrub within twenty feet of them. The most important arrangement, because the most satisfactory in its results, consists in what is called grouping, that is, planting trees of the same kind, or of different kinds, in groups or clumps. This is such a perfectly natural arrangement, that no general rule can be made for it. The combination never should be imitated on the same ground, and different profiles of lawn, or surface plans, require different arrangement of the clumps. In grouping trees, the expected rapidity of growth of the different sorts must be considered, also the different colors or shades of foliage and bark. The charm of a landscape is its light and freedom. Never plant so as to destroy this, never crowd the trees, so their future growth will make perpetual shade. Plant trees or clumps of trees at the curves and angles of the walks and drives, so as to make it appear that the curves and angles were made to avoid the seeming obstruction. Do not plant strong growing trees near the walk or drive—fifteen or twenty feet is near enough, so that when full grown their branches will not crowd the avenues, but at the nearest droop gracefully over the margins. Small and dwarf trees and shrubs may be planted within four feet of the margin, but not too many of them.

A dozen would be sufficient for an acre lawn. The idea that if you have a

certain tree or group upon one side of the grounds, that its exact counterpart must be on the other is entirely erroneous. Nature does not balance up that way. We always plant to break up the appearance of a level, therefore we plant clumps on the highest points to make them look higher, and leave the grass to rule the low places. If there should be a hollow or gully in the ground, plant trees in the highest margins to give them the appearance of great depth. In this way you can give an undulating appearance to the tolerably level tracts.

When we come to deal with the city lot, small in area, we must change our plans. Here, we want first, a clean, closely cut lawn, as the first requisite, at the side of the entrance, standing well toward the center of the lawn a single vase three or four feet high, wide at the top, and filled with geraniums and trailing plants. On the other side, a circular bed, planted thickly with coleus and other variegated plants. Stop there; don't plant a tree, or put another ornament from the front fence to a line across the front of the house. On either side of the house you may plant a profusion of flowers or a few trees.

