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TRANSACTIONS

OF THE

Illinois State Horticultural Society

FOR 1872,

BEING THE

PROCEEDINGS OF THE SEVENTEENTH ANNUAL MEETING

HELD AT

CENTRALIA, DECEMBER 10TH, 11TH, 12TH AND 13TH.

EDITED BY THE SECRETARY;

—ALSO—

PROCEEDINGS OF THE SIXTH ANNUAL MEETING

OF THE

NORTHERN ILLINOIS HORTICULTURAL SOCIETY.

PREPARED BY A "PUBLISHING COMMITTEE" OF THAT SOCIETY;

—ALSO—

REPORTS FROM LOCAL SOCIETIES, FRUIT LISTS, ETC.

NEW SERIES—VOL. VI.

CHICAGO:
PUBLISHED BY THE SOCIETY.
READE, BREWSTER & CO., PRINTERS.
1873.

CONTENTS.

FRUIT, OR HORTICULTURAL DISTRICTS.

I. NORTHERN ILLINOIS.

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2. *Rock River District.*—Bureau, Carroll, Henry, JoDaviess, Lee, Ogle, Putnam, Rock Island, Stephenson, Whiteside, Winnebago.—11. Total, 23.

II. CENTRAL ILLINOIS.

3. *Illinois River District.*—Adams, Brown, Cass, Fulton, Hancock, Henderson, Knox, McDonough, Marshall, Mason, Mercer, Menard, Morgan, Peoria, Pike, Schuyler, Scott, Stark, Tazewell, Warren, Woodford.—21.

4. *Grand Prairie District.*—Champaign, Christian, Coles, DeWitt, Douglas, Edgar, Ford, Iroquois, Livingston, Logan, McLean, Macon, Moultrie, Piatt, Sangamon, Shelby, Vermillion.—17. Total, 38.

III. SOUTHERN ILLINOIS.

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6. *Alton, or Kaskaskia District.*—Bond, Calhoun, Clinton, Greene, Jersey, Macoupin, Madison, Monroe, Montgomery, Perry, Randolph, St. Clair, Washington.—13.

7. *Grand Chain District.*—Alexander, Gallatin, Hardin, Jackson, Johnson, Massac, Pope, Pulaski, Saline, Union, Williamson.—11. Total, 41. Grand Total, 102.

INTRODUCTION.

It is due to the Executive Board of this Society, that the membership should be informed of some of the causes which have operated to delay the publication of this volume.

In the first place the Society had not sufficient funds in the treasury to publish its annual volume of Transactions, and, as was generally conceded, the Board must, in consequence, await the action of the General Assembly in re-organizing the Society, so as to constitute it a "Corporation of the State," and appropriating funds for its maintainance. It was not until the latter part of February that I learned, through the State Auditor, that, by "a recent decision of the Supreme Court," the Society was entitled to its hitherto uniform appropriation of two thousand dollars—under the provisions of the old constitution.

The contract was then at once made for the publication and delivery of the volume by the tenth of May, but during the progress of the work the publishers—who had lost their all in "the great conflagration," and had not yet succeeded in establishing their business upon a sure financial basis—were compelled to go into bankruptcy. This disaster caused still further delay; yet through the kind assistance and perseverance of Mr. C. F. Brewster, a member of the firm, the work has been pushed to completion much sooner than the hindrances seemed to indicate could be done.

The disastrous effect of the unprecedented cold of last winter has cast a gloom over almost the entire peach-growing region of the State; but this calamity is not so truly discouraging as the fact that at the time, above all others in the history of this Society, when persistent research and experiments are imperatively demanded, to ascertain and prevent the causes of disasters to trees and fruits, our representatives in Springfield should refuse to place our Society in a position to enable it to continue its good work and to aid it, by a small appropriation, in publishing, for the benefit of the whole State, the results of its labors.

The bill for an act to re-organize this Society passed one branch of the General Assembly almost unanimously, but was defeated in the other House by a small majority; so small, indeed, that it is within the power of the horticulturists of the State to secure its triumphant passage at the next session. If every member of this Society shall hold a *personal interview* with the representatives of his district, in both houses of the General Assembly, and explain to them the nature and importance of our work, he will be almost certain to secure pledges from them to sustain the society by proper legislation.

Let us all increase our diligence and zeal in our chosen work as we find new obstacles to be overcome, that our Society may sustain its position among the horticultural institutions of the land, and that its usefulness may continue unimpaired. THE SECRETARY.

MORRIS, GRUNDY CO., ILL., May 8, 1873.

OFFICERS FOR 1873.

PRESIDENT:

M. L. DUNLAP, Champaign, Champaign County.

VICE PRESIDENTS:

1st	District—	W. T. NELSON	Wilmington, Will County.
2d	"	SAMUEL EDWARDS	LaMoille, Bureau County.
3d	"	A. G. HUMPHREY	Galesburg, Knox County.
4th	"	L. C. FRANCIS	Springfield, Sangamon County.
5th	"	J. C. COOPER	Centralia, Marion County.
6th	"	ISAAC SNEDECKER	Jerseyville, Jersey County.
7th	"	PARKER EARLE	South Pass, Union County

SECRETARY:

O. B. GALUSHA ..... Morris, Grundy County.

ASSISTANT SECRETARY:

H. J. DUNLAP ..... Champaign, Champaign County.

TREASURER:

JONATHAN HUGGINS ..... Woodburn, Macoupin County.

EXECUTIVE BOARD:

M. L. DUNLAP, JAMES E. STARR, ARTHUR BRYANT, Senr., W. C. FLAGG, and O. B. GALUSHA.

STANDING COMMITTEES FOR 1873.

Gentlemen on these Committees are expected to act independently, and each is requested to report upon his topic with reference to his particular district—Northern, Southern, or Central, as the case may be. It is believed that additional facts and principles may be discovered, relating to the *conditions* to which fruit culture in Illinois must conform, by a careful study of atmospheric phenomena, our soils, insects, and birds, in connection with vegetable physiology and the hygiene of plants.

NORTHERN.	CENTRAL.	SOUTHERN.
METEOROLOGY:		
Prof. J. Wernli, Galena.	J. B. Turner, Jacksonville.	Prof. John H. Tice, St. Louis, Mo.
GEOLOGY AND SOILS:		
Capt. E. N. Beebe, Geneva.	Tyler McWhorter, Aledo.	H. C. Freeman, So. Pass.
BOTANY AND VEGETABLE PHYSIOLOGY:		
H. H. McAfee, Freeport.	Dr. E. S. Hull, Alton.	T. A. E. Holcomb, So. Pass.
ENTOMOLOGY:		
Dr. Wm. LeBaron, Geneva.	J. R. Muhlemann, Woodburn.	Prof. C. V. Riley, St. Louis, Mo.
ORNITHOLOGY:		
Robert Douglass, Waukegan.	J. E. Starr, Elsa.	A. M. Brown, Villa Ridge.
ORNAMENTAL AND TIMBER TREES:		
A. Bryant, Jr., Princeton.	H. J. Dunlap, Champaign.	W. C. Flagg, Moro.
ORNAMENTAL AND LANDSCAPE GARDENING:		
J. P. Bryant, Princeton.	G. W. Minier, Minier.	P. R. Wright, So. Pass.
VEGETABLE GARDENING:		
J. Periam, Chicago.	A. L. Hay, Jacksonville.	G. H. Baker, So. Pass.
ORCHARD CULTURE:		
Dr. L. S. Pennington, Sterling.	J. W. Robinson, Tremont.	Parker Earle, So. Pass.
VINEYARD CULTURE:		
E. C. Hatheway, Ottawa.	G. B. Worthen, Warsaw.	E. J. Ayers, Villa Ridge.

LIST OF MEMBERS FOR 1873.

NAME.	POSTOFFICE.	COUNTY.
Butterworth, T.	Quincy,	Adams.
Stewart, John	Fowler,	do
Limbert, John	Cairo,	Alexander.
Bryant, Arth. Sr.,	Princeton,	Bureau.
Bryant, Arth. Jr.,	do	do
Bryant, L.	do	do
Edwards, Samuel	La Moille,	do
Cotta, J. V.	Lanark,	Carroll.
Burrill, T. J.	Urbana,	Champaign.
Dunlap, Albert	Champaign,	do
Dunlap, M. L.	do	do
Gregory, J. M.	do	do
Hammersmith C J	do	do
Phinney, J. B.	do	do
Vickroy, H. K.	do	do
Blower, R. L.	Pana,	Christian.
Currans, J. B.	Mattoon,	Coles.
Atkins, Charles	Chicago,	Cook.
Bonham, Jeriah	do	do
Cochran, J. W.	Blue Island,	do
Emery, H. D.	Chicago,	do
Periam, John.	do	do
Schuyler, W. H.	do	do
Graves, H. C.	Sandwich,	De Kalb.
Daggy, E.	Tuscola,	Douglas.
Ellsworth, L.	Naperville,	Du Page.
Richmond, C. W.	do	do
Curtis, B. O.	Paris,	Edgar.
Irish, E. W.	Farina,	Fayette.
Overman, N.	Canton,	Fulton.
Clapp, Henry	Morris,	Grundy.
Galusha, O. B.	do	do
Sanford, E.	do	do
Hammond, A. C.	Warsaw	Hancock.
Hoppe, C. C.	do	do
Whitaker, B.	do	do
Ridenour, J. B.	Woodhull,	Henry.
Snedecker, Isaac	Jerseyville,	Jersey.
Starr, J. E.	Elsa,	do
Cobb, Emory	Kankakee,	Kankakee.
McKinstry, B. N.	Yellow Head,	do
Minkler, S. G.	Oswego,	Kendall.
Carpenter, A. N.	Galesburg,	Knox.
Childs, E.	Oneida,	do
Humphrey, A. G.	Galesburg,	do
Douglas, R.	Waukegan,	Lake.
Baldwin, Elmer	Farm Ridge,	La Salle.
Hathaway, E. C.	Ottawa,	do
Hansen, W. H.	Franklin Grove,	Lee.
Whitney, A. R.	do	do
Beach, J. A.	Woodburn,	Macoupin.
Bell, R. M.	Brighton,	do
Blodgett, Daniel	do	do
Clark, H.	do	do
Compton, George	Woodburn,	do
Corwin, L. B.	Carlinville,	do
Cummings, J. F.	Bunker Hill,	do
Eldred, E. B.	Carlinville,	do
Eldred, Moses	do	do
Flanagan, John	Bunker Hill,	do
Gore, David	Carlinville,	do
Hilliard, A. A.	Brighton,	do
Hollister, E.	Woodburn,	do
Howell, J. C.	Carlinville,	do
Huggins, Jona.	Woodburn,	do
Huggins, J. C.	do	do
Huggins, P. C.	Bunker Hill,	do
Hunter, George	Carlinville,	do
Ingersoll, G. B.	Shipman,	do
Loomis, H. J.	Carlinville,	do
McConnell, J. T.	do	do
Miles, Jona.	Miles Station,	do
Olmstead, Martin	Shipman,	do
Pettingill, John	Brighton,	do
Scamen, M. W.	Shipman,	do
Simmons, J. L.	Piasa,	do
Summerville, Th.	Bunker Hill,	do
Williams, E. S.	do	do
Wood, R. O.	Woodburn,	do
Young, J. T.	do	do
Barler, O. L.	Upper Alton,	Madison.
Flagg, W. C.	Moro,	do
Gillham, D. B.	Alton,	do
Hollister, E.	do	do
Hyde, H. J.	do	do
Johnson, S. B.	do	do
Long, B. F.	do	do
Pearson, J. M.	do	do
Smith, W. E.	do	do
Eldridge, Lewis	Centralia,	Marion.
Hallam, J. L.	do	do
Hooton, M. M.	do	do
Perrine, Charles	do	do
Phillips, C. B.	do	do
Phillips, C. W.	do	do
Pope, R. F.	Kinmundy,	do
Pullen, B.	Centralia,	do
Taylor, J. S.	do	do
Webster, Jabez	do	do
Wier, D. B.	Lacon,	Marshall.
Hageman, Andrew	Bushnell,	McDonough.
Rodgers, J. S.	Marengo,	McHenry.
Woodard, L.	do	do

LIST OF MEMBERS FOR 1873—CONTINUED.

NAME.	POST OFFICE.	COUNTY.
Phœnix, F. K.	Bloomington,	McLean.
Prestelle, W. H.	do	do
Smith, W. H.	Normal,	do
Bassett, J. R	Aledo,	Mercer.
Lee, Graham	do	do
McWhorter, T.	do	do
Pepper, John	do	do
Vernon, Marion	New Boston,	do
Barker, C. A.	Jacksonville,	Morgan.
Carnel, H. F.	do	do
Clayton, W. W.	do	do
Gillette, P. S.	do	do
Gilman, H. A.	do	do
Hay, A. L.	do	do
Miller, E. S.	do	do
Milligan, H. W.	do	do
Neal, E. C.	do	do
Turner, J. B.	do	do
Wilbur, C. T.	do	do
Brown, A. M.	Villa Ridge,	Pulaski.
Shepherd, Smiley	Hennepin,	Putnam.
Francis, L. C.	Springfield,	Sangamon.
Garland, A. M.	do	do
Raymond, W.H.V.	do	do

NAME.	POST OFFICE.	COUNTY.
Hartman, Jacob	Freeport,	Stephenson.
Hineline, C. M.	do	do
Scofield, L. K.	do	do
Minier, G. W.	Minier,	Tazewell.
Robinson. J. W.	Tremont,	do
Baker, G. H.	South Pass,	Union.
Earle, Parker	do	do
Essex, Isaac B.	Dongola,	do
Freeman, H. C.	South Pass,	do
Holcomb, T. A. E.	do	do
Wright, P. R.	do	do
Clark, L. G.	Channahon,	Will.
Fuller, J. C.	Joliet,	do
Minard, D. G. W.	Crete,	do
Nelson, W. T.	Wilmington,	do
Westgate, C. A.	Peotone,	do

NAME.	POSTOFFICE.	STATE.
Bower, R. F.	Keokuk.	Iowa.
Matthews, B. A.	Knoxville,	do
Miller, Mark	Des Moines,	do
Willet, R. S.	Malcolm,	do
Dailey, M. A.	Owatonna,	Minnesota.
Wells, H.	Trotwood,	Ohio.
Cooper, J. C.	Topeka,	Kansas.
Stickney, James	Wauwatosa,	Wisconsin.

DELEGATES FROM OTHER SOCIETIES.

Warsaw Horticultural Society,
A. C. HAMMOND, EZEKIEL McCUNE, DR. A. C. WARNER.

Jonesboro Horticultural Society,
ISAAC B. ESSEX.

Galesburg Horticultural Society,
DR. A. G. HUMPHREY, OTIS JONES, MISS S. E. PUTNAM.

CONSTITUTION AND BY-LAWS,

AS AMENDED AT THE ANNUAL MEETING, 1872.

CONSTITUTION.

I. This Association shall be known as the ILLINOIS STATE HORTICULTURAL SOCIETY.

II. Its objects shall be the advancement of the science of Pomology and of the art of Horticulture.

III. Its members shall consist of *Annual* members, paying an annual fee of one dollar; of *Life* members, paying a fee of twenty dollars at one time; and of *Honorary* members, who shall only be persons of distinguished merit in Horticulture or kindred sciences, who may, by vote, be invited to participate in the privileges of the Society. The wives of members shall be members without fee.

IV. Its officers shall consist of a President, one Vice-President from each Fruit District in the State, a Secretary, an Assistant Secretary, a Treasurer, and an Executive Board, which shall consist of the President, the last three Ex-Presidents, and the Secretary; all of whom shall be elected at the annual meeting, and serve from the first of January until the thirty-first of December, and until their successors are elected.

V. It shall hold an annual meeting and other meetings, and an annual fair, as the Society or the Executive Board may direct.

VI. This Constitution may be amended at any regular meeting, by a two-thirds vote of the members present.

BY-LAWS.

I. The President shall preside at all meetings of the Society; call meetings of the Executive Board, and, under its directions, have a general superintendency of the affairs of the Society and direction of the expenditure of money; he shall deliver an annual address upon some subject connected with Horticulture, and shall appoint all committees, unless otherwise ordered.

II. The Vice-Presidents, in the order of their Districts, shall act in case of absence or disability of the President; and shall, by correspondence and personal intercourse with the horticulturists of the various counties of their respective districts, endeavor to organize local societies, obtain accurate information of the condition and progress of Horticulture therein, and report annually, in writing, to the Society.

III. The Secretary shall conduct the correspondence of the Society; have charge of its papers, books, and reports, and prepare its reports for publication; and shall receive, for so doing, his necessary expenses for postage, stationery, printing, expressage, and office rent, and the sum of three hundred dollars per annum; he shall render an annual account in detail of such necessary expenses, which shall be referred, with the Treasurer's report, to a special auditing committee.

IV. The Assistant Secretary, in the case of the absence or disability of the Secretary, shall perform his duties, and shall aid him, at the annual meeting in making his report.

V. The Treasurer shall receive, and keep an accurate account of all moneys belonging to the Society, and disburse the same upon the written orders of the President, which he shall retain and file as vouchers; he shall make an annual report to the Society of the receipts and disbursements, which, with the vouchers, shall be referred to a special auditing committee appointed at the annual meeting. Before entering upon his duties, he shall give bond to the Society in the sum of five thousand dollars, for the faithful performance of his duties; such bond to be approved by the Executive Board.

VI. The Executive Board shall, subject to the direction of the Society, manage all its affairs.

VII. There shall be chosen annually, by the Executive Board, a Standing Committee, to consist of one or more members from each of the three divisions—Northern, Central, and Southern—of the State, on the following subjects:

1. Meteorology in its relation to Horticulture.
2. Geology and Soils.
3. Botany and Vegetable Physiology.
4. Entomology.
5. Ornithology.
6. Ornamental and Useful Trees.
7. Ornamental and Landscape Gardening.
8. Vegetable Gardening.
9. Orchard Culture.
10. Vineyard Culture.

VIII. These By-Laws may be altered at any meeting by a majority vote.

LAWS AFFECTING HORTICULTURE.

An Act to Incorporate the Illinois State Horticultural Society.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That Smiley Shepherd, O. B. Galusha, S. G. Minkler, W. C. Flagg, J. T. Little, W. H. Van Epps, Lewis Ellsworth, Jason C. Ayres, W. A. Pennell, J. W. Fell, W. Durley, Samuel Edwards, their associates and successors, members of the Illinois State Horticultural Society, be and are hereby declared to be a body politic and corporate, known by the name and style of "*The Illinois State Horticultural Society.*"

SEC. 2. The object of the Society being to promote the science of Pomology and the art of Horticulture, they shall be allowed, for those purposes only, to take and hold real and personal estate to the amount of fifty thousand dollars.

SEC. 3. This Society shall have the right to contract and be contracted with, to sue and be sued, to plead and be impleaded, to answer and be answered unto, in all the courts of law and equity of this State, and shall further enjoy all the privileges incident to incorporations of said character, and not inconsistent with the laws of this State.

SEC. 4. It shall and may be lawful for said corporation to have and use a common seal, and the same at their pleasure to change, alter, and make anew, and in general have and exercise all such rights, privileges, and immunities as by law are incident to or necessary to the society herein constituted.

SEC. 5. The Society shall have power to alter or amend their present constitution, to make, alter, or repeal such by-laws as may be deemed necessary for carrying out the objects of the Society.

SEC. 6. This act shall be in force from and after its passage.

APPROVED FEBRUARY 16, 1865.

[NOTE.—The Society was *first* incorporated Feb. 11th, 1857—two months after its organization.—ED.]

An Act for the Protection of Fruit and Ornamental Trees, Shrubbery, and Vegetable Products.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That if any person or persons, in this State shall willfully, maliciously, and without lawful authority, cut down, root up, sever, injure, peel, or destroy any fruit or ornamental tree, cultivated root or plant, fruit, or other vegetable production, grape, strawberry, or cranberry vines, currants, gooseberry, raspberry or cultivated blackberry bushes, standing or growing on or being attached to the land of another, or shall willfully and without lawful authority, cut down, root up, destroy, or injure any fruit or ornamental tree or shrubbery, planted or growing on any street, lane or alley, or public grounds in any city, borough, or incorporated town in said State, every such person so offending, shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine of not more than five hundred dollars, or by imprisonment in the jail of the county not exceeding three months, or both, at the discretion of the court, and shall, moreover, be liable in double the amount of damages to the party injured.

This law to take effect from and after its passage.

APPROVED FEBRUARY 15, 1865.

An Act for the Protection of Growing Fruit.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That if any person or persons shall, hereafter enter the enclosure of any person without leave or license of such owner, and destroy or carry away any part or portion of the fruit of any apple, pear, peach, plum, or other fruit tree or bush, such person or persons shall be deemed guilty of a misdemeanor, and upon conviction thereof, may be fined in any sum not less than ten or more than fifty dollars, and may be imprisoned in the county jail for any period of time not exceeding twenty days. The penalties incurred by a violation of this act may be enforced by indictment in any court having jurisdiction of misdemeanors in the county where the offence is committed, or the fine may be recovered in an action of debt before any justice of the peace of such county.

APPROVED FEBRUARY 16, 1865.

An Act for the Protection of Orchards, and to Prevent the Destruction of Small Birds.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That it shall not be lawful in this State, for any person to shoot, or in any other manner to kill or destroy, or to entrap, ensnare, or otherwise capture any of the following description of birds, to wit: The blue-bird, swallow, martin, musquito hawk, whip-poor-will, cuckoo, woodpecker, cat-bird, brown-thrasher, red-bird, hanging-bird, rice-bird, sparrow, wren, humming-bird, dove, goldfinch, and mocking-bird.

SECTION 2. Every person who willfully violates the provisions of the preceding section, or who shall willfully destroy the nest or eggs of any of the birds herein before designated, shall be punished by a fine of not more than five dollars for each offense.

This Act to take effect and be in force from and after its passage.

APPROVED FEBRUARY 24, 1859.

An Act making an appropriation in aid of the State Horticultural Society of Illinois.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That there be appropriated for the use of the State Horticultural Society, to be expended in the payment of premiums, in publishing the Transactions of said Society, procuring scientific investigations relating to Horticulture, and paying expenses of Ad-Interim Committees, the sum of two thousand dollars per annum.

SECTION 2. The said sum of two thousand dollars shall be paid to the Treasurer of said State Horticultural Society, on the order of the President and Secretary of the same.

APPROVED FEBRUARY 28, 1867.

[This law, although inoperative under the New Constitution of the State, is published for the information of new members as to the means by which the Society has been enabled to publish its "new series" of reports.—*Secretary.*

An Act for the Protection of Consignors of Fruit, Grain, Flour, etc., to be sold on Commission.

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That if any warehouseman, storage, forwarding, or commission merchant, or his or their agents, clerks or employes shall convert to their own use the proceeds or profits arising from the sale of any fruits, grain, flour, beef, pork, or any other goods, wares, or merchandize, otherwise than as instructed by the consignors of

said goods, and shall on the demand of the consignor fail to deliver over the proceeds or profits of said goods, after deducting the usual per cent. on the sales as commission, shall be found guilty of a misdemeanor. And any person or persons who shall be found guilty of retaining or embezzling any money prohibited in this section, not exceeding one hundred dollars, shall be punished by a fine of not more than five hundred dollars, or imprisoned in the jail of the county not exceeding three months, or both, at the discretion of the court, and shall, moreover, be liable in double the amount of damages to the party injured; any person or persons who shall be found guilty of retaining or embezzling a greater sum than one hundred dollars, shall be punished by fine, not more than five hundred dollars, or imprisoned in the jail of the county not exceeding one year, or both, at the discretion of the court; and shall, moreover, be liable in double the amount of damages to the party injured.

SECTION 2. This act to take effect from and after its passage.

APPROVED MARCH 4, 1869.

An Act to permit the planting of Shade and Ornamental Trees along the Public Roads.

SECTION 1. *Be it enacted by the people of the State of Illinois represented in the General Assembly*, That it shall be lawful for owners or occupants of lands, bordering upon any public road in this State, to plant shade and ornamental trees along and in such road, at a distance not exceeding one-tenth of the legal width of the road from its margin.

SECTION 2. This act shall be deemed a public act and be in force from and after its passage.

APPROVED MARCH 25, 1869.

PROCEEDINGS OF THE SEVENTEENTH ANNUAL MEETING,

HELD AT CENTRALIA,

DECEMBER 10, 11, 12, 13—1872.

In response to a call signed by the President and Secretary, the Illinois State Horticultural Society convened in Reeder's Hall at ten o'clock a. m., on Tuesday, Dec. 10, 1872.

The President, Mr. James E. Starr of Elsa, Jersey Co., in the chair.

The Rev. Mr. Rankin of the Presbyterian church, opened the meeting with prayer.

Dr. M. M. Hooton, of Centralia, in behalf of the Local Horticultural Society, and citizens of Centralia, then welcomed the State Society in the following address:

DR. HOOTON'S ADDRESS.

Mr. President and Gentlemen of the State Horticultural Society:

On behalf of the fruit-growers and citizens of Centralia and the vicinity, it becomes my pleasant duty to welcome you to the hospitalities of our hearts and homes. Somewhat depressed by the results of the last fruit season, we cannot fail to have our hearts lightened and our hands strengthened by your discussions, and by the very presence, in our midst, of a Society whose members show by their intelligence, enthusiasm, and refinement, that Horticulture draws to its service many of the best and ablest men of our country.

Surrounded as Horticulture is by many unsolved problems, may we not hope that the action of this Society will, to some extent, clear away the fog and rubbish that impede us and leave us a purer atmosphere and a clearer field, in which to pursue our calling, than we have heretofore enjoyed? We are glad to believe that these hopes will be realized, and that while we are benefited, you will have a pleasant visit in our city. Once more I bid you welcome.

Following this address of welcome, President James E. Starr made a brief business address as follows:

Gentlemen:

The Seventeenth annual session of the Illinois State Horticultural Society has now convened, pursuant to adjournment. You are about to transact business in which, I trust, not only yourselves but the cause of Horticulture will be benefited.

Your attention is called to the following brief statements. I have not attempted to accompany them with arguments, but think them of sufficient importance to call for some action by this Society.

Under date Dec. 20, 1871, a circular was issued by the Commissioner of Agriculture, calling for Delegates from each Agricultural College, State Agricultural Society, State Horticultural Society, and State Board of Agriculture, to meet at Washington on the 13th of February, 1872, "for the purpose of conferring upon subjects of mutual interest."

The expenses of Delegates must be defrayed by themselves or by the associations they represent.

Deeming the call, (coming from so high a source), one entitled to consideration, I endeavored to appoint such delegates as would fully understand our position and wants, and at the same time meet the other requirements. In this I failed. The meeting was held in accordance with the announcement; an organization was effected and steps taken, in the future results of which this Society is interested.

In May, 1872, two organizations, each claiming to be national in character, met in the city of St. Louis.

Their interests, aims, and objects being common, they consolidated and adopted a Constitution in which, after much opposition, State Horticultural Societies were distinctly recognized, and placed upon the same footing as other State organizations, working for the same general object.

I regret to say that local organizations were not justly or fairly recognized.

After the re-organization of the two Societies I appointed Dr. E. S. Hull (who was in attendance at my request) as a Delegate from this Society.

The Society adjourned to meet in Indianapolis in May next.

It is a fact well known to this Society, that no appropriation was made by the last General Assembly for our use. With the cause of this failure I have nothing to do. The General Assembly meeting again this winter, it was thought best that we should be early in the field, and that if we made any application for aid it should be through a well organized and understood plan. I therefore authorized the Secretary to call a meeting of Delegates from Horticultural Societies, and the friends of Horticulture throughout the State, to assemble at Bloomington on the 14th of November, to take such steps as should be thought necessary to secure the needed aid.

The result of the meeting the Secretary will lay before you. I will only say that the consultation was entirely harmonious.

The next meeting of the American Pomological Society is to be held in the City of Boston Every effort will be made by our sister states to be fully represented by their Horticultural products on that occasion.

State aid has been successfully evoked upon similar occasions by Kansas and other states.

To be fully represented would cost too much for individual effort, and should be done under the auspices of this Society and paid for out of its treasury.

The custom of leaving the appointment of committees in the hands of the executive board has hitherto prevailed, but I have thought, since brought in immediate connection with this practice, that it had better be done during the session by the delegates and members from the several fruit sections of the State.

It may not be premature, in view of the importance of the occasion to call your attention to the International Exhibition to be held in Philadelphia in 1876.

The subject embraces too much of importance to be more than alluded to in this connection.

I call your attention also to the fact that very many railway companies utterly refuse any concession to parties attending our annual meetings. There are some noble exceptions to this short-sighted practice, and these roads I would recommend to your favorable consideration for the liberal course pursued by them.

You, as members of this Association, leave your business, give your time and means and many hours of thought, all for the cause of Horticulture; no thought of pecuniary advantage (for none is possible) urges you on in this matter, but solely the extension of knowledge in the pursuit of Horticulture; the awakening of public interest and the development of resources which now in a great degree lie dormant. As these resources are developed, so does the railway traffic in that direction increase. It would seem that as we work for less than nothing and find ourselves; as the benefits of our labors are fully shared by the railroads, that they could well afford to lessen their rates for the general good.

All associations looking to the advancement and development of Horticulture should be recognized.

If of a national character, we should be represented by delegates; if local in character, by extending such aid and assistance as will enable them to widen their influence and give the results of their meetings to the general public.

Our connection with such bodies must however, be general and universal, and not special.

Allow me to congratulate you upon the progress made in the cause of popular education in our common schools since our last meeting, by the introduction of the natural sciences, and the issuance of primary books explanatory and aiding to their understanding.

Some changes in the Constitution will be needed to meet the proposed changes in our organization.

While these are being considered, I would recommend the striking out of that clause in the By-Laws which renders it obligatory upon your President to address you upon some Horticultural subject.

I cannot omit tendering the Secretary my sincere thanks for the care and watchfulness over the interests of the Society, manifested by him during the year now nearly closed.

It will be seen by reference to the Programme that no special papers have been solicited, other than the regular reports; this will admit of free discussion on any and all topics which you may think of interest. Let this meeting, then, be remembered by you as one in which all had a part; let each member consider that he has an equal interest in maintaining the high standard in public estimation which is accorded us; an equal right to be heard and the same right to direct.

That your deliberations may be devoid of all disturbing causes, that they may be wholly harmonious, and that the cause of Horticulture through your exertions may be carried forward successfully, is my sincere wish, and my every effort in connection with the position in which you have placed me is here fully pledged to that end.

The regular order of business, as announced in the printed programme, was then entered upon and adhered to, throughout the session.

JONATHAN HUGGINS, Treasurer, of Woodburn, read the

TREASURER'S REPORT.

Statement of the Treasurer of the Illinois State Horticultural Society for the year ending Dec. 10th, 1872.

RECEIPTS.

Balance in hand, as per statement, Dec 12th, 1871. -	$ 736.19
Membership fees for 1871–72, - - -	132.00
Donation from the State, - - - -	2000.00
Total - - -	$2,868.19

EXPENDITURES.

Paid on warrants as follows:

Dec. 12th, 1871,	A. Bryant, Senr., traveling expenses, - -	$	10.50
" 15, "	H. J. Dunlap, (Asst. Sec.) - - -		12.00
" " "	W. C. Flagg (balance due on account) - -		32.15
" " "	O. B. Galusha (bal. on settlement,) - -		112.64
" 29 "	Reade, Brewster, & Co. (advance on publishing Transactions) - - - - - -		400.00
" 30 "	A. Bryant, Senr., traveling expenses - -		7.60
Jan. 29	1872. Reade, Brewster, & Co., publishing Transactions		100.00
Mar. 4 "	Western B'k Note and Engraving Co. (engraving)		75.00

" 21	"	Reade, Brewster, & Co., (publishing Transactions)	300.00
May 20	"	do do do -	500.50
Nov. 14	"	O. B. Galusha (part salary for 1872) -	150.00
" 27	"	do do - -	150.00
Dec 10	"	J. E. Starr (postage and traveling expenses) -	7.46
		Whole amount paid on warrants, - -	$1,857.85
		Leaving in the Treasury the sum of	$1,010.34

CENTRALIA, Dec. 10th, 1872.

JONATHAN HUGGINS, Treasurer.

On motion of the Secretary, a committee consisting of Messrs. H. C. Freeman, P. Earle and E. Daggy, was appointed to take into consideration the suggestions and recommendations contained in the President's address, and report to this meeting.

W. C. FLAGG.—I move that the Treasurer's Report be referred to an auditing committee. Motion carried.

PRESIDENT.—I will announce the committee in a few minutes.

The Secretary, O. B. Galusha, presented the following

REPORT OF SECRETARY.

Mr. President, and Members of the Society:

Perhaps an apology is due from me, or at least an explanation, of the cause of the delay in publishing the last volume of Transactions of this Society.

I was instructed by a majority of the Executive Board, and solicited by other prominent members of the Society, to procure the annual report of the State Entomologist to bind with the volume, if it could be done without the expense of printing it. I accordingly obtained a ready pledge from Governor Palmer for one thousand copies of that report for this purpose, and also a pledge from the Superintendent of the State printing, that the report would be ready by the 20th of February, at the latest. I accordingly planned the volume, and made a contract with the publishers, to include this report; but its publication, by the State Printer was deferred from time to time, so that it was not received by me until about May 1st, though the Transactions of this Society were printed and ready for the binder, more than a month previous. This delayed the issue of the volume until the 15th day of May.

I trust that, hereafter, the Executive Board will instruct the Secretary to wait for no outside matter after the regular proceedings and papers of this Society are ready for publication, however desirable it may be to secure such valuable papers as this Entomological Report.

Negotiations with the Northern Illinois Horticultural Society resulted in the publication of the transactions of that Society, to the amount of 108 pages, for seventy dollars, supplying books for the full amount at one dollar and thirty cents, postage free—the same rates as members of this Society and other persons receive them.

HORTICULTURAL MEETING AT BLOOMINGTON, Nov. 14, 1872.

Pursuant to a call ordered by the Executive Board and signed by the President and Secretary of this Society, a meeting of Horticulturists of Illinois was held in Shrœder's Opera House, Bloomington, Nov. 14, at which there were present all the members of the Board, also F. K. Phœnix, Dr. E. S. Hull, W. S. Robinson, A. M. Garland, Smiley Shepherd, J. Baldwin, Brainard Smith, and Dr. H. Schrœder.

J. E. Starr, President of the State Society, was chosen President, and O. B. Galusha, Secretary of the Society, was selected as Secretary of the Convention. Hon. W. C. Flagg explained the requisitions of the new Constitution as interpreted by the Governor, and agreed to by the General Assembly, as relating to State appropriations and the necessity of a reorganization of this Society to secure a continuance of such appropriations. He stated that the bills for the reorganization of, and appropriations for this Society which were agreed upon at the last annual meeting had both passed the Senate, almost unanimously, but did not make much if any progress in the House of Representatives, owing perhaps, to a misapprehension, in the minds of the agricultural committee of the House of the true import and bearing of the bills.

Copies of those bills were presented and read before the meeting, and a free discussion of the end to be secured in a reorganization of the State Society was had.

All the speakers were desirous that a form of reorganization should be agreed upon, which should operate justly and equally in fostering the Horticultural interests of all portions of the State and all Horticultural organizations within the State.

A committee was appointed to prepare forms of bills to be laid before the next General Assembly.

The Convention took a recess of an hour during the absence of the Committee.

MEETING OF THE EXECUTIVE BOARD.

President Starr called the Executive Board of the State Horticultural Society together, during the recess of the Convention.

Present, Messrs. Starr, Galusha, Bryant, and McWhorter. A general programme of business for the next annual meeting was agreed upon, and warrants ordered drawn upon the Treasurer for the salary of the Secretary and for the printing bills of Reade, Brewster, & Co.; when the Board adjourned.

The Horticultural Convention reassembled at three o'clock, P. M.,

when the committee reported forms of bills, * which, after slight amendments by the convention were unanimously agreed upon.

The Secretary was instructed to secure the printing of a supply of copies of these bills for presentation and distribution at the next meeting of the State Society.

On motion the convention then adjourned, *sine die*.

Statement of expenditures and receipts from Dec. 11th, 1871 to Dec. 8th 1872—as per detailed statement herewith presented:

EXPENDITURES.

Stamps and stamped Envelopes,		$29. 66
Stationery,		7. 88
Expressage and Telegrams,		15. 25
Postage on Books,		26. 64
Traveling and Publishing Expenses,		80. 34
Printing Memorials and Circulars,		10. 00
Total		$169. 77
Salary,	$300 00	
Office Rent, fuel, and lights,	30 00	
		$330 00
		499 77

RECEIPTS.

From Northern Ill. Horticultural Society,	$69 75	
For Books sold,	25 45	
" Memberships,	64 00	
" Salary for 1872,	300 00	
		$459 20
Balance due on all accounts,		$40 57

LIST OF WARRANTS DRAWN ON THE TREASURER, FROM DEC. 12TH 1871, TO DEC. 10th, 1872.

1871					
Dec.	12.	No. 10.	For A. Bryant, Senr.		$10 50
"	15.	" 11.	" H. J. Dunlap,		12 00
"	"	" 12.	" W. C. Flagg,		32 15
"	"	" 13.	" O. B. Galusha,		112 64
"	29.	" 14.	" Reade, Brewster & Co.,		400 00
"	30.	" 15.	" A Bryant, Senr.,		7 60
1872					
Jan.	29.	" 16.	" Reade, Brewster, & Co.,		100 00

*NOTE—The bills were read by the Secretary, but as they were subsequently amended they are omitted here.

Mar.	4.	"	17.	"	Western B'nk Note & Engraving Co.,	75 00
"	21.	"	18.	"	Reade, Brewster, & Co., - -	300 00
May	20.	"	19.	"	Reade, Brewster, & Co., - -	500 50
Nov.	14.	"	20.	"	O. B. Galusha, - - - -	150 00
"	27.	"	21.	"	O. B. Galusha, - - - -	150 00
Dec.	10.	"	22.	"	J. E. Starr, - - - -	7 46
						$1,857 85

All of which is respectfully submitted,

O. B. GALUSHA,
Secretary.

MORRIS, ILL., Dec. 8th, 1872.

MR. FLAGG—I move that so much of the Secretary's Report as refers to finances, be submitted to an Auditing Committee, and that the portion not financial be referred to a committee of three members, who will report thereon. Agreed to.

The President then appointed the following committees:

Auditing Committee, Messrs. Francis, Nelson and Wright.

Committee on the non-financial portions of Secretary's report. Messrs. Humphrey, Hilliard and Wilcox.

On motion of Mr. Earle the hours for meeting, during the session, were fixed at 9 A. M., and 2 and 7 P. M.

THE PRESIDENT—I wish to ask the Society, if they will work to these hours now appointed. That is my course ordinarily. *Voices*—Yes, yes.

THE PRESIDENT—Well, gentlemen, let us have punctuality. I shall call the meeting to order *sharp* at the hour.

POSTAL RATES ON SEEDS.

MR. FLAGG—There is a matter of considerable importance that should be brought before this Society at some time during its meeting. And as we shall, perhaps, be crowded hereafter with other matters, I beg leave to introduce it now. I refer to the change in the postal rates on seeds and cions. It is known that by an act of our last Congress, the weight of packages sent through the mails has been reduced from 4 lbs. to 12 oz., thus subjecting the seedsmen and nurserymen to great inconvenience. Instead of putting up one package of 4 lbs., dealers are obliged to make some half dozen packages. Besides having the effect of cutting off a great many parties from receiving seeds and cions; by the provisions of the existing law the packages are not only smaller, but

the expense is greater. (It is not thought that this was the intention of the law, but it has been so interpreted.—*Reporter.*) The expense of getting flower and garden seeds by express is so great as to prevent a large class from getting seeds, that under the old law would reach them.

It does seem to me that this Society, in common with all the societies in the West should enter its protest in this matter, and unite with them in efforts to secure a repeal of this law, at the earliest opportunity. It will not be hard to persuade our congressmen into this measure if we do our duty. The measure is so manifestly just.

I am in favor of having the mails do a considerable amount of express work. As the matter now stands the express charges are enormous. It is found, in sending money orders through the Post Office, that expenses have been curtailed. It has cut down the charges of local banks and express companies.

Now it seems to me, that a similar use might be made of the mails in carrying a great variety of packages. I want not only the restoration of former privileges, but I want to get additional privileges. I would have the mails carry still larger packages, in compact forms—say of six pounds weight.

MR. FREEMAN—Would you include the abolishing of the franking privilege?

MR. EARLE—I move the appointment of a committee of five with W. C. Flagg, as chairman, upon Postal Matters.

MR. WIER—I think the best way is for every member of this Society to do as I have done, viz :—make personal application to the congressmen of his district. There is no difficulty in the matter at all if every one will go to his congressman. The law-makers will accommodate the public in this matter. The people were just beginning to understand the old law, and it was getting to be of great benefit to all. I would like to see a law passed that would permit the carrying of anything in the mails that would not destroy other mail matter. I must say, however, I have sometimes seen what I call imposition upon the mails—I have myself received, through the mails, pear trees two feet long. I believe, also, in *restriction* as well as in enlargement.

The motion prevailed, and the President appointed the following committee: W. C. Flagg, Moro; Parker Earle, South Pass; M. L. Dunlap, Champaign; Robert Douglass, Waukegan; Samuel Edwards, La Moille.

COMMITTEE ON RATES OF EXPRESSAGE.

MR. FLAGG—There is another matter, upon which I think this Society should in some way act, and I think I shall move that Mr. Earle be chairman of a committee to take the subject in consideration. Our only way to reach corporate bodies is in the formation of public opinion—and to this end I would like to see a ventilation of the manner in which express charges are made—I will not now say anything about the reasonableness of said charges, but what I wish to get at now is the lack of system in making the charges. I move that a committee, with Mr. Earle as chairman, be appointed, who shall look into this matter and report to this Society. Motion carried, and the President appointed the following committee; Parker Earle, South Pass; Dr. M. M. Hooton, Centralia, and D. B. Wier, Marshall Co.

MR. EARLE—I want Mr. Flagg upon this committee.

MR. FLAGG—I would not be willing to serve upon that committee, unless Mr. Earle will serve upon the other. [Laughter.]

MR. EARLE—My name is mentioned in connection with too many committees. I cannot attend to all of them. I therefore ask to be excused from serving on this committee, especially as it is a very important one. If it is in order I would nominate Arthur Bryant, Jr.

THE PRESIDENT—Gentlemen what is your pleasure? Will you excuse Mr. Earle?

Voice—I second the nomination of Mr. Bryant. Carried.

Mr. Bryant was added to Mr. Flagg's committee, in place of Mr. Earle.

RAILWAY TRANSPORTATION.

DR. HOOTON.—I wish to ask if there is any provision made for making inquiry into the matter of Railroad Freights. I do not know what the Society intends to do in regard to this subject. If it is in order, and if it is a proper motion at this time, I would move that a committee of three be appointed to report upon the subject of Railroad Transportation of horticultural products.

MR. WIER—I find that there is a great inequality in the freight rates—I have paid at the rate of sixty cents for freight carried fifty miles, and forty-five cents for one hundred and twenty-five miles—I do not know why this should be so. It does not look right.

MR. SCOFIELD—The way I get around such things is like this.—If the freight is considerably more to any point than to a central point beyond, I ship clear through, and then back again, and save something by the operation. [Laughter.]

MR. FREEMAN—It is a fact that railroads cannot carry way freight as cheap as they can through freight.

MR. WIER—Now, it does not appear to me that this is so; and furthermore, I do not believe that it is *right* to make the discrimination that is often made. That railroads can carry way freight cheaper than through freight appears to me evident from the fact that for all freight shipped through to Chicago, for instance, the agents must give notice; but for way freights no notice is required. These extra charges on way freight make it very hard on the small towns, and I repeat, to me it does not seem right to make them.

MR. FREEMAN—I think there are instances where uniform rates should not be insisted upon—or at least where the railroad parties could afford, in one case, to carry freight cheaper than in another. It happens, for example—in going south, that they are running cars empty for want of freight—on their return to Chicago they are full and crowded, for want of room.