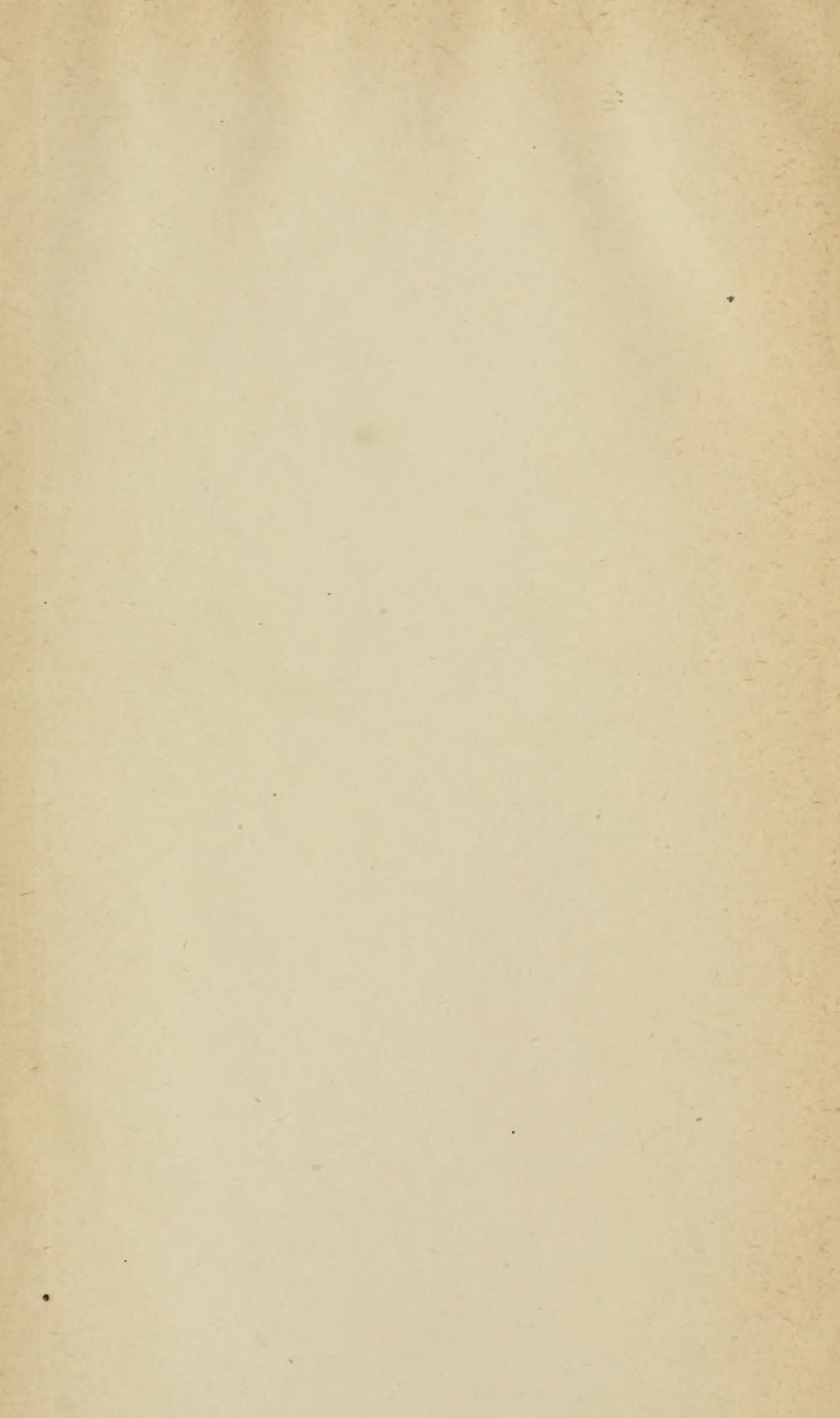
Whenever you have a fine view, in any direction, either from the prominent windows of the house, or even from the highway, plant trees so as to leave this view unobstructed. On the contrary any unsightly object should be hidden from prominent points of view or screened by trees. This will be a guide, to a certain extent, to planting. A very neat background grouping may be of our white birch, relieved by the dark green of the Scotch pine, and this in turn by the light green of the arbor vita. The birch behind the Scotch pine and trained to make the highest growth; the arbor vita in front of the pine and pruned down to one-half the height of the latter. If there is room this group should contain three or four trees of each sort. For groups in the foreground, the highest trees should be near the center, surrounded by those of lower growth; groups should not be circular in form, but there should be angles and bold projections, keeping in mind, mainly, close planting. This close planting should not be carried to that extent that the growth of the trees would be injured by crowding. As to the ornaments of the lawn, they should be few and no two alike. Rustic chairs and settees, statuary and vases are very popular. None of these should be white, but of a dull color, to heighten the color of the surroundings, rather than that the surroundings bring out the colors of the ornaments. An old stump, filled with bright flowers, is better than the expensive abominations of cast iron dogs and deer. Rock work is very desirable in its place, but I am of the opinion it ought not to be attempted except in the vicinity of a pond or stream of water. Flower beds should be placed where their bright colors will be subdued a little by a back ground of green, either of foliage or grassy bank. They should not be too near the walk, but a distance from it, and so placed that they will be in view from the windows of the house. The form of these may be round, oval, crescent shaped, or any form, using curved lines in its construction, avoiding angles and squares.