MR. SCOFIELD—Mr. President, this question is too much for me to grapple with. It is big enough for the State to take in hand. I have thought a great deal, however, and the only way I can see out of the difficulty is where there is competition. I can ship a roundabout way, where there is competition and save four or five dollars in a distance of a few hundred miles.

MR. FLAGG—I propose a different remedy. It has been said that competition is impossible, and I think it is so. I cannot ascertain that there is really much competition anywhere. I know very many points where there is no competition—but *combination* rather; it is common to find combination taking the place of competition. I think the *Legislature* must interfere and compel these corporations to submit to law, that will not oppress the people. Our railroads may be run by the Government.

In one of these ways I think we shall find a remedy for the evils that oppress us. It has been done in Belgium, where the government has such a control of railroads as to fix the price; and if there are corporate bodies controlling railways they are compelled to come down to the government prices, just as with us, the express companies are compelled to come down in their rates in carrying money packages, since the new postal law has been in force. What we want—and what we can do, is to strengthen public opinion—to educate it, and then we shall have the proper legislation.

A great many, I know, are proposing to submit to these monopolies. Now, I do not think it necessary—nor even safe to take that view of the subject. If it comes to this—if we are likely to be forced to submission—I do not see any other way of escape, but through another rebellion. The fact is, the people must control the railroads, to that extent, at least, that will prevent the oppression of the people. And I think these corporations must recognize the fact that it is essential that they should be subject to law. Now, it seems to me that the decision recently made in the McLean county court by Judge Tipton, contains the gist of the whole matter. I understand it to be this—that the State did not give, and cannot give the right of way to anybody, or to any corporation, for their own private use. It is only so far as they subserve the public interest, that they have the right of way.

Now, if the railroads go against the public interests—that is if they charge unreasonable rates—do not discharge their obligations to the State, and perform their service to the people—then the decision of Judge Tipton is that the law can reach them, and the law makers will compel them to render the public service. It may take time, and cost a struggle, but it must come to this.

The case of the Washington University in St. Louis, in reference to paying city taxes is in point, and shows the progress of public opinion. The Institution held a charter with special privileges—one of which was the non-payment of taxes. And when recently the legality or right of the case was questioned, the University escaped by a majority of only *one vote*.

Now, let a similar question be brought up in reference to railroads and I have little doubt as to how the decision would go. One thing, at any rate, will be done. If existing courts do not act in the measure, we must *change* the courts.

MR. DAGGY—One thing at least is legitimate. We can aid in the development of public opinion. I don't think it will be necessary to resort to *mob* violence. There is no question, our Legislature should step in and regulate the freights. Railroad corporations should and must in the end, respect the public interest. I see no better thing for us to do now, than to appoint this committee and get from them a report upon this subject of railroad transportation.

MR. WILCOX—It seems to me, that I have lived long enough to learn that railroad companies work for money. Now, if this committee can bring this subject before them in this light—if they can make them

believe that they can make money—and *more* money by lowering their freights, and accommodating the people, then will they prevail with them; but if we cannot show them that they can make more money by adopting a more liberal policy, I see but little hope of reaching them.

DR. HOOTON—I do not think we are so helpless as all this, nor do I think it necessary to adopt the submissive policy. Because the railroads work for money, are we to allow them to oppress the people? I think not. The man who stops you on the highway, works for money, so does the common swindler work for money and many other scamps who work for the same purpose. But does that make it *right?* Is it not possible for the people to control these railroad monopolies, so far, at least, as to prevent acts of oppression? Railroads are public servants, and the public should have some control of them, even if they do work for money. If it is true that we have no sort of control over them, and if they are to become oppressive, then is their career ended, and the sooner the railroad iron is converted into *horse shoes*, the better.

MR. SCOFIELD—The manufacture of public opinion in these matters will surely relieve us. I know no other way to bring a remedy. It is proverbially true that railroad corporations have no *souls*, and how are you going to work upon them effectually?

MR. FREEMAN—Now, as being interested in the interests of the State, and also in railroads, I think I can see how much may be done *indirectly*—not directly—that is in the way that has been suggested—through public opinion.

MR. COOPER—As I understand, it is a question of law between the people and the railroad corporations; and the interpretation of law varies. We generally find that courts and judges make different decisions—and these depend, in a measure, upon the state of public opinion. Mr. Flagg says educate public opinion, and I say so too, for until you can get public opinion in its favor, you cannot get any law enforced.

But it is said, the railroads have a contract by the terms of their charter, giving them control, and that the people must submit—that they have no right to interfere or make objections.

Now, it is my understanding, that the Legislature consists of representatives from the people, and that the people have a perfect right to elect such men as will carry out their views, and that will *un-make* laws that have been unwisely or unjustly made. The people have a right,

through their representatives, to repeal laws that give dissatisfaction. I think this is one of the important features to look at, in this controversy between the parties. I understand that the railroad companies, in accepting a charter containing any privileges, do so at the peril of having these privileges withdrawn, for sufficient reasons. In asking and receiving privileges from the State, they are supposed to subserve the interests of the State. So that this question of *public opinion* is what we are after.

Let this Society, and let our public journals speak out—and then when the question comes up for action, the decision of courts and judges will be likely to accord with the will of the people; until that time arrives we shall have to keep *pegging* away. [Laughter.]

MR. WIER—There is another regulation which the railroads have in regard to nursery stock baled, and in boxes. If I send apple trees for example, in boxes, the charges are for first-class freight; if in bales double first-class freight. Why this discrimination is I do not know. I can bale a hundred apple trees so that they can go just as safely as in boxes.

MR. DUNLAP—I think I can explain this matter. This regulation of freight rates in regard to boxed and baled nursery stock was made when the roads first commenced to ship trees to the West. It was found that trees not in boxes reached their destination in bad order—and the railroad parties had to pay for the *dead* trees, in many cases; but there is not now, as formerly, the danger from this cause, and trees are safely shipped in bales.

The only reason a change has not been made is, that the matter has not been brought before the railroad officials when they meet in council to fix their rates. The Illinois Central road now charges first-class rates for trees in bales and second-class rates for trees in boxes. I think there is no doubt, if this Society would recommend to the railroad companies a change, it could be had without difficulty. It would encourage the shipment of trees, and ultimately increase the traffic of the roads. I believe all the Western railroads are willing to come into this measure; the only thing wanted is to get the subject before them when they meet in council. Eastern roads, I believe, charge third-class rates on nursery stock; so that some of the roads are coming down as fast as their consciences will allow. [Laughter.]

MR. GALUSHA—I want this committee, if appointed, to take steps to secure a reduction of fares to the members of this Society, attending

the annual meetings. I think it can be shown that the railway companies will make more money by returning members at one-fifth fare than by demanding full fare, as the attendance would be doubled thereby. Some companies do commute fares, though the majority declined to do this year.

MR. FLAGG—There will be introduced into the Legislature this winter, as there was in the last session—a bill to classify freights, and limit the rates. I think there should be a bill passed to fix the rates—and I hope this Society will go for something of this kind.

The motion prevailed; and the President appointed the following gentlemen on the committee: Dr. M. M. Hooton, Centralia; H. C. Graves, Sandwich; L. K. Scofield, Freeport. On motion, the Society adjourned.

TUESDAY AFTERNOON.

PRES. JAMES E. STARR called the meeting to order.

Reports of Vice Presidents were called for.

DR. A. G. HUMPHREY of Galesburg read the following report:

REPORT OF THE THIRD HORTICULTURAL DISTRICT.

Mr. President and Brethren of the Illinois State Horticultural Society.

The horticultural interest in my district this year has not been great, though by no means entirely wanting. The planting and growing seasons have been fair, so that trees, shrubs and plants have made comparatively a good growth of wood. Flower gardens and lawns have done well. Fruits have not been near as abundant as last year, nor of as good quality.

Apples in Knox and adjoining counties have been an average crop and of rather inferior quality, most of the varieties being somewhat scabbed and decidedly irregular in shape, the Ben Davis being about the only perfectly fair winter apple we have; it is fine in appearance and is exhibiting excellent keeping qualities. If its flavor was equal to its other excellencies it would emphatically be the apple for the million.

Several terribly wintry days in October felled many of the winter apples to the ground, which had to be carted to the cider press or fed to swine; yet enough remained for our home demand, and prices have ranged from twenty-five to fifty cents per bushel.

We were favored with a crop of peaches this year, the first since 1858; but they were not so abundant nor of so good quality as in 1857 and 1858.

Raspberries were nearly a failure on account of the canes being winter-killed, though small plantations, well protected bore a good crop.

The Kittatinny blackberry, on my grounds, bore a light crop of very fine large berries.

Cherries were not an average crop.

Strawberries blasted; so strawberry festivals were generally postponed until another year.

Grapes were in great abundance, and most varieties ripened well and were of good quality. The Delaware, as last year, failed to ripen in flat prairie soils, while it ripened well on high rolling ground.

S. S. White, who made a very valuable report for this Society last year on grapes, writes me this year as follows:

DR. A. G. HUMPHREY.

Dear Sir—As you have inquired, recently, about the Siglar Grape, I beg leave to state that it maintains its reputation. I left it on the trellis last winter and it came out all right in the spring, made a large growth of wood during the summer and bore a heavy crop of fine fruit.

Being anxious to save as much wood as possible I did not prune the vines at all. It is four years old and with me has been as hardy and healthy as the Concord or Ives' Seedling.

DR. J. G. ZELLER, correspondent for Woodford County, writes me as follows:

"*The Apple Crop* in this county has been the largest known, since the county has been organized. The hot and dry summer of 1871 and especially the dry fall checked the growth of wood and produced an abundance of well matured buds. During 1871 the fertility of the soil had been kept dormant for want of sufficient moisture, but the growing season of 1872 had enough rainfall to unlock the latent fertility of the soil, which was necessary for the development and maturation of a large crop, of prime quality, The price for cider apples ranged from ten to twenty cents per bushel; winter apples from twenty to thirty cents, the purchaser picking and hauling them himself.

In that part of the timber region of this county which is situated along the Illinois River, consisting of about three full townships, not less than three thousand barrels of cider were pressed. Cider was sold according to quality, at from three dollars and fifty cents to five dollars per barrel, the purchaser finding barrel. The farmers in this vicinity leave no fruit on the ground; if not taken to the cider mill, the orchard is opened to the swine.

The Pear Crop was good and of fine quality; this crop is annually increasing, as more trees are coming in bearing. Pears sold from two to three dollars per bushel—formerly as high as four and six dollars.

Peaches yielded a good crop. The trees in this neighborhood are nearly all seedlings, but there is some very fine fruit among them, especially of the clingstone variety. The crop supplied more than the home demand of the county, and large quantities were marketed at Peoria, averaging about one dollar and fifty cents a bushel.

Grapes were a moderate crop, Concord yielding the most; Catawba and Isabella suffered badly from grape rot, and still more from mildew of leaves. Virginia Seedling brought a large crop of well matured grapes; the wine of this variety commands the highest price in the market. Delaware was damaged by leaf blight and tettigonia; Rogers' Nos. 3, 4, and 15 were all attacked with leaf blight.

Cherries and Plums were nearly a failure, the fruit being badly stung.

The Small Fruits brought a medium crop.

SOILS.

Our best apple orchards are found on clay soil with sufficient surface drainage, which seems to be all that is necessary for the healthfulness of the trees. The stratum of clay is frequently forty to fifty feet deep. It is generally believed that apples raised on clay soil are of superior quality and keep better than those raised on sandy soil. In

most of our orchards on dry soil the water will rise in a wet season within three or four feet of the surface, while in a dry season, on the same soil, water will recede as far as forty or fifty feet from the surface; therein resembling our prairies. Peaches do well on the same soil, but prosper most on a hillside or the abrupt bank of a deep ravine. Pear trees prefer a richer and more porous soil, but yet many good trees are found on clay soil where there is good surface drainage.

The good effect of protective timber belts, whether natural or artificial, is most evident in prairie orchards; protection from the north and west being the most beneficial; a belt of timber even a half mile distant from an orchard still exercises a salutary effect on the same. Most of our orchards are seeded down with grass or clover, the latter being preferred; after two or three years the sod is turned under and put in small grain for one season, generally oats, which is mostly cut green and the ground left in grass or clover again. Good farmers manure their orchards every few years with well-rotted stable manure.

The oldest apple trees in this county are now nearly forty years old, and some of them are still in good bearing condition; though most of these pioneer trees have been badly neglected.

I have no doubt that there is no part of a cultivated farm which, with an equal amount of labor brings as large an income to the farmer as that part on which his orchard is planted. An orchard is a source of money, pleasure, and health.

There has been a marked improvement within the last thirteen years in the quality of fruits, the trees in this vicinity have for years been sold to farmers by a conscientious nursery agent. The varieties were generally recommended by the agent, and, contrary to general experience, proved to be true to name and mostly well adapted to the locality."

A. C. HAMMOND, of Warsaw, correspondent for Hancock County, writes me the following brief notice of this year's success of Horticulture in his county.

"The latitude of Hancock Co., the facilities it possesses for shipping cheaply by river north and south, and west by rail, and the thirty miles of bluff—peculiarly adapted to fruit growing—that borders the Mississippi river, is destined to place it in the front rank as a fruit growing locality.

Our Apple Crop has been very large, but on heavy clay soils badly cracked and scabbed; on sandy soil they were more perfect in form and larger in size. Winesap was a complete failure, as the few specimens that were found on the trees were so badly scabbed as to be worthless, except for cider. Ben Davis is the leading variety grown for market. It is now selling twenty per cent. higher than much better apples, such as Rawles' Janet, Baldwin, and Rambo. But I would advise the planter to "make haste slowly," with this variety, as the time cannot be far distant when the popular taste will become so far educated as to demand a better apple. Never in the history of orcharding, in this county has so large a portion of the apple crop been sent to the cider mill. On tenacious clay soil scab has prevailed to an alarming extent, Early Harvest, Red June, Winesap, Rawles' Janet, and some other varieties being nearly all unfit for market.

The Peach Crop was satisfactory, both in quantity and quality, and good prices were obtained for the best fruit. A peach mania seemes to be taking possession of our people, and countless thousands of trees have been planted during the last two or three years. Unless a cold winter like that of 1855—6 blots them out of existence, those that have planted to supply the local markets will soon find that they have "an elephant on their hands."

Pear Orchards have been remarkably free from blight, probably owing to the excessive drouth of the fall of 1871, which caused the wood to ripen without making a second growth. It may be safely predicted that we shall—from the same cause—be measurably exempt from this scourge next year.

The Grape Crop has been a partial failure; in some vineyards, the Concord pro-

duced well, in others very little, probably owing to the enormous crop produced the year before. Catawbas, except in a few favored localities, were badly winter-killed and have produced nothing. The opinion is gaining ground that the Catawba must give place to something more hardy and healthy. The Clinton is also being discarded on account of its liability to lose its leaves from the attacks of the thrips. Concord, Norton's Virginia, and Ives' Seedling, are considered the most profitable varieties.

The low prices of farm and orchard products, and the general pressure in monetary affairs, is operating seriously against ornamental planting.

Mr. ANDREW HAGERMAN of Bushnell, correspondent for McDonough County, sends interesting notes of the status of Horticulture in that county:

"In McDonough County an increasing attention to the cultivation of fruit is observable, especially in the newly settled districts. The main supply of apples—which was almost the only kind of fruit raised by the early inhabitants—has been, heretofore, from the southern and western portions of the county, which, being well supplied with timber and running streams, were first settled, and have the oldest and most productive orchards. In these days, however, one need not go far in any direction, to find among our enterprising farmers a wealth of choice fruits, in variety, and suited to any tastes.

Several flourishing nurseries, in different parts of the county, especially those in the vicinity of Macomb and Bushnell are doing a prosperous business in furnishing trees and other stock to the prairie farmers, who are fast improving the hitherto unimproved lands, and who almost invariably adopt the commendable practice of planting trees, shrubbery, and fruits of all desirable kinds.

The past summer has been an unusually favorable one here for the horticulturist. Our markets have been well supplied—at prices somewhat lower than usual—with apples, peaches and grapes; and in less quantities with cherries, raspberries, strawberries, gooseberries and currants—the last two varieties of small fruits not having perfected as well as last year.

THE APPLE is regarded as the king of fruits here, and is (very properly) the most extensively cultivated. Of the varieties which succeed well in this locality we may mention as best in flavor and keeping qualities, the Early Harvest, Red June, Red Astrachan, Summer Queen, Benoni, Am. Summer Pearmain, Sweet Bough, Sweet June, Maiden's Blush, Sherwood's Favorite, Rambo, Bellflower, Golden Pippin, Spitzenberg, Winesap, Janet, Small Romanite, Willow Twig, White Winter Pearmain.

PEARS are but little cultivated, and are not regarded as a success, either as dwarfs or standards. Amateur horticulturists generally try a few on quince stocks to make up a fuller variety in the garden, and sometimes raise a few specimens of the Bartlett, Duchesse de Angouleme, or Louise Bonne, before giving up the cultivation entirely. Pears are a choice luxury, but hard to obtain.

PEACHES have yielded abundantly, wherever there are trees of bearing age. The chief market supply however has come from Brown, Fulton, and other neighboring counties; prices ranging from fifty cents to one dollar and fifty cents per bushel; but from St. Louis, seventy-five cents to one dollar per box. With suitable protection in the way of hedges and timber belts, peach trees stand the rigors of our winters well enough to yield remunerative crops.

CHERRIES blossomed well, but were blighted by late freezings, so as to be almost an entire failure this season; and the same may be said of all the small fruits, excepting in some favorable localities.

THE GRAPE CROP, in McDonough County, has far exceeded anything heretofore, both in quantity and excellent quality of fruit. It is much to be regretted, however, that with such a superabundance of a most delicious fruit, so little, comparatively, should be brought to the city and village markest, that the non-producing denizens thereof might be permitted to share the blessing of health-giving, appetizing Concords, Catawbas, and Isabellas. Three cents per pound in the vineyard, and four to five delivered, in bulk or boxes, has been the average price. The favorite variety is the Concord; and this is in-

deed the only grape that uniformly succeeds in this locality, bearing bountifully every season, with or without careful training and cultivation; perfectly hardy, and ripening well; and, (which is not least important,) it has a sweetness and lusciousness of flavor unsurpassed by any even of the most costly and stylish new varieties, so highly praised by their originators and venders. The Ives', Delaware, Diana, Hartford Prolific, Catawba, Clinton, and other varieties are found in some gardens, but mostly for the sake of increasing the variety.

FLOWERS, ORNAMENTAL TREES, and SHRUBBERY, receive considerable attention, both in town and country. Front yards and gardens are tastefully laid out and adorned with the common and rarer beauties of the floral kingdom, and choice specimens of evergreen and deciduous trees and shrubs. These improvements seem to result rather from a spirit of imitation, and friendly emulation and rivalry between neighbors in the art of adornment, than from the influences of local Horticultural Societies and Farmers' Clubs—of which our county can boast of very few as yet—but the establishment and proper conducting of which might considerably accelerate our progress in horticultural science."

DISCUSSION ON DR. HUMPHREY'S REPORT.

MR. HILLIARD.—I understood Dr. Humphrey to say that he had a new Grape, *Siglar*, that hung upon the vines all winter, and came out all right.

DR. HUMPHREY.—Not exactly. I said the vines hung upon the trellis all winter and came out all right. (Laughter.)

And while I am up, I will say the position taken by one of my correspondents, that the Concord is to be put before all other varieties of grapes may be questioned. This new variety of which I speak—the Siglar—is very promising. It has for four or five years succeeded well with me, and I think it well worthy of further trial.

MR. EDWARDS.—Is this new grape a local variety?

DR. HUMPHREY.—It is certainly a local success; it might not succeed in every place.

Voice.—Is that upon the river bank?

DR. HUMPHREY.—No, sir. But it is well drained, naturally and artificially.

MR. WIER.—I have been interested in the reading of the report from my neighborhood. The report says the apple crop has been abundant. The fact is, with us we have had the poorest crop we have had for twenty years. Apples scabbed that never scabbed before this year; viz: Willow Twig, Domine, and Rawles' Janet; while some sorts which usually scab, more fair this year, as Red June and White Winter Pearmain. Our grape vines came out of the winter in poor condition; the Concord bore a crop, but a great majority of the grapes never turned black. Our Pear trees lost their leaves as badly as ever I saw them do in "Egypt,"

MR. FLAGG.—What was it that injured the grape vines?

MR. WIER.—I suppose it was the dry weather, together with the cold winter. The Delaware bore a heavy crop, but the wet weather injured the foliage.

MR. EARLE.—What caused the leaf blight in the pears?

MR. WIER.—The extreme hot, dry weather, followed by hot, wet weather.

DR. HUMPHREY.—I do not believe that the freezing up of vines injures them if they remain frozen through the winter. It is the frequent freezing and thawing of the vines that injures them.

MR. WIER.—I am very well convinced that the injury done to the roots of grape vines last year was the dryness of the soil. My vines that were on the more elevated and dry soils were injured. Those planted below in soils more moist were not injured.

THE PRESIDENT.—*Gentlemen*, if there is no further discussion to be had upon this report, as Mr. Douglass is not ready to report, I will call for that of Samuel Edwards, Vice President for the Second District.

MR. EDWARDS then read the following comprehensive report.

REPORT OF THE SECOND HORTICULTURAL DISTRICT.

Mr. President, and Fellow Members:

In presenting my Report I will first give the communications received from correspondents in several counties within my district.

BUREAU COUNTY.

VERRY ALDRICH, of Tiskilwa, writes that APPLES of nearly every variety bore to their utmost capacity.

Baldwin trees, that had never before given much fruit were loaded. Some of his trees of this variety bearing from twenty to thirty bushels each.

Red Canada has proved one of the best.

Rhode Island Greenings bore very full and the fruit was the finest he ever saw. He picked these in September, when still green, and stored up about one hundred bushels "to go through winter as an experiment."

The Stark fruited but moderately—not up to his expectations—but he thinks it may do better when the trees acquire greater age; this fruit dropped much more than *Willow* and *Ben Davis*. "These last two varieties are more profitable than any others that I have".

"*Grimes's Golden* fruited a little upon four years old grafts, set in bearing trees, but the fruit all dropped before the last of October. The fruit was mellow, of good quality, though too small, and ripening too early for profit here." He mentions the *Newtown Pippin*, *Red Seeknofurther*, (?) *White Winter Pearmain*, *Michael Henry Pippin* and *May* (of Myers) as scabbing badly, and of little value.

The Pennsylvania Vandevere and *Sweet Romanite* he condemns as utterly worthless on his grounds.

Small Fruits he finds of no value except for home consumption—the cost of picking and marketing being equal to the price received for them. He manufactures his surplus grapes into wine, but doubts if wine made by a non-professional wine-maker will find a market; and supposes he will have to use this also for "home consumption."

He finds "California Wine" sells best, though he thinks his one year old wine superior to samples he has tasted which were imported directly from California.

Mr. Aldrich has a variety of sweet Apples of very good quality, fine size, that hang well to the tree and he thinks will prove a good keeper.

The cions of this variety were obtained from Williamson Durley, Esq.

A. E. Richmond, of Geneseo, correspondent for Henry County, sends the following statement of fruit growing in that county.

"Fruit has been plenty this year.

Strawberries were abundant, and of fine quality.

Raspberries, *Currants*, and *Blackberries* produced well wherever found, though a less area is planted to either of these than to strawberries.

Cherries.—Early Richmond and Belle Magnitique bore well.

Pears.—Flemish Beauty and Bartlett were fine, as in fact were all others, though these are the principal varieties planted—there being, probably, more Bartletts than of all other sorts.

Grapes.—Concord and Hartford can be grown here almost as easily and as surely as corn.

Peaches.—Trees bore in various parts of the county—though there are few planted.

Apples.—We have trees of Ben Davis, Willow, Duchess of Oldenburg, planted on White Oak barrens four years since—being then two years old from the graft—which bore this year a peck of fruit each.

Williamson Durley writes as follows:

"Little Putnam has produced the largest crop of apples the present year that has ever been produced in any one year in the county.

The county is divided by the Illinois river, the principal part lying on the east side of the river.

The first orchards were planted about forty-two years ago, were mostly seedlings, of which many of the trees are vigorous and healthy and continue to produce large crops of fruit; but the fruit is of little value except for feeding to stock or making cider.

There are many very fine orchards in the county, containing most of the choice varieties of apples now cultivated in Illinois.

The best locations are those protected by timber, on elevated ground sloping to the north and west, and near the river or lakes, and on sandy loam with clay subsoil.

Our orchards that are cultivated in corn, potatoes, and crops that are plowed or hoed, for the first ten years after being planted do the best, and then they are sowed to clover not to lie more than three or four years before being plowed again.

The choice varieties of Apples have been sold in our market in large quantities, the past fall for twenty-five cents per bushel; and even at that price no crop produced on the land would pay as well as our fruit crop.

The only nursery in the county was owned by the late I. W. Stewart, and is now carried on by his family.

Our people are still imposed on by tree peddlers. I met a man this fall with a handful of trees and asked where he got them; he said they came from an Ohio nursery and cost thirteen dollars; all of which, and of better quality, could have been bought at one of our home nurseries for less than half the money.

APPLES.

The varieties of apples cultivated in this county, that are the best and most profitable, are of

SUMMER.—*Early Harvest* for family use only.

Red Astrachan, Williams' Favorite, Summer Pennock.

FALL.—*Maiden's Blush, Porter, Fameuse, and Rambo.*

WINTER.—*Jonathan, Domine, Smith's Cider, Wagoner, Ben Davis, Willow, Winesap, Rawles' Janet, Red Baldwin, Sweet Vandevere;* and I cannot leave out the *Yellow Bellflower.*

Out of about one hundred varieties that I cultivated, the above list has proved the most profitable, and I have paid special attention to the cultivation of fruit for the past thirty-five years, especially apples.

PEARS

Are cultivated for home consumption and have done well the past few years, as but little blight has affected them of late years.

PEACHES

Are but little cultivated. What trees there are were very productive the past season.

PLUMS

Do no good on account of the Curculios; even the wild plums are destroyed by them.

SMALL FRUITS

Are cultivated for home consumption only.

We have no Horticultural Society in the county; but especial attention is paid to the cultivation of fruit.

Smiley Shepherd reports from Putnam County as follows:

"Our fruit season, from the opening of the buds in spring until frost in autumn was not distinguishably different from ordinary seasons by anything that would be considered a cause to produce a material result in general crop; yet the crops have been unusually large, though variable.

APPLES.—Apple orchards which have been cultivated have given the best results, while those which have been for a long time untilled have produced but indifferent crops of inferior fruit.

Larvæ of Codling Moth were found in every orchard, but for unknown reasons were less numerous and destructive than for the last five years.

The bloom of the apple orchards was large and fine, though not as copious as in some years, and the fruit did not *set* as abundantly as it sometimes has done, yet nearly all that did set developed into perfect fruit.

I will now note, in detail some of my own observations of fruits without reference to reports from others.

Amongst trees setting fruit in this way, and making good crops I note:

Northern Spy.—Heavy crops of extra large and fine fruit.

Rambo.—On sound trees, a fair crop and perfect fruit.

Willow.—An abundant crop, fruit all large.

Summer Pearmain.—Healthy trees and an excessive crop, fine and good.

Baldwin.—(On sound trees) Heavy and good, though injured by Codling Moth.

Gloria Mundi beat itself greatly, both in size and number.

Autumn Strawberry had a full crop in number and added fifty per cent. to its usual size.

Gravenstein was moderate in number, but its size and beauty put it far ahead of any other apple in the LaSalle and Peru markets.

Porter, a good crop and fine size.

Bailey's Sweet was not surpassed in size of fruit and quantity of product.

Early Harvest gave a fair crop of good sized fruit.

Kirkbridge White about the same.

Red Astrachan a good crop, and large size fruit.

Early Pennock a small crop of fine fruit.

Yellow Bellflower.—Generally a scant crop of inferior fruit; though in some orchards this variety was productive and the fruit fine.

Sops of Wine.—A small crop of inferior fruit. [I suspect a mistake in the identity of this fruit.—SECRETARY.]

Seeknofurther.—Moderate in crop and size of fruit.

Autumn Swaar.—A good crop, but only a small part of it fair.

One *Seedling*, only, out of ten varieties produced a full crop of fruit of a larger than ordinary size.

Domine everywhere produced a large crop of large fruit.

PEARS were a very small crop—say not more than one fourth that of last year—and this failure was nearly equal in all varieties. I have only one kind (a winter variety) that bore a full crop, but the fruit of this was nearly spoiled by the punctures of the Four-humped Curculio.

PEACHES were a light crop, except in favorable situations; some young trees bore good crops of large fruit. I have trees that had borne two good crops of small fruit, which this year produced good crops of fruit of very large size.

I have a number of young trees of the most approved varieties which bore a few specimens each, of fruit fine in size and appearance, but all of them sour and unpleasant. The same complaint was made of nearly all the peaches in my neighborhood.

CHERRIES, of all kinds—sweet and sour—were not more than one third of a full crop; and this was of inferior quality.

CURRANTS and GOOSEBERRIES an ordinary crop.

RASPBERRIES bore a good crop, but a very hot sun, in one day, dried about half the Black-caps.

STRAWBERRIES fell short nearly one half in size, of the first pickings, while the last pickings were still smaller and the ripening protracted to an unusual period.

PLUMS failed entirely.

PERSIMMONS are an average crop but are not of good quality.

GRAPES promised well, but ripened imperfectly and were unfit for the press or for market owing to the blighting of the leaves."

The following letter is from the well known principal of the *North-western German-English Normal School* at Galena:

Samuel Edwards, Vice President &c., La Moille.

DEAR SIR:—Complying with your request, and in accordance with the duty of a correspondent I will concisely write what might be of interest from Jo Daviess Co.

By my limited time, mostly or entirely taken up by my professional duties, but very little could be done and observed by me in any other field of labor.

1 Of new fruits in this county none were introduced, to my knowledge. But a severe loss we had this fall by the departure of Capt. Beebe, to Geneva. He did so much for the development of *sound* and *practical knowledge*, that I sincerely regret his loss.

2 The Horticultural Society of Jo Daviess County is continuing its good work, but has lost some of its best members by the departure of Messrs. Robson, a year ago, and Beebe, this year.

3 In *fruit*, this year was a blessed one:

a *Strawberries* were plenty and of excellent quality.

b *Currants* suffered by the currant worm, and were not so abundant.

c *Raspberries* were fine, and many.

d *Apples* were not so plentiful; but as there are larger and more orchards in bearing, and the fruit was sound, they are at a low price, the best not over one dollar per bushel.

e *Pears* were not so plenty; too many trees suffered by the blight, and many in Mr. Ehstlain's beautiful pear-orchard died from an unknown cause.

f The *Curculio*, the friend of plums, appropriated most of this fruit for home consumption; only the "Hinkley Plum" seems not to be in his reach, and is therefore regarded by him as sour, like the grape in the fable. This last variety yields well, and is a safe investment.

g The *Vineyards* of Jo Daviess County are gaining every year more importance. The crop is so abundant, the culture so easy, the fruit so certain on the lime-stone for-

mation of the hilly Jo Daviess, that this fruit is repaying the best for the labor bestowed upon it. Mr. *Zins* had again a fine and abundant harvest; Mr. Goulard's vineyard brought a fine crop; Messrs. Schmidt and Scheller had their vines overladen with fine fruit. My vines, about one thousand Concords, planted in May, 1870, yielded over two thousand two hundred lbs. There are several kinds cultivated, but the Concord is the plant for the million; my *Hartford Prolific* did so well that I shall plant more of them. Although not of a very good quality, it is two weeks earlier than the Concord and therefore commands a higher price. My Clintons suffered greatly by the insect that usually infests this variety.

4 Our Northwestern Normal School is prosperous as far as I can see. The number of scholars from abroad is increasing. The action of the Legislature proves that our institution took the proper course from its beginning, by introducing Horticulture and the Natural Sciences. But it is very singular that institutions, supported by the state, and yet being of less general usefulness than our own—"which has to hoe its own row," are also generously helped along by privates, while we here are left in the cold and no aid given us from any part of the wealthy state of Illinois.

Are religious institutions below par in Illinois? Never was I treated so shabbily in Wisconsin, where I taught nine years, and with less power and experience.

Not that we have a special claim, but I know that our limited means also limits our usefulness. And any man likes to be as useful as possible when engaged in such work as we are.

Yet better times may possibly be in store for us.

Very respectfully yours,

J. WERNLI.

C. H. Keim, of Mt. Carroll, correspondent for Carroll County, reports substantially the following:

The APPLE crop in this county was a fair yield though not large, owing probably to the over-bearing of the trees in 1871. There is an excess of Summer and Fall varieties over Winter sorts.

Varieties that succeeded best this year, in this vicinity, are *Red Stripe (?), Early Pennock, Trenton Early, Red Astrachan, Maiden's Blush, Snow*, and *Winesap*. *Yellow Bellflower* did better than for several previous years.

PEAR culture is so limited that I am not able to report upon it.

CHERRIES were an average crop.

PLUMS were a failure.

GRAPES were abundant, though not of the best quality—many varieties not ripening their fruit.

Concord, Creveling, Delaware, and *Salem* were most remunerative.

BLACKBERRIES produced a poor crop.

RASPBERRIES.—*Mammoth Cluster* and *Doolittle* gave a large yield.

STRAWBERRIES.—The varieties tested here are *Wilson* and *Green Prolific*, which produced a good crop.

W. E. Lukens, correspondent for Whiteside County, sends the following report.

"The chief that can be said in reference to the fruits of this region, can be said in a very few words, namely: Fruits of all varieties attempted to be raised in this locality are *very abundant* and of *excellent quality*.

This part of Illinois has never before been so amply blessed with so large, and so fine a crop of *Apples*. There were some wormy and defective ones, but a larger proportion of sound, fine apples than has ever been known here before. Many persons who have large orchards found it impossible to dispose of all that were even good that fell prematurely from the trees. But good picked apples sold at from forty to fifty cents per bushel. A considerable amount sought a market where the people were not so blessed with fruit as we.

Cherries also were quite abundant, and sold at about ten to twelve cents per quart, or seven to ten cents per lb. Very few if any but Early Richmond and Kentish are raised in this neighborhood.

Strawberries were as good a crop as usual and sold well.

Raspberries.—The production of this delicious fruit is rapidly increasing, and yet it commands remunerative prices. Bushels were sold and consumed the last season, where but a few years ago scarcely a family consumed a quart. It is a cheering sign, and promises well for future moral health, as well as physical, that children are fed on more fruits and fewer dead hogs. Heaven speed the day when swine's flesh will pollute no man's table or stomach. With the present facilities for procuring wholesome fruit, at comparatively cheap rates, it is surprising that the wants of so many children are not supplied. This natural fondness for fruit every fruit-grower knows by the anxiety manifested by the youth for all kinds of fruits; so much so that some are tempted to partake without leave. Yet who ever knew a boy to steal a dirty pig and eat it to the neglect of fruit.

Grapes.—In reference to Grapes we may say, that we have demonstrated the adaptibility of the country to the growth of this delightful and health-giving fruit, and that its production is overdone, it being sold last fall below the cost of production; still a great many families consume but few, preferring to invest in dead animal matter. It is pleasant however to know that the consumption of grapes is yearly increasing.

Wherever there were *Pear* trees large enough, good crops of excellent fruit were raised.

I cannot hear of the much talked of *Miner Plum* producing any good results. I know trees four inches in diameter and a spreading top of nine or ten feet diameter to produce largely of blossoms but no fruit. For our climate and soil I think it is vastly overrated.

The crop of all kinds of fruit is so largely in excess of any previous year, and we cannot discover but all slopes or levels are equally productive. Neither do we discover that proximity to groves or timber belts has made any perceptible difference in results; all localities and soils producing well this year.

Mr. L. K Scofield, the correspondent of this Society for Stephenson County, writes from Freeport as follows:

"The year 1872 has been like the two previous years in respect to the fruit crop in Stephenson County. We have been favored with a bountiful crop of apples, but with the same deficiency as heretofore, in winter varieties—which deficiency is supplied by importations from Michigan and New York.

Farmers usually place too much dependence on tree-peddlers to make out their fruit lists—not knowing exactly what they want themselves—and the result has been that they have planted too many trees of fall and summer varieties. We only need to plant winter varieties to secure a home supply of winter apples in future.

The *Rambo, Jonathan, English Russet, Rawles' Janet, Willow Twig, Perry Russet* and *Talman Sweet* are some of the varieties that have come under my notice as most productive and giving satisfactory results.

I have noticed less ravages by the Curculio and Codling Moth than usual.

There have been large quantities of Eastern trees sold in this county for a few years past, but purchasers say they do not thrive any better—if as well—as those grown at home and are usually ready to admit the foolishness of buying Eastern trees at exorbitant prices.

Pears.—Too little attention is given to the cultivation of the pear, yet there are good results shown from its cultivation in this county. There are a few varieties which seldom fail to bear a crop—among which is Flemish Beauty.

Plums.—The Miner or Townsend plum has not, this year, verified statements as to its annual bearing qualities; there has been less than usual of this fruit in the market; yet it is the only sort with which we have had reasonable success, and I shall stand by it until we can obtain some better sort on which we can depend for a crop. I have several other varieties on my grounds, but have not been able to gather a quart of fruit from the trees during the last five years.

Cherries.—English Morello, Kentish, and Early May (or Richmond) seem to succeed well, giving annual crops; the latter does well both on the Morello and Mahaleb stock, but is longer in coming into bearing on the latter, and while young is not as prolific. I prefer the Mahaleb stock, however, as it does not throw up suckers, which are so troublesome about trees grown on Morello stocks.

Peaches.—The home of the peach is farther south, yet I observe trees on my grounds that have grown well without protection for three years and remain sound.

Grapes are becoming so abundant that they have been a drug in the market at six to eight cents per pound. The Concord is generally cultivated, and is most esteemed for this latitude. Perkins seems very prolific, but many persons object to its flavor. The Diana, Delaware, Hartford, and Rogers' Nos. four, fifteen, and nineteen, in some localities, give satisfactory results.

Raspberries.—I am not yet willing to give up my Doolittle Raspberry, as a market fruit, for any on the list. With me it will yield more fruit, and show larger returns than anything in the line that I have cultivated; but for table use at home, I stand by the Purple Cane and Philadelphia.

The Davidson's Thornless is too seedy, and after two or three pickings have been of but little value. They may be better when older. I have gathered the third crop from my plants.

Of *Blackberries* in the open field, with the Kittatinny and Lawton varieties my experience has been unfavorable, but in protected situations, I have had very satisfactory results. All my plants exposed last winter were killed down near to the ground, while others partially under the shade of deciduous trees were not injured and have borne a heavy crop the past year.

Of *Strawberries.*—The Wilson's Albany is the stand-by. My President Wilders were much injured by the winter, and produced no fruit.

I would state that our timber soil produces the largest crops of fruit of most kinds—the Raspberry may perhaps be excepted, although some of our prairie orchards are not far behind in quantity or quality of fruit.

Young Nursery stock has ripened its wood well for three years past, and what few trees are grown here cannot be excelled by eastern or any other stock.

Evergreens suffered to some extent the past winter, but I think not as much as in some other localities.

The *Balsam* has been the greatest sufferer, and many of the finest trees in our city have yielded up their beauty forever. The fatality has not been so great among the smaller trees. The Norway Spruces have suffered but little, in comparison with the Balsams.

The foliage on very few large trees was slightly discolored, but not otherwise injured.

I had a few two to three feet Norways too much discolored to remove, but think I did not have a single one than has not made a good growth this season.

The *American Arbor Vitæ* suffered severely—many having been killed near the ground. I observed in my nursery where the plants were all exposed that the tops of at least one-fourth of them were injured excepting a strip of about two rods in width along a common board fence on the west, where they were untarnished. Among a quantity of these plants—two to three feet high—two years transplanted in nursery rows, about one-fifth, *scattered* through the block were killed from one-fourth to three-fourths of the way to the ground, while the balance were unscathed. The injured plants were cut back and all grew.

Irish and *Swedish Junipers*, with partial protection were not injured.

Chinese Arbor Vitæ all killed at the top with few exceptions. They were not protected.

Many of the *White Pines* were discolored in the foliage, but none killed.

Scotch and *Austrian Pines* unscathed.

Mr. Edwards read the following letter, and placed upon the desk quite a quantity of the "trap" stuff referred to; some of which had

been used; as was shown by the large numbers of cocoons still adhering to the wood.

Little Prairie Ronde, Michigan, Oct. 12th, 1872.

"*Samuel Edwards,*

MY DEAR SIR:

You will call to mind perhaps, that, while at the meeting of the Horticultural Society last winter, I mentioned to you that I thought I had a better device for trapping the apple worm than that patented by Mr. Wier. I experimented during the season on about one hundred trees, and I feel assured that my method is as much superior to his as his is to the straw band.

I asked Mr. Wier for the privilege of putting his traps on a few trees in competition with mine, and I agreed that, if his was the better, I would give him the benefit of the fact.

The worms have not been so numerous as last year, though they have badly damaged our partial crop; our Greenings are about all spoiled. I am in hopes that by a thorough and systematic effort, another year, to be able to report a promising progress in the destruction of this insect.

Perhaps I told you of my device—a simple wooden band to inclose the tree. I have manufactured a berry box for a long time, and have a machine for cutting the runs. These runs are about three and a half inches wide and seventeen and a half to eighteen inches long.

I use one, two, or three, according to the size of the tree, and I fasten the runs with a string—a piece of wool twine.

These I put on about the middle of June, and have looked after them during the season, every two weeks or so. I have put my runs on alternate trees with the Wier trap, also on the same trees, some above, some below, and the result shows that my trap will catch on an average four to his one; at least this has been the result so far. Then my trap is not only the cheapest, the most simple, the least work to clean, the most efficient, but what is of some moment at least, it is not a patented thing.

I find that for a part of the season the traps must be looked after as often as once every twelve days, or thereabouts, while later, as at present, they can run as long again; as the weather becomes cool, the change to the miller is slower. I have caught, however, more worms late than early in the season.

I took some runs to the meeting of my own State Pomological Society at South Haven in September and distributed them among fruit-men, also to Grand Rapids. And I regret that I did not send some to you in time to have you give them a trial the present summer. I will be glad to forward them another spring. I might, if you thought advisable, send you a sample, including some that I have used, showing the marks of the worms, to be exhibited at your winter meeting.

As you are aware, I have no quarrel with Mr. Wier. He deserves credit for his efforts, and his trap is, no doubt, an advance upon the old methods, though, as I have stated, I do not think it entitled to the dignity of a patent, and in this view I believe I am very generally sustained by intelligent fruit men.

Neither, as you need not be told, have I any ax to grind—or selfish end to subserve in this matter.

Let it once be seen that this form of trap—the wooden band—is the cheapest, best, far most efficient, and the basket and small fruit-box manufacturers can furnish them just as good, and even better than I can—for they can furnish any length—at a price that will be merely nominal.

There is much more that I might say, as that it requires some little practice to properly manage these runs, in taking them off and killing the worms, the necessity, that is obvious, of timely attention, and that but little good can be expected to result if one man alone in a neighborhood gives battle to the infinite host, and nine-tenths of the orchards are left to their unmolested mutiplication. But I have already made this letter long.

Apple crop good in this state, but just in this county not more than one half or two thirds of a full crop, and the market is not such as to be encouraging to fruit growers. The best apples are only bringing—on the line of the railroad—one dollar a barrel, the buyers doing their own packing, and as they furnish their own barrels, they contract with the coopers for large barrels, holding fully three bushels.

My own crop—mostly *Northern Spy*—I shall, as usual, put in my cellar, and market in the spring.

Truly Yours,

B. HATHAWAY.

MR. EDWARDS' PERSONAL REPORT.

In Bureau County we have abundant cause for gratitude to the Lord of the harvest for bountiful crops of nearly all the fruits usually grown in our latitude.

STRAWBERRIES were of fine quality but the yield was moderate.

CURRANTS and GOOSEBERRIES bore well, and none of the Currant Worms seen or heard from in this vicinity.

CHERRIES.—*Early Richmonds* bore about half a crop; *English Morellos* were loaded; but very little fruit could be found upon trees of the *Duke* and *Heart* varieties.

RASPBERRIES of all varieties were abundant.

BLACKBERRIES.—*Kittatinny* bore moderately, and appears hardier than the *Lawton*.

PEACHES fruited a little, for the fourth year of successive bearing, among our evergreens; they will be considerably planted in this vicinity.

PLUMS set full of fruit, which all rotted and fell prematurely.

PEARS.—Most varieties in bearing, gave a fair crop, with but very little blight. *Standards*, only, are now planted.

APPLES were abundant and fair, with no increase of the Codling Moth. *Russets* are more exempt from injury by this pest than any other varieties.

At the time of gathering, good winter varieties were bought by shippers at twenty-five cents per bushel; they are now, December 7th, paying fifty to fifty-five cents, with the prospect that in the spring, as usual, they will command one dollar or more. Last April, *Red Romanites* brought a dollar and twenty-five cents per bushel delivered on the cars at Mendota, and at the same time the previous year a dollar and sixty-seven cents.

The great extent of country north, west, and south of us, dependent upon us especially for late keeping varieties will probably give us a good market for all our surplus winter apples.

In one orchard, planted in 1860, sheltered on all sides by belts of evergreens now thirty feet or more in height, the fruit of *Willow Twig*, especially, along the south side of the orchard, appears to suffer from fungus, and it is proposed to cut out a tree occasionally, from the screen in the hope that the air will then have circulation enough to prevent the injury mentioned.

GRAPES of all varieties cultivated here were loaded with fruit of fine quality, which sold as low as four cents per pound.

VEGETABLE GARDENS should receive more attention than is given to them by our people generally, and it is hoped that one result of the present low prices of farm products may be to induce them to begin at once the planting and proper care of good kitchen gardens.

FLOWER GARDENS.—Very gradually an increase is noticed in the number of families cultivating flowers, and the lovers of these beauties are encouraged to patiently labor and wait, in the good cause.

TIMBER PLANTING.—The great necessity of planting trees for timber, on a scale commensurate with the present and prospective needs of our people, is making no little progress; yet we need an army of apostles, with the zeal and energy of Peter and Paul to preach and exhort the people to go forward in this crusade against the chilly blasts of winter, and to avert the terrors of the timber-famine [and consequent famine of cereals.—*Ed.*] which is so certainly and rapidly approaching.

During the past season it was my fortune to traverse, for the first time the treeless region from Plattsmouth to Kearney Junction, Nebraska, enabling me to realize more fully than ever before the immense and increasing demand upon the timber resources of the country to open and keep up the improvements being made almost simultaneously over the wide extent of territory that constitutes what was the mythical "Great American Desert" of our boyhood.

Although we might express in figures the requisite number of plants which should be set to supply this great need, yet it is difficult for the human mind to comprehend the vastness of the enterprise.

We need a score of establishments like that of Douglas and Sons, in constant operation to the full extent of their capacity.

It is my painful duty to record the departure of our esteemed Putnam County correspondent Isaac W. Stewart of Florid, in January last. While operating a buzz saw a splinter from the wood struck his head, fracturing his skull. He lingered for three days, before passing to the reward awaiting him in the land where there is no more sorrow, sickness, or pain. It is no mere empty formality to record of him that he was a zealous, intelligent laborer in our great work of making the wilderness bud and blossom as the rose; those who knew him best, loved and esteemed him most.

The great loss to his wife and children can only be made up by Him who has promised to be "the widow's God and a Father to the fatherless."

To those of you who knew my own faithful companion of thirty years, I can say nothing to add to your knowledge of my one great loss in her removal to the better land since last we met. Whatever of usefulness it may have been mine to accomplish is as much the result of her labors as my own. In this greatest of trials that can befall man, I am comforted by the great truths that "my loss is her gain," and that the Infinite One "doeth all things well."

DISCUSSION ON MR. EDWARD'S REPORT.

MR. FLAGG—Mr. President. There are one or two points upon which I would be glad to have more light, and which will be proper subjects to discuss in this connection. One is in reference to the singular fact that we have had, in many cases during the present year, superior excellence in the growth of fruits and grain. There is in our apples, in many cases, more coloring and size, as well as superior flavor. I have noticed upon my own trees, especially the Red June, Benoni, Early Harvest, and several other varieties—in fact, it is true of the majority of my trees—that the fruit is of extra size, and superior quality. I have noticed the same in some other productions; for instance, that in our locality, the wheat was of superior quality, and corn is of better quality than usual, generally, throughout the State. I have heard some say that the *drouth* of last year produced this result, by storing up an unusual amount of plant food, which has been, this season, appropriated—thus effecting extra growth in tree and fruit—how is this?

Another point. Will Mr. Edwards tell us what caused the fungous growth upon his Willow apples, near the screen on the south side of his orchard?

MR. EDWARDS—I attribute it to too close confinement of the air in hot, damp weather. This does not, however, militate against the value of protection by timber belts, but shows the results of a too close confinement—preventing a proper circulation.

MR. FLAGG—I want to know, whether in planting again, you would put a belt upon the south side of your orchard.

MR. EDWARDS—I think I might, but I would take out a Christmas tree, now and then, and so prevent excessive protection on the south.

DR. HUMPHREY—I have noticed this last year this effect of a too dense shade and shelter on the south. We want protection, but we want also, and must have, *ventilation* and *sunlight*, so that when the rains come, the water will dry off. We must bear this in mind. Protection on the north and west seems to be most desirable; and is, perhaps, all-sufficient.

Voice—I would ask Mr. Edwards, what variety of evergreens he has planted for shelter belts?

MR. EDWARDS—The one of which I am now speaking, is a row of pines, planted ten feet apart. I have taken up some of them.

MR. FLAGG—How much shade do they cast upon your orchard trees?

MR. EDWARDS—I would say about three or four hours in the day.

MR. FREEMAN—I have noticed that for three years past we have had very dry seasons, producing in the North conditions that are the usual conditions where we have fruitfulness. In regard to the large size in corn, I have noticed that we had in the North, as well as on the hills of "Egypt," some timely showers, which helped to increase the crop.

MR. FLAGG—Have you, this year, noticed anything in regard to the hardness of the kernels of corn and other grains?

MR. FREEMAN—I have, and think it owing to the long dry season, and perfect ripening before frosts. In case of early frosts, the grain would be soft. I think I have observed the same conditions in Northern Illinois that are the *usual* conditions in Southern Illinois, and hence the general increase and superiority of fruits and grains.

DR. HOOTON—Said that fruit is perfected by rays of light and by heat,—that trees should be pruned so as to admit sunlight and a free circulation of air to the fruit.

MR. WIER—Dr. Hooton's theory about pruning to let sunshine on the fruit don't apply in my orchard. I do not prune, yet all my fruit is good.

Voice—How do you get into the tree to pick your fruit?

MR. WIER—I am least troubled in that way—a large portion of the fruit is reached from the ground. And I claim that I can grow more apples and finer fruit on my system of no pruning, than can be grown on any other plan. Why is it that you get no fruit from your Northern Spys till they are fifteen years old? Take the *inside* out of a tree, and it will not bear as soon, nor as well. I can show you Northern Spy trees, planted in 1866, that are now bearing their *second crop*.

THE PRESIDENT—Will you state the kind of soil?

MR. WIER—It is the common sandy loess soil of the Illinois river banks.

Voice—How long has your orchard been planted?

MR. WIER—The oldest trees in my *unpruned* orchard were planted in 1861.

MR. FREEMAN—How will they look twenty years hence?

MR. WIER—They will look just the same as now, only larger.

MR. DOUGLASS—How near the ground are the lowest branches?

MR. WIER—I have trees started as low as four inches from the ground, and others as high as five feet and nine inches, and all the way between.

Voice—What height is best in your judgment? What height would you recommend?

MR. WIER—That would depend somewhat upon the variety—probably eighteen inches is a good average.

Voice—How about the cultivation of low-headed trees?

MR. WIER—You can cultivate closer to low-headed than high-headed trees.

THE PRESIDENT—If there is to be no further discussion upon this report, we will pass to the next regular business of the afternoon—viz:

DISCUSSION ON SMALL FRUITS.

The subject of Grapes is first on the list. Let us hear from some gentleman upon the grape question.

DISCUSSION ON THE GRAPE.

DR. HUMPHREY—Mr. President. It is, I believe, generally conceded that the medium system in the pruning of the grape vine is best. I would not advocate the *no pruning system*, nor the *too close pruning system*, but the golden mean between them. I would then say moderate winter pruning, and little *summer* pruning. Twice pinching, and that early, is all the summer pruning the vine should have. There are a few who do not prune at all in summer; but, so far as my observation goes, I think I notice a little the finest results from vines that have been slightly summer-pruned.

In regard to protection, we believe it will pay to lay down our vines, in this latitude, and slightly cover them with the soil, and upon this it is well to spread a light covering of loose litter; that will prevent the rains from beating upon the ground, and rendering it so hard, that there is danger of injury in lifting the vines. I believe it will pay to give this attention to our vines, if it will pay at all to grow grapes.

MR. NELSON—Is there no danger of mice secreting in this "litter" and dirt?

DR. HUMPHREY—I think not, if you put on the dirt first—and then the "litter" on that.

MR. MAHAN—Will not the buds of the vine be destroyed by this covering?

DR. HUMPHREY—No, sir, I think not, if the covering was put on in the right time—that is—after the ground is frozen. If you cover the unfrozen soil with the *mulch* I think there is danger.

MR. BARLER—If I had to go to the trouble and expense of covering grape vines, I would never grow grapes for market. There is "where the money goes." No wonder gentlemen complain "there is no profit in grape culture." I was never guilty of covering grape vines—and if they die for want of it—they die *eternally!* That is, I will quit the business, and turn it over to those who can grow them less expensively, for market. But for *family use* I would be at the utmost *expense and care*, and I would recommend that everybody

"From Greenland's icy mountains,
To India's coral strand,"

plant his "own vine and fig tree." Why not?

MR. FLAGG—Does Dr. Humphrey train upon trellis, or upon stakes?

DR. HUMPHREY—I train on trellis.

MR. FLAGG—Do you fruit upon the old, or upon the new wood?

DR. HUMPHREY—I fruit upon the new wood. I keep my vines near the ground, and take great care to get fruit buds low down, near the ground.

MR. GALUSHA—One would gather from Dr. Humphrey's remarks, that he, by always *covering* his vines *always* had good crops. Now, it is my observation that covering may or may not be of service. I have noticed, in more than one instance, vines not covered produce better fruit than vines covered, and that in the same neighborhood on similar soil and situation, and of the same varieties. For instance, I had a heavier crop this year on uncovered vines, than my neighbor, on vines carefully buried with earth—the varieties and conditions were the same, except the single difference of "protection," of the vines. The reverse is doubtless sometimes true; so I say covering may, or may not be serviceable.

The point I wish to make is, that to know you are going to insure your grape crop by burying the vines in earth, you must know what the winter weather will be—whether wet or dry. I think that in the North, where the vines can be kept dry, the general result is in favor of covering the vines; but in my latitude I do not think it is usually necessary, but have usually found it sufficient to cut the vines loose from the stakes letting them fall to the ground.

MR. NELSON—I have noticed where the vines were covered deep, they were injured. I have also noticed that where I have covered with a very little earth, it is successful. When I first commenced to cover, I covered deep, and lost my vines. But as Mr. Galusha remarks, I have had them do as well with no covering at all.

MR. SCOFIELD—The best crop of grapes that I ever raised I raised last season—without protection, save that afforded by a few old maple trees. While in my yard I had vines that I had carefully cared for, and protected, and the result was not more than one-fourth of a crop.

MR. FREEMAN—I would recommend the Perkins as a better grape than the Hartford.

MR. WIER—I have fruited the Perkins this year and find I prefer it to the Hartford—indeed, I think a great deal of it; and I want to call the attention of this Society to one other grape—I mean the Telegraph. It is, for family use, almost equal to the Delaware.

Now, speaking about covering the vines, I have this to say. In a vineyard of two or three hundred vines, I had a portion of them covered, another portion, not covered, was laid upon the ground, and a third part was left tied up to the trellis; and now for the result. Every one of the vines in the spring were dead, except those tied up to the trellis. The roots were all right, but the canes were dead

DR. HUMPHREY—If the vineyard is planted upon flat ground I would not cover. Upon my flat ground I plow furrows together, so that the vines stand upon a ridge—and in this way, I can safely cover my vines.

MR. WIER—Ordinarily my plan is to lay down my vines, and lay the stakes upon them to hold them in their place; this is the only protection, I think, that is necessary in our latitude.

MR. HAMMOND, of Warsaw—I do not think that you can fix upon any one plan, that will invariably produce the best results. In some cases where vines have not been cared for, we had the best results. I have in mind now one vineyard that was not even cultivated, and yet from it was gathered one of the finest crops of grapes that I ever saw. I also have in mind a vineyard, planted by a gentleman, after the Dr. Grant plan. The soil was spaded deep and filled with manure, the vines planted and tilled with care. For a few years the vines bore light crops, but now the vines are *dead*. I do not recommend the non-culture sys-

tem; but you see from these extreme cases that no particular system is always and invariably the best.

MR. HILLYARD—Brighton. It is my observation, and I give it as my opinion, that vines uncovered do better than vines covered. My vines are tied to stakes. In the fall I cut them loose and let them fall down upon the ground, and I have never found it necessary to protect them in any other way.

MR. NELSON—I don't wish to be understood as advocating the *no-pruning* system—but I must say, that one of the finest crops of grapes I ever saw was upon an unpruned vineyard, left to have its way. Not expecting a crop of grapes they were not looked after, but in the fall, sure enough, the children crawled in under the vines, and found them—and *such grapes* as they were! [Laughter.]

MR. HILLYARD—They will never bear another crop.

MR. WIER—I will now tell my story. A few years ago, I had six acres of vines. I had cared for them, and waited for them, and expected much from them—but I have been met with disappointment. I saw no profit in grape-growing for market, either for the fruit or wine. Accordingly, I determined I would not spend any more time with them. I let the stakes rot upon the ground. The sand-burrs and weeds came up among them, and for two years, there had not been a plow among the vines. The third summer, I think, I had from this "terribly let alone" vineyard, the best crop of grapes that I had seen for some time.

MR. NELSON—I can testify to the truth of what my friend Wier says,—for I was there and saw the grapes.

MR. DOUGLASS—Well, my friend Wier can run a fruit farm cheaper than any man I ever saw. [Laughter.]

MR. BUCK—I would like to ask Mr. Wier about the quality and the quantity of the must of this neglected vineyard.

MR. WIER—There is surely no lack of *quantity*—Grape juice is cheaper than water, about this time. [Laughter.]

MR. FREEMAN—What MR. WIER has said may all be well enough in a dry season. And in regard to wine being cheaper or more plenty than water, that may be so too. I have heard of its being used instead of water. [Laughter.]

MR. CLAYTON—It strikes me as a very singular and novel view, if this is the decision to which we are hastening—that we are to let our grape vines run wild. If these experiences related here are of any value—that no culture is better than good culture—why, sirs! we might as well dismiss our meeting and go home. To me, sir, these isolated facts are of very little value and especially as one man's experience differs with another. I think it can be shown that cultivation is the thing. Individual experiences must be considered in connection with the circumstances that favor results. It will not do to follow any one plan, perhaps, rigidly and invariably, without regard to time, place, and seasons. The culture and pruning of the vine may be excessive, and then results are unfavorable.

MR. WIER—I don't like to be brought to test upon this question. I am not growing grapes with a view to get any profit from them. We cannot get any *money* out of the grapes or the vines—and hence we let them take care of themselves. We cannot afford to put labor and expense upon them when they bring us no return. If it was a crop that would give us money we could afford to prune and cultivate—and of course in that case we would give them some attention. I would ask Mr. Miller, of Iowa, if he knows anything about this "neglect system." Have you ever seen any vines growing in grass and producing large crops?

MR. MILLER—I have seen something of the kind. I had some vines put out where I was going to make a lawn. It was my intention to cut them out; but being crowded with other work, it was not done, and the vines grew in the grass—running upon the ground, and without any care whatever. It was not my intenion to have a crop of grapes, but I did have a crop and the grapes ripened perfectly in the grass. They were not quite as large as usual, but the quality was very fine. I presented some to my neighbor, Mr. Smith, who was a good judge, and he said they were the finest he had ever seen. Now, these vines lay right in the grass, and I think I shall let them stay there.

MR. DOUGLASS—Was it a wet or dry season?

MR. MILLER—It was medium. My philosophy in reference to the superior quality of the fruit is, that it lies down in the grass, where there is regular warmth. I had used these vines for a number of years for propagating by layers. I was told that it injured, and even destroyed vines to layer them excessively, and accordingly when the price of vines

went down, I let them go, intending, as I said, to cut them down. I am convinced that all we need is to keep out the weeds, and I have found a better quality where there has been not one bit of cultivation.

THE PRESIDENT—I would like to ask Mr. Miller if these grapes of which he speaks, have been put to the test of the must scale?

MR. MILLER—I did not test them.

MR. HILLIARD—I have my opinion about this rough culture, or "no culture." I do not think "it will do to tie to." The vines may endure for one or two seasons, but they will be sure to go back on you.

THE PRESIDENT—As I am more interested in the grape than any individual present—having more invested in the vine—it may be proper for me to say—I can't approve of this rough treatment of the vine—the better the preparation the better the result. My practice is close pruning—and good cultivation.

The fact that grapes are grown without cultivation, seems to show the good-nature of the vine even under severe and harsh treatment. I would not attempt to grow grapes in this neglected manner—and what is more, if I lived in the North, I would not attempt to grow grapes at all for market. I would plant, and cover and care for enough for family use, but no more—and you who live up there would do better if you would leave this business to those who live in latitudes where they can grow grapes—and turn your attention to that which is suited to your climate. I say what I believe; you will do better not to attempt to grow grapes for *profit*—and this is what you say—"there is no money in grapes for me"—and that must be so. We can grow ten pounds where you can grow five.

MR. SCOFIELD—That we cannot raise grapes in the North, I think is a mistake. We have raised as bountiful crops of grapes there as grow anywhere—and among them the Concord, Perkins, and others.

Voice—Can you do it every year, and all the time?

MR. DAGGY—I have had vines that I have tenderly cared for, and put upon trellis and I have had them in a neglected condition—and no grapes. I do not think that any kind of treatment—either care or neglect, will invariably produce a good crop of fruit.

MR. WIER—I have been tinkering at grape vines, for many years; every promising variety I would get and plant it, and cultivate it for two or three years, tie up carefully to stakes and only be disappointed. As

for the grapes *rotting*—I am not troubled in this way. I have seen grapes covered up in my sandy ground, in a green state, and there is no rot there. It is not the trouble of growing the grape, of which I complain—I can grow grapes—but I cannot get anything for them when they are grown—and hence the "no culture" is the cheapest plan for me.

MR. ELDRIDGE—The "no culture" system will do for two or three years—but not longer.

Eight years ago we had three or four varieties of grapes. When I found it would not pay to give them attention I let them go. The first year they did about as well as usual. Second year not so well. The third year they did badly, and the fourth year you would have to hunt to find the vines.

DR. HOOTON—It is now about time to adjourn, but before a motion to that effect is made, I wish to move that M. L. Dunlap and Robert Douglass be added to the committee on Railroad Transportation.

Motion carried. Adjourned until evening.

TUESDAY EVENING.

PRESIDENT STARR called the meeting to order at seven o'clock, and called for the report of Committee on Meteorology.

PROF. J. H. TICE, member of the committee, being absent, sent the following paper to the Secretary as his

REPORT ON METEOROLOGY.

Mr. President, and Gentlemen:

I do not claim to be a meteorologist, yet the study of physical phenomena has been a favorite pursuit with me through life; not for unraveling the complicated laws of Meteorology, but for solving the mystery of the universe. My investigations therefore have compelled a close observation and a thorough study of the imposing phenomena of clouds, rain, hail, snow, thunder, lightning, winds, tornadoes, waterspouts, in short, all the facts that form the basis of Meteorology.

The time has now come when people are beginning to talk of, and want to hear something about this important branch of physical science so intimately related to the well-being and prosperity of the human family. Our discussion then is opportune, since it is possible only to disseminate knowledge on any subject to the extent that an interest has been awakened in it, and to the extent the public mind has been prepared for its reception. In other words, the subject must have arrested

attention, and excited thought by presenting itself as a great problem demanding solution, and as claiming the undivided intellectual resources of the age to accomplish it.

Whenever this is the case, the teacher is welcome, and he has an easy task, because his lessons will be appreciated and readily understood. To a great extent the operations and observations of the Signal Service Corps have prepared the public mind for effective instruction in Meteorology by awakening, in many minds, an intense interest on the subject of foretelling the weather. It has done more than this; it has done an inestimable service to humanity and civilization by demonstrating that the facts of Meteorology are capable of being systematically arranged and constructed into a science.

Like all branches of natural science, the foundation of Meteorology must be laid broad and deep in physical facts, requiring for their accumulation, long, patient, and exhaustive observation. When a sufficient number of facts have been collected, they must be classified for study, and collated to ascertain their whole meaning, and to discover the general and special laws in which they have their origin and by which they are governed.

Meteorology is that extensive science which takes cognizance of all atmospheric changes, and explains their causes and laws. It consequently embraces not only the variation in pressure, in temperature, and in moisture of the air, but includes the phenomena of fogs, clouds, dew, rain, hail, snow, winds, water-spouts, lightning, thunder, auroras, and the electric and magnetic tension of the Earth and its atmosphere. It therefore offers a wide field for investigation, and presents problems that tax for their solution the utmost capacity of the mightiest intellect.

We have no design, even if we had the ability, to discuss the whole scope embraced by this comprehensive science. Time and the occasion demand that we confine ourselves to the humble task of merely stating and explaining the general principles of the science and the causes of its phenomena as far as they originate in, and are connected with our Earth and its atmosphere.

First; there is the phenomenon of clouds, and consequently of the stores of rain, hail, and snow they bear. What are the facts? A tropical rainstorm appears upon our Gulf coast, and traverses the Atlantic front of the continent from the Rio Grande to the Gulf of St. Lawrence, a distance of over 3000 miles, and then it passes on the ocean beyond our observation. In its progress it deposits water from three to four inches in depth throughout its entire course. As such a storm usually passes any given point in a few hours, it cannot have any great width. Suppose it to be even one hundred miles wide. Then if it held all the water it discharged while under our observation, the water so held must have been from seven to ten feet deep over its whole width. This we know is an impossibility.

Moreover, it came to us laden, and when it took its departure beyond our observation, it was unimpaired in energy and capacity. It is

therefore preposterous to assume that the clouds constituting and enveloping a rainstorm bring along with them either the water they precipitate in their course, or even the elements of which it is composed.

We have selected a tropical storm for illustration because it answers our purpose better on account of the immense rain-falls that characterize these storms. But what is true of them, is equally true of continental rain and snow storms that frequently sweep over our continent from the Pacific to the Atlantic. It is in their case also impossible for a cloud to hold aqueous vapor enough to deposit, for instance, a snow from two to four feet deep for a distance of four thousand miles. As these facts show that the clouds cannot carry this immense load of rain, hail, or snow from one ocean to the other, it therefore is evident that they, in some manner, must gather it in their course. This brings us back to the the original question; how are clouds formed?

You must here pardon a necessary digression; for it is impossible to answer or to understand this question, unless we know the condition of the Earth and its atmosphere, and the necessary action and reaction consequent to this relative condition.

The fundamental principle of Meteorology,—in fact of all physical science,—is that the Earth and all bodies in space, are highly charged with electricity. The necessary consequence is that the atmospheres of all suns and planets have an equally high charge, but of opposite electricity; that is, all celestial bodies have a negative charge, consequently their atmospheres must be positive. Every tyro in electricity knows that both poles of electricity are always present, and that they are inseparable. It is the same with magnetism: break a magnet in ever so many fragments, yet each fragment is a complete magnet. In our laboratories we can prove that if we charge any conductor with either of the electricities, it evokes its opposite pole by induction in surrounding bodies. Besides, if we take two wires forming closed currents, and send a current through one, it induces a current in the other, or adjoining wire, but in the opposite direction and of opposite electricity.

It has been established by observation that constant currents of electricity flow through the Earth from east to west, consequently there must be a constant current in the atmosphere in the opposite direction.

But electricity can only pass by either of two ways; conduction or convection. As the atmosphere is a nonconductor, therefore electricity must pass through it by convectlon. Aqueous vapor is the medium of convection; hence those fine cirrus clouds that we can see almost every day, and all hydrometeors take uniformly an eastward direction in the temperate zones.

Besides these electric currents in the Earth, there are electric waves both in the Earth and in the atmosphere, rolling from west to east. In the Earth these waves, obstructed by matter of low-conducting capacity, produce earthquakes; while in the atmosphere they collect the aqueous vapor to form clouds and feed a rainstorm. It is to the action of these

electric waves that we must look for the laws and explanation of the formation of clouds, and consequently of rainstorms.

The fore-casts of the weather are made upon the state of atmospheric pressure as indicated by the barometer. When the barometer is rising at our locality or west of us, we confidently predict clear weather. On the contrary when it is falling, we as confidently predict the approach of cloudy weather, and a storm whose violence we estimate by the rapidity and extent that the barometer falls.

We are not now speaking of the two daily risings and fallings of the barometer which have a fixed position in relation to the Sun, the former occurring regularly with but little variation at nine o'clock A. M., and about ten o'clock P. M., the latter about four o'clock A. M., and three P. M.; but we are speaking of those secular and irregular variations in pressure which occur with more or less frequency and at intervals of longer or shorter duration, and whose wave-like motion is from west to east at the rate of from eighteen to thirty-six miles per hour. These waves carry beneath them the phenomenon called low-pressure. The wave is dual to correspond with the two electric poles, and can appropriately be represented by an hour-glass. The positive wave of the upper atmosphere, being an inverted cone, is met by a counter cone on the surface of the Earth. They have no great breadth from east to west, but sometimes have great length from north to south. They move side-ways toward the east, their line being frequently straight, but generally it is curved with the convex side toward the east. But our attention must be fixed upon the apexes of these cones, for there the phenomena are taking place which solve our problem, namely: the most intense action and reaction.

We have seen that these invisible cores or rolling waves,—revealed to us only by the barometer,—are the opposite poles of electricity; and between opposite poles in such a position, there is always a reciprocal interchange of their respective electricities to relieve their tension. The atmosphere,—as already stated,—is a nonconductor of electricity, and as electricity cannot pass without being conducted or conveyed, therefore some medium must be found to bring the opposite electricities together.

In speaking of the apparent general eastward movement of the atmosphere, it was shown to be really only an electric current conveyed by attenuated cirrus clouds and other invisible aqueous vapors. The case before us of conical electric waves rolling eastward, one on the surface of the Earth and the other opposite but inverted in the clouds, mutually neutralizing each other by one discharging in the other, is only another aspect of the same phenomenon, namely, aqueous vapor conveying electricity.

For illustration of these natural phenomena we must here refer to similar ones which we can reproduce on a small scale in our laboratories. The electric machine has attached to it a brass cylinder called the con-

ductor and which is charged by putting it in communication with the machine when in operation. But if this conductor is left exposed in the free air, after a while it is found to be discharged. If however it is put under the receiver of an air pump, it retains its charge for an indefinite time. How does the conductor in the open air discharge itself? By its inductive influence it acts upon the particles of dust and all other matter floating in the air. It evokes the opposite electricity in them; hence attracting them, and having charged them with its own electricity, repels them. In flying off, they of course carry a portion of the charge with them. This operation is continued, and in a short time the conductor is found discharged. The conical electric wave which rolls over the surface of the Earth eastward acts similarly on the air and all particles of matter floating in it. It attracts both; hence there is always a current of air toward, or, in the northern hemisphere, rather in a direction somewhat to the right of an area of low pressure. The wind moves around this area in a direction opposite to the hands of a watch. But over the whole area covered by the low pressure, there is an ascending current of air. Hence all the vapor within the periphery of the electric wave's influence, is attracted and carried up, forming and feeding the overhanging cloud. Hence it is when we are within the attractive influence of an approaching electric wave, no dew falls, and we predict rain. In fact the low pressure indicated by the barometer is not owing,—as is generally supposed,—to a diminished volume of the superincumbent atmosphere, but to the upward current that there obtains. In proof of this, Professor Wise, the æronaut, while investigating the phenomena of a thunder-storm, with his balloon passed in the ascending current upward through the centre of the storm above the clouds, and then descending by its own weight, his balloon was repeatedly drawn in below and carried up through the storm again.

The manner in which an electric wave feeds the overhanging cloud, is beautifully illustrated in every mountain region. The only difference is that a high range of mountains, is a fixed electric wave. A mountain is like a ridge on a corrugated conductor. When the conductor is charged, the charge collects on the ridges, while the furrows between give no sign of electric excitement. The Earth is permanently charged with electricity, secularly varying in intensity. Hence a high charge is permanent on the summits of all mountain ranges. If therefore we watch the action of a mountain in the formation of clouds, all mystery vanishes as to the origin and the supply of vapor to form rain.

I cannot refrain from relating and describing an interesting and entrancingly beautiful observation illustrating this point, made by me last summer in the Rocky Mountains. My position was in a mining camp over nine thousand feet above the sea. It was a bright morning in the fore part of August; and I was up as soon as day had sufficiently dawned to make the magnificent scenery visible. West of me, at the distance of about four miles lay the Snowy Range exposed to full view from Long's

Peak on the north to Gray's Peak on the south, a distance of about sixty miles. At the nearest point due west, majestically rises Mount Audubon to a height of nearly fourteen thousand feet above the sea. For symmetrical shape, steepness of ascent and impressive aspect, this is the most notable peak of the range as seen from here. I saw its base, except on the east front, enveloped in a dense gray fog. I discovered this fog had a rapid motion from west to east; and vast masses of it were rolling up from Middle Park. Casting my eyes along the whole range in sight, I perceived through each notch in the range, similar masses were rolling. I expected every moment to see the whole range enveloped and shut from view. What was my surprise, after watching some time, to see that notwithstanding the rapidity with which these rolling volumes moved, they made no advance eastward; but mysteriously disappeared in front. It soon became evident that the strong current of east wind setting toward the range was the cause of this mysterious disappearance.

The Sun had now sufficiently risen to illuminate the range to its base, and presented one of the most magnificent spectacles I ever beheld. There lay the Snow Range with its deeply serrated crest sharply defined against an intensely deep blue clear sky, while its fields of ice and snow glistened like rubies and amethysts; and there rolled restless and headlong through each notch those massive and mysterious volumes of mist, ever moving yet making no progress. It was not only an inspiring sight for a poet, but a phenomenon of deepest import to the philosopher.

The mass of fog gaining volume from Middle Park in the rear, gradually pushed up to the crest and cloud-capped each peak. Then could be seen attenuated fibrous tufts of fog standing upright along the summit of the range. A close inspection showed that the fog of these tufts streamed with great velocity upward, disappearing in the deep blue sky above.

The complement of the phenomenon now presented itself. This was a dense cloud stretching north and south parallel to the range, and separated from it by a streak, about thirty degrees wide, of the aforesaid intensely deep blue clear sky. This cloud rolled rapidly eastward toward the Plains, but its western margin was stationary, so that its relative position remained unchanged as to the mountains. In the clear sky along the cloud's margin now reappeared in a continuous stream,—as if shot from below,—the fog which had so mysteriously disappeared over the mountain range. The sequence was a heavy thunder shower in the afternoon, followed by a rain of thirty-six hours duration on the mountain and plains east, and a heavy fall of snow on the range.

The phenomenon however was not new to me. I had often,—however not in this exact form,—seen it in my boyhood days, but this was the first time that I comprehended its cause, and understood the laws

by which the physical effect was produced. Reared at the western base of the Tuscaroras, I had observed during a general rain,—there always accompanied by an east or northeast wind,—a dark scud-cloud overhanging the mountains which was rolling rapidly away, yet remained stationary. Between the scud-cloud and the mountains, there was a wide belt disclosing the upper grayish white rain cloud; and on the upper margin of this belt, along the edge of the scud thin streamers of fog were seen rapidly shooting over the belt and replenishing the scud-cloud as fast as it drifted away. It excited my boyish wonder so much as to often set my wits at work, to explain the paradox of a flying cloud remaining stationary. Since the world has learned the laws and mode of electric action, the explanation has become self-evident. The mountain range, acting like an electric wave,—or, if you prefer it,—like the ridge of a charged corrugated conductor, attracts the watery vapor floating in the atmosphere below the clouds by its inductive influence, charges it with its own negative electricity, and shoots it up to meet the positive overhanging charge in the clouds.

We can now understandingly explain certain phenomena which have been noted in previous ages, and handed down to us by tradition as teaching abstract truths and as unfailing signs by which to foretell the weather. For aught we could see, the relation between these phenomena and what followed was entirely arbitrary. We could trace no necessary antecedence and consequence between them. No such relation as cause and effect. It was so, because observation had established it to be so; but we could see no reason why it must be so and could not in the nature of things be anything else. One of these is embodied in the meteorological maxim current throughout the civilized world, that a fog that rises brings rain; to which may be added its corollary that a falling one brings fair weather. It is the same with haze and smoke. As long as they rest on the Earth and shut out the horizon, no rain can be expected. Because there is a high barometer and consequently a downward flow in the atmosphere. Or a downward discharge of matter floating in the atmosphere. But when they lift, there is a low barometer, and consequently an upward discharge of matter in the atmosphere. Or, to speak philosophically, the Earth then having a high charge of electricity, is discharging itself by electrifying the vapors floating near its surface, and sending them to the upper region of the atmosphere.

I will now recall your attention to one of the phenomena of the mountains. I refer to the belt of intensely blue and clear sky through which the vapor in its transition from the negative to the positive state passed, not only invisible, but heightening, intensifying and deepening the serenity. We may therefore lay it down as an unfailing sign, that the deeper blue and serene the sky is when fog is lifting or has lifted, the more copious will the rainfall be that is sure to follow. While on the contrary, the grayer and hazier the sky remains after such an event, the less is the probability that there will be any rain. The cause, I take it

to be, is that there has been no complete transition of such fog or haze from the negative to the positive state.

If the theory advanced be correct that high and low atmospheric pressures are electric phenomena, then it follows that the currents of air to which they give rise are electric phenomena also. Time and the occasion prevents me from going into details to establish these propositions. There are however some observations made by Dr. Wislizenus of St. Louis which are pertinent here. He says,—in his remarks on his tables on electric observations published in the Missouri Statistical Report for 1867,—that from 1861 to 1867, he had observed the atmosphere to be eleven thousand two hundred and thirteen times in a positive state; four hundred and forty times in a negative state; and three thousand four hundred and seventy-six times neutral, that is the electricities in equilibrium

I have already stated that the Earth is always negative, while the charge on the upper atmosphere is always positive. As the electrometer of Dr. Wislizenus is insulated and placed some thirty-five or forty feet above the surface of the Earth, it can only show a negative state when an electric wave is rolling over, and streams of negatively electrified vapor are flowing upwards. He tacitly admits this, when he says that "instantly with the approach of a storm the negative makes its appearance, and of such high tension that the electrometer cannot measure it." When however the rain sets in, the negative tension decreases until it becomes zero, or when the atmosphere becomes positive. Why? Because the rain is positively electrified and neutralizes the negative charge on the surface of the Earth.

He adds "of the four hundred and forty times that the atmosphere was observed to be charged with negative electricity, it was found one hundred and sixty times to be connected with thunder-storms; one hundred and fifty-eight times with rain only; one hundred and three times with dry storms, that is, without rain, or thunder and lightning, and seventeen times with snow. The dry storms, no doubt, were the effect of a rolling electric wave, whose storm-center, where precipitation took place, passed north or south of the observer.

He also says, "Snow is generally accompanied with positive electricity, and fogs, always." Why? Because snow receives a positive charge in the upper region of the atmosphere, and in descending neutralizes and finally changes to the positive the surface stratum of atmosphere. In the case of fogs and in that of dew, the positive condition to which the atmosphere is changed is owing to the same cause operating as in rain and snow, with this difference; rain and snow descend through the atmosphere by their own specific gravity; while dew and fog are vapors having greater levity than the atmosphere; when they become positively charged, they are precipitated *against* their specific gravity by the law of electric discharges between opposite poles.

We have spoken of areas of low barometric pressure and of winds blowing toward them; and of areas of high barometric pressure and of

winds blowing from them. This is not strictly correct. Such winds move in winding spirals. Those flowing from an area of high pressure, can be represented by a spiral receding from the center or axis; and those toward an area of low pressure, by a contracting spiral.

Draw a double spiral resembling the letter S reversed, and you will have a graphic illustration of such winds in the northern hemisphere, while a spiral drawn so as to resemble the letter S will illustrate such winds in the southern hemisphere. Represent the direction of the wind by arrows pointing in opposite directions along the line of the first diagram,—that is, the one representing the winds in the northern hemisphere, and you will find the direction of the out-bowing wind is a *direct* spiral, that is from left to right or with the hands of a watch with its face lying upwards; while the *in-blowing* wind describes a retrograde spiral, that is, from right to left, or contrary to the hands of a watch. If similar arrows are placed alongside of the other double spiral to represent the direction of the wind in the southern hemisphere, it will be seen that the direction of corresponding winds is reversed.

The practical point now is to ascertain in what direction the areas of high and low pressure lie. In whatever direction the winds may be blowing, turn your back square to it; then to the left will be the area of low pressure, and to your right the area of high pressure. For instance, if it be a south wind, then you will face the north; your left hand will be west and your right hand east. Consequently, the area of low pressure will be west, and that of high east. But an electric wave has longitudinal extension, while it may have only one point that is a storm-center. If therefore the wind be south, while a wave of low pressure is approaching from the west, then the storm-center or nucleus of greatest disturbance will lie about half-way between the north,—the way you are facing,—and the west, that is in the northwest. If in such case the storm-center only covers a small area, there will be no rain; since all hydrometeors in the northwestern part of the Mississippi valley, move on a line nearly due east from the west.

Suppose that the wind is southeast, then the point of the compass toward which your face will be turned is northwest, and your left shoulder will be turned to the southwest. In that case, because the wind describes a retrograde or left hand spiral, the storm-center will lie in the west; and the probability is, you will be in its path eastward. Your safest guide now will be the indications of your barometer. If the wind remains steady in the southeast, and your barometer keeps falling, you are on the line of the storm-center. If the wind shifts to the east, the center is passing south of you; if to the south, then it is passing north of you. When the storm-center passes south, the wind shifts by way of the east and north to northwest; if it pass north, then the wind shifts by way of the south and southwest to the west.

If the storm-center approaches you, the wind will be steady in the southeast until you are in the center, when there will be a lull for a few

moments; then the wind will break furiously from some point west, and the barometer will commence rising. In proportion to the rapidity that it rises, will be the force of the wind that concludes the phenomenon.

I have now passed under review a small section of the vast domain of Nature. I have tried to treat it in as popular a form as possible, and hope I have succeeded in making myself understood. It is a difficult task to popularize physical science, because with truth it must be said, that physical science in its highest sense is not yet born, but will be the child of the future. We have wild theories that we call science, which the more a man studies the less he knows, because they have no foundation in solid facts. But physical science of the future will be absolute truths deduced and demonstrated from actual facts; and the whole logically arraned into a system. The first step toward constructing it, will be a thorough investigation of the phenomena, laws and modes of the Physical Forces, namely, Light, Heat, Electricity and Magnetism, their correlation, equivalence, mutual convertibility, and persistence in some form of Force. They constitute the motive power of the universe and produce all its phenomena. Phenomena are only the behavior of matter when affected by these invisible, imponderable, and intangible forces. This is the great lesson yet to learn. Man is intended as the interpreter of Nature, and he has ample ability bestowed upon him to do it. Nature is also a patient and persistent teacher, obtruding her lessons on all occasions, at all seasons, and in all ages upon the attention of the people. Her authority to teach is enforced by severe penalties on her obstinate, refractory, and intractable pupils, for *Man is under a necessity that he must learn.* The people now as in prior ages "perish for want of knowledge;" and will continue to perish until Man has mastered the interpretation of Nature, and in his life and conduct follows her infallible precepts,

The other members of the committee—Profs. Wernli of Galena and Baker of Champaign, were not present, and sent in no reports.

A letter from Professor Baker, stated that he was prevented from making out his report, by a serious illness.

The President then read his annual address, as announced in the printed programme.

PRESIDENT'S ANNUAL ADDRESS.

Ladies and Gentlemen:

It will be admitted that the immense area of Illinois embraces lands adapted to all the varied pursuits of Agriculture and Horticulture. All lands are not alike; differences of soil, location and exposure exist on almost all farms; climatic differences also exist; the growth of spring wheat is a success on the north part of the State, while it is a failure in the south, where the fall sown or winter wheat takes its place. The rich prairie and alluvial bottoms are found best adapted to corn, while the broken, hilly lands produce the finest wheat. Orchards abound in al-

most all soils and all locations, but even here it is found that the adaptation of the variety to the soil and location is the cause of success or failure.

While then we have lands adapted to the cultivation of the cereals and orchard fruits, we have also lands bordering our rivers and creeks where the soil is too thin and light for successful farming or too broken to render the cultivation easy, but which are admirably adapted to the cultivation of the grape.

These lands are found in all parts of the State and upon almost every farm, yet notwithstanding that such a condition necessarily presents a great variety of soils, exposures, and climatic influences, so hardy and healthful are some of the many varieties of the grape, that no exposure or condition can be found that some vine will not meet its requirements.

The importance attached to the culture of this fruit on a large scale for commercial uses has been distinctly recognized by some of our sister states.

California, at the expense of the state, sent an agent to Europe to investigate as to the varieties, modes of culture, soils, hardiness, etc. of the grapes of that country; the report of his mission has been long before the public, the results have added largely to the productive capital of that country, and given her a position in this speciality not held by any of her sister states.

Missouri too has claimed high rank as a grape producing state, and great stress is laid upon the fact that they have large bodies of land peculiarly fitted for this culture. The State Geologist and the press have dwelt particularly upon these advantages.

From my own observations I am led to believe that Illinois, our own beautiful Prairie State will eventually take high rank for her grape production. The steep hillsides and rocky slopes, the beautiful bluffs bordering her streams will be made valuable; these lands, useless for the ordinary purposes of agriculture, when converted into vineyards, will add largely to the wealth of our common country. It is not my purpose however to dwell largely upon this view of my subject but rather upon that which brings it nearer home to us, viz. Home Culture and Home Consumption.

Here then we have a fruit of surpassing worth, health-giving and delicious—almost unknown—yet ready to add to our comforts.

When about to plant an orchard the first inquiry is: "What apples shall I plant?" Perhaps the party has seen or heard of pears, but if he has, he has heard of the blight also, and wisely resolves to let them alone. If he is located where peaches are an occasional success they are added to his list. Grapes? O no, his old boy home had apples, they grow themselves, somewhat like Topsy, but grapes, they require care, they must be looked after. The impression evidently is that there is a mystery about grape culture, a mystery which they have no right to investigate; or if they did, they would find its culture encumbered

with innumerable difficulties, to overcome which they have neither time nor inclination. Thus it is that one of the choicest fruits, designed to add to the comforts of home is persistently neglected.

I would that this impression should be done away. I would have grapes upon every farm and around every homestead. There are difficulties in the way but they can be overcome. The greatest of our troubles arises from ignorance. We have a class, and a large one too, who would not recognize a fine bunch of grapes if placed within their reach; they have never eaten a really good grape. They are the unlucky ones; their homes are remote from the schoolhouse, they have orchards and fields of grain perhaps, they are surrounded with many comforts from which the dweller in the city is debarred, but grapes are not for them.

This class I would I could reach. I would say plant, plant vines, plant trees, plant shrubs, but plant. You may not see the money in the operation but it is there and much comfort besides.