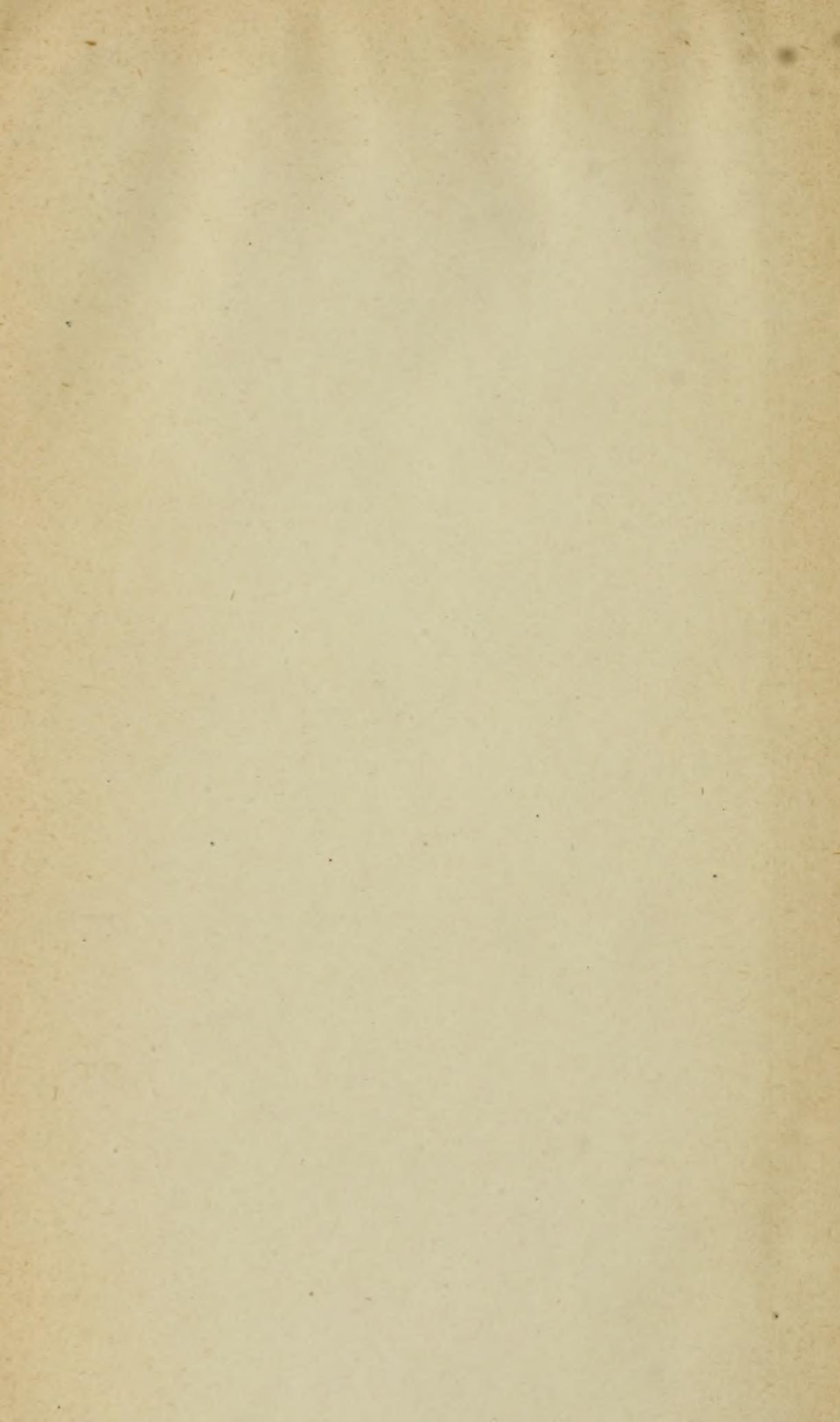
There is a much neglected and very important part of the grounds, that as a general rule should be improved. I refer to the drying ground. This of course will be well back in the rear of the house, and should be large enough to accommodate all the clothes line the housewife wants. It should have just as smooth a surface, be just as cleanly shaven, as the best part of the lawn, and surrounded by a low hedge of arbor vitæ. These directions or suggestions are for grounds of considerable size.

But to go back to our farm. I am aware that to carry out plans I have

sketched would involve radical changes, but were I to purchase that farm, or open an entirely new place, my plan would be the same, though I confess I would much prefer to take a wild-wood farm or new prairie, to starting in to improve an old farm. I would dig up nearly every tree and break the ground in June. The next spring I would plant the ground to potatoes, and give them thorough cultivation. Then the spring following, I would plant and sow the lawn, lay out the walks and drives, get it in shape. I hear some of you ask the question—what will this all amount to, if it don't pay? I take the ground most decidedly that it will pay. It will pay you in the satisfaction of "bringing order out of chaos." It will pay you in the pride you will take in it, and it will add a money value to your farm, ten times greater than the cost. If you wish to sell, it will attract a buyer sooner, and bring a better price. But aside from all consideration of profit, aside from all selfish consideration of satisfaction and pride, there is something about these horticultural studies and pursuits worth more than these. It is this, they make men, women and children better. Communion with nature, is next to association with deity. It refines the most stubborn human nature. I care not what a man may be, when he enters the surroundings of home, their condition or appearance has an influence on him. He may ride to his gate in a carriage and liveried footman take down the steps for him; when he enters the gate, if the neatness of the lawn, the brightness of the flowers, the odor of roses, greet him, he enters his house a better man for these things being there. He may be a laborer, going home from his toil, with his dinner bucket on his arm, and the world uses him harshly, but when he enters his house if but a convolvulus wreaths the eaves, he is glad for a minute that his doorway is low, for it gives him an excuse to bow his head to nature's God.







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