We are all too much disposed to follow the practices in which we have been educated rather than to strike out new paths for ourselves. The introduction therefore to the homes of the many of any variety of fruit, which they have been taught to believe required for its successful cultivation a peculiar and mysterious knowledge, is fraught with more than usual difficulties.

Now, thanks be to horticultural and agricultural societies the culture of the grape is likely to become known to all or at least to those who do not stand aloof from such associations. There is a class, and a large one too, who shun these associations, and books, and papers devoted to their calling as the mad dog shuns water. Even these however have occasional attacks of "Horticulture" when some beautiful fruit is on exhibition, but the disease is not deep-seated and they soon recover.

Most of those whom I now address have homes of their own and I should judge from what I see that they are surrounded with the fruits in their season; but there are some I fear whose ideas of home-comforts are too contracted, for it is a fact that by far the larger part of those who own, occupy, and cultivate the land are without them. They may have a few neglected apple trees dignified with the name of orchard, in some few instances you will find some Morello cherries, (the gift of a friend or neighbor whose grounds have become overstocked with them) or a few worthless seedling peaches, these last grown from the seed of some peach of unusual excellence, which seed has been saved and planted under the mistaken delusion that in this case "like would produce like." But no grape-vine has found its home there, no pleasant arbor or porch is sheltered by its grateful foliage or perfumed and made pleasant with its luscious fruit; they are content to gather their grapes in the woods disputing for their possession with the wild beast of the forest. That which can be so easily procured and at a

small outlay is never bought or planted; they seem possessed with the idea that such choice fruit is to them a forbidden thing.

There are however many noble exceptions to this rule—homes where not only the grape, but the sweet cherry, the luscious pear, the plum, and other choice fruits are gathered and used freely as home necessities.

Most of our ideas of grape culture have been derived from hot-house practice. The necessity of a thorough preparation of the soil by deep culture, under-draining, and expensive manuring has been held as an absolute prerequisite, until many who would have entered upon its practice, in a small way at least, have been driven from it and their attention given to some seemingly easier pursuit.

Now, on the contrary, those who have been, and still are advocates for the old practice or a near approach to it are held by many modern cultivators in derision; they point exultingly to vineyards which with only such cultivation as one should give a well prepared cornfield are making splendid returns for the labor and capital employed.

I believe that the deeper and the better the preparation, all else being equal, the better will be the final result. So vigorous and hardy are many of the varieties now in cultivation that they will surmount neglect and produce good returns even under *no treatment;* superficial observers are thus led to draw erroneous conclusions and decry all methods when they see success so easily attained.

As to what soil is best adapted to the growth of the vine,let me say that any soil well prepared will give satisfactory results. The very best success can only be secured however by understanding well the wants of the vine, and then creating as near an approach to that condition as possible. Vines succeed best in loose, friable soils, such as do not retain water, and where the drainage is good; if then you have a retentive soil or a subsoil that is compact, so that the drainage is imperfect you should so far as possible remedy those defects. I do not attempt to give you explicit directions for each peculiar soil, but only state a general rule. To you who would plant for home use, I would not be understood as saying that you cannot grow grapes without complying with these conditions; *they will grow if you will plant them*, though plaecd under the most unfavorable conditions; but I repeat, the better the preparation the better the result. Something is gained by the growing of the grape besides the fruit. I hesitate not to say that I think the culture of the grape is the most instructive branch of Horticulture. Once well understood and practiced it attracts and stimulates the most negligent and slothful. It furnishes *practical education*, the result of a close study of the habits and growth of the vine, with the pruning and training necessary for the best results. The practical education thus commenced, studied, and applied, is founded upon a great principle alike suited to orchard trees as to the vine, producing in either case similar results. This principle kept constantly in view and carried out in the

successful treatment of the vine viz: the adaptation of the crop to the capabilities of the plant is found, I repeat it, to be alike applicable to our orchard trees. The necessity of so doing with the vine has been made the law, while the same necessity exists with regard to our fruit-trees but has never been sufficiently insisted upon.

This training and pruning of the vine has become reduced to a system and the success following it has clearly demonstrated its necessity.

Societies have been formed to ameliorate the condition of the laboring brutes, to protect them from their hard taskmasters, but few sympathizing friends have raised their voices for the crushing, rending, breaking cruelty to fruit trees. They blossom in beauty, they cover themselves with the foliage so pleasing to the eye—time rolls on and the red and golden fruit peeps out from the green which enshrouds them, man looks on and sees from day to day the bending bough drooping to the earth pleading for relief, but no relief comes.—That which was so shapely and beautiful becomes by man's neglect or cupidity distorted, broken, and almost worthless. If the vine system had been applied, the trees would have maintained and increased their fair proportions, the fruit would have been larger and better, and the owner have been amply paid for all his extra labor.

In some few instances this has been practically demonstrated in its application to fruit trees. The peach especially has been subjected to this system.

When the fruit has been thinned out, or more correctly speaking when it has been proportioned to the capacity of the tree, when the wood has been shortened in and the superfluous parts removed, the results have been precisely similar to those produced under the same treatment of the vine. Carry this principle into your orchards and you will not only grow finer fruit, but what is perhaps to you individually of fully as much importance, you will find a ready market and better prices; for this rule holds good, that while fine fruit is eagerly sought for by the buyers, poor fruit is as certainly neglected. Good fruit, ready sale, and good prices on the one hand, poor fruit, dull sales, and empty purses on the other.

I have alluded briefly to some of the pleasures and advantages to be derived from the culture of the grape; think not however that grape growing is all sunshine. It is true of this as of all other varieties of fruits, they need care and intelligent attention.

Insects injurious will need to be carefully exterminated, while those which aid you and are your friends must be as carefully protected.

There must not be any strong competition between the growing vine and the growing weed; if you will look carefully after the weed growth, the vine growth will be satisfactory.

The grape is not alone however in its demands upon your labor and must not suffer in your regard on that account. The time was

when the apple was so entirely free from insect depredators that it could be safely eaten at any time without fear of disturbing them; but it is not so now; the Codling Moth has found an abiding place there, and you who expect good, sound, marketable, paying crops of apples must not longer be content to let them grow themselves, but must exterminate that pest and all others which prey upon your apples.

So of the grape, there are some insects which you will need to look after to insure fair crops. You need not feel alarmed nor discouraged because of these insects; a resolution to succeed, a little watchful care will richly repay all outlay of time and labor while the education afforded in this way will extend until your entire crop will be benefited by it; for the truth exists notwithstanding it has been so long buried under the crust of ignorance, that all your crops have their especial insect enemies, and as you extend cultivation either of the cereals or fruits, you afford food and nourishment to your enemies.

Every source of enjoyment, every comfort or luxury is but a means when rightly used and appreciated, by which home is made pleasant and attractive.

Our homes are in this respect too much neglected. Let us strive then to make them lovely and beautiful too look upon; let us surround them with the fruits in their season, with flowers and shrubs that in their loveliness and usefulness shadow forth God's munificence, love, and bounty. Let us add the grape also both for the beauty of its foliage and its rich clusters of fruit. Let us study its habits and wants and in so doing educate ourselves for greater usefulness.

Let us above all teach our children to take an interest in all these, so that in after years they shall remember with pleasure the place and the associations which surrounded them in their youth.

DISCUSSION ON GRAPES.

MR. WIER—*Mr. President*—I understand you to say, that in the growing of Grapes, the better the preparation of the soil the better the result. I think I have some facts upon this point. I know a man who had read in some of our books that he must trench the ground two or three feet deep, and add half as much manure as soil if he would succeed in growing grapes.

Accordingly he set to work and trenched a piece of ground, two rods wide by sixteen rods long, and planted Catawba vines. After filling up his trenched ground, he found that he had *one* vine left; this his wife claimed, and she wanted him to plant it near the house, for the benefit of its shade. He did so—planting it in the sand without manure; and now for the result. The vines upon the trenched land did not thrive, and finally actually died, while the vine near the house grew,

and was exceedingly productive, and one season matured a crop of 300 pounds. This does not look as if the better the preparation the better the result.

Now, a person that did not know anything about grape culture, would say, that the President of our State Horticultural Society says, "the better the preparation the better the results," and might be led astray. I have grown grapes without any manure, on a soil that was good enough for plastering houses. I do not understand that we need as rich ground for grapes as we need for corn. The most of our ridges are good enough for grapes without manure.

MR. GALUSHA—I would not like to have the idea of non-culture which is here advanced, go out as if it were indorsed by this Society, for such is not the fact. We know that the grape will adapt itself to a great variety of circumstances and soils. It is a fact that our native grape vines, and especially the Concord, have inherited from their ancestors an original, hardy constitution, and great power of endurance, and hence will bear much neglect; but is this any reason why they should be neglected, or why it would not be better to give them needed attention and care. It pains me to hear these remarks of gentlemen, for it will tend, I fear, to encourage neglect. There are gentlemen here who have traveled this State over and over, from one end to the other, and have seen vineyards in every conceivable state of care and neglect, and I ask any such gentleman, who has observed our vineyards from year to year, if it is not true that care and culture produce the best results—the largest fruit and heaviest crops?

MR. WIER—I would give fair cultivation.

MR. GALUSHA—I believe in thorough culture and frequent stirring of the soil for all crops. Soils frequently stirred absorb most freely the manurial gases and dust particles from the atmosphere. That has been sufficiently proved. *Cultivation* and *pulverization* is *manuring*—and is most effectual. You may put manure upon a lumpy soil, and not pulverize it, and you will not get as good results as you will in any other part of the field not manured, which you have thoroughly cultivated so that you get all the benefit from the atmospheric manure. The pulverization without manure usually gives a better crop than manure without pulverization. This theory of good cultivation is no mistake. It will hold good. I have made this matter a study, and I know that good culture—and not poor culture—pays.

DR. HOOTON—Was not the effect, in the example Mr. Wier mentions, the result of digging holes?

MR. WIER—Where this experiment was tried was upon sand, and not where water could stand. I say more—You can manure corn till you will fail to get a crop. Mr. Galusha would manure his orchard. I would ask if you have not soils that should be made poorer for apples instead of richer? I know such soils; this is not a new thing. I have had grape vines grow and do well on soils as poor as you can imagine. I have grown grapes for ten years, and had good crops on soils not rich, and I can still do it.—I will guarantee this. We need cultivation, it is true, but not manure. If there are soils too poor to grow apples and grapes they must be very poor!

DR. HOOTON—I understand Mr. Wier to say, that in the example he has mentioned, the manuring and cultivation given were in the highest style of the art. The question is, how shall we know when we are putting on too much? Excessive manuring may destroy our plants, but a reasonable amount can't hurt the soil around Centralia.

MR. HILLIARD—Mr. Wier has advanced an idea that I never heard before, that you can injure corn with manure! [Laughter.]

MR. GALUSHA—"Brains" make the best manure. You must know what is in the soil if you would know what kind of fertilizers to use. Suppose the soil about Centralia is new prairie, rich in humus, with considerable ulmic acid in it, it is not then a suitable soil for the grape, although very rich, until the excess of ulmic acid is neutralized. You must put your brains at work—experimenting and observing results, and you will soon know just what manure and what conditions it requires to insure good crops of grapes. Few soils, perhaps none, contain all the elements, and in the best proportions, for any kind of fruit or cereal. *Brains*, applied in the right way, must supply the deficiency.

I know a vineyard, to which I have before called the attention of this Society, of which the soil one year before planting was nearly level prairie, black and exceedingly rich in humus; this was subsoiled, manured with a hundred large loads of barnyard manure, three hundred bushels of lime, and a hundred bushels of ashes to the acre, all well incorporated in the soil. The ground was thrown into ridges, and grapes, pears, apples, and cherries planted. All varieties of fruits have borne well there for six years, and the ground has been well cultivated and

manured every year. Among the grapes bearing good crops of large clusters are Allen's Hybrid, Delaware, and Rebecca. The crops of Delawares, Hartfords, and Concords are immense.

I know another Concord vineyard upon a sandy soil which usually bears good crops of sweet fruit without manure; but it is manured with "brains" and muscles too, the entire vineyard being kept pulverized as finely as can be done with a garden rake, and a plank crusher to grind the soil to a powder.

MR. WIER—What if the gentleman had put on stable manure and did not put on the lime and ashes?

MR. GALUSHA—I would say in that case, he did not manure with his brains. [Laughter.]

DR. HUMPHREY—It is not over rich ground that we want for grapes. If we find that our land is too rich and fat, we had better take some of the "fat" out of it, by seeding it in grass for a few years, and then it would be in a good state to put in to grapes.

PRES. STARR—I do not know, but that you may expect an explanation from me. I said, and still say, the better the preparation the better the result. Excessive manuring would not be good preparation. I said nothing about manure. I would get away from the idea of "hot-house" culture, and would encourage the thorough preparation and cultivation of the virgin soil, as productive of the best results. I am sorry gentlemen, you did not get a better hold of the illustration.

MR. WIER—I understood you myself. But those who go back to the books,they get just this principle—"the hot-bed process." It burns the vines up. I was afraid your remark might lead the novices in grape culture astray.

PRES. STARR—They must be better informed.

MR. WIER—I would say just one other thing. I find I can raise a great deal of manure right on the ground, and since I adopted this plan of plowing in the natural manure grown upon the land, I can see a vast improvement in the productions. I now grow twenty bushels more of corn to the acre than before I adopted this practice of plowing under the natural food for plants; and I now apply to many crops, no other food.

MR. FLAGG—There seem to be some very contradictory facts. It is known that the Delaware grape is grown successfully, upon just the

conditions that is here stated are so dangerous. I have seen the Delaware grown over manure in just this way, and under the influence of one of the most powerful manures, that of *bones*. I do not pretend to account for the facts. I wish to call on Mr. O. L. Barler for his facts and experience in the culture and treatment of the grape vine.

MR. BARLER, *Alton*—I shall certainly not be influenced by what I hear to-night to go home and commence any systematic neglect of my vineyard—certainly not after all the care and attention I have given it in the past, and the excellent returns that it has made me. What is worth doing at all is worth *doing well*. I am aware that of late years vineyards are not always paying institutions, but how the no-culture system is going to help the vineyardist does not come in my "way of thinking." It strikes me that this would only be making bad worse. Far better would it be, where grapes do not pay, to grub up the vines, and plant corn, or other crop in which you have confidence, and that will reward *good culture*.

I ask myself, can it be possible, that which I hear—that neglect of culture in any crop—a garden overgrown with weeds—a vineyard turned to a wilderness—can in any way profit its owner, and not damage his credit?

I respect the opinions of these gentlemen of experience who say these things, and can only put it up in this way:—grape growing is not their business, and they are, after all, *mistaken* in this matter. The fact that has been stated, that the vine will bear rough usage—if smitten on one cheek it will turn the other—and under the worst circumstances, bring the owner a half crop, which if found in the *grass* looks *big* indeed, —proves nothing favoring non-culture. Why, sirs! if you should find the heavy rich clusters that I grow upon clean land, nicely tied up on their wire trellis, I say, if you should find such a crop, say ten tons to the acre, in the *grass* and upon the *ground*,—you would never cease speaking of it as one of the wonders of the vegetable world. It is because you find your small grapes on smaller bunches (than ordinary)—*sweet* though they may be—in so *wretched a place*, that you think they are *so many* and *so fine*!

I remember when we used to gather our strawberries wild from the woods, if perchance we were fortunate enough to find a few quarts, we would tell of it, and how sweet they were! But how mean a product in size and quantity, when compared with our cultivated crops that

produce from 200 to 300 bushels to the acre! I think gentlemen are mistaken, honestly mistaken. Had this idea been advanced in our Alton Horticultural Society, I should have been tempted to meet it with a sharper reply than here, because the vineyardists around Alton *know better*.

MR. MILLER, *Iowa*—I do not wish to be understood as *recommending* growing of grapes in grass to any one. It was not my *intention* to have a crop of grapes, in my case, and I purposely abandoned my vines, I expected nothing from them; but without my attention they grew and prospered, and bore a crop that surprised me. I have stated the facts. I do not know what the ultimate result may be.

MR. WIER—For one, I believe in growing grapes in grass for the reason that it does not pay to give them cultivation; we can't get any money out of our grapes. A few men who are favorably situated as to soil, climate, and the market can, perhaps, grow grapes and sell them, but for us there is no money in them.

MR. EDWARDS—If I had been fortunate enough years ago to have had the instructions you have given here this evening, I might have had grapes to eat long before I did; but I had formed an idea that grapes could not be grown without a great deal of trouble and extra care. So I postponed planting the vine, until I could give it needed attention. I am thankful that you have introduced this subject, and yet I believe many will plant vineyards, and tend them in a careless, loose way, expecting to reap a harvest, and will be disappointed. I had a few vines of the Clinton that were left without cultivation, and for three or four years they gave us some fruit, but for the last five years they have not fruited. I am of the opinion, that the neglect system will not do to depend upon for a long series of years.

THE PRESIDENT announced the next thing in the regular order of business to be

DISCUSSION ON STRAWBERRIES.

DR. HUMPHREY—We have given up, pretty much, the cultivation of all varieties save the Wilson and Green Prolific. I think the Green Prolific bears more berries than the Wilson, and will bear one or two more pickings than that variety; the berry is firm and ships well.

I have one patch of Jucunda strawberry, that has borne well for four years. It is on clay and gravelly soil, has good culture, and is

mulched with leaves. We prefer to plant in the spring; if fall planting succeeds, we get more berries the first season—perhaps half a crop—and the second season a full crop.

MR. CLAYTON—Please describe your process of setting out.

DR. HUMPHREY—We set out just the same as we would set out tomatoes or cabbages.

DR. HOOTON—We have but two good strawberries here. I have tried ten or twelve different varieties, and have settled down upon the Green Prolific and the Wilson as standard sorts. Of course, there are others that I would not be without, but these succeed the best. The Green Prolific, however, is rather soft for market. In some respects the Colfax is a better berry than the Green Prolific; and to my friends who wish to get rid of the weeds, I recommend the Colfax, for it will kill out the weeds and everything else, and completely occupy the ground; it is worse than white clover in this respect.

The Wilson succeeds finely—nothing does so well. I have tried Knox's Seven Hundred and I can do nothing with it; I never got a berry from them. I tried Charles Downing, and this served me in the same way.

I have planted the Wilson in hills and in rows, and have settled down upon the plan of planting in rows of thirty inches, by fourteen between the hills. I plant with a trowel, opening the ground so that I can put the plant down and draw it up, till the crown is just at the top of the ground, avoiding doubling up the roots of the plant.

Voice—Have you any Crown-borers in your strawberry plantations?

DR. HOOTON—We have; some have had their plants damaged by them. They have not damaged my field yet. After planting I give thorough cultivation with the plow and hoe. I do not cultivate after the middle of August. Sometimes I have not been as thorough as I should be.

MR. CLAYTON—How do you clean the hills of runners?

DR. HOOTON—I do it with hoes in the hands of boys. I set them to work, and walk behind them to see if they do it right. You cannot trust them in your strawberry field behind your back. They will cut up one-third of your plants; there is no such thing as delegating labor here; yourself must direct it.

If you are going to get a full crop of berries you must go into the patch, and, as you have been told, "manure with brains." I mulch with

straw,—as leaves are likely to be blown away,—there should not be a vacant place upon your ground.

MR. MILLER—How long can you keep a strawberry field in bearing?

DR. HOOTON—This is my fourth year, and I think I can keep it in good bearing order for another year; I keep up the cultivation; I first use a plow that simply lifts the ground, without turning it over, running from twelve to sixteen inches deep, then take the cultivator and the harrow, and finish up with the hoes—cleaning all up nicely.

MR. MILLER—How many bushels of fruit do you get to the acre?

DR. HOOTON—Last year I got from fourteen to fifteen thousand quarts from four acres. I never set plants in the fall or in the summer; it is an expense for nothing. The spring is the time to set your plants and get them in as early as you can; and the next spring you will get a better crop than you would with fall planting—and what is very important—you will have a better stand of plants on the ground. If you will try this plan I think you will not wish to plant at any other time.

Before the plants start to grow the second spring, open up the mulch and leave it upon the ground as a protection to the plants, and then the pickers can get down upon their knees, and work easily. Keep the pickers in the space between the rows, and never let them get on the plants. I never let a team and wagon drive upon my strawberry beds. I think it is a fair conclusion, that if you are thorough and neat in your strawberry culture, you will be most likely to get your reward.

Voice—Do you use any fertilizers on your strawberry beds?

DR. HOOTON—Yes, sir. I have applied two barrels superphosphate on two-thirds of an acre. I also put on one wagon load of ashes, on rows by the side of those which had the phosphate—same kind of plants—and the result was quite satisfactory.

I also put one barrel of land plaster on two-thirds of an acre, sprinkling the plaster around the crown of the plant. Where the land plaster was applied, there were more berries but not so large, and the foliage was not so abundant as where I applied the phosphate; the plants upon which I put the phosphate were the most magnificent I ever saw; they stood fully one foot above the ground.

Voice—What time did you make this application?

DR. HOOTON—Soon after picking the crop—and all about the same time.

PRESIDENT STARR—What was the effect of the ashes?

DR. HOOTON—It increased the foliage, and considerably increased the berries. One of the most peculiar effects was, the berries had the most brilliant gloss on them I ever saw, but those where the phosphate was applied were the largest.

Voice—Do you keep an account of the yield of berries?

DR. HOOTON—I do; but I have not with me the figures, and cannot speak the exact yield.

Voice—What is the expense of the fertilizers of which you speak?

DR. HOOTON—The superphosphate, I think cost about five dollars and fifteen cents. The plaster, four dollars and fifty cents. The ashes, the cost of a man and team to haul them, say one dollar and fifty cents.

MR. EARLE—I wonder how those who applied the phosphate liked the job? [Laughter.]

MR. CLAYTON—I like these careful and minute statements. It looks like and implies good culture.

MR. BARLER—What do you think of the practice of some in mowing off the leaves of the strawberry plants after fruiting?

DR. HOOTON—I don't approve of the plan.

MR. ESSEX, *Dongola*—I use a tool for cutting off runners, which I get made at the blacksmith shop. It is inexpensive, and with it a man can trim his plants as fast as he can walk.

DR. HOOTON—I have tried this process, and have quit it. I find that it pulls up a great many of my plants, in spite of all I can do, and this is what I will not allow. I forbid anything that makes vacant places in my strawberry beds.

MR. CLAYTON—I would like to hear from gentlemen from other parts of the State. What are their experiences, as to soils, manures and manner of culture?

MR. FREEMAN, *South Pass*—I believe in the application of manure to this crop, if it is done early in the season. I once applied to my strawberry crop a preparation of gypsum and poudrette, about one-half tablespoonful to the hill. The land was thoroughly prepared, and subsoiled,

and the yield was very large and profitable, although I got but fifteen cents per quart for the berries.

MR. MILLER—How much do you think the application benefited you in the crop?

MR. FREEMAN—About, I should say, twelve hundred dollars on the one and a half acres—for without the fertilizer I do not think I could have got twenty dollars out of it.

MR. WIER—I would recommend Cramer's Seedling strawberry as a very valuable berry for family use. It is not fit for a market berry, but you can use it with less sugar than any other, and for canning purposes I know no better; the color is too dark, and it is too small for the market.

MR. EARLE—I would like to ask Dr. Hooton, if he has compared the hill-culture system with the row system of his neighbors, so as to tell which gives the best yield

DR. HOOTON—I do not think I have any statistics, but I believe my neighbors think my strawberry crops are about as good as any one's; and my practice is to me satisfactory, and I shall not change.

MR. EARLE—I think some, by the row system, have heavier crops—perhaps double—with the expense of one cultivating. Still I think the hill system is very nice.

MR. FREEMAN—In Southern Illinois the soils, except the bottom lands, are rather destitute of humus, and we have a drouth just at the time of ripening of the berries, hence the importance and benefit of the application of gypsum or some fertilizer to help the plants.

DR. HOOTON—There is one fact, to which I wish to call attention. I hear it stated, that in this locality a large number of plants have died, that many whole fields have died outright,—while my fields, under this system have not died. There are very few good healthy fields in this neighborhood. I would like to know if this is so elsewhere.

MR. CLAYTON—Which system do you think will last the longest?

DR. HOOTON—I think the *hill* system will preserve the plantation longest. I think this system will preserve the plants in a healthy condition for four years.

MR. SCOFIELD, *Freeport*—I have never been successful in the cultivation of strawberries. I have a neighbor who has for five years raised

annual crops of splendid berries, and grows more on one hill than I grow, in the row system, on one rod. His crop is enormous! In regard to the dying out of the plants, I have noticed this—I have in mind a plantation near Freeport that has thus died out; I have myself a plantation of the Wilder—or did have, but I find not a single plant now. In another plantation, under cherry trees, I find a few plants. The Wilson has stood the test.

MR. DAGGY—At Onarga, we have strawberries cultivated on the "broadcast" system, and it produces more berries than any other system, and I have known them to last for four years. The soil there does not go to weeds, as in many places, and this may favor our practice.

MR. EDWARDS—We used to grow strawberries for the Chicago market, but since that market has become glutted, we grow them for our own town. We grow them on the "broadcast" system. I have tested, perhaps, fifty varieties, but have now settled down on Dr. Humphrey's list—the Wilson and Green Prolific. In regard to the Cramer, I can endorse what Mr. Wier says. It is good for family use. We have tried the plan of mulching with corn-stalks, and we think them the best mulch that we can use, as it brings no weeds. I have never known of any special fertilizers being used in our section of the country. It is said that plantations will remain good for four years, although I have known plantations to remain good for seven years, and that on the broadcast system.

MR. MILLER—I know a plantation that has borne good crops for seven years, and the only attention that is given to it is to harrow it once a year, with a large two-horse harrow.

MR. GALUSHA—I have grown good crops of Wilson strawberries for five successive years, on light, sandy land by mowing off the weeds and old leaves every year after the crop is gathered. The patch was manured with barn-yard manure once—late in the fall—during the time. A good crop can be grown in this way, though a better method is either cultivation in hills or rows.

MR. FLAGG What proportion of the leaves of the plant do you cut off in the mowing?

MR. GALUSHA—Only the older leaves; probably one-quarter. All the new and best leaves are left.

MR. NELSON—I know a man who plants in rows three feet, by one foot in the row—cultivates the next season—the next year he pulls out weeds, and then lets the runners take the ground. After he has gathered the crop, he plows up the old row, and rolls the land; the next year he gets a good crop from the new plants, and after harvest goes through the same operation.

MR. HAMMOND, *Warsaw*—I have settled down upon the Wilson as the best strawberry. I cultivate in rows and have obtained the best results from top-dressing with barn-yard manure; I think it is just as good as any of the special fertilizers.

MR. WESTGATE—When I undertook to grow strawberries I started my patch thirty inches by twelve inches, let them remain two years, and then practiced the renewal system and I like it.

MR. SCOFIELD—I move we adjourn. Motion carried.

SECOND DAY.

MORNING SESSION.

PRESIDENT STARR in the chair. Meeting opened with prayer by Rev. I. S. Mahan.

THE SECRETARY exhibited a volume of colored plates of Fruits and Flowers, which had just come to his hand as a present to the Society, from the artist, Mr. William H. Prestelle, of Bloomington, Ill.

On motion of Mr. Earle the thanks of the Society were unanimously given to Mr. Prestelle for his beautiful present.

The regular order of business was taken up.

THE PRESIDENT calling for Mr. Daggy's report, Mr. Elias Daggy, Vice-President in the Fourth District, then presented the following

REPORT OF THE FOURTH HORTICULTURAL DISTRICT.

Mr. President and Gentlemen:

I have endeavored to act upon the suggestions made at our last meeting, on the subject of condensing reports as far as may be possible not to destroy their value.

I am compelled however to report each county independently—instead of giving a synopsis of the various subjects reported upon—on account of the tardiness of correspondents, as most of the counties still remain to be heard from.

MR. FRANCIS, of Sangamon, reports the fruit crop too large to be appreciated.

"APPLES ripened prematurely, and the trees were affected by leaf-blight to some extent; while the early peaches were badly injured by the curculio.

THE PLUM crop was also heavy where protected from curculio, but badly damaged by a kind of blight or rust.

THE LAWTON BLACKBERRY was winter- (or rather perhaps) summer-killed while the Kittatinny bore a good crop and commanded a high price.

He also states that insects were quite abundant, but the fruit crop was so very large that their depredations were scarcely observed—was not successful with Wier's moth trap on a limited trial—and thinks the apple bin the best moth trap of which he has any knowledge."

MR. CAPPS, of Logan, thinks that success depends upon the adaptation of varieties to soil and climate, and attaches very little importance to protection by timber-belts. He mentions Early Harvest, Carolina June, Summer Rose, Keswick Codling, Sops of Wine, Red Astrachan, Pomme Royal, Maiden's Blush, Rambo, Aut. Strawberry, Snow, Fall-Pippin, Mother, Rawles' Janet, Domine, Ladies' Sweet, Winesap, Jonathan, Smith's Cider, Fulton, Wagoner, Ben Davis, Newtown Pippin, Milam, and Willow, as twenty-five favorites out of one hundred and sixty sorts fruited on prairie loam.

The most successful pears are Bartlett and Flemish Beauty, as standards, and Belle Lucrative, Duchess De Angouleme, and Seckel, as dwarfs—out of more than fifty sorts fruited.

Thinks heavy mulching or red clover better than clean culture for the orchard, and especially for the pear orchard.

Early peaches rotted badly, but the crop was heavy.

He introduced the "Alexander" as a new seedling having ripened as early as the 18th of July—three weeks before Hale's Early, and possessing the rare qualities of extra earliness, attractive appearance, pleasant smell and agreeable taste.

The sweet cherries were a failure generally, while the Early May, English Morello, and May Duke, produced good crops; but the plums are all given up to the curculio.

Ealy Golden Apricots abundant—but it is useless to waste time with Nectarines.

Quinces produced a moderate crop.

Concord and Hartford grapes did well but some twenty other sorts failed on account of unhealthy foliage.

Wilson and Green Prolific, our best strawberries, but the crop was short this year.

Lawton, winter-killed. Kittatinny, more hardy. Doolittle, Miami, and Philadelphia raspberries have proven the best.

Less damage done by insects than for some years past. Codling Moth scarce.

Have had three dry summers in succession.

MR. H. J. DUNLAP, of Champaign, reports another very dry season, yet an abundant fruit crop except *Strawberries* which were damaged by the previous season's drouth, and grubs, both white and brown.

Currants and *Gooseberries* plentiful but not profitable as a market fruit.

Of *Raspberries*, he mentions Davidson's Thornless as early, Doolittle for quality, and Miami for late crop.

Blackberries, badly damaged by drouth.

Grapes produced a heavy crop, suffering but little from insects; the Concord still holds its position as a favorite.

Early May *Cherries* produced a half crop; Late Richmond and English Morello good crops—while other varieties produced only enough to entice the birds and ants.

Quinces produced a partial crop.

Peaches plenty, as well as curculios. Hale's Early rotted as usual, while Early York, Early and late Crawfords, and Honest John ripened well.

Pears were abundant, of leading varieties—without damage from blight.

Apples, abundant with an excess of summer varieties, while good keeping varieties are demanded—especially a good sweet apple. If I had Doctor, Professor, or Judge before my name I might venture a suggestion to fill this demand.

MR. MERTON DUNLAP, of Ford County, says their orchards are young in his county, but the *Northern Spy* and *Prior's Red* are favorites, while the *Snow* is superceding the *Rambo* on account of its great productiveness.

Thinks people buy and plant on *reputation*—without regard to adaptation of varieties to soil and climate—and mentions *Sops-of-Wine*, *Standard*, *Razdes' Janet*, *Winesap*, and *Willow*, as the very best. He recommends the *Osage Orange* as a windbreak rather than the *White Willow*—or the sprouting *Silver-Poplar*—and also the *White Ash* as a shade and timber tree.

The *Early May* is the only reliable CHERRY among many sorts tested.

Of GRAPES, the *Concord* and *Clinton* have thus far given the best satisfaction.

The *Soft Maples* are nearly destroyed by the borers—and although the Ash Leaf seems to be the coming tree—people are greatly inclined to purchase something new if offered under a fascinating name. Thinks also that if the Transactions of this society could by some means be placed in the hands of every farmer, the county would be greatly benefited—so say I.

In Douglas county we have had a fine crop of *Apples*, *Pears*, and *Peaches*, with a good showing of *Grapes* and *Raspberries*, while *Strawberries* and *Blackberries* were nearly a failure, and *Cherries* were unusually scattering.

Insects were less injurious this season than usual, or rather, the crop was too much for them.

Tree planting has not been very successful for two years on account of the drouth. The borers are not satisfied with the Silver Maple but have attacked the Ash Leaf also.

I have received reports from the four counties above named which are only one fourth of the district exclusive of my own county.

While I regret that so few correspondents reported, I am inclined to the belief that they are a fair indication of the condition of the whole district and you are relieved from the great addition they would have made to my report, which is already long enough.

Very respectfully,

E. DAGGY.

DISCUSSION UPON APPLES.

THE PRESIDENT—The first branch upon this subject as laid down in the programme is Nursery Culture.

MR. DAGGY—While others are getting ready to speak, I wish to say that most customers who come to our nurseries, choose trees by their appearance above ground; they want *large* trees. I think it is a grand mistake, and sometimes a fatal mistake. These trees have not been root-pruned, or transplanted, for we cannot afford to grow trees to the size that is wanted, and give them the treatment that they should receive. The *roots* of nursery trees are more important than the tops, and the former should be increased rather than the latter. But we can't get the people to take small trees. If you keep trees on hand, they should be root-pruned; which increases the numbers of small roots and at the same time checks the growth of the tops, so they do not appear as thrifty, and hence we can't get customers to take them.

My attention was recently particularly called to this: a man who is one of the best tree growers in the county, who knows but a few varieties, but grows fine fruits, came to buy trees. I showed him my root-pruned trees, but could not get his attention to them, until I had taken them up and showed him their roots.

But we can't afford to transplant large trees, and sell them at the price demanded. I cannot afford it. I would like to hear from others on this point.

DR. HUMPHREY—I would ask Mr. Daggy if he would not like to have his customers go through his nursery and pick out all the big trees?

MR. DAGGY—Oh yes. I am always glad to see them do this. My point is, we can't afford to grow trees four or five years old, and then sell them at the same price as younger trees with equally large tops but less roots.

DR. HUMPHREY—I think it is the experience of all intelligent fruit growers that trees not more than three years old make the best growth in the orchard. I believe that two years old trees are the very best size and age for setting, and I believe that in seven or eight years they will be from one-half to two-thirds larger than trees that were four or five years old when set.

MR. DAGGY—I have noticed that this recommending young trees is generally regarded as a kind of trick of the nurseryman to get off his stock, (I don't know but it is a trick,) and the idea of going upon the prairies and planting little switches seems to many preposterous. But we have tried it, and can testify that it can be done successfully.

MR. VICKROY, orchardist and gardener for the State Industrial University, presented the following statements of experiments at that Institution.

REPORT OF EXPERIMENTAL GRAFTS FOR 1871-'72.

VARIETY.	Cut of Cion.	Cut of R't.	Average Growth 1871. Feet	Inches	Average Growth 1872. Feet	Inches	Per ct. Living, 1871.	Per ct. Living, 1872.	Rem'ks.
Ben Davis	1	1	1	3	3	8	90	70	These were grafted Feb. 5, 1871, and wrapped with waxed [illegible] and packed in saw dust, until wanted for planting. They were set in Nursery, Apr 15, 1871. All treated alike throughout. They were planted on poor land without any manure. The first cut of [illegible] is the best cut and the growth the one with the terminal bud. The first cut of root is the collar cut.
"	2	1		9	3	1	70	40	
"	3	1		8	3	4	80	50	
"	4	1	1	7	3	7	60	40	
"	1	2	1	3	3		70	20	
"	2	2	1	4	3	6	80	10	
"	3	2		8			30		
"	1	3		9	3	4	30	20	
"	2	3		10	2	5	40	40	
"	3	3		10	3	5	70	20	
"	4	3		7			40		
"	1	4		12	2	5	30	10	
"	2	4							
"	3	4		12	1	9	40	10	
"	4	4		8	2	2	20	10	
"	6 inch Root.	1	1	11	3	11	80	80	
"	6 inch Root.	2		8	3	1	50	40	
"	4 inch Root.	1	1	4	3	6	80	70	
"	4 inch Root.	2	1	7	3	3	70	60	
"	2½ inch Root.	1	1	7	2	10	60	60	
"	2½ inch Root.	2		9	3		20	10	
"	2½ inch Root.	3		9	2	11	10	10	
"	2½ inch Root.	4	1	1	4	2	30	10	
"	1½ inch Root.	1	1	9	3	11	30	30	
"	1½ inch Root.	2	1	11	4	2	10	10	
"	1½ inch Root.	3	1	1	3	5	40	30	
"	1½ inch Root.	4	1	5	2	7	30	20	
"	2½ inch Root.	1 cut inverted.	1	3	3	2	30	10	
"	2½ inch Root.	2d cut inverted	1	2	3	1	60	40	
"	Root 6 times larger th'n Cion	1st	1	10	3	5	80	80	
"	Root 4 times larger th'n Cion	1st	1	7	3	7	70	70	

REPORT OF EXPERIMENTAL GRAFTS FOR 1872.

Variety.	Cut of Cion.	Cut of R't.	Average Growth. Feet.	Inches.	P ct. Liv'g	Remarks.
Ben Davis	1	1	1	11	70	
"	2	1	1	11	80	
"	3	1	1	8	50	
"	1	2	1	9	70	
"	2	2	1	8	90	
"	3	2	1	10	60	
"	1	3	1	7	60	
"	2	3	1	6	80	
"	3	3				Land was low and they drowned out.
"	6 inch Root.	1	2	6	70	
"	6 inch Root.	2	2	1	100	
"	4 inch Root.	1	2	1	90	
"	4 inch Root.	2	2		60	
"	2½ inch Root.	1	2		80	
"	2½ inch Root.	2	1	10	60	
"	1½ inch Root.	1	1	11	80	
"	1½ inch Root.	2	1	7	40	
"	Root 3 times larger th'n Cion	1	2	5	70	
"	Root same size of Cion.	1	1	10	80	
Stark,	Dressing with hot wax.		1	11	68	
"	Dressing with warm wax.		1	8	88	
"	Dressing with medium wax		2		56	

Number one to nineten inclusive, ten grafts of each, grafted Feb. first, eighteen seventy-two, using warm wax for dressing the joints, and packing them in sawdust until planted, April twenty-sixth, eighteen seventy-two. They were all planted at the same time and received the same care and attention. The roots were cut in pieces three and a half inches long and cion five inches. First cut of cion is the butt, the second next to it, and the third the one with the terminal bud on it. The first cut of root is the collar cut. Our roots were not long enough to make a fourth cut as we did last year.

There were of Nos. twenty, twenty-one, and twenty-two, twenty-five grafts each. These were grafted to see how hot we could use the wax and not injure them. The hot wax would run like water and burn the hand if touched to it; the warm wax was a little thicker but would burn the hand if held in it a second or two; the medium wax would not make any rattling noise when a spoonful was taken up out of the bucket and dropped into it again. When the wax will not make any rattling noise when dropped into the bucket, you need not be afraid of its doing any injury. You will see by the record we had about as good success with the hot wax as we did with the medium warm. The advantage of using the wax hot or warm is that it takes only about one fifth the wax.

We use a two quart tin bucket—for the wax—fixed on a frame so we can set a kerosene lamp under it, and in this way we can keep the wax about the right temperature. We use a wooden spoon—which a man can make in fifteen or twenty minutes—about one and a half inches wide, with notches cut across at the handle, wide enough to receive the

graft. Then let the handle of the spoon rest on the side of the bucket—using the bucket as a fulcrum—and by the time the spoon is raised as high as the level of the bucket, the wax will begin to run out at the notches, when we turn the graft in once, having a box of sawdust or sand at hand, we give it a turn in it to prevent them from sticking together, and the work is done. We can dress them in this way two or three times as fast as tying with thread, and we get an air- and water-tight joint. In getting an air-tight joint we need not plant them so deep and use shorter roots which seem to do about as well as long ones.

We observed this year where grafts were planted shallow they started growing sooner in the spring and made a better growth than where they were planted deep.

We prepared most all our ground by subsoiling fourteen inches. Then we prepared some by common plowing, six inches deep, and on the common plowing they have done just as well as those on the subsoiled ground.

As the ground is prepared for planting, I would lay the land off in blocks, planting the winter, fall, and summer varieties in blocks by themselves, leaving avenues crossing the blocks between the winter, summer and fall apples for driving teams through to get the trees when dug.

For marking off the ground for planting we use a line stretched across the piece to be planted, using a pair of wooden wheels, say one and a half to two feet in diameter and two or three inches thick with cleats screwed on the rim the distance apart you want the trees to stand in the rows. These wheels are put on to an axletree four feet long, with holes in it so we can slip the wheels and make them any width. We have a tongue attached to this axle, so we can draw it along with one wheel on the line. In this way we mark two rows at a time, and space grafts at the same time. Respectfully,

H. K. VICKROY.

DISCUSSION ON GRAFTING.

MR. CLAYTON—What was the per cent. of the grafts that lived on the whole.

MR. VICKROY—I should think about fifty or sixty per cent.

MR. DOUGLASS—What was the cause of the loss?

MR. VICKROY—I think the cause in great part was the dry weather.

NELSON—How long were the cions used?

MR. VICKROY—From three to four inches.

MR. PHENIX—You did not try planting at different depths?

MR. VICKROY—Yes, and found that shallow setting did best this year.

THE PRESIDENT—Gentlemen will understand that this year the loss in budding and grafting has been greater than usual, from some cause.

Mr. Wier—I have had some experience in grafting, and as for this *waxing*, it is only of use in holding or strengthening the grafted parts while handling. I have had just as good success without as with waxing.

Mr. Nelson—In regard to this waxing, I think it excludes the air too much. I have had the best success without waxing, only tying. I think this is all that is necessary, if the root is large enough.

Mr. Flagg—What do you mean by excluding the air. Is not absolute exclusion of air the best thing?

Mr. Nelson—It never succeeds so well with me.

Mr. Baldwin of LaSalle—The exclusion of the air where the graft has been cut is all well enough, but if you in any way stop the pores of a tree you injure it. If you varnish it all over, you kill it. I have used wax, and I have used waxed thread. I prefer tying with soft thread, and if the grafted part is put below the ground, it is all sufficient.

Mr. Clayton—It is a physiological law in the process of healing, that the air should be excluded from the wound. Is not this the law in grafting?

Mr. Baldwin, of LaSalle—It is well to exclude the air where the cut is made, which is sufficiently done by putting it under ground, but it is not necessary to exclude air from the part above ground. This would be injurious.

Mr. Douglass—My experience is that of Mr. Baldwin.

I have used waxed paper, but now use only the waxed thread; it answers every purpose, and does just as well as any other way. It is only needed to strengthen the graft while handling. I think now, nearly all the large nursery men have adopted the waxed thread as the best method. It is cheaply and easily made. I take balls of cotton yarn and throw them into a kettle of wax, and then lay them on a rack to drain.

Mr. Flagg—What is the composition of your wax?

Mr. Douglass—I shall have to answer as the good cook answered when inquiry was made how she made her nice pudding. She said: I take a little flour, a piece of butter, and some rasins, and ———[laughter]. That is about the way I make my wax: I take some rosin, a piece of tallow, and some beeswax, and melt them together.

Mr. Baldwin, of LaSalle—The following proportion makes a good mixture: three parts rosin, two parts beeswax, and one part tallow.

MR. NELSON—I use in place of tallow, linseed oil. I think it is better. The wax works better.

MR. COOPER—I would infer from the remarks here made, as well as from my own observation, that the object in wrapping is to hold the graft in its place, and cover the *cut* portion, and that is all that is necessary.

MR. PHENIX—Not only in reference to grafting but also to budding, we hear it said it is necessary to exclude the air. We do not find this necessary at all. We make no attempt to wrap the bud air-tight; we tie with cotton string and do not care to exclude the air. We think this practice cheaper and pleasanter. The old practice of waxing is a tedious and miserable process. I have seen buds set even without tying, but I do not recommend it.

MR. DAGGY—I am satisfied that notion of excluding the air is a kind of delusion. It is not necessary.

DR. HUMPHREY—If you have a small cion and small root you must tie; a large root does not need tying.

MR. NELSON—I have tried some experiments in this thing of fitting. The graft will often grow without fitting the barks of root and cion as generally recommended. I have taken pains not to have them fit, and have had them grow, and you will find where you examine a package of grafts, that many of them do not fit, and yet the most of these grow. But I do not recommend this kind of practice.

MR. GALUSHA—It is well known that the cirulation of sap is between the bark and the wood, and if the joining is close and neat, the cion and root will unite readily and in a short time; but if the barks of the root and cion do not coincide at any point, they will still unite, after a time, provided these parts are not so far apart as to be beyond the reach of the granulations which are formed on both cion and root in the process of cicatrizing, for whenever they meet, the union is soon effected. These granulations—except in very strong roots and cions—rarely extend more than the sixteenth of an inch, either way, from the inner bark.

But I suggest whether we are not losing sight of the points that it was intended should be discussed. I know that, in getting up this programme, the design was to have such parts of this subject discussed as would show how to propagate and grow nursery stock so as to produce the best orchard trees; I think we should not lose sight of this in this discussion.

MR. WIER—Gentlemen here lay great stress upon having the bark in grafting meet. Now, I assert to the contrary. I know that the union will take place, even if the separation is a quarter of an inch, and another thing, it does not make any difference which end is up.

MR. DOUGLASS—Does it make any difference in the planting?—[laughter.] In regard to the budding, I have seen Mr. Phenix's work, and can testify that the wrapping with string seems entirely satisfactory. It is my practice, also.

THE PRESIDENT—The practice in Alton is to use cotton string, waxed.

MR. FREEMAN—Woolen yarn is better than thread.

MR. NELSON—I used to be foolish enough to believe that if I did not have the bud covered up, it would not grow. Now, I want nothing better than an old sock that I can ravel out and tie up my buds. They need no other covering.

MR. MILLER—I would like to have an opinion as to the best length of roots in grafting. I wish Mr. Phenix would give us some light upon the subject.

MR. PHENIX—It is rather my opinion that a section two or three inches long, of a good root, is about as good as a longer root—though perhaps a six inch root would give greater growth the first season under favorable circumstances. The late Mr. Overman used roots about two and a half inches long and would not admit that longer roots were any better.

MR. NELSON—I have made some experiments in regard to ascertaining what is the proper length for roots, and have settled down upon two to two and a half inches.

DISCUSSION ON PRUNING.

MR. PHENIX—When is the best time to prune?

MR. FLAGG—What do you think, Mr. Phenix?

MR. PHENIX—I am getting into the notion that fall pruning is best. September is as good a time as any; all things considered, it is perhaps the best time.

MR. ESSEX—After the leaves fall, then prune.

MR. FLAGG—Must we wait till the leaves fall?

MR. PHENIX—I think, if I had my choice, I would begin to prune the last of August. I know some persons who prune in February, with

success, and the fact is, if your trees are in good, healthy condition and all right, you can prune at all times, except in the dead of winter.

MR. FLAGG—I saw the statement, made in the Alton Horticultural Society, that pruning in frozen weather did not injure the tree, and that apple grafts, cut when frozen, came out all right. What do you think of it?

MR. PHENIX—I know this, we very frequently cut cions in the winter, but I would not like to cut very close to the tree in frozen weather, but would trim to a long stump, and finish up in the spring.

MR. SCOFIELD—My experience has been that June pruning is the best for nursery stock.

MR. GALUSHA—*Mr. President*—One important object which the nurseryman should have in view, in pruning his trees, is to so prune as to avoid forks and double headed trees. There should be only one leading stem. If other strong branches put forth, threatening to destroy the shape and unity of the tree, I do not cut them entirely away, but cripple them—by cutting them back—and thus encouraging the main shoot; and in this way get a good tree for the orchard; one that will not split down. I would refer to the Ben Davis tree, as a model nursery tree. Get your trees as near the natural shape of the Ben Davis as you can.

MR. SCOFIELD—Have you any experience in June pruning?

MR. GALUSHA—Yes, I have; I would not like to tell all my experience here. It is my opinion that the best time for summer-pruning is just at the time the terminal bud is forming.

MR. EARLE—Are you speaking of pruning nursery stock, or orchard trees?

MR. GALUSHA—I am speaking of nursery trees.

MR. PHENIX—The perfect, model tree is to be made at two years old.

THE PRESIDENT—"As the twig is bent the tree's inclined."

Voice—At what height would you top, or cut back your tree?

MR. PHENIX—I would make heads little higher than I used to, but vary the height according to the habit of the growth of the tree.

But about your model trees, that you talk about. I think gentlemen will find that there are some varieties, the Primate, for example, and Rhode Island Greening and some others, that all their cutting back and

coaxing will not *straighten*. I do not like to sell crooked trees, but you take such varieties as I have mentioned and you cannot help yourself; they won't grow straight. Another crooked grower is the Stannard—Mr. Dunlap's tree—It is a perfect abomination to the nurseryman.

MR. M. L. DUNLAP—It wants a little moral suasion and cutting back to bring it into shape.

It is a remedy for the crooked growing varieties to cut them back near the ground at one year old. I know a man who adopts this practice upon all his trees, with good results.

DISCUSSION ON ORCHARD CULTURE.

THE SECRETARY—I would like to hear from Judge Baldwin upon the subject of Orchard Culture.

MR. BALDWIN, *La Salle Co.*—I do not know that I can impart any light upon this subject. If I were going to cultivate trees for myself, I would like to begin in the nursery, where I would plant them about one foot apart, and let them grow till the third year, when I would transfer to the orchard, setting the trees twenty feet apart, so that the trees might occupy the ground and shade each other. I would cultivate for five or six years, until they came into bearing. Perhaps, heavy mulching would do as well but I prefer the cultivation. I would not seed to grass, especially at this early age, for I am convinced that a crop of grass in a young orchard is injurious.

After the trees have grown so as to shade the ground, I would seed to clover, and plow up every few years; a little barnyard manure will not hurt them. I would prune sparingly till they come into bearing.

MR. MILLER, *Iowa*—Have you ever seen an orchard where the trees were set ten feet apart?

MR. BALDWIN—Yes, I have, and never saw a better.

MR. MILLER—Have you ever seen them planted thirty feet apart?

MR. BALDWIN—Yes, and they were more affected with drouth. My first planting of an orchard was thirty feet apart.

MR. COOPER—I will relate my experience. In the year 1856 I set an orchard on my farm in Iowa, the trees sixteen feet apart, and trained them low; I cultivated the ground in vegetables and small fruits, such as would not be in the way of the trees, being careful to keep the plow from breaking the roots; I cultivated in this way for a few years, until they shaded the ground, when they were able to take care of themselves, with the exception of running the cultivator to keep down the weeds.

In six years after I planted this orchard I left the farm; last fall I went back there, and learned that this orchard was the most successful of any in the country; the trees completely covered the ground and were annually loaded with fruit.

DR. HOOTON—I would like to hear from Mr. Flagg.

MR. FLAGG—I do not know that I can say anything new, or particularly instructive.

I have trees that were planted in 1822, and I have trees that were planted last year; and between these dates many plantings have been made, as in 1842, 1857, and 1858.

The first orchard that I planted, I put the trees forty feet apart. My next planting was thirty-two feet apart, which I think is a very good distance—for our latitude. But, perhaps, there is too much waste of land, at this distance, when the orchard is young. The pruning in my earlier orchards was not well done. Crotches were allowed to form, making hollow and rotten places in the trees, and often causing them to break down. In my later practice I prune to one stem with lateral branches; this, I believe, is Mr. Galusha's plan.

In my orchards planted forty feet apart, I filled up with peach trees—planted half way between. So I have stated, in my old orchards I did not prune enough; indeed, I did not prune at all, till I was obliged to, then I found I had to cut off great *legs* of wood, which could only be the *least* of two evils. I do not approve of the low-head plan, because it makes too much dead air in the orchard, inducing fungus and blotches on the fruit. I find that the lower limbs do not ripen their fruit well. So that I am inclined to think that we do not want low-headed trees, especially if closely planted; I prune the stems to three or four feet.

I have recently planted one orchard sixteen and one-half feet apart, and another, for experimental orchard, I have set ten feet apart.

I do not expect any good result from the trees set ten feet apart, but for some varieties, as the Benoni, I do not think sixteen and one-half feet is too close—in case the trees interfere, a part can be cut out. In an orchard I think it is best to grow trees and nothing else.

It is my opinion—and this is the point I make—that you must keep a good circulation of air under the trees to have the best results.

DR. HUMPHREY—I think it is important to set apple trees so that the feet are dry. I think orchard trees are often lost for want of this. If the ground is level, and the tree is set without special preparation upon the level surface, the roots must stand in water much of the time.

When I set trees upon level ground, which I have done, I plow in lands so as to raise the roots of the trees at least six inches above the general level, and for ten feet from the tree on each side. In this way, I have excellent results, because the roots stand above water. I have set two rows of apple trees ten feet apart, to serve as a wind break, and on these trees I have, for five years past, had more fruit than from trees set twenty feet apart. I have noticed the same advantage in close planting in other instances.

MR. GALUSHA—I once saw an old orchard, near Mt Vernon, Ill. that had been planted about twelve feet apart; and it looked like a grove of timber—a forest. The fruit was so far skyward that it was not worth gathering. If gentlemen will plant forest-orchards, they will have *forest trees*.

DR. HUMPHREY—I will say, these trees of which I speak are headed back, and not allowed to run up.

MR. FLAGG—I would like to call out Mr. Bryant, Jr., upon the subject of orchards protected by forest trees. I wish to know if his own orchard which is surrounded by forest trees, continues to bear well?

MR. BRYANT, JR.—I would say, it is one of the best orchards I know, it bears good crops, but the timber which formerly surrounded it has been cut off. In regard to this matter of close planting, I may say that we have another orchard planted, one hundred trees to the acre, (about twenty feet apart) and the trees are too thick; the most of the fruit upon the lower branches is inferior to that in the tops of the trees where the sunlight can strike them. The trees have not been shortened back, as Dr. Humphrey suggests.

This discussion was ended here, by general consent, and the subject next in order was taken up.

DISCUSSION ON NEW VARIETIES OF APPLES.

MR. FLAGG—There is one apple to which I would like to call your attention, that promises to be a valuable variety; I gave a drawing of it recently in the *Prairie Farmer*—The apple is called Peak's Fall, and comes from North Carolina. It is evidently a seedling of Rawles Janet; it has the color, size, texture, and pretty nearly the taste of the Janet, and has the same persistency to hang on the tree. It seems to me, from what I have seen of it, that it promises to be a valuable variety for early winter use. With us, it would probably ripen in December; I

have not observed whether it is a *late* bloomer. I will be happy to furnish any of the members of this Society with cions, who wish to try it.

DR. HOOTON—I have here two specimens of apples, that were grown in my orchard. I would like to know if they are new or old varieties. One of them is now out of season, the other will keep till spring.

MR. FLAGG—One of the varieties looks very much like the Pennsylvania Red Streak.

THE PRESIDENT—They should go into the hands of the Committee on Fruits.

MR. FLAGG—I want to call attention to another apple—The *Bevan* of N. Carolina. Mr. Downing mentioned it to me as one of the best southern apples; it is a fruitful tree, and the apple of good quality, and I think promises fair. I will be glad to furnish cions to all who may desire to have them.

DR. HUMPHREY—I would speak of the Ben Davis as one of our best apples. The tree has excellent qualities, and the fruit is beautiful and quality fair. I think if the Ben Davis is planted on high dry soil, and well cultivated, it will give most excellent returns.

MR. HAMMOND—I have an apple here—a seedling—for which I would be glad to have a name suggested. I have only one tree of it, which is an annual bearer, and from it I have taken twenty-five bushels of apples in one season.

MR. PHENIX—I would like to ask if any one has fruited the Huntsman's Favorite?

PRESIDENT STARR—I have fruited it. The apple resembles the Fulton; it is a large and showy apple, that originated in Missouri. It does not keep well with me, and worst of all, it drops from the tree before its time.

MR. WEBSTER—I have an apple here that was taken from the nursery, which I submit to the Committee for examination.

MR. GALUSHA—Spoke of the Fulton as one of our best dessert apples. It will keep till January.

MR. PHENIX—I think it is a seedling from the Rambo.

MR. FLAGG—I would ask about the Grimes' Golden. Is it to be recommended?

MR. PHINNEY—I cannot recommend it; the fruit drops from the tree. Will keep till January when you get it.

MR. HAMMOND—I have had this apple in bearing for three years, and with me they drop from the tree.

MR. NELSON—I have had this apple in bearing, and have noticed this disposition to drop from the tree, and I came to the conclusion that it was an early fall apple. Recently the trees split and broke down, and I was not sorry—I don't like it.

MR. PHENIX—I would like to ask about the Stark. What is its reputation?

MR. WEBSTER—With me this apple rots badly, and I have no specimens left.

MR. POLK—They dropped this year. The apple is good, and the tree is a good grower, and until this year, they have succeeded well with me.

Voice—They are better than Willow Twig.

MR. POLK—Yes, they are better than the Willow Twig, and I do not know why they did not succeed better this year.

MR. FLAGG—I want to have some expression in regard to an apple that was named in honor of one of our members, called the *Nelson*. It is a seedling of Tolman Sweet, and I would like to have Mr. Nelson tell us more about it.

MR. NELSON—The apple did not originate with me. I came across the apple, and presented it to the Horticultural Society at Champaign. I think it is evidently a seedling of the Tolman Sweet—fully as good as that variety, and its keeping qualities make it a very desirable apple; it has been kept till the fall of the succeeding year. About the middle of May the apples begin to turn yellow, and some of them have a little blush on one side; they make excellent pies, and bake well. The man who had the apple told me that he was in the habit, every year, of putting them up and keeping them till June, and that he had kept them in a sound condition till September of the next year. I saw some of the apples that had been kept till this time, and could not tell but they were sound enough to run another year. The tree is hardy; is inclined to form a high top, and when in bearing it weeps over like a weeping willow; it is an early bearer. The tree was brought from Edgar County, and planted when four years old; bore a crop the second year after planting, and has borne every year since.

I will send cions of this variety to any member who wishes to progagate it.

MR. FRANCIS—It is said that an application of charcoal about the roots of flowering shrubs imparts a brighter red color to the flowers. I used it about apple trees, bearing red apples, but cannot see that it affects the color of the fruit.

DR. HUMPHREY—I have used ashes about the roots of apple trees with excellent results, both in quantity and quality of the fruit.

MR. BUCK—I wish to caution members about using ashes; a little may do good, but too much will take the acid out of the fruit and make it insipid. (?) ED.

MR. BALDWIN, *La Salle*—I have noticed that a long drouth affects fruit, in ripening it prematurely, causing it to drop—nearly all varieties of apples drop this year, more than usual.

DR. HOOTON—Exhibited two apples—both called Rawles' Janets, which are really two distinct varieties.

The trees look alike, and the fruit is almost indentical, except in size. This difference in size is radical and permanent.

MESSRS. DUNLAP AND NELSON—Testified to the fact that they had both the Big and Little Janets, as they are called, and that there were two varieties of Rawles' Janets.

MR. DUNLAP—I wish to speak of another thing. We have grafted the apple, and grown them, and now we want something to put them in, and I present this box, as the most convenient thing that I can use.

[Mr. D. here exhibited a box for gathering and marketing apples; consisting of heads—ends—and lath sides and bottom.] ED.

MR. FLAGG—How much will it hold?

MR. DUNLAP—Just one bushel. It is twelve inches high, fourteen inches wide, and seventeen inches long. Thirty-six of these boxes made a two-horse wagon load. They are more convenient than baskets, and cheaper. I have no doubt we have saved in labor this year the cost of the boxes.

MR. FLAGG—What is the cost of the boxes?

MR. DUNLAP—About twenty cents each. We take stock boards, and have a machine that will cut out the heading—say forty pairs an hour.—They charge seventy-five cents an hour for the work; this, with the price of the lath and labor of making, brings the cost to about twenty cents.

The Society adjourned until two o'clock.

SECOND DAY.

AFTERNOON SESSION.

The Society reassembled and business was resumed at two o'clock.

THE PRESIDENT announced the business first in order to be the continuation of reports from Standing Committees, and called for report on Vegetable Gardening.

MR. HAY from the Committee, reported the following:

VEGETABLE GARDENING.

In the cultivation of vegetables, as in all other pursuits, the largest possible returns for the amount of money and labor expended is the object always sought to be obtained; not always the greatest number of pounds per acre or rod, as is generally the case in growing root crops for stock, but the greatest amount of rich, wholesome, nutritious, vegetable food for the family or market as the case may be.

Different cultivators often adopt different methods for securing the same results; for instance one man may plow deeply and cultivate often for the purpose of securing his crop from the evil effects of drought, while another, with the same object in view, may practice a system directly the reverse of this, and each will support his own method with argument and often facts that appear almost conclusive. But the point I wish to make is this: that, if farmers and the heads of families generally could be made to understand that to be successful in the cultivation of any or all of our common vegetables, it is not particularly necessary to follow the directions of any expert, there might be at least a possibility of some of our most valuable vegetables that are now to be found only in market, coming into more common use.

It is a well attested fact that the earlier any vegetable arrives at natural maturity after the seed has been sown, the better, sweeter, and more nutritious it is as an article of food; and the best and cheapest method of obtaining this result is the point at which every gardener should direct all his efforts, even from the time of saving the seed to the harvesting of the crop.

The earliest ripened beans, peas, peppers, tomatoes, and other vegetables are always the largest and best; and seed saved from them will in turn produce a much better and earlier crop of its kind than that from late-ripened, inferior specimens.

As one of the earliest vegetables and one of exceeding great merit, I would mention

ASPARAGUS—Coming into use as it does soon after the frost leaves the ground in spring, and furnishing a fresh supply from day to day until peas are ready for the table, it fills a place in the kitchen garden that could not be occupied by any other vegetable.

Writers upon the subject of vegetable gardening have undoubtedly done more to discourage the cultivation of asparagus, among the people generally, than any other influence I could mention.

The idea of trenching land to the depth of three or four feet and stuffing it with old boots, bones, brickbats, etc., is a task too great for most persons to undertake, and after several years of varied experience I have found that such a process is not only unnecessary, but is really a disadvantage to the plant.

A thorough comminution of a well drained, thoroughly enriched soil, to the depth of ten inches or a foot is, I believe, the best possible preparation for an asparagus bed, and may easily be accomplished with a team and plow. This much, if convenient, should be done in the fall at which time the plants may be set, or left until spring. If placed five or six inches below the surface they will, after once established, require little or no winter protection, but a few inches of manure if forked in before the plants start in spring will be found beneficial. A spring top-dressing of salt will also encourage a stronger growth, and if applied in sufficient quantity will completely eradicate all weeds.

This extra care though not necessary to the production of a respectable crop of asparagus, will always be found a paying investment, but more especially so if the crop is grown for market.

If planted in rows three feet apart with plants two feet apart in the row, and well cared for, a bed two rods square will be sufficient for a family of ten persons. When cultivated for market the returns will be more satisfactory if planted in rows three feet by four, and cultivated the same as corn, with the addition of a liberal topdressing of strong manure.

Beans—One great object of a kitchen garden should be to give to the family a succession of vegetables from the earliest possible moment in spring until the season of severe frosts in fall. Therefore the originator of the potato that arrives at maturity fifteen minutes earlier than the Early Rose may be justly regarded as a benefactor of his race, and the one who brought the Early Fejee and Early Rachel beans to the notice of the public is equally worthy of respect. Either of these varieties with the Early Mohawk and Dun Cranberry, will give a long succession of excellent string beans. The Fejee is remarkably early, is less susceptible to injury from cold than the other varieties mentioned, and is therefore best adapted to early planting.

The Dun Cranberry is very productive, and remains longer in a green state than either of the other varieties, making it almost a necessity when once introduced in a garden. As a pole or running bean, the small Lima or Butter bean has given such general satisfaction that I try no other.

Beets—There is probably no vegetable more highly appreciated than the early beet; and the gardener who can bring them into market a week in advance of his neighbors may rely upon large sales and excellent profits. The early Egyptian being of good size and color for

market, and several days earlier than any other sort, should have a place in every garden. The Bassano and Philadelphia Extra Early follow the Egyptian in regard to season, but their color and manner of growth are very objectionable and they should not be largely planted. The Blood Turnip is undoubtedly the best of all for winter use and entirely obviates the necessity of planting the deep growing sorts.

CABBAGES.—In the kitchen garden, where but few cabbages are used, and two plantings are generally expected to supply the family for the whole year, much difficulty is usually experienced by the bursting of the heads as soon as they arrive at maturity, with often a loss of one-half the crop; especially is this the case with the Early York; therefore where convenient, it should be succeeded by the Jersey Wakefield. I say where convenient, for the reason that most families depend upon professional plant-growers for their supply of plants, and the seeds of the Wakefield costing nearly three times as much as the York, they are not likely to grow them for market where so few people understand the difference in the value of the different varieties. Besides being several days earlier than the York, it has uniformly larger heads and is not so shamefully addicted to the habit of "going on a bust."

There are many other varieties of early cabbages worthy of cultivation, but to extend the list would only serve to perplex the cultivator and result in no good.

For winter use the Flat Dutch has no equal. Cabbages may be preserved during the winter by simply throwing in piles and covering with straw to prevent frequent freezing and thawing.

CORN.—A garden that fails to furnish the family with a full supply of green corn for at least three months of summer, falls far short of accomplishing the good that it ought. The ground upon which early corn is grown may, the same season, be made to return another crop of equally as great value. The Extra Early Dwarf sugar is, I believe, the earliest variety now in cultivation, while the Mexican ranks first in regard to quality.

For late use, Stowell's Evergreen should be planted.

Corn may be started in pots in a hot-bed or green house, and grown until six or eight inches high and transplanted to the open ground, with but little trouble, and but a slight check to its growth. With me Gregory's Mammoth proved perfectly worthless the first season. It was its first and not a very extensive trial. In other localities, or under different circumstances, it may do well.

POTATOES.—The great improvement made during the past few years in the varieties and cultivation of the Irish potato is truly remarkable. Ten years ago, new potatoes by the fourth of July were considered a rarity; but by the introduction of the Early Rose, and improved modes of culture, our markets are now well supplied nearly a month prior to this.

Experiments made during the past few years prove conclusively to myself at least, that the nearer potatoes are divided to one eye on a piece,

and planted one piece in a place, the more satisfactory will be the returns, and I have adopted the following method of planting and cultivation as the one requiring the least expenditure of labor and money, and the most likely to lead to success.

If possible select new or sod land; prepare in the most thorough manner by frequent plowing and harrowing; furrow four inches deep, one way only, and three feet apart. Drop the seed one piece in a place —varieties with small growing tops, one foot apart—those of larger growth from fifteen to eighteen inches—cover with a double shovel plow going twice to a row, throwing a furrow from each side. This forms a slight ridge immediately over the seed, and in case of heavy spring rains (which were quite common a number of years ago), throws the surplus water between the rows, and if the land is likely to wash, prevents the seed from being uncovered. If weeds should start, or the surface of the ground become baked, harrow thoroughly both ways; this will exterminate the weeds, pulverize the crust, and allow the air and heat to penetrate to the seed. As often as the ground becomes baked or the weeds start, the harrowing should be repeated, and may be continued with profit after the plants have made their appearance above ground. A five-tooth cultivator will be found an excellent implement and should be used at least once each week. The last two plowings are generally done with a double shovel plow.

As a late potato the Peerless has proved an entire failure; with me, it ripens earlier than the Early York, and in one month's time after digging, is perfectly worthless for the table. It yields enormously, and the tubers are remarkably fine looking; further than this it does not compare with the recommendations of the parties introducing it.

Sweet Potatoes.—In the cultivation of the sweet potato, I have found the instructions of many writers upon the subject to be very erroneous. If the ridge and drill system of planting could be entirely abandoned, and the plants set in hills about the size and shape of an inverted bushel basket, more than half the plants now used might be saved to the cultivator, and the yield per acre would be much greater, besides being of better quality and a week or ten days earlier than those planted in drills.

The rolling, tumbling, twisting, turning, upsetting, and capsizing of the vines during their growth—a practice so generally recommended by all writers—is probably the most systematic and effective method yet discovered for entirely prohibiting the formation of potatoes.

It would be equally as sensible for an apiarian to visit his bees once or twice per week, and give them a thorough shaking up, when a large yield of honey was the object aimed at, as for the sweet-potato grower to be continually belaboring his vines when a large crop of potatoes is the object desired.

The practice of plant growers selecting the smallest, most inferior potatoes for seed, has been the great cause of so deteriorating the Yellow Nansemond that it is not worthy of cultivation; and the Early Jersey,

which much resembles the old fashioned Nansemond in shape, color, and quality, will undoubtedly supersede it; but this also will, in a few years, have lost all its good qualities, and from the same cause.

PEAS.—After a thorough trial of many varieties of peas, I have found that for early table use Carter's First Crop is one of the best. It is an abundant bearer and requires less care and trouble in sticking than any of the other very early sorts; and with McLean's Little Gem, sown every ten days or two weeks for a succession, will give a family a long supply of the very best peas.

TOMATOES.—Among the new vegetables introduced during the past few years, the Trophy tomato has been among the most successful in gaining public favor. Wherever cultivated it has given the greatest satisfaction, both for table use and for market. The vine is a vigorous grower, capable of carrying an immense amount of fruit, and is much more hardy than most other varieties.

MANURES.—I have said nothing in regard to the use of manures in connection with the vegetable garden, believing that it is generally understood that to arrive at anything like perfection in the growing of vegetables, it is necessary to use it without stint.

For any crop the deep plowing-in of manure as practiced by many is a mere waste; in fact, it is simply throwing it away. A stick of wood buried one foot underground, will undergo less change in five years than it would in one, if buried only two inches, and the same thing is true in regard to manure; if buried a foot or more it will be manure for a much longer period than if kept at or near the surface, and so long as it retains shape and form, it continues plant food that can in no way be utilized. If it is wanted for the immediate use of growing crops, it should be applied in a liquid form, and its effects will be visible in twenty-four hours.

During the month of March last, I succeeded in growing lettuce and radishes (in a hot-bed) ready for the table in eighteen days from the time of sowing the seed. This unusual growth I attribute mainly to the care taken in the preparation of the soil, and the after use of liquid manure. The soil, to the depth of six inches, was passed through an ordinary sand-riddle, and mixed with one-half sand. As soon as the plants made their appearance, they were watered with tepid water, impregnated with guano. As often as water was required it was applied in same manner. At no time were the plants allowed to settle more than two inches below the glass; and the result was as above stated.

The destiny of a plant is fixed during the first few weeks of its existence; if allowed to suffer and become stunted for want of food during the early part of its life, it can never recover from it, and the result must be a vegetable inferior in both quality and size. Therefore the necessity for the thorough preparation of garden soil before it receives the seed, and the application of the proper stimulants in such a manner that they may be readily taken up by the tender rootlets, and the plant not allowed to suffer from starvation at the very period of its life when it most needs assistance.

A. L. HAY,
Gardener for the D. & D. Institution, Jacksonville, Ill

THE PRESIDENT—You will now listen to the report of the Committee on the Secretary's Report, through its chairman, Dr. Humphrey.

REPORT OF COMMITTEE ON SECRETARY'S REPORT.

Your Committee beg leave to report that we fully endorse the Secretary's report, and recommend its approval by the Society.

We believe that the reorganization of this Society, therein recommended, will secure the best interests of this Society, a just recognition of local horticultural societies, and, in securing the co-operation of the State Government, will result in promoting the best interests of the State. (Signed)

A. G. HUMPHREY.
A. A. HILLIARD. } *Committee.*
L. G. WILCOX.

MR. FLAGG, from the Committee, reported upon ornamental and timber trees.

REPORT UPON ORNAMENTAL AND TIMBER TREES FOR SOUTHERN ILLINOIS.

The State of Illinois, according to the estimate made in the Auditor's office, contains fifty-five thousand, eight hundred seventy-two square miles, or thirty-five million, seven hundred fifty-eight thousand, eighty acres. According to the census of eighteen hundred seventy, about five-sevenths of this amount, or twenty-five million, eight hundred eighty-two thousand, eight hundred sixty-one acres are in farms; nineteen million, three hundred twenty-nine thousand, nine hundred fifty-two acres being improved; five million, sixty-one thousand, five hundred seventy-eight acres woodland; and one million four hundred ninety-one thousand, three hundred thirty-one acres, "other unimproved"; leaving nine million, eight hundred seventy-five thousand, nine hundred nineteen acres to be otherwise accounted for. Assuming the acres of woodland returned with farms to be all the woodland of the State, we find that about one acre in seven, or fourteen and one-tenth per cent. of our Prairie State is covered with trees. Iowa with the same area has only half as much or about seven per cent. of her area in forests. Wisconsin has ten per cent; Missouri twenty-one per cent; and Indiana thirty-two per cent. From this we may argue that our portion of the great Northwest, is not so much wanting in forests and future timber as is sometimes asserted.

Coming to our own State I have had the curiosity to ascertain the distribution of forests within its borders, following our Society's division into Horticultural Districts.

The Fox River District in the northeastern corner of the State with its twelve counties comprising seven thousand, three hundred fifty-four square miles, or four million, seven hundred six thousand, five hundred sixty acres, has two hundred ninety-seven thousand

three hundred fifty-three acres of woodland, or about six and three-tenths per cent. of its surface.

The Rock River District, including the northwestern portion of the State, has a somewhat larger amount of forest. Its eleven counties, six thousand, six hundred fifty-two square miles, and four million two hundred fifty-seven thousand, two hundred eighty acres contain three hundred seventy-two thousand, seven hundred twenty acres of woodland, or about eight and seven-tenths per cent.

Taking these two districts together we may say that about seven and a half acres in every hundred of Northern Illinois lands are wooded.

Coming to Central Illinois, we find the Illinois River region, comprising twenty-one counties, eleven thousand, two hundred eighty square miles, and seven million, two hundred nineteen thousand, two hundred acres, to have one million, seventy-three thousand, five hundred ninety-three acres of its surface, or about fifteen per cent. covered with with woodlands.

Going thence eastward into the Grand Prairie District we find its seventeen counties, twelve thousand ninety-six square miles, or seven million, seven hundred forty-one thousand, four hundred forty acres of territory, to have five hundred thirteen thousand, seven hundred and twenty-six acres of woodland, or about six and six-tenths per cent.

The two districts comprising Central Illinois have therefore an average supply of ten and eight-tenths per cent. of forests.

Coming down into Egypt we ascertain that the Wabash District, comprising seventeen counties, seven thousand, eight hundred seventy-four square miles, and five million, thirty-nine thousand, three hundred sixty acres on the Wabash slope, contains one million, two hundred sixteen thousand, nine acres of forest, or twenty-four per cent. of its whole surface.

The Kaskaskia District comprising thirteen counties, six thousand nine hundred seventy square miles, and four million, four hundred sixty thousand, eight hundred acres, has nine hundred sixty-four thousand, six hundred thirty-six acres, or twenty-six and six-tenths per cent. of woodland.

Whilst the Grand Chain District, comprising the eleven counties in the extreme southernmost part of the State and having an area of three thousand, six hundred forty-six square miles, or two million, three hundred thirty-three thousand, four hundred forty acres, has six hundred twenty-three thousand, five hundred forty-one acres, or twenty-one and six-tenths per cent. of woodland.

The forty-one counties of Southern Illinois contain therefore eighteen thousand, four hundred ninety square miles, or eleven million, eight hundred thirty-three thousand, six hundred acres, of which two million, eight hundred four thousand, one hundred eighty-six acres, or twenty-three and seven-tenths per cent. are covered with forests.

Placed in tabular form for the reader's eye, the amount and percentage of woodland in the districts is as follows:

District No. and Name.		Miles Surface.	Acres Surface.	Acres Woodland.	Per cent. Woodland
1 Fox River,	12	7,354	4,706,560	297,353	6.3
2 Rock River,	11	6,652	4,257,280	372,720	8.7
3 Illinois River,	21	11,280	7,219,200	1,073,593	15.0
4 Grand Prairie,	17	12,096	7,741,440	513,726	6.6
5 Wabash,	17	7,874	5,039,360	1,216,009	24.0
6 Kaskaskia,	13	6,970	4,460,800	964,636	21.6
7 Grand Chain,	11	3,646	2,333,440	623,541	26.6
Totals,	102	55,872	35,758,080	5,061,578	14.1

These statistics probably understate the amount of acres in woodland. As I have noticed nearly ten millions of acres are unaccounted for. It is probable that one million of these are in woodland. In the case of Franklin, Johnson, and probably other counties there were great omissions made by the census takers, and it is not likely that the count was often if ever in excess. On the other hand no doubt much of the so called woodland had little valuable timber upon it. Much of it was, no doubt, either young and small or the refuse left by the woodman. Much of it never was and never will be of value as sawed lumber but may answer for firewood and posts, and the coarser uses of the farm.

But these figures show our weak side as well as our strength. From the Galena on the northwest around to Champaign on the east there is but seven per cent. of timbered land. This is not made good by the twenty per cent. along the Illinois, Mississippi, and Wabash.

It is only when I come down into Egypt and to the proper ground of this report that I find timber still to spare; and now that a half-dozen new railroads are rushing out the great trunks of white oak, and the nicely cut and sawn planks, timber, laths, and heading of tulip wood, I know that the end of good lumber is not far off, even along the Grand Chain.

As exhibiting the forest wants and resources of the different counties of the State, I submit a table giving the number of acres of woodland to the square mile in each county of the State:

	Squ're Miles.	Acres Woodl'd.	No. Acres Woodland to Square Mile.		Squ're Miles.	Acres Woodl'd.	No. Acres Woodland to Square Mile.
Adams,	828	112,576	136	Calhoun,	255	63,443	248
Alexander,	226	17,761	78	Carroll,	446	29,793	67
Bond,	378	42,613	113	Cass,	379	33,493	88
Boone,	288	29,886	104	Champaign,	1,068	16,780	16
Brown,	296	35,491	119	Christian,	709	19,803	28
Bureau,	867	41,866	48	Clark,	509	102,201	201

	Squ're Miles.	Acres Woodl'd.	No. Acres Woodland to Square Mile.		Squ're Miles.	Acres Woodl'd.	No. Acres Woodland to Square Mile.
Clay,	468	80,612	172	Marshall,	387	28,260	73
Clinton,	489	48,868	100	Mason,	560	31,739	57
Coles,	523	45,214	86	Massac,	242	33,396	138
Cook,	982	19,635	20	McDonough,	576	52,547	91
Crawford,	435	78,350	180	McHenry,	624	53,293	85
Cumberland,	350	40,234	115	McLean,	1,154	40,366	35
DeKalb,	648	17,722	26	Menard,	314	34,931	111
DeWitt,	405	29,548	73	Mercer,	548	45,977	84
Douglas,	408	11,897	29	Monroe,	381	83,369	219
DuPage,	338	17,243	51	Montgomery,	702	47,804	68
Edgar,	631	66,803	106	Morgan,	564	60,217	107
Edwards,	233	57,585	247	Moultrie,	331	24,783	75
Effingham,	486	56,330	116	Ogle,	758	43,643	58
Fayette,	720	93,460	130	Peoria,	618	48,666	79
Ford.	480	2,996	6	Perry,	444	68,470	154
Franklin,	422	(?) 3,994		Piatt,	442	5,978	14
Fulton,	878	123,823	141	Pike,	795	128,953	162
Gallatin,	326	68,750	211	Pope,	362	87,754	242
Greene,	546	93,242	171	Pulaski,	187	12,516	61
Grundy,	432	6,256	14	Putnam,	168	17,184	102
Hamilton,	431	93,878	218	Randolph,	577	162,274	281
Hancock,	773	43,385	56	Richland,	361	50,618	140
Hardin,	176	44,771	254	Rock Island,	436	31,239	71
Henderson,	386	34,705	90	Saline,	379	70,393	186
Henry,	828	12,620	15	Sangamon,	868	51,085	59
Iroquois,	1,132	22,478	20	Schuyler,	426	62,477	147
Jackson,	582	87,642	151	Scott,	251	44,633	178
Jasper,	506	67,023	132	Shelby,	776	74,908	96
Jefferson,	574	94,888	165	Stark,	288	12,375	43
Jersey,	365	51,427	141	St. Clair,	665	76,591	115
Jo Daviess,	609	82,076	102	Stephenson,	567	43,167	76
Johnson,	336	(?) 3		Tazewell,	626	45,268	72
Kane,	540	34,646	64	Union,	398	83,606	210
Kankakee,	696	10,978	16	Vermillion,	1,008	53,078	53
Kendall,	324	14,244	44	Wabash,	218	37,558	172
Knox,	720	41,566	58	Warren,	540	27,294	51
Lake,	478	21,072	44	Washington,	556	55,852	100
LaSalle,	1,152	48,117	42	Wayne,	720	146,794	204
Lawrence,	365	72,738	199	White,	500	78,167	156
Lee,	736	12,071	17	Whiteside,	697	21,823	31
Livingston,	1,026	12,462	12	Will,	852	24,261	28
Logan,	618	17,394	28	Williamson,	432	116,949	269
Macon,	577	18,153	31	Winnebago,	540	37,238	69
Macoupin,	864	81,224	94	Woodford,	527	25,217	48
Madison,	748	89,459	120	Totals,	55,872	5,061,578	90
Marion,	576	61,579	107				

Throwing two of these counties, in which there has evidently been gross mistakes out of consideration, we may classify them as follows:

One County (Ford) has less than ten acres of woodland to the square mile.

The following seventeen counties, naming them in order as the ratio of timber increases, have more than ten and not over forty acres woodland to the square mile: Livingston twelve, Grundy and Piatt fourteen, Henry fifteen, Champaign and Kankakee sixteen, Lee seventeen, Cook and Iroquois twenty, De Kalb twenty-six. Christian, Logan, and Will twenty-eight, Douglas twenty-nine, Macon and Whiteside thirty-one, McLean thirty-five.

The following have more than forty and not exceeding eighty acres of woodland to the section: La Salle forty-two, Stark forty-three, Kendall and Lake forty-four, Bureau and Woodford forty-eight, Du Page and Warren fifty-one, Vermillion fifty-three, Hancock fifty-six, Mason fifty-seven, Knox and Ogle fifty-eight, Sangamon fifty-nine, Pulaski sixty-one, Kane sixty-four, Carroll sixty-seven, Montgomery sixty-eight, Winnebago sixty-nine, Rock Island seventy-one, Tazewell seventy-two, De Witt and Marshall seventy-three, Moultrie seventy-five, Stephenson seventy-six, Alexander seventy-eight, and Peoria seventy-nine; embracing twenty-seven counties.

A fourth class having more than eighty, and not exceeding one hundred and twenty acres of forest to the square mile, embraces the counties of Mercer eighty-four, McHenry eighty-five, Coles eighty-six, Cass eighty-eight, Henderson ninety, McDonough ninety-one, Macoupin ninety-four, Shelby ninety-six, Clinton and Washington one hundred, Jo Daviess and Putnam one hundred and two, Boone one hundred and four, Edgar one hundred and six, Marion and Morgan one hundred and seven, Menard one hundred and eleven, Bond one hundred and thirteen, Cumberland and St. Clair one hundred and fifteen, Effingham one hundred and sixteen, Brown one hundred and nineteen, and Madison one hundred and twenty; twenty-three counties in all.

The counties having more than one hundred and twenty and not exceeding one hundred and sixty acres of woodland to the square mile are Fayette one hundred and thirty, Jasper one hundred and thirty-two, Adams one hundred and thirty-six, Massac one hundred and thirty-eight, Richland one hundred and forty, Fulton and Jersey one hundred and forty-one, Schuyler one hundred and forty seven, Jackson one hundred and fifty-one, Perry one hundred and fifty-four and White one hundred and fifty-six; eleven counties.

The counties ranging between one hundred sixty and two hundred acres of forest to the section are: Pike one hundred sixty-two, Jefferson one hundred sixty-five, Green one hundred seventy-one, Clay and Wabash one hundred seventy-two, Scott one hundred seventy-eight, Crawford one hundred eighty, Saline one hundred eighty-six, and Lawrence one hundred ninety-nine; nine counties in all.

Six counties have from two hundred to two hundred forty acres of

woodland to the square mile, namely: Clark two hundred one, Wayne two hundred four, Union two hundred ten, Gallatin two hundred eleven, Hamilton two hundred eighteen, and Monroe two hundred nineteen.

Five counties have between two hundred forty and two hundred eighty acres of forest to the section: Pope two hundred forty-two, Edwards two hundred forty-seven, Calhoun two hundred forty-eight, Hardin two hundred fifty-four, and Williamson two hundred sixty-nine.

One county only, that of Randolph, has as much as two hundred eighty-one acres of woodland to the section.

The most heavily wooded region of the Fox River District is found in Boone and McHenry, whilst in the Rock River region it is in Jo Daviess. Pike and Scott are most heavily wooded of the counties of the Illinois River District, and Edgar and Coles of the Grand Prairie District. Edwards and the adjoining counties are the most timbered in the Wabash District, and Randolph and Calhoun in the West. Pope, Hardin, and Williamson rank first in the counties of the Grand Chain.

Thirty-two counties have more than twenty per cent of their territory in woodland, and therefore come within the line of climatological safety drawn by some climatologists who say that not less than one-fifth of our territory should be planted to trees. Thirty-four counties have ten per cent. only, or less, and undoubtedly would be improved climatologically and otherwise by the planting of trees.

I submit herewith a map illustrating the distribution of the forests by counties, with the remark that in the future I hope we may have more exact and frequent information as to the extent, increase, and diminution of our forests. Our new assessment law requires assessors to "set down in separate columns the number of acres in wheat, corn, oats, meadow, and other field products, in enclosed pasture, orchards, and *woodlands, whether enclosed or not*, in that year." This will furnish a means hereafter of judging of the increase or diminution of woodlands from year to year, and obtain a basis of facts for legislation upon the subject of encouragement to tree planting in this State for which we have failed thus far to obtain a law, but for which we should not fail to again memorialize the General Assembly, and present a bill for an act to give such encouragement to tree planting as we think the case demands.

I have said thus much of the general question of woodland in our State in order to place before the Society and the people of the State the latest facts that have been collected, even though I may seem to trespass upon ground assigned to other members of the committee. We need to consider the forest question as affecting a wide scope of country rather than in its immediate effect upon a limited territory in our own State.

What I have said upon the general topic shows that Southern Illinois, upon which I am expected specially to report, has nearly one quarter of its surface clothed with woodland. No county has less than one-eighth, and one has seven-sixteenths of its territory in forests. With

us therefore it is a question not so much of new planting as how best to preserve, continue, and improve our woodlands, and how best to add new trees for ornamental and useful purposes. Upon this subject I shall offer a few suggestions.

I may say in the first place, that so far as my knowledge extends, a very large part of our forest growth could be replaced advantageously with better species of trees. We have a great quantity of oak and hickory trees, for instance, that has little value except as firewood, and that might with great profit be replaced by other species of the same genera.

If our Black Jack, Post Oak, Laurel-leaved Oak, and Water Oak were replaced by the White Oak and Burr Oak, it would be an immense addition to our forest wealth. If we had more Tulip-trees and fewer Cottonwoods, more Deciduous Cypress and less White Elms, more Pecan-trees and fewer Pignuts, it would doubtless be greatly to our advantage. Hence we should aim to save the young trees of valuable species and to plant our broken lands with something that will make them as productive and profitable as other parts of the farm. Hence arises the question here as elsewhere: What will be most valuable to preserve and plant?

This leads me in the second place, to suggest a few native species that we know will do. With the fear of Mr. Douglass and his favorite Larch before my eyes, I will not say *because* they are *native* species but because they are *well tried* and not found wanting.

First, I would place the Black Walnut. It grows easily and vigorously. Makes a timber valuable for nearly every purpose, from fence rails to fine furniture, that should the present taste not change will make a few acres of old trees a fortune twenty years hence; bears valuable nuts, and is a handsome tree. Next, for purposes of general utility I am inclined to name the White Overcup and Chestnut Oaks, without special preference for either. Oak is one of the timbers for which there is perennial use and demand. The White Ash, the White Hickory, the Pecan Hickory, the Sugar Maple, the Tulip-tree, the Mulberry, and the Catalpa are all trees that promise to be useful and profitable.

In the third place, I would say a few words of trees not native. One of the most profitable for our Southern Illinois soil I believe to be the much abused common Locust; admitting that it has been nearly exterminated on our northern and central prairies by the climate or borer —perhaps by the two, I find it still healthy and vigorous in many places in Southern Illinois; and its value where it will grow is well known and conceded. The Osage Orange is another tree of considerable prospective value, but it has not like the locust, had a fair test.

The Chestnut, to which a great deal of attention has been latterly called, will succeed on porous sub-soils such as are furnished by our river bluffs, but I think will find an uncongenial soil, as a rule, throughout Southern Illinois as well as in most other parts of the State. I have known several instances in my own county where the tree after bearing

fruit, has, at the age of fifteen or twenty years, begun to fail, and died in the course of a few years. Trees upon our Mississippi bluffs in the same county and of equal age seem healthy, vigorous, and fruitful.

The Larch of both species does not seem to me to give promise of success in our almost southern climate, whatever may be its fortune in the north. I think we can do better than to grow it; but it needs farther trial in a variety of soils before we can speak intelligently on the subject.

As the profit of growing Conifers for timber has not yet, so far I know, been proven in Southern Illinois, I will only suggest the trial of the Norway Spruce as most reliable, and of the Scotch, Austrian, and White Pines. Our one native evergreen, the Red Cedar, is of course one of the most vigorous and healthful.

The consideration of ornamental trees, also embraced in the scope of the duties assigned us, opens a much wider field. We have a great variety of native trees and a climate favorable to many foreigners. I give the following notes from my own and others' experience of some of the more desirable species:

The Tulip-tree of course is most desirable; the Great Flowered Magnolia, an evergreen and beautiful tree, is grown, says Dr. Vasey, at Jonesboro, and I think I have seen it at Chester.

The Cucumber Tree is native, and of course desirable throughout Southern Illinois at least.

The Asiatic species of Magnolia I have not happened to see, but several of them would no doubt succeed.

The Papaw is a beautiful tree, but I have hardly seen one instance of a successful attempt to cultivate it. It is native everywhere in the South.

The Linden is a common though not plentiful tree, and makes one of the handsomest of our larger ornamental trees.

The Ailanthus, though in disrepute, has many good points; prominent among which are its great vitality and availability for planting in places unfavorable to plant growth, and its unique foliage.

The Horse-Chestnuts, native and foreign, succeed well and are admired by many.

The Maples, of which we have three native species, according to Dr. Vasey, are all easily grown and all more or less attractive, though I hear a good deal of complaint of the liability of the Soft Maple to the attacks of the borer.

The Sapphora does not seem quite hardy with me, but I presume is so in the southern district generally.

The Red-Bud is found native quite commonly, and is beautiful by reason both of its early flowers and later leaves; but by reason of its prevalence is little cultivated.

The Kentucky Coffee-tree is native and curious, and as such perhaps admired, but I do not much like it.

The Honey Locust is more common, and more ornamental. Being more common it is less planted for ornament.

The Peach in its ornamental varieties, Weeping, Fastigate, and Double Blossomed, is much less grown than it deserves. The ornamental foliage sorts I have not seen; but I think we should pay more attention to these fair if not productive relatives of our fruit trees.

There is a double flowering Plum lately introduced from China, that would probably also be desirable, as well as the double blossoming Cherries.

The wild Black Cherry is a handsome tree in foliage, blossom, and fruit, and only needs to become rare in order to be valued.

The same is true of our native Hawthorns, of which we have two or three beautiful species.

We have at least one species of the Service-tree, though I have seen it but once and cannot specially recommend it.

Our Wild Crab, so plentiful throughout the State, is one of the finest ornamental trees; but too plentiful to be appreciated.

The Sweet Gum is native and a most desirable tree in the shape and color of its foliage.

The Flowering Dogwood is a common tree, and like the Red-bud much admired from the early appearance of its so called flowers.

The Tupelo is admired by those who know it better than I, and is native in the southern end of this district.

The Persimmon is sometimes a rather handsome tree, but is specially desirable on account of its fruit, some varieties of which ripen by the last of August. Frost is not needed, as is popularly supposed, to ripen either this or papaw's fruit. The persimmon tree may be top-grafted with choice varieties (by the ordinary process of cleft grafting, with grafting wax wrapped about the junction) and thus much improved. As the tree is dioecious, or rather occasionally tending to be so, its barrenness may thus be corrected.

The Catalpa, native in the southern end of the district, is at once beautiful in foliage and blossom, and very easily grown from seed. It is tender in the northern part of the State, but grows to nearly a hundred feet in height in Pulaski County.

The Paulownia I have not cultivated, but have seen near Alton, and I believe it is worthy of cultivation in many parts of our district, though it is somewhat impatient of our colder winters.

We have no less than five species of Ash: White, Red, Green, Black, and Blue. Of these I have seen most of the White Ash, of which we formerly had very straight and tall forest growth in Madison County. The Green Ash is said to be more handsome, and all are valuable.

The Sassafras is to my notion one of our most ornamental trees. Grown singly it makes a tree of handsome shape, and its foliage, glossy in summer and red in autumn, with its yellowish green twigs and dark berries, makes it at once unique and ornamental.

There are three species of the Elm native in our district, including that magnificent tree, the White Elm, which Henry Ward Beecher pronounced the true, absolute tree, and that curious species, the Winged

Elm, which is found only in the extreme south. I have the English Elm in cultivation but it presents no noticeable superiority in any respect to our native variety.

We have two species of the Hackberry, one of which is familiar to us all as a handsome though not valuable tree. The other (*Celtis Mississippiensis*) is found, according to Dr. Vasey, only in the extreme south, and I have not seen it.

The Mulberry in its native species is a rather handsome and valuable tree. Our poultry show a keen appreciation of its fruit. It makes a dense shade whilst alive, and a durable post when dead. The foreign species are less hardy and valuable, so far as I have seen or tried them.

The Sycamore is one of our forest giants. Very unique from the whiteness of its branches; and grown in the open ground makes a broad-based pyramidal tree, of impressive appearance.

The Butternut is a common but not plentiful tree in Southern Illinois, and ornamental enough to be desirable with the many who love its fruit. I have however seen little success in its cultivation. For some unknown reason, I am informed by others, and have a like experience myself, the tree often dies young.

The Black Walnut is very abundant in the richer soils of Southern Illinois, and perhaps has been more grown than any other forest tree; and as I have before said it is one of our finest trees, rapidly disappearing, however, in these days of walnut furniture and finishing.

The Pecan is abundant at many points in the American Bottom, and the groves of it at East St. Louis and the old town of Kaskaskia are handsome as a body, and as individual trees. As producing the most delicious and valuable of our American nuts, its culture ought to be extended, especially in rich, deep soils.

The Shell-bark Hickory makes a handsome tree; its timber is valuable and its nuts delicious. The variation in the size, quality, and thinness of the nuts is so great that there is no doubt but that the fruit might be much improved by the selection and propagation of the better varieties. Two trees in my own neighborhood bear nuts of nearly twice the usual size, preserving the thin shell though perhaps not the finest flavor of the smaller nuts.

The Western Shell-bark, found upon our creek bottoms in Madison county, and common, I think, through the southern district, is equally fine in tree, and bears an enormous and good, though rather coarse flavored nut. I have never seen it in cultivation, and failed in a single trial made by myself.

The Mocker nut, as I suppose it to be, is the pioneer tree in advance of the woodlands on the prairies in our part of the State, and though sometimes a handsome tree it often, like the Black-Jack Oak, shows the honorable scars that are apt to mark the leaders in other movements, whilst its nuts are of little value. Two or three other species of hickory I will not now take time to notice.

Twelve or thirteen species of Oak, according to Dr. Vasey, are native to Southern Illinois, many, perhaps all of them, are more or less attractive though not always beautiful. I suppose their appearance of gnarled and rugged strength excites a not less pleasurable though different feeling from the symmetry or pliable grace of other trees. The White and Overcup Oaks are notable examples of this. The Post-Oak growing in clumps and groves on the borders of Southern Illinois prairies, is a pleasing object in the landscape. The Laurel Oak sometimes shows some fine specimens of a conical glossy leaved tree, when growing singly; and the Swamp Spanish Oak, as it grows upon our creek bottoms in Madison county, presents occasional specimens of a perfectly formed tree. But I know very few oaks in cultivation.

The Chestnut is probably not native in our State, though Judge Brown has seen some old trees at Caledonia, Pulaski Co., that are supposed to have been planted by the Indians. I have already spoken of it at sufficient length.

The Beech is native in the southern end of the State and probably in Edgar county, on the eastern side, and in Vermillion, and is one of the finest trees though difficult to transplant, and is restricted by nature to a very limited area in our State.

The Red Birch is our only southern native Birch, and I have never seen it planted, though I know a nice tree of it growing solitary, miles from any other, on a farm adjoining my own on the upland. I do not find in my experience or observation that the White or Black Birch is very successful in the South. I think the climate is not favorable.

The Willows of course are found in considerable abundance, both native and introduced, but none of natives seem to have attracted attention. I have seen one apparently native willow that seemed worthy of ornamental planting, but I do not know its botanical name. Of foreign species the Weeping Willow is sometimes found with us a handsome tree; and Golden Willow is attractive in spring-time, as well as the Goat Willow with its early catkins.

There are said to be four native species of Poplar in our Southern District, of which the Cottonwood is chief. The White and Lombardy Poplar from Europe however are the species chiefly planted for ornament. The Lombardy is considerably planted by our German immigrants, in memory, probably of the fatherland, where it is much planted along the roadsides.

Of Pines we have no natives except that the Yellow Pine has strayed over from Missouri (there is a Pine Hill in Union county). The Scotch Pine, though not one of the most handsome, is healthy and a rapid grower wherever I have met it. The Austrian is not so healthy, and owing to its open top is attacked and bored by the sap-sucker. The Heavy-wooded Pine grows well, but may be liable to the same attacks. A single specimen of the Red Pine does fairly with me, and I know specimens of the White Pine thirty years old, in our county, that thus far are hale and thrifty. The Stone Pine of nearly an equal age is thrifty and handsome, in its kind.

Of Spruces, the Norway, here as everywhere, grows finely, probably the best of all the evergreens. I know specimens thirty years old that are as handsome as ever, but sadly bored by the Sap-sucker. The Hemlock Spruce is less successful; I know of more failures than successes with it, yet I know of fine specimens, none however, have attained much age. The Silver Fir makes a handsome tree in many places that I have seen it. The Southern Cypress grows vigorously and apparently healthfully on our high lands; and has a very beautiful foliage. The Arbor-Vitæs are cultivated with varied success; many of them seem handsome and healthy—especially the Golden Chinese, which is one of the finest colored evergreens that I know. The Red Cedar, our special native evergreen tree of Egypt, I believe to have been unwarrantably criticised and often neglected on account of supposed shabbiness in its old age. It has not yet been proved that any other evergreen will do better, and until then I shall plant the Cedar. The Cedar is our longest planted tree; more old specimens exist than of other species, and these have generally not received as intelligent care as those planted later, so that we must not expect perfect specimens in the old trees. Comparing trees of the same age properly treated, I do not find the Red Cedar much if at all inferior to Pine or Spruce.

All trees, nearly, I may add, seem to me more healthful in our Southern Illinois soil than in the center and north. As I look upon the somewhat unwholesome evergreens that I meet upon our great prairies I sometimes fear that it will be many generations before the soil will be fit for healthful growths of deeply rooting trees. Probably some of the harder and less fastidious forest growths, such as the Willow, the Cottonwood, and the Soft Maple must pioneer the way and fit the soil and sub-soil for more delicate and valuable growths.

Our Illinois Egypt, according to Dr. Vasey, furnishes "perhaps a larger variety of trees than is to be found in any other district of a like extent in the northern or western states." Robert Ridgway, in the American Naturalist for November eighteen seventy-two, gives some "notes on the vegetation of the lower Wabash Valley," that impress us with the variety and luxuriance of the forest growth about Mt. Carmel. He mentions a specimen of the Sycamore one hundred sixty-eight feet in height, and sixty-eight feet to a limb, with a circumference of thirty-three and a third feet; of the-Tulip tree one hundred fifty-eight feet in height, seventy-four feet in the trunk, and twenty-three feet in circumference; whilst the average height of nineteen trees was one hundred forty-two and seven nineteenths feet. Three trees of the Pecan Hickory averaged one hundred seventy feet in height, eighty-five feet to a limb, and fifteen and two thirds feet in circumference, and two trees of the White Ash one hundred forty and a half feet in height, seventy-nine and a half feet to a limb, and fourteen feet in circumference. Two trees of Black Walnut averaged one hundred twenty-five feet in height, fifty feet to a limb, and eighteen and a third feet in circumference; and six Spanish Oaks (*Quercus coccinnea, var. ?*) averaged one hundred twenty and

two-thirds feet in height, fifty-eight and four-fifths feet to a limb, and seventeen and one half feet in circumference. Five Burr Oaks showed an average height of one hundred nineteen and one-fifth feet, forty-two and two-fifths feet of trunk, and seventeen and one-half feet in circumference; whilst six White Oaks averaged one hundred forty-two feet in height, forty-eight and one-third feet of trunk, and fourteen and three-fourths feet in circumference. Four Cottonwoods measured one hundred forty-two and one-half feet in height, sixty-one and two-thirds feet to a limb, and fifteen and one-third feet in circumference; seven trees of the Sweet-gum, the tallest tree in proportion to its girth, averaged one hundred seventeen and three sevenths feet, sixty-two and one-half feet to a limb, and eleven and seven-eights feet in circumference; whilst the Sassafras, one of the *undergrowths*, measured seventy-one and two-thirds feet in height, fifty-two and-one half feet to a limb, and seven and two-thirds feet in circumference.

Such are the magnificent growths that our *Prairie* State contributes to the *sylva* of North America. The beautiful plains of the Rock River Valley, the fair and fertile prairies of Central Illinois are fitly supplemented by the primeval forests of lower Egypt.

DISCUSSION ON ORNAMENTAL AND FOREST TREES.

MR. FREEMAN—There is one variety of Persimmon which ripens before frost, and four which seem to require frost to ripen them, as they are not good till after frosts.

In answer to a question, he said that the one ripening early is the best in quality.

MR. FLAGG—The early varieties of Persimmons will ripen before the frost comes; but it has generally been supposed that the later sorts required the frost to ripen them.

Perhaps Arthur Bryant, Jr., can tell us something about this.

MR. BRYANT JR.—I have noticed that on the same tree, some of the fruit is good to eat before frost and some not till after frost.

MR. FLAGG—Which are the best?

MR. BRYANT—I don't know; they vary in different seasons; one season, I remember, they did not get fit to eat at all.

MR. BROWN spoke of two trees, found in Southern Illinois, which are not mentioned in Mr. Flagg's report; one the Southern Buckthorn (*Bumelia lycioides*), the other the deciduous Holly, (*Ilex deciduce*) which is very beautiful and showy.

MR. SCOFIELD—I do not know that I understood Mr. Flagg rightly. I understood him to say that the Conifers did not succeed well in the northern and central portions of the State.

MR. FLAGG—Not exactly. My statement is this. I do not believe that the prairie of central and northern Illinois is the natural habitation of trees. The very existence of these prairie lands, shows an *original* unfitness for tree growth. I do not think that the prairie states are going to be immediately fitted for all kinds of tree growths. I think that such trees as the Cottonwood and White Elm must pioneer the way for other growths.

My opinion is that the growth of such trees makes the soil fit for other growths; my observation is that Evergreens are not as healthy in the northern as in the south part of the State. There are exceptions however to this.

MR. DOUGLASS—Don't you think the coal smoke in and about our cities has an effect upon our evergreen trees? I notice this in particular, about Springfield.

MR. FLAGG—Yes, I think it does have some influence.

MR. SCOFIELD—I live in the northern part of the State, and I contend that we are not unfavorably located in this particular of tree growth; particularly in the growth of Conifers. Take such trees as the Norway Spruce, and Scotch Pine, and where do they grow better? I am satisfied that coal smoke is detrimental to the healthfulness of our evergreens.

MR. FLAGG—I will state that the facts are against the gentleman, as reported by Mr. Edwards. He then read that portion of his report which refers to evergreens upon the prairies.

MR. DOUGLASS did not think Mr. Flagg right in stating that the Cottonwood and other soft-wood deciduous trees are "pioneers."

Cottonwood will grow in wetter ground than most Conifers; but these will thrive in northern and central Illinois where the soil is not too wet, and where not poisoned by coal smoke.

He had furnished Mr. Elliott—Industrial Agent for the Kansas Pacific Railway company—with a quantity of European Larch, one third of which were planted at Wilson in pleasant weather and lived well; the balance were taken on to Ellis and Pond Creek and planted in cold, wet weather; these did tolerably well, but a hailstorm killed many of them. Some were planted in a "dip hole" or low place and did not, of course, succeed as well as those on higher land.

He thought we have the greatest encouragement to plant trees upon the prairies, and plant extensively.

MR. BALDWIN—I wish to protest against the intimation that the prairies of Northern Illinois will not produce as great a variety of trees as Southern Illinois.

I know it was once the opinion that prairies were not adapted to tree growth; but I believe that opinion has about exploded. The prairie soil is especially adapted to the growth of White, Hard, and Ash-leaf Maples, Black and White Walnuts, Tulip-tree, White Pine, (this will grow sometimes three feet in a single season) White Elm, White, and Blue Ash; nearly all the varieties of Oak grow faster on the prairie than on timber soil. The only objection to prairie soil is that it gets too dry in time of excessive drouth. There is little doubt that the prairies would be covered with trees had the fires been kept from them.

MR. DOUGLASS—I used to think as Mr. Flagg does.

MR. FLAGG—I was brought up on the prairie. [Laughter.]

MR. DOUGLASS—I have cut nine cords of wood from one Burr Oak. This was a *big tree*. It stood upon a sort of island, and the fires that devastated the prairie around it could not reach it; showing that it is not for want of adaptation of soil that we have not trees, and *large* trees.

MR. EDWARDS—In common with many of the members of this Society I once fell into the way of thinking that our prairies were not adapted to timber growing, but facts have overthrown this theory. Now let us not be misled in this matter. There are some facts that are looking us squarely in the face. The country is being devastated of its timber, and must we not replace it?

I know that in my part of the State, since I first came there, thirty years ago, there is not, now, one tenth the timber that there was then. Indeed, there is not much more timber to cut. I learn that the same is true elsewhere, and necessity is upon us, we *must* plant, and to say that our country is not adapted to the growth of trees, is like saying it is not adapted to the white man. No doubt some varieties of trees do better in one place than in another—but trees grow freely in every part of the State; and, I repeat, our influence should favor planting trees—and I do not understand Mr. Flagg to have any different view in this regard.

MR. M. L. DUNLAP—I wish to say a word about the adaptation of our prairies to timber growing. I think the difficulty is in the physical condition of the country. You will find that where there are timber belts there is water. And these creeks and sloughs have kept off the fires. The reason the Grand Prairie is so destitute of timber is, that it has no

water. Hence I say it is the physical condition of the country that has prevented the prairies from being covered with timber. We find east of the Wabash river a timbered country; the fires coming from the west being stopped by the river.

MR. WIER—Mr. Flagg speaks of grafting the persimmon. I have had that question asked me fifty times. Can it be done?

MR. FLAGG—I have no experience, but I have the testimony of one Mr. Balsiger of Madison County that he tried root-grafting and failed; he then tried top-grafting, using wax, and succeeded well.

MR. FREEMAN—I would say in regard to the *fire theory*, we have fires, and are as liable to fire in the southern part of of the State as in any other. We have a fire there *now*. I have a letter, just received from home, saying a fire has swept over the country.

MR. EARLE—Along the very wide breadth of country through which the Illinois Central Railroad passes, there is no timber fit for railroad ties, and the nearest point of supply in Southern Illinois, is forty miles away.

I think it is time this question of supply of timber was being agitated. I do not think we can do the people of the State a better service than to wake them up on this subject, and I welcome all this talk. I believe that the discussions and published Transactions of this Society have done more to call attention to this subject than all other influences combined. Let the grand movement go forward.

Legislation may yet help us. Our legislatures, state and national, should encourage this great enterprise of tree planting.

He referred to the statement of Mr. Mathews, of Iowa, that the European Larch is not durable timber when grown upon the prairie, and thought there was some mistake about it. He has hopes of this tree as a timber tree.

MR. SNEDECKER—I would suggest, that the Osage Orange is one of our best timber trees; the Larch I don't think is to be compared with it. It makes a good fence; there is nothing you can plant better for a wind-break, and when grown for timber, it will last as a fence post equally as long as Red Cedar; and for wagon timber it ranks number one. I recommend it as one of the most valuable timber trees that we can plant.

MR. BRYANT, JR.—I would name the Catalpa as an excellent timber tree. It makes excellent posts, does not rot; we have nothing better.

MR. WIER—How large does it grow?

MR. BRYANT—Two feet in diameter. It is necessary to plant trees close for timber purposes, so that they will grow up straight.

MR. ESSEX—I think well of the Chestnut. I planted some years ago in Rock Island County, four rows of chestnut trees, so close that I could not drive a wagon between them. For ten years they have borne chestnuts, and are now growing annually from three to four feet. They were planted for a wind-break; and I find in cold weather with a west wind the thermometer indicates two or three degrees warmer on the east than on the west side of it.

MR. FLAGG—How far from the Mississippi river?

MR. ESSEX—About one-half mile.

MR. FREEMAN called the attention of the Society to a valuable paper upon this subject in the December number of Youmans's Scientific Monthly.

MR. FLAGG—I would be glad to have the opinion of gentlemen upon the subject of the fitness of the European Larch for Southern Illinois.

MR. EARLE—I have questioned Mr. Mathew's published statements regarding this tree, and I would be glad to hear from Mr. Douglass, Mr. Scofield, or Mr. Whitney upon the subject.

MR. DOUGLASS—Being very much interested in this tree, I have tried to inform myself in regard to it. Knowing that a Mr. Hobbs in St. Louis had some old Larch trees, I wrote to know about them, and I learned that trees planted twenty years ago were now in healthy condition, and were about eighteen inches in thickness. There are some noble trees in Shaw's Garden, St. Louis, showing that the tree is suited to that climate.

MR. PEARSON—There is a tree in Godfrey, my town, that is thirty-two years old, forty feet high, and say fifteen inches in diameter. It is a beautiful tree. There are others in the neighborhood twenty feet high; and while I can recommend the tree, there is no such wonderful growth as we hear.

MR. WIER—I believe with Mr. Snedecker, that the Osage Orange is the best tree for all purposes. The only objection is its thorns, but the thorns go off as the tree grows older. I don't see why it is not more generally grown for timber.

MR. NELSON—I do believe it is one of our best timber trees. When in Texas, some time since my attention was called to a *gate post*—which was a very old looking piece of timber—covered with moss. I asked what kind of timber it was, and was told that it was "*Bodark*;"*—the Texan name for Osage Orange. On being told that it had been standing thirty years, I procured a spade and dug around it and found it perfectly sound; much to my surprise.

I also saw, while there, a wagon the wheels of which, the owner assured me had been made three years before from green "Bodark" timber; they were tight and in excellent order, though the tire had not been reset.

Voice—How large trees have you seen?

MR. NELSON—From three to three and a half feet in diameter. I have seen them in Texas forty feet high before you came to a limb. It is good timber for rails. There is another kind that branch out right at the ground, like friend Wier's apple trees. [Laughter.]

MR. WIER—They had lots of fruit, did they not?]Laughter.]

MR. NELSON—Just so. [Continued laughter.]

MR. FLAGG—Are there any conditions to expedite growth?

MR. NELSON—Where trees are planted thick they grow tall without much branching.

MR. SCOFIELD—I have every confidence in the success of the European Larch in this country. Mr. Mathews' failure was due to the fact that he put his trees in wet soil, whereas they should be planted very early and in dry soil, to succeed well.

MR. WIER—I think we have made a mistake in recommending the planting of the Larch everywhere; I have not succeeded with it, but I know one experiment does not settle the matter. Last year I planted a lot of one thousand trees on the fourteenth of May, and also another lot on the twenty-fourth day of May, none of which were leaved out, and they lived.

As these plants were procured from Mr. Douglass, I will ask him how they were kept back till that time.

MR. DOUGLASS—They were kept in an ice-house, that is all; and while I am up I will say, in regard to the durability of the wood, that

* This is a corruption of the words Bois d'Arc or Bow-wood, so called on account of its elasticity. [Secretary.]

while the wood is young and sappy, and growing rapidly, even the wood of Red Cedar is not durable.

I read Mr. Mathews' account and explain it in this way: the sap-wood of young trees is not durable; an oak sapling two inches through has no *real* wood at all, and will soon rot in the ground. Just so with his young larches—the sap-wood will soon rot.

The discussion was arrested at this point by an announcement by the President that the time for adjournment had arrived.

Mr. Hammond moved that the subject of the Utilizing of Fruits be made the order for the evening session; which was agreed to.

On motion the Society adjourned.

SECOND DAY.

EVENING SESSION.

President Starr announced that the special order of business for the evening was the report from Committee on the Utilization of Fruits.

Mr. Scofield said that he had received a paper from Professor McAfee, a member of the Committee, and requested that it be read by the Secretary, as follows:

REPORT OF COMMITTEE ON UTILIZING FRUITS—CHEMISTRY OF DECAY.

BY H. H. M'AFEE.

No question of economy is of greater importance to the fruit producer, than that of how to preserve fruits in their ripe condition, so that their use may be extended over the whole circle of the year, thus making his products take on the character of a staple merchandise, rather than that of a periodical commodity. And the interests involved not only touch the professional producer, but equally affect the consumer who produces his own supply, together with the purchaser in the general market.

To arrest decay,—always impending decay,—and save for a season the products of the orchard and garden! What more desirable object? More especially since those products have grown in our domestic life, from luxuries to conveniencies, and finally, since their healthfulness and economy are so well proven, even to necessaries.

How shall we secure the noble apple for a season from the myriads of spores,—active, deadly enemies, floating in every breeze, and ready to lodge and grow whenever favorable conditions arise, and to send their mycelia rioting among the luscious cells to disorganize, break down, and destroy, transforming grateful juices, delicious flavors, delicately enticing aroma, to the "gall of bitterness" and the "corruption of decay"?

How can we save the cheap merchandise of the overloaded market until the glut is over and the price remunerative? or how can we preserve the goods, bought cheaply, so that they may serve us when the scarcity and high prices arrive?

If there be any way, any process, it will probably be reached through a correct knowledge of the laws of chemical combinations which govern the changes of the decaying fruit, together with a better understanding of the character and action of the organic destructive agents which hasten disorganization.

What is this decay, then, in a chemical point of view? Wherein does it differ from growth? Normally it is but a step farther in the process of ripening—*excessive* ripening—maturity beyond the point of usefulness. And it is just as much a logical sequence of ripening, as ripening is of growth. But if diseased action supervene, as it is almost invariably sure to do, then another element enters into the problem; an element too, of exceeding complexity, which will likely ever continue to baffle a full investigation, from the fact that a life-principle is involved in the action. Normal decay, as I have called it, or decay not hastened or helped by the action of the lower forms of the fungi, is probably very rare, perhaps in the case of fruits never occurs; and in that case we must consider decay as disease; an action wholly or in part caused by a morbific agent. Truly "in death there is life" when every death is the occasion and support of myriads of lives, while the myriads of lives accomplish the death that they may live.

The arbitrary lines which we please ourselves to draw between the sciences and the branches of science do not exist in nature, and they are only useful as a means to keep the complexity of a subject out of sight so that our imperfect minds may better grasp its parts. So if we investigate the chemical combinations and reactions in decay, apart from the physiological action of the fungoid growth taking place in the decaying substance, we are gaining but a partial insight into our subject; but still we must so divide it to comprehend it.

Vegetative action is described sometimes as a process of deoxydation, because the plants which most engage our attention are, during active growth, reducing carbonic acid, and restoring itsoxygen to the air. This action is directly due to that force, so wonderful, and so hardly comprehended, which we know of only by its action, and which we have called life, or the vital force. Were all other things equal and the vital force lacking, the carbonic acid might still exist free, or enter into combinations, but it could not be reduced to its elements. Not only so, but let the vital force once be lacking in intensity, or at least not in action, and the so recently divorced elements rush together and are again carbonic acid, and this action is decay. See how the plant, taking in carbonic acid and at the same time giving off oxygen during the day, begins to undo its work, taking up oxygen and yielding carbonic acid, at nightfall. So, too, when conditions unfavorable to growth occur to a *part* or to the whole of the plant, oxydation, decay at once commences.

True, under the conditions unfavorable to oxydation, such as low temperature and lack of absorbing and excreting surface, the decay is so retarded as to be very much less discernible, but that it is taking place even in our plants while hybernating, is well established.

But what then of the fungi which do not live and grow by a process of deoxydation, as do the others, but which do exactly the opposite, namely, oxydize; which stand in the same relation to the other plants that animals do, and which accomplish the destruction of their so-called more highly organized brethren, whenever they can. If it be the office of plants, in the economy of Nature, to take unorganized substances and organize them into food for animals which must have organic food or die, then must the fungi be animal in their functions, for they feed upon organic food already prepared for them by other plants. They are oxydizers and plant destroyers, as are animals; and the products of *their* action and decay, (as is the case with animals) are finally inorganic.

But the strangest part of the mystery of the fungi is that their *presence*, simply, will induce chemical combinations the opposite of those which would occur were they absent. They feed upon plants when dead, but they do vastly more, to our sorrow; their intimate presence kills that they *may* feed. When the phenogamous plant decays it does just what the fungus does when it lives and thrives. "Evil communications corrupting good manners" again. The history of the phenogamous plant, is in stages and degrees, as follows:

First. A seed, in which the nature of its constitution, and the circumstances surrounding are such that decay is retarded. Especially is lack of moisture the cause of its preservation. But decay does go on, because it finally eats up—annihilates the life principle, and the seed cannot grow.

Second. Seed growth. Supply moisture, oxygen, heat, and a part of the seed begins to decay, and another part to grow by feeding upon it. The young plantlet, acting like the maturer fungus, living upon organized food.

Third. Daily plant growth. While circumstances are favorable the plant grows, deoxydizing carbonic acid, but when circumstances (notably the circumstance of light) are unfavorable the plant begins to lose its vital force and its deoxydizing power, and decay—oxydation— begins in turn to be arrested on the return of light.

Fourth. Hybernation. The loss of leafage not only curtails absorptive and excretive surface, but, the millions of laboratories, the chlorophyll cells are gone. So the decay which sets in is not so rapid, but then the temperature is lowered, and often the supply of moisture is impaired by the frozen earth, so the decay of winter is but a minimum quantity. But decay takes place, as is early proved in the products of the tree at the end of its hybernation. Where was starch in autumn (as in the maples) in spring there is sugar, and a little later a mucilaginous, substance containing nitrogen which is food for the bursting buds now feeding on organized food as the fungi do, and as the plantlet did in its early history.

Fifth. Inflorescence. A process which is growth till the object of the flower's life is completed, and from that point decay, as is proven from the fact that opening blooms exhale no oxygen, and those which have been fertilized do.

Sixth. Fruitage. The growth of the fruit is all organization; the laying up of stores of food often, as in the apple, very excessive of any apparent wants of the inclosed seed.

Seventh. Ripening. This is entirely a process of decay. Observe a very sweet apple; when of full size and not ripe its macerated pulp yields much starch; it has indeed a starchy taste; but when ripe the starch is gone, and glucose or sugar remains; so the acids when green lack an atom of oxygen as compared with the acids when ripe.

Here are the seven ages of the plant. Its last, the one which is to be our reward for all our care of it. And now how are we to so prolong this interesting and profitable stage that it shall most contribute to our enjoyment and profit. What is the fruit doing? Decaying. We must arrest that process if we can, or as we cannot entirely arrest it, we must retard it; to do which it is necessary to surround it with the circumstances most unfavorable to decay. Its nitrogen must be kept from the union with hydrogen which it desires, by keeping the hydrogen closely united with carbon and oxygen. Its carbon must be kept from the oxygen which it desires, by excluding the free oxygen desiring to enter, and by an unfavorable temperature. Its sugar must not be able to become alcohol and then acetic acid.

How is all this to be done? In many ways. First, by rapid desiccation. Abstract the water, and both chemical affinities and fungoid influences are overcome. But the drying cannot be too quick, for the high temperature and the access of air necessary, strongly favor chemical changes. Such a process as the Alden, or one better still in which air super-dried chemically will be used, must be far in advance of the old style of drying fruit, so slowly that it was at least partly rotten before dry.

Second. By sealing we may exclude a large portion of air having to fill spaces caused by the contraction of the contents of the vessel, an atmosphere which soon becomes excessive in nitrogen and carbonic acid, both of which are unfavorable to decay.

In such cases it often happens that the fungus mold helps preserve for a time the fruit below, for it takes up all the oxygen presented, and leaves little or none to pass into the fruit. But the changes which may go on in the fruit by interchange of elements already there, simple readjustment, are not arrested by the sealing, except the farther circumstances unfavorable to decay, of low temperature and darkness, are present. And even then with every care flavor is lost, some decay goes on still.

Could we have a substance which by its presence would exclude the possibility of oxydation, and yet be perfectly tasteless and not unhealthful, we could set away our cans with perfect confidence in their subsequent purity and flavor. But alas, there now appears to be no hope for such a boon.

Third. We may surround our fruit with the circumstances of low temperature, darkness, and a confined atmosphere, and then decay must be slow, for so soon as any oxygen is taken from that air, there is left an excess of nitrogen which of all gases is most unfavorable to decay, especially if dry and unaffected by electric passages.

But where oxygen is absorbed, its place is supplied by carbonic acid excreted; and carbonic acid does not feed decay, any more than it will feed flame, or support respiration.

Here then seems to be a set of conditions which we may apply at so slight expense that our process may be economical, and the results reached still be of great use.

We can readily confine fruit in the dark where it is cool. But may we not do more? Suppose we supply the atmosphere surrounding our fruit with a substance hungry for oxygen, or with another substance both hungry for oxygen and exerting a destructive influence upon the fungoid growths. It seems as though, if we could find such substances cheap and plenty, our fruit might be cheaply and easily preserved long beyond its usual time.

Chief among the substances which have a tendency to retard decay is earth,—mother earth. The soil is, either wet or dry, an absorber of oxygen, especially so when it holds certain salts of iron; and the accounts we see, together with experience, teach that many substances are preserved in earth where they would soon decay out of it. But ordinary earth holds enough organic matter to give a good foothold to fungoid growths whenever moisture and heat enough are present. So it would seem that pulverized and dried subsoil would better serve our purpose, were it not that the very presence of the organic matter helps make the top soil an absorber of oxygen.

We all remember the buried apples of our youth, how well they kept, and how mouldy they tasted. Can we not keep them as well, and avoid the mould?

I believe we can, and that it will be done by the aid of dried earth and a salt of iron, or some similar body which will put a veto upon the fungi and still take up oxygen so that the air shall be able to spare none to assist decay. How strange it is that substances that are oxydizing take up flavors and perfumes so rapidly! A ripening apple, in an atmosphere smelling strongly of tobacco, in six hours will actually taste of tobacco a half-inch under the skin. Cream will greedily suck up every perfume presented, as will butter, and both are taking up oxygen. Perfumes and flavors really *seem* to accompany the atoms of oxygen. Who knows but that they do? I had hoped when appointed upon your committee to be able to institute a series of experiments to gain light upon this branch of my subject, but unfavorable circumstances (the same which generally deter private experimenters in pursuit of knowledge) prevented it; and as the knowledge was as yet undeveloped, I had no place to go to get that which would adequately supply my own deficiency. It may be that the German experiment stations might have given light

if accessible for, *they* are busy there making—developing—knowledge; but we of America have not yet had the wit to profit fully by an example of one of the greatest successes of the nineteenth century. Our experiment stations are overshadowed by the mere business of teaching, and their mark has not yet reached the point where the world can draw upon them for new installments of knowledge in aid of husbandry. It is desirable that thorough tests of the value of the earths, and combinations with the earths, as preservative agents, be made. An interest which reaches pecuniarily into the millions calls for such tests, and it is too much to require private shoulders to bear the whole burden of expense.

Hearken, Messrs. Agricultural Chemists who receive the bounty of the nation for your salaries, tell us how to keep apples, grapes, pears plums, peaches, yes, strawberries and raspberries; if you can only tell, us how to keep them one day longer, we will some of us bless you every time we count our cash, while the rest will bless you all the same, whenever we count what we have saved, and how much more we have enjoyed.

Mr. Periam from the same committee, reported upon

UTILIZING FRUITS—IN NATURAL STATE, DRYING, AND CANNING.

In treating this subject, it was agreed that the work should be divided between the Committee, as follows:

Mr. Dunlap agreed to treat of the liquid products of fruits; Mr. McAfee, of the chemistry of fruits, and my share of the work was to include the preservation of orchard fruits in their natural state; preservation by drying; and keeping of fruit by canning, etc. My understanding was that the committee would not go into a detailed account of the various processes by which fruits are utilized, but simply to present such data as would be of interest to the pomologist: or rather to gather some facts that would elicit discussion, to be followed by additional information as the facts could be gathered from season to season.

I have therefore concluded to divide the portion of work assigned to me under three heads: Preserving fruits in their natural condition, preservation by drying, and conservation in air-tight packages.

All that is necessary in order to keep fruits perfectly, in fresh or natural state, is to place them in a dry, pure atmosphere, at a temperature of thirty-five to thirty-eight degrees. This has been accomplished by the plan of Prof. Nyce, and also in Schooley's preservatory, the essential features differing in no great degree. The plan adopted by Mr. Nyce was to keep the temperature of the room at thirty-four degrees, and the atmosphere dry by means of the refuse of salt works, chloride of calcium, commonly called "bitterns." It is thus stated by Prof. Nyce:

"In a room or any confined vessel when filled with fruit in the gradual processes of ripening, carbonic acid and water are constantly being generated. Six pounds of carbon and one of hydrogen will take up all the oxygen contained in one hundred and twenty pounds of air. The oxygen, especially if the fruit be ripe and the room warm, will usually

be consumed in about forty-eight hours. The atmosphere is then made up of the nitrogen of the air, and carbonic acid. The former is destitute of all active properties, good or bad. The latter is not found to have any action on fruit immersed therein. Hydrogen and carbon then cease to be evolved from the fruit, as there is no agent to unite with them, in the same way that they cease to be evolved from a burning candle when air is removed. Decomposition ceases in both cases, from the same cause."

It is simply the application of a principle laid down by Liebig, who says:

"Decay is much retarded by moisture, and by the substance being surrounded with an atmosphere of carbonic acid, which prevents the air from coming in contact with decaying mattter."

From this it would appear that the more perfectly the fruit is ripened, the better it will keep, care being taken that it be not overripe; the process of after ripening being a purely chemical process, the starch being gradually converted into sugar, for however much starch a green fruit may contain, it is gradually changed during the process of ripening, until not a trace of starch may be left; for again Liebig says, "The more starch the green fruit contains, the more sugar will be evolved during the process of ripening."

The same principle was used in the plan not long since promulgated, the invention being to place the fruit in water-tight packages, and fill the interstices with carbonic acid gas, but as a matter of course, the plan did not work except in theory.

The fruit houses of Mr. Nyce were two-story buildings, the upper chamber containing ice, the sides and floor being double, three feet thick and filled in with some nonconductor, so that the fruit room should be practically air-tight. The fruit was placed on shelves or racks, to the depth of two or three feet. I have had tomatoes preserved for three months in the house in Chicago, which came out in perfect condition. The Chicago house, however, did not pay, and it was soon, I believe, abandoned.

The elements, therefore, of a complete preserving atmosphere are a uniform temperature, just above the freezing point, dryness, purity, and the exclusion as far as possible of the great agent of decomposition—the oxygen of the atmosphere. Whoever can secure these conditions most cheaply will best succeed in keeping apples, pears, and grapes, and with plenty of these fruits out of their natural season, there is a fortune to whomsoever succeeds in its accomplishment.

I think the best place for keeping fruits in their natural state is in fruit-houses with double walls, secure at the same time from frost and the constant changes of the atmosphere; for however cheap dried or canned fruits are in the market, first-class natural fruits will always command a remunerative price. A curious fact in connection with seasons of extreme plenty like the one just passed, is, that being plenty, so much fruit is wasted that a scarcity almost always follows.

Where the soil is perfectly dry to a sufficient depth, or capable of perfect drainage, a fruit-house may be readily built under a barn or carriage-house, provided no stock is kept in the barn. The walls should be seven feet high, and if three sides are under the ground, the other side may be exposed to the weather if the ventilators and windows are double.

To prevent frost entering through the upper floor, it will only be necessary to have the beams one foot deep, the floor to be made of common two-inch plank, the joists or beams to be covered with matched boards for the ceiling; if the inter-spaces are filled with sawdust, or some material of like nature, frost will not enter. A trap-door should be provided for taking out fruit, or entering the cellar in cold weather; and a chimney also, for ventilation in extreme weather. If the whole cellar is not wanted for fruit, it can be partitioned off and a part used for storing vegetables. If the fruit in a cellar of this description be kept in tight packages, the temperature may run down to twenty-eight degrees for several days together, next the walls, without injury to the fruit, provided the packages are tight; and as an index to the temperature, a sufficient number of thermometers should be kept, at top and bottom, to indicate the degree of cold, so that when the frost once gets in the room, means may be taken to obviate it.

One of the principal reasons of failure in keeping fruit is that care is not taken to keep it uniformly cool from the time of picking, and as near the freezing point as possible. This may be measurably attained by admitting the air at night, and closing it in the day-time until hard weather comes on. It is the true secret of greatest success.

Before leaving this branch of the subject, I would say that all plans for the preservation of fruits in their natural state aim at keeping them just above freezing point; as Nyce's, Schooley's, etc., are founded upon principles only differing in the details. One other plan that may receive a passing notice is Smith's method of driving out the atmospheric air from the packages containing the fruit, by means of the introduction of carbonic acid and nitrogen through a tube; this is effected by first passing a current of common air through a vessel of burning charcoal; and, although the plan is feasible, it has not resulted in profit.

We now come to preservation of fruits by drying. This plan has been practiced from remote times by simple exposure to the air; but the fruit becomes so black from oxygenation and dust, that its market value is slight. In order to be salable it most be dried by the application of heat. This is performed in a variety of ways by the simple radiation of heat, and by currents of hot air forced either up through the prepared fruit, or down from above. The last is, we believe, the Ruttan system, and is used principally for drying grain.

The Alden process is performed by carrying to a certain point a series of shelves automatically, and at such regular intervals in a hot-air chamber, that when the fruit reaches this point it is cured. Thus when one tray is taken out, another is put in. The erection of these works

requires the expenditure of considerable capital, and probably skill; for notwithstanding the fact that this plan has been in operation for several years, the quantity exposed for sale in our cities is very limited, and exceedingly high in price. It must be said, however, that the fruit so produced is of the very highest quality, and leaves but little to be desired. I have seen it stated that the royalty for this process is so excessive, that it has prevented its adoption to a great extent. I am fully convinced, however, that the preserving of fruits by desiccation, by means of a blast of hot air, is the proper direction for us to look in the future.

I learn through the *California Agriculturist*, that a gentleman of Santa Clara, California, has perfected a process this season, for the perfect preservation not only of fruits, but also of any other article capable of being so treated, by this means; that he has erected a building, with engine, blower, etc., and is prepared to fill small orders for such desiccated fruits. Fruits, meats, fish, and vegetables are said to retain all the richness and excellence of natural flavor; and the process, although simple, is said to be perfect. When Mr. Gould was east last year he examined the Alden process, but owing to the cost of a royalty from Mr. Alden, he set about inventing a way of his own, upon which he has filed a caveat to protect himself against the possible patents of others. But the *Agriculturist* says he is willing that any one should adopt his method, free of royalty. This is the spirit we feel like commending, and it is to be hoped that those interested will inform themselves of the facts, in order to profit by such self-sacrificing liberality; a commodity not much in vogue in these days.

It only remains for me now, Mr. President, to notice the other principal mode of preserving fruit, which is, in the form of jellies, jams, sauces, and the so-called "butters." There are many persons who consider this the most economical manner of preservation. Unfortunately with many varieties of fruits preserved, the cans represent a greater value than the fruits so preserved, one of which may be mentioned, tomatoes. Were it not for this, sealed fruits would always hold a close competition with the best class of dried fruits. For many of the finer fruits, as cherries, plums, apricots, nectarines, and perhaps peaches, will always be sought, until the system of drying fruits is brought to a greater perfection than at present. There is one thing in favor of sealed fruits. The packages once bought, the expense for fixtures is not great. The process may be carried on in any village large enough to afford a steam-engine to give the necessary heat, the other appliances being only of moderate cost. A steam-box is needed for heating, capable of holding the water in which the steam is introduced, and a machine for pressing the corks into glass packages, and also implements for soldering tin. A good formula for making the sealing wax is one pound of rosin, one and one-half ounces of tallow, and three ounces of beeswax. I am informed, also, that pitch, as used for calking vessels, is admirable. It is first prepared by boiling a few minutes, and then heated as wanted. The jars, after the corks have been driven and pared, are inverted and

dipped into the pitch or sealing-wax, just to the rim or bulb, for if dipped lower, it is apt to crack the glass. If there are blisters, they must be rubbed out, using a little tallow to prevent sticking.

I have thus imperfectly performed the labor assigned me, and can only offer in excuse, that my time is so constantly taken up, that I have not been able to give more attention to gathering facts relating to this subject. In conclusion I unhesitatingly express the opinion that we rely in a great measure on the first and second plans named in this report—the preservation of fruits in their natural state, and desiccation. The second I consider of far more importance than the first, since the fruits are so largely reduced in weight thereby, that it makes the cost of transportation a comparatively small item. When the processes for drying shall be cheapened as they must be, the demand for these fruits will increase to an unlimited extent, and the profits of fruit growing will be largely increased. In the meantime, recourse must be had to the drying of fruits by radiation; and this is so simple, that no orchard distant from market, should be without an appliance for this purpose. Any rough carpenter can build the house, and any rough workman can put in the flues. It is simply to get the most radiating surface possible, at the least cost, and so arrange the drawers upon which the fruit is placed, as to make the handling economical. Thus the surplus of fruit can be easily worked, and if quickly and cleanly performed, there is abundant sale for the product at remunerative prices.

The proper drying of fruits, or rather the most economical appliances therefor, are in their infancy yet, and I would like to see this society take measures to continue inquiry in this direction; for thereby I feel assured will be solved *one* of the problems: what to do with our fruits in seasons like the present.

MR. M. L. DUNLAP, another member of the committee said that he had no prepared, written report, but would make a few remarks upon the subject.

MR. DUNLAP'S REPORT ON UTILIZING FRUITS.

Mr. President and Gentlemen:

There are several ways, in which the fruit grower may utilize his fruits. As for example, by drying, canning, making cider and cider-vinegar.

We have gentlemen here, like Mr. Huggins, Mr. Earle, and others who are posted in the drying methods of utilizing fruits, and others who can tell us all about how to can our fruits.

I will therefore turn my attention, and make my remarks upon the utilization of the apple by making cider, and cider-vinegar. But I do not know where to begin, nor where to leave off. I have been in the orchard ever since the thirteenth of July, and I have got so much cider, and cider-vinegar in that time, that I do not know anything else *much*. I do claim to know how to make cider and cider-vinegar, and what I shall say will be gathered from my own experience and practice.

When your apples begin to drop from the tree, then is the time to begin to gather them. You assort the perfect specimens for market, and the remainder, which is sometimes the half of the crop, are to be made into cider, or cider-vinegar. The best cider is made from sound winter fruit. Some varieties of apples often ripen their fruit prematurely, and you must be prepared to utilize the product by putting the same into cider or vinegar. Ordinarily one half of the summer apples must go into cider-vinegar, which will under proper treatment, be ready for the market a year after.

I was in an orchard this summer, where there were not less than seven hundred bushels of apples that were allowed to drop from the trees, because the owner said it would not pay to ship them, and these were fine, beautiful red-cheeked apples as any could wish, and would have made from two thousand five hundred to two thousand eight hundred gallons of the best cider, that could have been sold for twenty-five cents per gallon.

The orchardist must be prepared to avail himself of every advantage in his situation. He must be independent of the apple market. I say to my customers, when you can pay me fifty cents per bushel for my apples you can have them. When the price falls below that I press them. I have cider made on the thirteenth day of August, that is sweet and good. I know that if I can't make the apples pay, I can make the cider pay, and the refuse not fit for market at any time, is put into vinegar.

Some say rotten apples won't make good vinegar. This is a mistake. The Shaker vinegar, so much sought after and praised, is made of rotten apples, exposed to the summer sun, and summer rains. Cider made in this way has sold for seventy-five cents and a dollar per gallon. Rotten apples make good vinegar, but to make good cider we use sound apples.

I am told that some make vinegar and can't sell it, and why can't they sell it? Because they do not have a clear, good article. Instead of racking the vinegar off, before stirring the barrel from its place, they perhaps roll it into the wagon, and stir it all up, and then it is impossible to settle it, and the grocery man will not have it.

There is another thing. I like to have my cider-vinegar high colored, and for this purpose, I let it stand in the vat twelve hours. We can ordinarily get about four gallons of juice out of a bushel of apples, in the method we adopt. We press out about three gallons of cider from the bushel, and in making vinegar we re-press this pomace, and get another gallon, so that from a hundred bushels of apples we get four hundred gallons of juice.

It is necessary to put into the grocers' hands *strong* vinegar, because, among other reasons, the grocer finds it very convenient sometimes, to put in four or five gallons of water. But if a customer comes and says, "Here, I want vinegar for pickles," the honest (?) grocer will be careful and not give him the watered vinegar.

To make good cider and vinegar there is needed care, skill, experience, and—if done on a large scale—capital. So that it may be ques-

tioned whether the man with a small orchard should attempt to be both producer and manufacturer. Might it not be better for him to sell to the manufacturer? It is not always that the small farmer can afford to lie out of his money, even if he had the tact and business ability to carry on a manufacturing establishment.

Another thing: to sell a manufactured article requires a previously earned reputation. A man who is not known in the market, might not be able to sell to advantage, but when a man has worked up a trade, and it is known that he makes a good article, he has no trouble in selling. There are gentlemen in this house who have thousands upon thousands of gallons of cider; you do not hear much about it, they have their customers, they come and take it and pay all that the man's cider is worth.

There was a time when it was difficult to get the grocery men to take our cider and pay for it. They could buy sulphuric acid cheaper. But when the people came to know the difference between this poisoned stuff and pure cider-vinegar, they were not slow to choose the latter, and pay what it was worth; and when grocery men refused to buy my cider-vinegar, I sold direct to their customers until they were finally glad to "try a few barrels," and they have been trying my cider-vinegar ever since.

DISCUSSION ON UTILIZING FRUITS.

MR. HILLIARD—I have taken the *cider* track, in the utilizing of the fruits of my apple orchard, and I can sell more cider than Mr. Dunlap, but he can sell more vinegar than I can. I have no *secret* in making my cider. The world is wide enough for me, and for every body else too. I think a full discussion of this subject will benefit all. As to the temperance part of the question, I will say we make a cider that will not hurt any body. We made three hundred barrels last year, and this year have made four hundred barrels, and have orders already for one-half of it. As to its keeping, I think that in drawing off into a barrel it would become hard. It should be bottled.

MR. WIER—If Mr. Hilliard will tell us how he refines his cider we will have something practical.

MR. HILLIARD—We have tried a great many things for settling. We have used sulphate of lime; it is the most villanous stuff that was ever put into cider.

Voice—That is so.

MR. HILLIARD—We once used isinglass; afterward we found that the raw material—that of which the isinglass is made—was better, and also find that there is one particular kind that is worth four times as much as all other kinds. There was a man in Ohio who had the patent

and I went to see him, and told him that if he had anything better than I had, I wanted it. I was pleased with what I learned and saw, and so I bought his patent process, which I now use with great satisfaction.

MR. FLAGG—I would like to ask Mr. Hilliard about the variety of apples that make the best cider.

MR. HILLIARD—The Janet and Little Romanite are among the best cider apples. We prefer to mix the varieties.

Voice—What can you afford to pay for apples to make into cider?

MR. HILLIARD—We bought a great many apples for fifty cents per barrel this fall. I think the Janet is, perhaps, the best cider apple.

Voice—I would like to hear from Mr. Holcomb upon this subject of utilizing the orchard fruits.

MR. HOLCOMB—I presume I am called upon because I happen to be connected with a factory of the Alden process for drying fruits. I do not think it will be necessary or wise for me to take up your time with a detailed account of the process. It consists simply in passing heated air through a tower, the green fruit being put in at the bottom, and taken out at the top in a dried state.

Voice—How many pounds of dried apples do you get from a bushel?

MR. HOLCOMB—About six pounds. We have in this way utilized hundreds and thousands of bushels of apples and other fruits that could never in any other way have found a market. And what is more, the work was done by those who would not otherwise have done fifty dollars worth of labor in any other way.

Voice—How about the expense?

MR. HOLCOMB—The enterprise being new and untried, the expense has been necessarily greater than it need be hereafter. I think thus far it has cost us about twelve cents per pound. I think hereafter the expense can be brought down to ten or eleven cents, and we sell for about twenty cents per pound. But remember we are not proposing to sell *dried* apples for twenty cents, but apples preserved in a fresh state—as if canned—and when made into pies, might be mistaken for green-apple pies.

MR. SCHUYLER—General agent at Chicago, for the Alden Fruit-drying Company, spoke at considerable length giving the excellences of that system of utilizing fruits, and stating the plans upon which the company are ready to establish co-partnerships with fruit growers in erecting fruit-drying houses. He stated that the entire cost of one of these

establishments is about two thousand dollars; but the company expected to bring out a plan for smaller houses, which could be built for about one thousand dollars each, but did not know as they would put it upon the market, as the company wish to control the process and sale of the fruit, until the price is established, and also to prevent inferior fruit being put upon the market by unskillful operators.

The uniform price at which the company sold its dried (or "desiccated") apples is twenty cents per pound, in quantity. The cores and skins are used for making jelly.

MR. WIER said he had tried to organize a company to build and equip an Alden fruit house, but failing in it had succeeded in getting up a company and building and operating a dry-house upon the plan of Smith's Baltimore house, which was less expensive and he thought made about as good fruit; yet as cheap as fruit has been the past season it did not pay expenses, and the company had closed out the business. He did not believe that any factory for drying fruit had paid expenses.

DR. HOOTON exhibited a sample of fruit dried in a dry-house which he had built at a cost of two hundred and fifty dollars. He could dry sixty bushels of apples in ten hours at an expense of two cents per pound. (?). He thought his dried apples as good as anybody's.

MR. HUGGINS also said he had built a dry-house for twenty-five dollars, which answered his purpose and he thought a good investment. He dries his fruit in ten hours, with an ordinary furnace, can put in twenty-five bushels green fruit at once. He thought the expensive establishments were beyond the reach of most of us. He sold his dried apples for nine cents per pound, yet a St. Louis buyer assured him that they so nearly resembled the Alden fruit that he could mix them with the Alden and there would be no cause for complaint by those who bought all as Alden fruit.

MR. DUNLAP called attention to the propriety of taking measures to secure the sale of green fruits by weight, and read a resolution upon the subject, which he thought it would be proper for the Society to pass, viz:

SELLING FRUIT BY WEIGHT.

WHEREAS—The selling of all farm, orchard, and garden products by weight is the most just and fair to both seller and consumer, therefore

Resolved, That the Boards of Trade in the cities of Chicago and St. Louis be requested to adopt a rule for their members to sell all farm, orchard, and garden products by weight; the time for inaugurating this change to be the first day of January next.

MR. PEARSON—I have no objection to vote for the resolution if it would do any good. The dealers will hear us, and treat us very courteously, and then go about their business, and do as they please. We have tried it. All the resolutions that we can pass will do no good.

MR. SCHUYLER—They sell potatoes by weight in Chicago, why not sell other vegetables and fruits by weight?

MR. ROBINSON—For my part, I have often sold by weight and that by the car-load. My apples run about forty-seven to forty-nine pounds to the bushel.

MR. WIER—The Bellflower will weigh only forty-two pounds.

MR. EARLE—This discussion is very interesting to me but I want to call the attention of this Society to the subject of *canning*.

We have a company at our town, who have turned out one hundred twenty thousand cans. They paid the growers from seventy-five cents to one dollar and ten cents per bushel for peaches.

I think this canning interest is worth something to the producer and will help us to utilize our fruits.

The time was when peaches were worth too much to can them, but now we have them, in favorable seasons, in abundance, and many can be utilized only in this way. If in Baltimore they can put up canned fruits and sell them among us with profit, why can not we do it?

MR. PEARSON—*Mr. President*:—I had, not long since, a conference with a man at Baltimore who had experience in this business of canning. I went through his large establishment from top to bottom. He was doing a large and profitable business. I told him we had often talked about starting this canning business out west, but some who have started this enterprise do not seem to get ahead, and asked him what is the matter?

The man laughed and said, "My engine never stops; when fruits fail, we can vegetables, then oysters, and we have something doing all the time." I think it would be well for gentlemen who think of going into this business to go to Baltimore and see how they manage to make it pay. They make the cans, and all the work from beginning to end is performed by them. This firm have not less than five thousand dollars invested in the business.

MR. EARLE—That is a very fair point to raise, but it does not take five thousand dollars to start a canning establishment in Southern Illinois. I am not myself in this business, but I know the members of the firm at

our place have not spent so much money. The labor in Baltimore and Philadelphia costs more than with us. We use labor that would not be employed in any other way, and our expenses are much less. So I think the objection that might exist in the East does not exist here.

MR. PEARSON—There is another way a man can use apples. He can feed them to his cows. They are worth as much at any time as bran used in this way, and you get something besides in the way of manure.

MR. GALUSHA—Feeding to cows makes what you call "apple butter." [Laughter.]

MR. PEARSON—Just so.

MR. WIER—Speaking of vinegar, I want to put a *flea* in Mr. Dunlap's ear. I found that there was a *gnat* that had attacked my vinegar. I showed it to our entomologists, Mr. Riley and Dr. LeBaron, but they knew nothing about it. I don't think Mr. Dunlap will make much vinegar, if he gets this gnat.

MR. DUNLAP—I told you you did not know how to make vinegar. We do not make vinegar in that way [Laughter.]

Adjourned till to-morrow morning.

THIRD DAY.

MORNING SESSION.

PRES. STARR called the meeting to order at ten o'clock. Prayer was offered by the Rev. C. Nash, of Centralia.

The Committee on Fruits reported through Mr. Vickroy:

REPORT OF COMMITTEE ON FRUITS.

Mr. President:

Your Committee appointed to report on fruits have performed their duty, and present the following report: We find the following fruit on exhibition:—

Dr. M. M. Hooton, of Centralia—seven varieties of apples; among them a long keeping sweet apple—unknown.

M. L. Dunlap and Sons, Champaign—eleven varieties, correctly named—good specimens.

O. B. Galusha, Morris—one variety, the Fulton—fine specimens.

G. H. Baker, South Pass—seven varieties—very fine specimens, particularly the White Winter Pearmain, which is large, smooth, and free from scab; one variety of Pear, Beurre Easter—good specimens.

E. Daggy, Tuscola—ten varieties—four for name; some fair specimens of the Dutch Mignonne, a winter apple, mild, tart, and good for cooking.

A. C. Hammond, Warsaw—three varieties and a seedling—medium to large, resembling in size and shape the Hocking—very juicy, mild acid—worthy of notice.

W. C. Flagg, Moro—thirteen varieties; among them Peak's Fall—identical with Hard's Limber Twig, of Bloomington, and probably Magnum or Carter, of N. C. All fine specimens.

Mr. Aldrich, of Tiskilwa—one variety sent for name, which the Committee pronounce Ladies Sweeting.

J. B. Essex, Dongola—four varieties.

W. T. Nelson, of Wilmington—four varieties, including the "Nelson," a sweet apple, and a long keeper.

C. A. Webster, Peotone—one variety—unknown.

From the Experimental orchards of the Illinois Industrial Uni—eighteen varieties.

Mr. Detrich, of Centralia—ten varieties of Apples, fine specimens—three varieties of Pears.

D. Cram, Villa Ridge—one variety of Pear.

J. W. Robinson, Tremont—six varieties—fine specimens, especially the Smith's Cider.

H. K. VICKROY,
for the Committee.

The Committee on Railroad Transportation, through its chairman, Dr. Hooton, made the following report:

REPORT OF COMMITTEE ON TRANSPORTATION.

WHEREAS—Unequal and exorbitant charges for transportation tend to check production and discourage enterprise, and

WHEREAS—The present rates for transportation by Railroad are so oppressive as to make it doubtful whether the production of many articles now largely raised can safely be continued, and

WHEREAS—On many Railroads the rates of transportation from the way stations are much higher proportionately than on through freights, or on freights shipped from stations where intersecting roads afford competition, and

WHEREAS—Railroads have been chartered in this State and the rights of eminent domain have been extended to the companies building them, solely because of the benefits the people should derive from them, and

WHEREAS—No legislative body of this State or of the United States has a right to irretrievably cede the rights of the people or to make any law that may not be repealed by a subsequent session of the same or another legislative body, therefore,

Resolved 1st.—That the policy now pursued by many of the Railroads leading from the fruit regions of our State to the principal markets of the country is detrimental to the public good, and will result in driving many from the field of production to their own injury and the ultimate detriment of the roads.

2d.—That it is not only good policy on the part of the Railroad companies, but it is their duty to grant to way shippers the same rates proportionately as are charged on through freights.

3d.—That equitable rates should be charged on all articles transported, making no unfavorable distinctions.

4th.—That we believe the present rates to be too high, and that the transportation companies would make more money at lower rates because of the increased shipments affording regular employment and relieving them of the expensive necessity of transporting so many empty cars as they now do over their roads.

5th.—That we heartily endorse the decision of Judge Tipton, in the recent case brought before him, and we hope his decision will be confirmed by the Supreme Court.

6th.—That we request the Railroad Companies of this State to perform the business now done by Express Companies, as far as relates to horticultural products.

M. M. HOOTON,
H. C. GRAVES,
L. K. SCOFIELD,
M. L. DUNLAP,
Committee.

On motion of Mr. Wier, the resolutions offered by the committee were adopted.*

MR. FLAGG offered the following supplementary resolution, which was adopted:

Resolved, That the exclusive letting to a single Express company on each railroad, the privilege of sending freight by fast trains is contrary to the Constitution of the State of Illinois, which makes the railways public highways on which all have equal rights of transportation; and is a needless waste of capital in sustaining two sets of officers, teams and other appliances of business where one would suffice.

RESOLUTION ON COMMUTATION OF FARES.

The following resolution was read, and unanimously adopted, viz:

Resolved, That we are fully satisfied that the interests of Horticulture would be more rapidly advanced by cultivating a more general interest among all classes of horticulturists and agriculturists, and that this end could be best accomplished by bringing together at our winter meetings a larger number than heretofore, and thereby more widely disseminate horticultural knowledge. And to this end we believe that the several Railroad corporations of the State, by giving commutation rates to and from these meetings, would not only materially advance those interests but also derive a much larger revenue therefrom.

REPORT UPON THE PRESIDENT'S ADDRESS.

MR. EARLE, from the Committee on President's Address reported the following:

The Committee to whom was referred the Address of the President respectfully report, that we deem it desirable that in any movement of a national character, relating to Horticulture, the State Society of Illinois should have its representation; though this expression is given somewhat qualifiedly, there not being information in our possession as to how far the National organization, to meet at Indianapolis in May next, can be relied upon as a means of consolidating the general interests of Horticulture.

We would call attention to the recommendation that measures be taken to secure the needed aid from the State, and that it is desirable to increase the edition of our Transactions for wider distribution. Funds should also be under control of this Society to meet expenses which can not reasonably be expected to be defrayed by individual members

*This vote was afterwards reconsidered, and the resolutions so amended as to refer only to horticultural products—see record.

when acting as representatives of the Society abroad, and giving their time freely in such capacity.

We do not concur with the President in the idea of striking from the By-Laws the obligation of that officer to deliver an annual address upon some horticultural subject, and think that any member accepting the honor of that position, can afford to render an equivalent in that way.

As to the appointment of committees it seems best that it should be done mainly by the Executive, but when local organizations have preferences it should be the rule for them to make nominations for their own districts, to be subject to confirmation by the Society.

Respectfully submitted,

H. C. FREEMAN, Chairman.

MR. FRANCIS read the following:

REPORT OF AUDITING COMMITTEE.

The Auditing Committee find the accounts of the Treasurer and Secretary correct, and that a balance is due the Secretary—on all accounts—of Forty Dollars and fifty cents ($40.50); for which amount we recommend that a warrant be drawn on the Treasurer in his favor.

(Signed) L. C. FRANCIS, Chairman.

THE PRESIDENT announced that the regular order of business for the morning was the election of officers.

MR. FREEMAN asked and obtained consent to call up the subject of

METEOROLOGY AND THE SIGNAL SERVICE.

MR. FREEMAN—Before the election of officers takes place, I wish to call up a little matter—and not so little either—that was overlooked yesterday—on the subject of Meteorology. I think it is desirable that this Society should take some action in regard to memorializing the Signal Service Bureau of the United States to do for agriculture what it is doing for the marine service and for commerce. Prof. Tice in his address shows clearly how this can be done; it only needs an extension of this service, which can be had with a little additional expense, to accomplish all we ask for the agricultural interest.

I therefore hope that some one will move a resolution to memorialize Congress to extend this service.

MR. CLAYTON—I would like to add a suggestion, viz:—that a committee be appointed, at once, to draw up a memorial to Congress, upon this subject, and solicit the signatures of the members of this Society now present.

I have brought with me a memorial that was drawn up at the meeting of the Jacksonville Horticultural Society, and adopted—It has already some signatures.

If the President will allow me, I would like to read this memorial.

THE PRESIDENT—If there is no objection Mr. Clayton will read.

Mr. Flagg read the memorial which is in the following words;

MEMORIAL.

To the Honorable Senate and House of Representatives in Congress assembled:

The undersigned, citizens of the United States, believing that the interests of Agriculture demand a more complete system of crop reports than the present limited appropriations will permit, and that the advantage of such a system would confer a benefit upon all classes of the people in a greater or less degree, and that it is, therefore, a proper subject of governmental action, do therefore respectfully ask that the appropriations for the Signal Service be so increased as to allow the establishment of Stations of Observation in the large agricultural districts, and such extension of the warning signals, and other publications of results and information as the Chief Signal Officer may find feasible and useful to the agricultural interests of the country.

And believing further that the science of Meteorology, as it is becoming developed, may be made available to the material advancement of the national prosperity, we, your petitioners, do humbly pray that, in accordance with the suggestions of Lieutenant M. F. MAURY, an invitation be extended to the governments of the earth to meet in conference, for the establishment of an International System of Crop and Weather Reports, and that your honorable body will commission one or more scientists of this country as members of said conference.

And they further pray that a sufficient appropriation be made to carry out the purposes herein suggested, in such a manner as your wisdom may suggest, and with a degree of liberality which its great importance may demand.

Respectfully submitted,

W. W. CLAYTON.
J. M. GREGORY.
W. C. FLAGG.

[Note by the Secretary: This memorial was afterwards signed by sixty members of the Society.]

MR. CLAYTON—I move that a committee of three be appointed who shall be instructed to prepare, circulate, and forward to Congress a memorial upon the extension of the Signal Service.

MR. FLAGG—I want to say a word in reference to that matter. I

have had some correspondence with the Signal Service Bureau at Washington, and I find Mr. Singleton, who is the official in this matter, zealously pushing his work, and ready to extend the Service in any direction desirable and practicable; but the Government is obliged to work through the private telegraph companies, and it is difficult to get cheap enough rates. If the Government had possession of these lines, it might be different.

MR. CLAYTON—I believe it is contemplated in this memorial that Government shall make such an arrangement that it will run the machine. For one, I should feel proud of the United States to have her enter upon this great work. Such an extension of this Service, as we contemplate, would place our government in the foreground, and fitly represent the progress and light of the nineteenth century. There may be some difficulties to encounter, but they are not insurmountable.

DR. GREGORY said that this was a matter that had engaged his attention, and he was glad that the subject was introduced here, and at this time.

He spoke of the great service which Col. Maury was rendering to the country, and especially to commerce. He regarded the move to extend the Service, so as to benefit the agricultural interests of the country, a step in the right direction.

He had conversed with the officers of the Signal Service Bureau, and believed that they were ready to serve us; he had suggested to the proper authorities the propriety of making the State Agricultural University one of the signal stations. He hoped that the Society would unite heartily in this memorial and that they would ask further that the Industrial University may become one of the signal stations in the State.

MR. FLAGG—I don't know that I am understood. I did not mean to throw cold water upon this movement. I go for the memorial, heart and soul—and I recognize the great service that is rendered the country through this Bureau, and I shall be glad to know that the Service can be extended.

The motion prevailed.

On motion of Dr. Hooton, the form of memorial, as read, was adopted—and

THE PRESIDENT announced the names of

Dr. J. M. Gregory, Rev. Wm. Clayton, and Hon. W. C. Flagg, as the Committee.

MR. EARLE—moved the appointment of a committee to confer with the railroad companies upon the subjects embraced in the resolutions adopted, respecting railroad matters.

The motion carried, and the following Committee was appointed.

M. L. Dunlap, Parker Earle, L. K. Scofield, W. C. Flagg, and B. Pullen.

MR. WILE—I suggest that this committee include in "horticultural products" *trees in boxes.*

JUDGE BROWN—It will be necessary for this committee to visit Chicago, if they do anything. I therefore move that the Executive Board of this Society be instructed to pay the necessary expenses of the visit.

MR. SCOFIELD—Perhaps, we had better wait and see if they earn their money—(laughter.)

The motion prevailed.

The Committee appointed to report upon Postal Matters, presented a report which was approved, and resolutions adopted asking for the restoration of the former rates of postage upon seeds, plants, and cions, which had been largely increased during the past year; but as the old rates were ordered restored about this time, the report is omitted.

ELECTION OF OFFICERS.

On motion the Society proceeded to elect officers for the year eighteen seventy-three, and the following persons were unanimously elected to the several offices.

President—M. L. DUNLAP, Champaign.

Secretary—O. B. GALUSHA, Morris.

Treasurer—JONATHAN HUGGINS, Woodburn.

Assistant Secretary—H. C. DUNLAP, Champaign.

Vice Presidents:—

1st District—W. L. NELSON, Wilmington.
2d do —SAMUEL EDWARDS, La Moille.
3d do —A. G. HUMPHREY, Galesburg.
4th do —L. C. FRANCIS, Springfield.
5th do —J. C. COOPER, Centralia.
6th do —ISAAC SNEDECKER, Jerseyville.
7th do —PARKER EARLE, South Pass.

LOCATION OF NEXT ANNUAL MEETING.

PROF. T. J. BURRILL—On behalf of the Champaign County Horticultural Society, invited the Society to Champaign.

MR. STEWART—Presented an invitation from the Adams County Horticultural Society, to this Society to hold its next meeting in Quincy.

After discussing the advantages of both places, and the probable railroad facilities which may be afforded to members to reach each point, the Society voted to hold the next meeting in Champaign, between the first and fifteenth days of December—the precise time to be fixed by the Executive Board.

On motion of Mr. Wier, Mr. Mark Miller of Iowa was elected an honorary member of this Society.

REPORT OF THE FIFTH HORTICULTURAL DISTRICT.

MR. PULLEN—Vice President in the Fifth Horticultural District reported as follows:

Mr. President and Gentlemen:

In reporting on the Condition of Horticulture in the Fifth District, I find myself almost entirely thrown upon my own resources—only one of the seventeen correspondents in my district having responded to the circular letter sent out by your Secretary.

I am therefore unable to report intelligently for the whole district, with many counties of which I am entirely unacquainted.

I shall endeavor to be brief and confine my report to the portion of the district lying east of the Illinois Central Railroad and immediately adjacent thereto, from Duquoin on the south to Vandalia on the main line, and Neoga on the Chicago Branch, north. This embraces probably three-fourths of the territory in the district, which is especially devoted to Horticulture.

It is believed, also, that over the section above referred to, the results and conditions of the fruit crop for eighteen seventy-two are much the same; and that what applies to one locality will apply with equal force, or nearly so, to all the rest.

The amount of fruit raised was immense—far exceeding any former year.

The Apple crop has been abundant, and uniformly of good quality, notwithstanding the extreme heat and drouth of the season; owing to these causes, however, the winter varieties matured too early and are not keeping as well as usual.

Varieties seemed to vie with each other in the perfection and quality of their fruits—while many of these same varieties for three or four years past have been comparatively worthless. Spur-blight was observed to be more prevalent than last year, though there was less of the common blight, than for two or three years past. A species of blight with

which I am not familiar, has caused the death of many bearing trees; the tree seems to be on the decline, and upon examination, the bark around the tree at the collar is found to be dead, while the roots and tops are apparently uninjured. Many trees are now struggling for existence, from the effects of damage sustained during the winter of eighteen seventy and eighteen seventy-one, indicated at the the time by the bursting of the bark, etc. Time has seemed to develope fully the injury sustained. The bitter or bleak rot has made its appearane in our orchards, and spreads with great rapidity; I stopped its progress in my own by picking off the affected fruit. So far as observed, it has uniformly made its appearance on the White Bellflower variety. The next in order seemed to be Willow Twig and Gilpin.

It is gratifying to be able to state that the apple has suffered less from insect depredations than for some years past. Summer and fall varieties are not profitable to raise here, except for home use and for hogs. All things considered, the present season should encourage the apple grower.

What has been said of the apple crop, may also be said of the Peach, as to quantity and quality. Prices obtained for the fruit were probably more satisfactory than for any of the larger fruits.

There seems to be no escape however from the Pear blight; many trees have suffered, and the disease is certainly not very choice as to varieties.

Very little that is gratifying can be said of the Peach crop. Had the fruit been uniformly good, it is believed that the supply was in excess of the demand; for fully one-third in this section was left to care for itself. Orchards were generally in good condition—better than usual—but over-bearing, together with excess of drouth, could have but one result. Much discouragement is met with on the part of the growers, and grave doubts expressed in regard to the future. It was observed that peaches raised in timbered sections of the district, were much finer than those grown on the prairie; this result is an exception. The Curculio was found to be so scarce that bugging was generally dispensed with; the result no doubt of the entire failure of the crop last year.

The Wild Goose Plum bids fair to become a valuable addition to our collection of fruits that succeed here; so far as seen or heard from, the fruit raised was very fine, and free from insect injury; the trees come into bearing early; it should receive more attention from fruit growers. Aside from this, no success has attended the cultivation of the plum in this district so far as I learn. The Early May or Richmond Cherry produced a fine fruit and was disposed of at good prices. The finer sorts are but little cultivated. The trees do not withstand our climate.

Small fruits were a light crop, but profitable to the producer on account of high prices obtained. The canes of Blackberries and Raspberries were badly damaged by the heat and drouth of eighteen seventy-one—the injury being observed in the fall; we must however except the Kittatinny variety which escaped uninjured. This latter promised a fair

yield, but the drouth of the present season rendered the fruit almost worthless. The Lawton and native sorts fared alike.

The Crown-borer is increasing rapidly, and threatens the destruction of our Strawberry fields; the dry seasons, prevailing for two or three years past, seem to favor their depredations, and they are evidently making the most of their opportunities. But few if any of our plantations can be said to be free from them, and a number have been entirely destroyed. Notwithstanding all these drawbacks of seasons and Crown-borers, a fair crop was raised, a good share of which was fine in quality, and the net results to producer more satisfactory than any fruit marketed during the year eighteen seventy-two.

Grapes yielded abundantly, and were of superior quality. Heard but little complaint of rot, mildew, or insect depredations. Prices ruling low, a large proportion of the crop was manufactured into wine. But one sentiment seems to prevail as to varieties; the Concord being the standard. Many other varieties are more or less cultivated, but not enough of reliability attaches to them to render them desirable to cultivate for market purposes. Mr. William Rickcords of Hamilton County writes:

"Our prospects for fruit in the spring were very flattering. All trees were filled with blossoms; in April a species of blight affected the pear, apple, and quince—killing many of the young branches; rot has prevailed in a great number of our orchards among the apples. Extreme drouth caused the fruit to be small, and in peaches very many did not come to maturity—but fairly dried upon the trees; so that on the whole the crop is below the average. I observed the blight above mentioned in Missouri orchards as far north as the Hannibal & St. Joseph Railroad. I would much like to see it accounted for, as I have inspected the injured branches but find no trace of insects or other cause of damage. As yet we have no one in the business of growing fruit for markets, so I am unable to give you a practical account of the capabilities of our soil for the production of the finer sorts, but from my own observations and experience we can grow with the proper care as good fruit as any county in Southern Illinois. Our soil is clay, easily worked, nicely rolling and well timbered. Our German population raise fine grapes for their own use, chiefly. As we have cheap lands and good railroad facilities, we hope for a large immigration to cultivate our unoccupied lands and cover them with orchards and grain."

I will conclude this report remarking that the aggregated result of the fruit crop for 1872, financially considered, has not been a success; the unprecedented drouth extending over a period of two years has affected injuriously, either directly or indirectly, the quality of nearly all our fruits; peaches were small and inferior in flavor, indeed many did not reach maturity.

The value of the apples was reduced by too early maturity; which in connection with high winds at the time of gathering, caused many to fall, while many others had to be disposed of too early to realize the best prices.

Pears dropped more than usual. The average of small fruits was reduced from the same cause, and the crop otherwise affected by the smaller size of stools and plants, thereby diminishing their yield. Of wood growth on our trees, while it may seem to be an anomaly, yet it may be said that there seems to have been no lack, and present indications are favorable for a good crop next year. Many in the district have converted their orchards into hog pastures, and it is believed that good results follow. The practice is growing in favor.

The average culture is about medium. Much diversity of opinion exists as to the extent and kind of culture that should be practiced. Our people continue to be exercised about the charges for transportation, which under all the circumstances are felt

to be oppressive. Many have labored throughout the season solely for the benefit of transportation companies, with the odds against them at that; for some, at the close of the season have had to draw on their private purses to bring up arrearages. Facts like these accord with another fact that a reduction of one-third in the rates could be made in seasons like the past, with profits to the companies equal to, if not greater than that on any other freight. Such a reduction would leave to the producer thousands of dollars that he sorely stands in need of, stimulating at the same time to increased efficiency and thoroughness in his profession. This latter I understand to be the legitimate and primary object of this Society—standing as it does—the representative head of Horticulture and horticultural interests in the State. Would it not then be proper for this Society as such, to lend its influence and aid to correct this growing evil? We know not if there is any remedy outside of railroad companies themselves, but if there is none we would like to know it.

All of which is respectfully submitted,

B. PULLEN,
Vice President, 5th District.

DISCUSSION ON MR. PULLEN'S REPORT.

MR. WIER—I have a few words to say upon this report of Mr. Pullen's. He speaks of blight in the apple orchard and pear orchard. Now, gentlemen, I have as large an orchard as there is in the West, and I have no blight, and why? I prune none. I consider pruning favors the blight, and I wish to impress it upon the minds of gentlemen present that if they never prune their trees they will not be likely to have blight in their orchards.

MR. FLAGG—I do not think that is so. I think there are so many causes of blight that this Society should not lay down the law and say just what it is that causes blight, for none of us have sufficient knowledge to speak definitely.

MR. WIER—I speak only of apple-tree blight.

MR. FLAGG—I have known blight to come from various causes, and I think we err in ascribing blight to one cause alone.

MR. PHENIX—Please name some of these causes.

MR. FLAGG—I do not deny that excessive pruning will cause blight; I think it will. I think also planting in soil excessively rich will cause blight—or any other treatment that will prevent the full ripening of the wood. Late rains and a warm fall exciting a second growth which cannot ripen, is productive of blight.

MR STEWART.—I have noticed trees not pruned to blight, and trees pruned with no blight.

MR. WIER—You cultivate your trees.

MR. STEWART—Yes, I do. Late cultivation caused blight—pruning did not.

MR. MILLER—In reference to this blight matter, I will say, I have given it a great deal of attention, and do not think that judicious pruning is in any way injurious. In eighteen sixty-three I put out an orchard of one thousand trees which I have cultivated well, and had no blight. I never shorten in the shoots, but prune out a few each year, between the fifteenth of May and first of July. These trees have borne fruit for three years.

THE PRESIDENT—I would be glad to know if we can get along without pruning. I prune and have no blight. I would prune nursery stock sparingly.

MR. SCOFIELD—I am of the same opinion about pruning nursery stock.

MR. WIER—I have often made up my mind not to say another word upon this matter of pruning orchards. There seems to be a question whether we can grow apples without pruning the trees. I say to gentlemen, "come and see." I gave the invitation last summer, and I received some visits from gentlemen who are here present, and they can tell you what they saw. They expressed themselves entirely satisfied with the appearance of my orchard. I never cut a limb from the inside of the trees.

MR. MILLER—Would you not cut limbs that crossed each other?

MR. WIER—Not at all.

After some further desultory remarks, the Society adjourned to two o'clock.

THIRD DAY.

AFTERNOON SESSION.

The Society met and resumed business at two o'clock.

MR. DUNLAP called up the subject of selling fruits by weight, and requested that the preamble and resolution relative to recommending to the Boards of Trade of Chicago and St. Louis, the selling of fruits and vegetables by weight, be read.

The resolution * was read, and adopted by vote of the Society.

SIGNAL STATIONS.

MR. CLAYTON, from Committee on Memorializing Congress for the extension of the Signal Service, reported the petition, with the names of sixty members of the Society attached, and the Committee was instructed to forward the same to members of Congress.

* For this resolution see page 116.

MR. FLAGG presented the following preambles and resolution, which were adopted.

WHEREAS,—The appropriation for the Signal Service of the War Department is declared to be in the interest of Agriculture and Commerce; and

WHEREAS,—The location of the Illinois Industrial University near the center of a large agricultural region, is also nearly equi-distant from the stations now established at Chicago, Indianapolis, and St. Louis, and

WHEREAS,—These stations are too remote from each other, to cover adequately the region in question. Therefore

Resolved, That our members of Congress be requested to secure the establishment of a regular Signal Station at the Industrial University, and to favor such increase of the appropriations for the Signal Service, as may be necessary to extend such service to the large agricultural regions not yet sufficiently supplied by such Service.

On motion of Dr. Gregory, the Secretary was instructed to send a copy of these resolutions to our members of Congress.

MR. FLAGG read the following, and moved its adoption:

Resolved, That the Executive Board of this Society be instructed to ascertain the weight of a bushel of the various horticultural products commonly sold by the bushel, and to ask the General Assembly to so amend the laws in relation to the legal weights of measures, as to include such weights as are not already provided for by law.

MR. DUNLAP—I was in the House of Representatives in the year eighteen fifty-five, and I helped to pass the law that we now have; and I would like to see that law extended. I remember the objections that were then urged against it. It makes no difference what you call a bushel of corn, or a bushel of apples, but let the number of pounds be fixed and determined.

MR. FLAGG—I think Iowa has fixed weights and measures; has she not, Mr. Miller?

MR. MILLER—I think our weights and measures are fixed. I cannot recall the figures but will send them to the Secretary, if it is desired.

MR. GALUSHA—It seems to me, Mr. President, that we are progressing slowly by adopting such resolutions; I do not know that we can do any better than to recommend the regulation of selling by the pound. What we want is to have fruit sold by the weight, and if we recognize a bushel, half-bushel, or a peck, we are not selling by weight. I think we should sell by the pound, without regard to measure.

MR. BONHAM—We sell wheat by the pound, why not fruit also?

MR. WILCOX—It strikes me that if we ask the Legislature to tell us how many pounds make a bushel, we shall still continue to sell by the bushel, and not by the pound.

MR. CLAYTON—I think to ask how many pounds make a bushel is to complicate the matter: Let us drop the term bushel, and substitute

the pound. And let the price be applied to the pound unit, and not to the bushel unit.

MR. ROBINSON—A bushel is one thing in one place, and something else in another. In Peoria it takes thirty-six pounds of oats to make a bushel. In the Chicago Board of Trade thirty-two pounds make a bushel of oats. Still it is a convenient term to use often, and helps men in their contracts.

MR. CLAYTON—Yet the term bushel is meaningless as applied to fruit. It does not mean any number of pounds. You may as well use the term "heap." [Laughter.]

MR. BONHAM—It takes in the country sixty pounds of rye to make a bushel. In Chicago fifty-six pounds is a bushel.

MR. PHENIX—After all, the term bushel is a handy thing. We do not want to say, for a dollar, "one hundred cents;" it is convenient to use the idea, or form of condensation, and I do not see how we are going to get along without it.

The resolution was adopted.

REPORT OF COMMITTEE ON MISCELLANEOUS ARTICLES ON EXHIBITION.

MR. PEARSON reported as follows:

Mr. President and Gentlemen:

Your Committee appointed to examine miscellaneous articles find the work assigned to them to be no sinecure. Our instructions are to include everything on exhibition not properly referred to the fruit committee. If in the multitude of articles any are found to have been omitted, we can only say that the omission was probably intentional.

The largest show of any article is that of potatoes, embracing seventy-three varieties grown at the Illinois Industrial University—many of these are old and well known varieties, while others are new and but little known. The importance of these experiments is evident to all; as many of our old varieties are running out, and we must replace them or do without potatoes. The particulars of culture and comparative yield will be given by Mr. Flagg, who has had this matter in charge on the Experimental Farm of the Industrial University. He says he is in doubt in regard to the nomenclature of some of these, and will be glad to receive any information respecting the identity of varieties from members in attendance.

The University also shows thirty-four varieties of *corn*; this not being a "horticultural product" we are not supposed to know anything about it, but are told that it is a very useful thing to feed domestic animals, and to make into wine, cider, and vinegar. [Laughter.]

Mr. Flagg also informs your committee that the University is indebted to J. B. Phinney Esq., of Champaign, for the seed of most of these varieties of corn, by whom they were collected with great care, and who has made very careful experiments in this direction.

Mr. A. A. Hilliard, of Brighton, shows two samples of cider clarified by a new process, which renders it very clear, and not bad to drink. Still your committee think that the cider made by Mr. Hilliard in the old way is equally good.

Mr. J. B. Curren, of Mattoon, shows three samples of Concord wine; the first, pure juice, clear and fine, from this year's crop, will, in a few months, be a good article; the second had sugar added, was not as good, and we cannot commend it; the third a very fair article.

Arthur Bryant, Jr., shows a fine collection of forest and fruit-tree seeds, such as he sells and propagates from.

We also find a lot of samples of dried fruit, from the Alden Fruit-Preserving Company, at Fowler, Adams Co. This seems to be a successful way of marketing fruit, and we are informed has been found profitable.

We also find samples of fruit dried by "Post's Steam Evaporator." Each of these processes has its advantages, and experience can alone determine which is the better.

Quite a collection of cions were donated by Mr. ——— for distribution, which the members of the Society will find upon the fruit tables.

Mr. B. Hathaway, of Little Prairie Ronde, Mich., shows wooden bands, for placing around fruit trees to entrap the larvæ of the codling moth. These are very cheap—no patent fee—and they show by their appearance that they have done good work.

Respectfully submitted.

JNO. M. PEARSON,
M. L. DUNLAP,
H. W. HUBBARD } *Committee.*

REPORT OF THE SIXTH HORTICULTURAL DISTRICT.

MR. PEARSON, Vice-President in the Sixth District, reported, remarking as he rose that "The sixth district, this year consists of Alton and vicinity."

Mr. President and Gentlemen:

As Vice-President of the Sixth District, I have been able to learn very little from the long list of correspondents printed in the reports;—Isaac Snedecker of Jersey county, and W. M. Jeffries of Randolph county being the only persons who have sent answers to the circular issued by our Secretary.

From these and from my own observations, I offer the following report:

As a general thing, our orchards, vineyards, and berry patches were not thought to be in very good condition last fall, owing to the exceed-

ingly dry weather. Many predicted short crops; which was fulfilled in regard to the berry crops, and particularly in regard to vineyards.

The *Strawberry* crop, in particular, was very short, and consequently prices were very high, and those planters who took good care of their grounds, mulching early, or by frequent surface cultivation, or by use of fertilizers overcame the natural difficulties, secured good crops and better profits

The *Apple* crop was, so far as I can learn, only fair, and prices have been generally good; the fall apples were sold low, but early apples and late keepers have been well sold.

The *Peach* crop was large, very large, and the peaches were small, very small, and the prices were beautifully less. That generally large peach crop, so feared and deprecated by Judge Brown, came upon us last year in full force. Ordinary culture or neglect of trees, and a free field left for the insects relieved the owner from the labor of harvesting and marketing, yet our best peach-growers, in the vicinity of Alton, express themselves well satisfied with the crop. They are getting to understand that "eternal vigilance is the price of" good peaches. The general tendency is this, in our district. Raising fruit for market is gradually getting into the hands of those men who will attend to it properly. The average Illinois farmer cannot raise fruit for market at any advantage in our district. The vineyards were injured, and did not do as well as usual, yet there was a great crop, and notwithstanding all, they are better paying crops than farm crops, and as good as any of the garden.

Vegetable growing for market, has paid well, is getting to be a specialty with some of our members, and has great claims from the fact that it gives rapid returns, and enables a poor man to live while his trees are growing.

We are not discouraged; if we find new obstacles each year, we also find new facilities. Respectfully submitted,

JNO. M. PEARSON, *Vice-Pres.*

REPORT OF THE SEVENTH HORTICULTURAL DISTRICT.

On motion of Mr. Flagg the regular order of business was suspended, and Judge Brown requested to present his report of the Seventh District, which he did—reading as follows:

Mr. President:

The correspondents selected by the Secretary for the several counties in my district have, with remarkable unanimity, failed to respond to my call for information as to the state of Horticulture in their respective localities. I am, therefore, restricted to my own limited knowledge of facts.

The fruit crop was a general one throughout the south-western portion of the State.

Strawberries—The yield was much smaller, in the aggregate, than for any of several preceding years, chiefly on account of the destruction

of plants by the drouth of the previous year, and by an insect known as the Crown-borer, which is becoming very troublesome in some parts of the district. Plantations set last spring have generally failed for the same reasons—as the past season had been much drier than that of eighteen seventy-one.

There are some who believe that the Wilson's Albany plant is degenerating, or losing much of the vigor which enabled it, for some years after its introduction, to grow and bear abundant crops of fruit with but very little attention. Whether this be so or not, or whether it is the result of bad seasons, the fact seems to be that it is more difficult than formerly, to secure a *stand* of plants and that they do not yield those great crops of fruit to which we were formerly accustomed.

As a result of the small supply, prices were good through the season.

Raspberries—There was a good yield of fruit where good cultivation had been given, and prices were satisfactory.

Blackberries are not largely grown in my district, but those who had the bushes gathered abundant crops of very fine fruit, and obtained good prices for it.

Cherries—There was a fine crop of Early Richmonds—the finer sorts do not succeed with us.

Grapes—I have no information except as to my own neighborhood and Massac County. The crop was very fine, especially when good cultivation and care had been given to the vineyard. There was but little rot. One vineyard of some two thousand vines in my neighborhood, which had for two years before yielded good crops, was seeded to clover a year ago, and the fruit this season nearly all rotted.

Those who marketed their fruit early, that is, as soon as it was fairly colored, made it quite profitable, but later in the season prices were low. The variety most popular with us now is Ives' Seedling. The vine is viogrous, healthy, and prolific, while the fruit seems to resist rot more perfectly than any other sort. It is also an admirable shipping grape, adhering well to the stem and having a tough skin which does not break easily in packing.

Pears—The Pear crop was a good one both in quality and quantity. Prices, except for the very earliest, were very low, on account of the large amount of the fruit on the market.

Peaches—In my report from the Committee *ad interim* a year ago, I expressed the opinion that, if all the peach orchards in the State should concur in producing a full crop, the fruit could not be disposed of at a profit to the growers. This contingency happened the past season, and the result proved the correctness of my judgment. The markets were absolutely glutted, and a large proportion of the crop, in some localities, was not sent to market at all, but allowed to perish on the trees or was fed to the hogs. Besides this it is probable that half the crop in my district, was destroyed by insects and rot. But there was another cause for the low price of this fruit besides the excessive

supply—namely, the poor quality of much of it. There is the best authority for the assertion that at least one-third of all the peaches sent to Chicago from Southern Illinois, were absolutely worthless,—green, knotty, wormy, and utterly unfit to eat; and what was worse, in some instances, the boxes containing this worthless stuff, were faced at the cracks with good fruit, thus showing the fraudulent intent of the shippers.

Much has been said, and sometimes truly, of the dishonesty of Chicago commission men, but it must be allowed that all the dishonest men do not do business in Chicago.

The natural effect of filling the market with worthless or indifferent fruit, and especially with fruit thus dishonestly packed, was to depreciate the value of that which was really good. Purchasers, after having been cheated two or three times, would not be eager to buy any more.

It may be remarked that, even during the worst glut in the market, really good peaches, under the brand of growers of good reputation, sold readily at paying prices.

With the present method of peach-growing, as it is generally pursued, when the trees are allowed to grow unpruned and often uncultivated, and permitted to bear all the fruit that sets, and when the Curculio is suffered to have full swing, the result is inevitable that much the largest portion of the crop will be entirely unfit to go to any decent market.

Apples—The Apple crop in my district was a pretty full one the early sorts brought good prices; fall and winter varieties rotted and fell from the trees, just before maturity, to a greater extent than ever before; of some kinds, all went in this way, so that when gathering-time came there was very little to be harvested, in proportion to the promise the trees had given.

This premature decay is generally attributed to the remarkable drouth and heat of the latter half of the summer, and the autumn.

There has been little planting done in my district during the present year, for people have began to understand and appreciate the fact that the business of planting fruit trees has already been greatly overdone, and there is no disposition to push it any further. Indeed, not to put too fine a point on it, there is a general feeling of discouragement amongst orchardists, growing out of the many difficulties that beset their calling; among which the most important are excessive production, and consequent low prices in favorable seasons—loss of crops by frost—destruction by insects—the amount of intelligent labor required under any circumstances and, last, but not least, the onerous cost of transportation to the places of sale.

A. M. Brown.

DISCUSSION ON THE PEACH.

Mr. Flagg—I would like to bring up one point, in order to solicit the experience of others. In talking with Captain Hollister of Alton, I was taking ground in defence of Dr. Hull's practice of severe thinning;

the Captain said, he thought he would not thin to the extent of Dr. Hull's practice, but that he would manure heavily so as to stimulate the tree, and thus enable it to carry a heavier crop. What is the experience of peach growers in this respect.

MR. PHENIX—What kind of manure would he apply—and when apply it?

MR. FLAGG—I suppose stable manure, applied early in spring.

MR. EARLE—To what extent is it advisable to thin?

MR. FLAGG—Dr. Hull's idea is,—about five hundred peaches to a full grown tree.

MR. BROWN—A gentleman at South Pass told me he stimulated his trees with special manures, and his fruit is very fine. I am inclined to think that Dr. Hull pushes thinning to an extreme. I am not sure. It seems to me that this is the case. But his trees being root-pruned would not carry as much fruit.

That Dr. Hull's system is necessary to the production of market peaches, I have no doubt. It is just as necessary to prune the peach tree as to prune the grape vine, and for the same reason; but I have talked so much, and written so much upon this subject, that I don't want to think much more about it.

THE PRESIDENT—I would ask if gentlemen are familiar with Dr. Hull's new Curculio catcher.

All peach growers know that unless some plan is adopted to destroy the Curculio, their "occupation is gone." It is known also that Dr. Hull has been one of our foremost men, in the measures adopted in destroying this insect. His original wheelbarrow machine was cumbersome, but this season he has so simplified and improved it, that he can easily go over three hundred trees before breakfast.—(laughter).

MR. EARLE—What time does he take breakfast? (renewed laughter.)

The President continued his remarks, giving a minute description of the machine, and of the manner and ease and despatch with which it is worked.

The machine is carried on the shoulders, and weighs from four to seven pounds. It is understood that the Doctor has a patent upon his improved machine.

MR. BROWN—There were serious objections to the old machine. It injured the tree, and then when the stem of the tree became large and

stiff, you could not by *bumping*, shake it. With this improved machine, you can with your mallet tap the limbs effectually and without injury—the work is about as hard as with the old machine, but a great improvement upon it.

MR. EARLE—How high must the trees be trimmed, in order to work under them with the Curculio catcher?

THE PRESIDENT—I would say, two or three feet high, not more.

MR. FLAGG—The Doctor took me around through his orchard, and showed me his manner of working it. I consider the new machine a great improvement.

MR. PHENIX—Why can't you use it upon low trees?

MR. PEARSON—You can, I have used it upon trees trimmed "boot-leg high," and so can any man who is not afraid nor ashamed to get down upon his knees.

Voice—But in going out before breakfast, do you not get wet with the falling dew?

MR. PEARSON—What of that. It will make cabbage heads grow, and *other heads* too—(laughter).

THE PRESIDENT—I wish to say that I, with others visited Dr. Hull's place in July last, when the Alton Horticultural Society met at his house, and I must say I was very much pleased with what I saw;—his peach orchard was a model for clean culture, and good treatment.

MR. WIER recommended Holbrook's Plow—"the only one-horse plow that you can run very close to trees without injuring them."

DISCUSSION ON THE DISEASES OF THE PEACH.

MR. BURRILL—I have been very much interested in looking up the cause of the rot in the peach, and that it is caused by a fungus, which is readily disseminated from one peach to another. I find that where this fungus is spread upon the dry surface of the peach, no harm is done; but where it comes in contact with the wet surface of the peach, or if the peach is bruised, the disease at once attacks the fruit and in a few hours will show itself. I speak quite positively about this, for we can see the operation.

MR. WIER—I have examined this rot, and find that the same causes rot both the apple and the peach. We know what will destroy the fungus—lime and sulphur. Lime is sometimes used to keep apples from decay—Why not use the same in the orchard, and for the same purpose? Mix

one-third sulphur and two-thirds lime—in lumps; slake it and you have a liquid sulphite of lime, which may be applied with a syringe.

MR. BURRILL—No doubt sulphur will destroy fungus if you can get it upon it. In regard to the fungus upon the apple causing rot, I consider it different from that on the peach; it is on the apple in form of a scab. The best living authority upon the subject recommend sulphur and lime, mixed, as the best cure.

MR. EARLE—I want to ask a question—I understood the gentlemen to say that the fungus is the cause of the rot. I wish to know if I would not be correct in saying that the fungus *is the rot*, and that the fungus was caused by the Curculio? Is not the damage done by this insect the immediate cause of the rot? This is my own opinion; am I wrong? As peach growers, we ought to understand this thing. If the surface of the peach is in any way damaged, it must rot.

I think we may not be discouraged in peach growing, if we can only circumvent the dread Curculio.

MR. BURRILL—The fungus *is* the rot; for as I have intimated if the spores of the fungus are placed upon the moist surface of a healthy peach, under favorable conditions, they will germinate, and in ten or twelve hours the fungi will penetrate the peach and reveal themselves in the form of "rot."

Peaches situated immediately below the rotting peaches are more likely to be affected than others, because more exposed; the rains wash the spores down upon them.

It is not necessary to the propagation of this fungus, that the surface of the fruit be ruptured, by Curculio or other cause.

MR. FLAGG—We may partially prevent the rot by keeping up a circulation in the orchard—letting in air and sunshine.

DISCUSSION UPON VARIETIES.

MR FLAGG—I would call attention to two very early varieties of peaches that are new, and that promise well, originating in this state.

The first is the Alexander peach, grown by one Mr. Capps in Logan County. It is a very beautiful peach, resembling the Early York, and ripening—Mr. Capps says—three weeks ahead of all others. I think, perhaps, he over estimates it, although I am inclined to think it will prove a very valuable peach.

The other peach of which I speak is one grown by a Mr. Lightfoot of Springfield, and was dead ripe on the twenty-third day of July. I

know but little about the peach, except that it comes well recommended Perhaps Mr. Francis, of Springfield, can tell us something.

DR. HOOTON—I don't think we ought to go very fast in recommending these early peaches.

MR. GALBRAITH—This early ripening might have been caused by the yellows.

MR. FLAGG—I can hardly think there could be any mistake in deciding whether a tree had the yellows; possibly this first peach might have been from a tree affected in this may. The color of this Alexander peach, so very red, is a little suspicious. It is known that trees affected with the yellows give to their fruit an unhealthy red.

MR. HILLIARD—I would like to ask Mr. Flagg if he has seen anything in the Alton district that may be properly called the yellows.

MR. FLAGG—I don't know that I have.

MR. HILLIARD—I have never seen any thing that I thought was the true *yellows* in the Alton district. I have seen something that resembles it, but it is not the true yellows.

MR. PHENIX—I think it very probable that these peaches were prematurely ripened.

MR. HUGGINS—I think it is well to make haste slowly in adopting new kinds of fruit; in my grounds this season, I have had Early Yorks ripen before Hale's Early, and some Hale's Early ripened three weeks later than others. More than one year is necessary to test a peach. Some of you will remember that some years ago my neighbor, Mr. Pettingill, thought he had a very early and desirable peach, which afterward proved to be from a diseased tree.

MR. ROBINSON—I have seen this peach of Mr. Capps' growing at Mr. G. W. Minier's; it seems very strange that we should originate three earlier peaches than any known, in one year. This leads me to suspect that these peaches are from trees that have the yellows. I do not know the disease when I see it.

MR. GALUSHA—The color of a peach prematurely ripened by the yellows has an unnatural, bright, mottled appearance; I will ask Mr. Robinson if the peaches seen by him had this appearance.

MR. ROBINSON—The color did not look natural, was bright, but I thought not a healthy color.

MR. FREEMAN—It takes five years to test new varieties, before we can recommend them.

MR. FLAGG—We do not recommend any thing. We only discuss their merits as they are known.

MR. DAGGY—To change the subject somewhat, I wish to say, I think it would be well, if peach growers would put the indifferent fruit upon the cracks of the boxes, so as to protect the good ones inside. The railroad men will, you know, sometimes get their fingers in. (Laughter.)

MR. GALUSHA—Pack them the same way that Mr. Daggy does his apples. (Laughter.)

MR. WIER—I am very fond of peaches myself. But I only bought two or three boxes the past season, for the reason that I could not get peaches that were fit to eat. Another year, I think I shall order from headquarters. (From Alton? *Reporter.*)

I can buy peaches upon the market, such as they are, but they are not worth a *cent*. They look well on the outside, many of them, but within is *rottenness*.

MR. RAYMOND—In Springfield I know the Alton peaches have a good reputation; if the box has on it the *Alton brand*, it will pass. (Cheers.)

MR. SCOFIELD—I think we had almost no good box of peaches last year. When I can get good peaches I buy one box a day for family use; as it was this year I did not get but two boxes that were fit to eat.

Voice—Send to Alton for your peaches.

DR. HOOTON scored that class of shippers who "make clean only the outside," as well as those buyers who don't know a good peach and judge only by the color of the tarlatan cover. He believed that in this matter of packing fruit for market, "honesty is the best policy."

MR. DAGGY followed in the same strain and declared that if shippers did not send better peaches, they would after a while get no sale for any.

MR. WIER—Some four years ago I helped this Society to perpetrate the grandest *fraud* of the season. We recommended to gentlemen that they put their name on the packages of fruit that were shipped by them.

MR. EARLE—I don't see how that was fraud.

MR. WIER—In this way. It went out that any box bearing the shipper's name was guaranteed. I bought peaches thus branded, in good

faith, but on opening the boxes found one-fourth good, and three-fourths bad. Just what would cover the cracks were good.

MR. DUNLAP—You have his name.

MR. WIER—What can I do with his name?

MR. DUNLAP—You can *keep* it. (Laughter.)

MR. CLAYTON—Another year I think I shall send to Dr. Hull for my peaches.

THE PRESIDENT—I make it a rule to put my name on every box that I ship, and I see no disadvantage or objection to it.

MR. BROWN—I think this is the right way to do; it is my practice.

MR. EARLE—I am really glad that I am not a peach grower, for if I was I should feel that I had been abused. I will admit all that has been said is done, and a great deal more might be said; but that *these* men, members of this Society, belong to this "unwashed crowd," I don't believe. Because we have men in our midst who have no good principles in the matter of packing fruit, and who act dishonestly, are we to be abused and cursed for that? We in Southern Illinois grow and ship as good peaches as come from Alton, or any other place. Let those who have earned a good name brand it upon the packages of fruit that they ship, and it will sell to disappoint nobody.

MR. ROBINSON—It would seem that the greatest amount of fruit was grown outside of this Society.

Voice—Which is true.

MR. ROBINSON—I think shippers would do better if they would send a portion of their shipments to the smaller towns, and not send so much to Chicago; much of it after going to Chicago finds its way to the country towns.

MR. EARLE—This has been done this year a great deal.

MR. FREEMAN—I believe in putting your name on your box. I have done this for six years, and have never yet sent a box that did not bring some return.

MR. FREEMAN, of South Pass, from Standing Committee on Geology and Soils, reported as follows:

NOTES ON THE ORIGIN AND DIFFERENCE OF SOILS IN ILLINOIS.

By H. C. FREEMAN.

In general terms we say the surface of Illinois is northern drift. This, although correct, fails to convey much information as to the soil.

While it is not my purpose to go into an elaborate analysis of the subject, which is too great an undertaking for an essay adapted to the present location, I shall aim to present certain salient features of noteworthy interest, and direct attention to their practical bearing upon the subject that calls us together in annual convention—*Horticulture*—incidentally, before leaving it, referring to an external agency as affecting results that might otherwise follow as general conclusions.

The Topography of the State is so nearly a plane that it is commonly so considered. Some data upon this point will be interesting. The Mississippi river at Dunleith is three hundred fifty feet above its level at Cairo, and twenty-three feet above lake Michigan. Between lake Michigan and the Mississippi river at Dunleith, the country gradually rises to the westward, until in the vicinity of Scales Mound, which is the most elevated point in the State, except the adjacent mounds. The Illinois Central railroad, at one point there reaches an elevation of eight hundred five feet above low water mark at Cairo, and Scales Mound two hundred eleven feet higher, or one thousand sixteen feet above the Cairo datum; making it about one thousand, two hundred ninety feet above sea level.

The mounds of this portion of the State are elevations of the original strata of Niagara and the Cincinnati group left remaining after the drift movement had carried away a corresponding thickness of the same formations over a large area of territory. Mounds corresponding with these are found in what is almost the lowest part of the State—the region of Big Muddy river, in Franklin and Williamson counties, formed in the same way, being elevations that resisted the erosion of the drift movement, but totally unlike those of the north, as they are sandstones, shales, and clays of the coal measures.

To represent the surface of the State by a profile, from North to south, if the vertical and horizontal scale were alike, it would be simply drawing a straight line slightly descending from the Wisconsin state line to Cairo, with a slight flexure upward from a point sixty miles north of Cairo for the next forty miles South, and then continuing the direction of the first line; and yet so much and constant is the deviation from a plane to a direct line of descent that grades of forty feet per mile are common on our railroads north and south as well as east and west. Even then considerable excavation has been done to avoid higher grades.

Ridges that are of considerable elevation, and many miles in length, cross the prairie region and have a local influence.

The mounds referred to, in northwestern Illinois, are a part of a great Silurian upheaval, forming a ridge that runs in a southeasterly course in a very direct line from Minnesota nearly across Illinois; the central line of which runs near Scales Mound, Grand Detour, Utica, and Urbana, at which point it has so far faded out as to be only traceable by a slight disturbance of the coal measures.

Throughout most of its course it would not be noticed by any dif-

ference of elevation of the surface from the adjacent level of the country.

At Rock Island is the point of crossing of another similar though lesser axis; at the mouth of Illinois river is another; in Monroe county—at Grand Tower and at Thebes are others; all of which cross the State in a southeasterly direction. Besides these principal ones are lesser undulations lying between them.

All these axes have left tilted up more or less the strata of the Silurian, Devonian, and Carboniferous formations, bringing various qualities of sandstones, limestones, and clays above the previous general level. This was prior to the drift period, and it is very apparent that the area of the State of Illinois did not then present as even a surface as now. The drift period was not one continued overwhelming movement of a great mass of material, but the evidences afforded by its depositions are that it was long continued and of varying action, sometimes with great force like a glacier, moving everything before it, and denuding the surface under it, plowing down the elevated portions, then with long periods of open water and quiet depositions of clayey matter in water almost clear, with movements of icebergs in the same manner as now noticed in the ocean, dropping the solid matter carried along in the form of boulders, gravel, and clay as the ice melted.

The effect of all this was the leveling down of the elevated portions and moving them forward in a southerly direction, mixing the fragments of the Laurentian clay slates of British America, the boulders of granite and other hard rocks of the lake origin with the Silurian limestones, clays, and silicious rocks of Wisconsin and Northern Illinois, the carboniferous limestones, clays, and sandstones of Northern and Central Illinois, all ground together as in a mortar, then again mixed with the erosions of Devonian and Carboniferous formations of Central and Southern Illinois. Much of the material seems to have been taken up and moved forward many times. As we go south examining all that belongs to the drift we find the boulders decrease in size, then in number, and the gravel beds are finer and fewer, with a general tendency of the soil to a finer state of division.

It was formerly considered that the ridge on which Pana stands was the southern limit of granite boulders; I have found them on the top of the high ridge of Southern Illinois—the Cobden and Makanda hill—though never larger than three or four inches in diameter.

While in this general way the origin of the great mass has been accounted for, let us look at some of the local differences.

Near the northern line of the State considerable gravelly soil is found east of the more elevated region. One hundred to one hundred and fifty miles south, gravel beds are interstratified in the blue clays, affording reliable water-beds for wells. Sometimes large areas are sandy, as in the vicinity of Morris, Onarga, and Hennepin. This is from the adjacent outcropping sandstones of the coal measures and the St. Peter's sandstone. In the case of the Onarga region it is associated with

considerable water; going southward it disappears under the surface, and the quicksand found at Champaign eighty feet below the surface is probably the same bed.

Large quantities of limestone in the surface soil of parts of Livingston and La Salle counties, by their lithological character and occasional pines and fossils are traced to the Niagara rocks in the adjacent counties to the north, as the place of their departure, and that they have not traveled from further shows by the fact that they are to a large extent quite angular andnot much worn by attrition. Farther north they diminish in quantity and finally disappear. The surface soil will be free, for long distances, of any local rocks until some new point of departure is passed, when occurs a like repetition of the southward movement of the neighboring rocks from some one of the axes before described.

In portions of Southern Illinois, spots of whitish clay, bare of vegetation, are found; sometimes a thin covering of soil is over them. An examination of this shows it to be a subsoil of wide extent, inasmuch as it can be traced from the vicinity of Neoga, on the Illinois Central railroad as far south as Dongola. In the southern hill portion of Illinois it is the first stratum immediately overlaying the rocks and has fifteen to twenty feet of soil over it. In portions of the prairie further north where not bare it has so little covering of good soil as to seriously affect success in horticultural labors.

The indications are that in the final drainage of the drift period, these places were exposed by considerable currents of water washing away the clay which seems to have been quite evenly distributed, and which forms the now fertile soil above this stratum. After passing Big Muddy river in a southerly direction the country ascends rapidly until at South Pass ridge an elevation is attained of about six hundred feet above the Mississippi river at Cairo, while Big Muddy, near Carbondale is only sixty feet above same datum, and the river banks seldom more than twenty feet above low water, with the adjacent country, I think, not more than a hundred feet above the stream.

A careful examination shows that the very broken character of the country for forty miles south of Big Muddy, or from Carbondale to Dongola, was formed, or fixed, prior to the deposition of the soil over it. The most conclusive evidence of this is the presence of the whitish clay referred to, and the identical stratum following the undulations of the country, and the generally even deposit of the heavy body of soil over it, remaining not much disturbed on the hills, but generally washed out in the bottoms of the valleys.

The only difference between the soil of these hills and that of the prairie appears to be the greater fineness of that on the hills, as though it had been more levigated.

From the general survey thus given it will be apparent that while there may be a general resemblance, there must be much local difference in the soils of the prairie in their original composition. Added to this is the fact that the little elevations of the prairie have been slowly

washing down, and the sloughs accumulating what the elevations, a few feet higher, have lost; hence another cause of local difference is plain, for much land that was formerly slough is now in cultivation.

The dryer elevations are now in condition to grow fruit trees and wheat, while the adjacent swales are better adapted to grass and corn until drainage and cultivation has reduced them, after a long period, to the condition of the lands first reclaimed. The natural progress of change is going on slowly on the prairie even when culture is not hastening it.

Another soil to be noticed is Loess, having its origin far away from its present position, having been brought down the valleys by the great rivers, and having the appearance of a deposit from almost still water. This is most noticeable after leaving the bottom lands of the Mississippi, near Cairo—of which Villa Ridge and vicinity are an example. It is traced up the river far above Alton, following the indentations made by the streams and thinning out on approaching the prairie.

From the prairie, descending to the valleys of the rivers we find terraces above the bottom lands which are deposits of the same material as the prairie that have been moved again and deposited by the rivers when much greater volumes of water flowed in these valleys than are ever found in modern times. These terraces will differ in composition according to the amount of washing received at the time of their formation, as well as from the changes vegetation may have since caused near the surface. From the manner in which the terraces have been formed, we would expect to find them generally of coarser material than the prairie; which is the case.

Lower still is the alluvium or bottom lands, of more recent origin and generally yet liable to periodical overflow, with changes of surface resulting.

Our Society recognizes three grand divisions of the State formed by latitude, and I am expected to give some special notes of the Southern division.

What I have said of the origin of soils, in a general way, applies throughout the State; as before remarked, it is noticeable that, as we go southward in the State the general tendency of the soil is to a finer state of division. A person examining the soil from the high ridges of Union and Johnson counties with a sample from the prairie one hundred miles north would note a difference without a chemical analysis. Let him traverse the distance between the two points, omitting the Big Muddy region, and the change from one to the other is almost if not quite insensible. Compare again the South Pass ridge with the soil of the second ridge, two miles south, and he can see no difference; then with that of Villa Ridge, thirty miles south, and but little difference is discernible unless with the aid of chemistry. Compare the growth of the same kinds of vegetation at the several places, and a wonderful difference is observed. Whence is this? Here we have to take some note of the difference of the difference of climate as affected by latitude, and again as affected by

elevation. The men growing pears at Centralia, South Pass, and Villa Ridge give very contradictory results from the same kinds, and not widely different treatment.

At some other points the Yellow Bellflower apples are highly prized and give satisfactory crops in the prairie region, while in adjoining places, trees twenty-five years old may not have produced a single good crop, and the general voice of fruit growers upon the prairie at the north is rather against this apple on account of unproductiveness.

Some think it not safe to cultivate the Chestnut in the prairie, others show success. The cultivation of the sugar-beet for the production of sugar as a source of profit has been a complete failure in one locality in the prairie, but successful in another. Corn crops are rather uncertain in one portion of Southern Illinois, but may be considered as never failing in another.

I have referred to the whitish clay that occasionally appears from Neoga southward, and known in the vicinity of the Ohio and Mississippi Railroad as "scalds." There is another whitish clay of similar appearance that forms a considerable extent of the surface in the region of Big Muddy, but this is a stratum of much more recent origin and is often under culture. If the season is dry enough to permit of early plowing and planting, this clay land produces a fine crop of corn, but if the spring is wet, making the planting late, the drouth of summer comes too soon and the yield is small.

In sections where the scalds are near the surface there is an excess of moisture in the spring and a lack of it in the summer, and fruit trees of some kinds are more liable to suffer than where a few more feet of soil, of the general composition of the prairie, covers it.

The failure of beet culture for sugar was remedied by removing from a soil highly nitrogenous and much like a partially drained slough, to a sandy or gravelly soil less rich in humus.

The discussions in this Society in former years show, after analyzing the results, that Yellow Bellflower apples must be grown in sandy lands to get much fruit; or at least on dry knolls, and not in rich swales of black muck or in the vicinity of barnyards.

The same distinction applies to the Chestnut grown as timber. Observing this, it is probable that both trees can be grown successfully in nearly every county in the State, with a little shelter for the apple trees in the northwestern part of the State; and so likewise of other varieties of trees which show decided preferences in adaptation to soils.

Great differences in results have been observed, in growing certain varieties of pears, between South Pass and Villa Ridge, points thirty miles apart. A careful examination of the subject shows a difference attributable to soil and another that is due to climate. The pears at Villa Ridge incline to rusty coats.

The difference in elevation of these two points has been noticed. The difference in soil is that the soil of Villa Ridge is a fine, deep loess, resting on a coarse gravel, giving excellent drainage, while that of South

Pass ridge is the same as the prairie a hundred miles north, though in a finer state of division. At the latter point, a good crop of corn can usually be only secured—except on land fresh cleared of timber—by very early planting and prompt cultivation, otherwise the summer's drouth will seriously damage it; while at the former location, an excellent yield may be obtained by planting as late as the first of July; the difference being due to soil and atmospheric conditions.

The climate of Villa Ridge is always moist, from its low elevation and its proximity to the Mississippi river, and the soil, owing to its exceeding fineness, is in condition to appropriate the moisture. The hills two miles south of South Pass, being two hundred feet lower, and but three hundred feet above low water at Cairo, show a difference of growth that I think is entirely referable to a moister atmosphere than that of the South Pass ridges, which is due to lower elevation. At Villa Ridge the rusty coating upon the pears is probably caused by the moist, warm temperature; the soil and climate together prevent the White Doyenne from cracking as this variety does elsewere.

In confirmation of statements just made, an illustration can be given from Big Muddy; a little band of loess reaches far up this stream overlaid by the Big Muddy—white-clay soil—the gentle slopes often make this band of loess the surface soil, which can be traced, in the month of July, through a corn-field by the lively green and fresh appearance of the corn growing in it, while the rest of the field will be drooping or of indifferent growth.

A long, dry summer is the regular order of the season in Lower Egypt; as a consequence fruit trees come into bearing early and bear with great regularity unless allowed to exhaust themselves too much.

In the counties bordering the upper portion of the Illinois river—say from Hennepin eastward—there has been a fine apple crop this year, and was a fair one last year. There have been three successive years of dry seasons and above an average in summer temperature. This has had the very natural result of making the orchards fruitful like those upon the hills of Egypt; it is also noticed that the apples in the region named are so fully matured this autumn that their keeping quality is impaired.

From these remarks it will be seen how much influence climate exerts in modifying the products of the soils; and in comparing soils either by general appearance, chemical analysis, or their productions, no comparison can be a fair one without a proper exhibit, in connection therewith, of the difference of meteorological condition.

Mr. M. L. Dunlap, another member of the committee, had no written report, but he was ready to make a few remarks in relation to the subject:

"The soil in the north part of the State, about Galena, has a tenacious clay sub-soil, but more porous as we come south. All such soils need under-draining, or to be so managed that the water shall pass down through them. It is found that throwing the land in ridges an-

swers a very good purpose, for this deepens the tillage, and allows the rain to fall, and the melting snow to percolate and pass down through its substance, and as the soil has a greater affinity for plant food than the water, the plant food is given up to the soil and the water passes off. But when the water cannot pass downward but is arrested by the subsoil, it must be evaporated, and in this operation the gases that hold the plant food must be evaporated also with the water. Thus our first study is to put the soil in such a mechanical condition that it shall be a plant-food holder.

It is not so much in the geological features of the soil, as in its mechanical texture, as nearly all soils contain about eighty per cent. of sand, whether formed from the azoic or carboniferous rocks.

We talk less than formerly of tile-draining for the orchard, as experience has proved that the ridging up of the orchard rows in the direction of the drainage, has accomplished the desired purpose. No matter if we throw a foot of earth along the rows and against the trees, for we give the roots, which are the feeders, access to the air, moisture, and a supply of the plant food that the great storehouse of nature, the atmosphere, has sent down with the air, the rain, the gentle dews, and the melting snow to minister to the plant.

For these reasons we must have not only clean culture, but must keep the surface in a finely comminuted condition to enable it to absorb the rain, the dew, the melting snow, and the air, for if we exclude these, we cut off the supply of plant food to the roots of the plants, and they cease to grow, and sicken and die.

When we come south, into this basin of Egypt where we now sit in council, we meet another condition of soil. The "scalds" are an incident to the soil that has perplexed the people, and given them great discouragement. It is but a thin stratum of clay four or five inches in thickness, and near the surface, and seldom more than two feet below. When this part of the State was covered with water, this thin layer of clay was deposited over the bottom of the lake, and being very tenacious is not permeable to moisture; hence it prevents the moisture below from following the laws of capillary attraction, and thus subjects the soil to suffer from drouth. The remedy for this is tile-draining or the ridging before spoken of, and thus exposing this thin layer to the action of frosts and other climatic changes, and in the end destroying its adhesive properties.

Along the Grand Chain where the soil is a modified *loess* or derived from the weathering down of the limestones and conglomerate rocks, it needs the decaying roots of trees and plants to separate its close texture, and so prepare it for its quota of atmospheric plant-food.

Then again, climate has much to do in determining the crops. For while the banks of the Mississippi, from St. Paul to Villa Ridge, are thick spread with the rich *loess*, it does not follow that the peach and the sweet potatoes alike flourish along this river-belt, as it traverses degree after degree of latitude."

Adjourned until seven o'clock this evening.

THURSDAY EVENING.

The Society convened at the regular hour.

DR. HUMPHREY presented the following preamble and resolution—moving their adoption.

WHEREAS,—For several years very few of the Correspondents in the seven horticultural districts have made any reports to the Vice-Presidents, notwithstanding the urgent requests made by our Secretary for them to do so, thus throwing each vice-president mainly on his own resources; and

WHEREAS,—This Society has dispensed with its Ad-interim Committee, therefore

Resolved—That each Vice-President be empowered with the functions of the ad-interim committee for his district, and that an appropriation be made to defray traveling expenses to an amount not exceeding two dollars for each county in such district.

MR. DAGGY supported the resolution.

MR. SCOFIELD said, with some hesitancy, that he had no objection to the Vice-Presidents' acting as Ad-interim Committee, but didn't know just where the money was to come from to pay their expenses.

MR. GALUSHA showed that the money was not in the treasury.

MR. WIER opposed the resolution.

MR. FLAGG thought that, owing to the lack of funds, the motion should not prevail.

MR. BROWN moved that the subject be referred to the Executive Board, with power to act, which was adopted.

MR. CLAYTON—I offer the following resolutions in reference to the introduction in our schools, of studies on natural science.

1. *Resolved*—That we as Horticulturists look with great favor and hope upon the action of the last Legislature of Illinois in prescribing the elements of the Natural Sciences as studies in the common school of the State.

2. *Resolved*—That we urge upon teachers of our public schools the necessity of studying nature from the *objects* of nature themselves, and of securing such study on the part of their pupils, rather than basing their instruction on the statements of text-books; and that we assure them of the hearty co-operation of this body in all earnest and well-directed efforts to impart to their pupils the knowledge of subjects pertaining to the practical industries of the State.

3. *Resolved*—That we recommend to Horticulturists throughout the State to take an interest in securing attention to the subjects of practical and scientific tree and fruit culture in the schools of their respective districts.

NATURAL SCIENCES IN PUBLIC SCHOOLS.

MR. FLAGG—I was informed that natural science has been introduced into the common schools at our place.

MR. EDWARDS—I am very thankful for this suggestion. The boys are scattered over this western country, and do not let us permit them to grow up as ignorant as we are, of Nature's works.

Resolutions adopted.

DECIMAL WEIGHTS AND MEASURES.

DR. GREGORY—Mr. President, I have some resolutions that I have prepared, at first, with some hesitancy. After writing them I showed them to a few gentlemen here, and they said, "by all means let them be offered." The resolutions were suggested to me by some discussion that was had on weights and measures. They do not concern us particularly as horticulturists, but they concern all as citizens.

He then read as follows:

WHEREAS,—The introduction of our present decimal currency has demonstrated the practicability of introducing, by law, such reforms in our system of weights and measures; and

WHEREAS,—The adoption of the decimal system of weights and measures, by its simplicity and ease in use, would effect an immense saving in time, care, and mental labor to the entire population of the country, and would especially avoid an incalculable waste of time and toil in the education of our children; and

WHEREAS,—The adoption of a uniform decimal system, resting on a scientific and invariable basis, by all the governments of the world, would greatly facilitate international trade and commerce, ever increasing in extent, and in blessed import of human sympathy and fraternity; therefore

Resolved—That in the opinion of this Society it is the duty of our national Government, in concurrence with other governments, to adopt and promulgate, at the earliest practicable day, a decimal system of weights, measures, and money, such as that now existing in France.

Resolved—That we earnestly invite the co-operation of all Industrial and other associations of the people, and all good citizens, and especially of the Press of the country to agitate this question till this great and beneficent end is finally accomplished.

MEETING OF AMERICAN POMOLOGICAL SOCIETY.

MR. FLAGG offered the following resolution which was adopted, viz:

Resolved– That the Executive Board be authorized to take such action as they may find best, in reference to the meeting of the American Pomological Society—on its twenty-fifth anniversary, with the Massachusetts Horticultural Society at Boston—by appointing delegates thereto, making collections of fruits for exhibition, and doing such other acts as may cause this Society to be adequately represented.

On motion of Judge Brown, the President elect was requested to co-operate with delegates from other Western State Horticultural societies, in securing commutation rates on railroads, to enable the Executive Board to carry out the instructions in Mr. Flagg's resolution, just adopted.

The regular business for the evening was entered upon, by a call from the President for the report of committee on Botany and Vegetable Physiology.

One member of the committee only, Mr. Earle, was in attendance at the meeting, and he had not prepared a report.

REPORT ON ENTOMOLOGY.

THE PRESIDENT announced that reports from members of the Standing Committee on Entomology were next in order, and Dr. William LeBaron, State entomologist, presented his report, as member of said committee, as follows:

A good deal is being said, at the present day, upon the subject of progress and improvement in the education of the young, both as respects its objects and its methods. A great reaction is evidently taking place in these respects. There seems to be a pervading feeling that the methods of education heretofore pursued have been too abstract, and too far removed from the every-day business and necessities of life. The plan now being agitated and pursued is to discard for the most part the study of dead languages and abstract mathematics, and to fix the attention of the rising generation upon things present, tangible, and practical.

Amongst other things which it has been proposed to introduce into our systems of education, in place of some of the discarded matters, is the study of natural history; and indeed it is now one of the laws of this State, that those who present themselves as teachers in our public schools shall be able to pass a satisfactory examination in some of the leading branches of this science.

The introduction of such subjects into common schools being a new experiment, and the science of natural history being so little understood by people in general, it may be fairly presumed that the ideas of educators themselves upon this subject are, as yet, crude and unsettled. There is yet a vague feeling that something of the kind ought to enter into the education of the young, without knowing exactly what it is, or how it can be best accomplished.

It has seemed to me that some thoughts upon this subject which my own course of study in these branches has suggested, would not be inappropriate at this time, and upon this occasion, for I believe that no person, has taken a more active interest in this matter of an improved system of education, than some of the more intelligent farmers and horticulturists of this State.

The ideas of most people, as to what constitutes the most desirable kind of education, are extremely vague. Perhaps if we should put into words, the aggregate sentiment of people in this busy and practical age, we should define education to be the acquisition of such knowledge as will enable them to make money; and the definition is a very plausible one. For what is there we want that money will not buy? Money represents houses and land, equipage and servants, and all kinds of material possessions. And yet the definition does not altogether satisfy us, and for the simple reason that we find, when we come to analyze the matter, that there are some things of the highest value which money can not buy. A man may set his table with the most luxurious viands, he may build for himself a marble palace, he may clothe himself in purple and fine linen; but if he have a rude and uncultured mind, if he

knows nothing, and cares to know nothing outside of his material possession; if the costly volumes, laden with the lore of ancient and modern times, which he may have purchased, as some people do, for the sake of show, are to him sealed books, which he only takes from their shelves once or twice a year, to have them dusted and replaced; the most uneducated of us feel that this man's life is little better than a splendid mockery. The higher or intellectual part of his nature, either from necessity or choice, has been left uncultured. It is an old saying that there is no royal road to learning; and we might vary it by saying that there is no golden road, or modernize it by saying that there is no railroad to learning or knowledge. It is true that wealth may enable the man of whom we have been speaking, to obtain for his children the most approved means of education; but in so doing, he sends them away from his own splendid mansion, to obtain that which he himself, with all his riches, does not possess.

Education means the development of the human faculties, and these faculties are so numerous and so complex, that the determination of the best means and methods of accomplishing this end is the most important and the most difficult problem which can present itself for our solution. This difficulty is greatly enhanced by the diverse pursuits of mankind, and the diverse conditions of human society, so that what is a suitable and sufficient education for one man, is not so for another. The necessities of society require, as a general rule, that every man shall devote himself to some one trade or profession. And as population becomes more dense, the range of a man's education becomes more specialized and consequently more contracted; and most men have but little time and little inclination to learn much outside of their special vocation. The preparation or training for these various useful occupations, constitutes, in the aggregate, what is usually understood as a practical education; that education by which a man is enabled to procure food and raiment and shelter for himself and his family; and the better educated, or the more expert he is in his special calling, the better will he fare in these respects.

But the question arises, whether there is nothing else which a man can and and ought to learn, in case he does have the time and opportunity; or if he have not the time himself, is there nothing else which he would wish his children to know. If we suppose the uncultured rich man we described above to have a bright and active child, it is very certain that the child will not be satisfied with his father's small stock of knowledge. His active mind will be reaching out after new light, new facts, new thoughts; and it will make no difference in his estimation, whether the knowledge which he may thus acquire have any practical application or not. The fields of investigation which will open to this child are boundless on every side; so varied and so extensive, that the longer and the farther we traverse them, the more conscious we become of their limitless extent. You recollect the anecdote of Newton, that when some one expressed a wonder at the extent of his knowledge, he replied,

that he seemed to himself to be but a child gathering a few pebbles on the shore of the ocean.

Now all this diversity of knowledge, so far as it can not be applied directly to our own business, may be said to be unpractical; and yet the possession of it is what makes the difference between the ignorant day-laborer and the man of culture and intelligence. Its utility is not special but general. It operates by stimulating and enlarging,—in a word educating the mind, and thus fitting it the better to cope with the complicated questions of life, whether of the individual or of the state.

An ancient king of Sparta, when asked what is the best education for a child, replied, "That which he will have to practise when he becomes a man." We sometimes hear this saying quoted as if it solved the whole difficulty, and left nothing more to be said. But I fear we shall not be able to dispose of this vexed and complicated question by any such short cut, or by any single comprehensive aphorism. If the old philosopher meant to say that the most urgent and the most necessary education, is that which will enable a man to become an expert in that trade or calling by which he is to get his living, no one will dispute its truth. But if he intended to say that this is all that a man needs to know, or all that it is desirable to know, his definition was very contracted and unsatisfactory.

I think we can get a clearer view of this disputed matter of education by classifying it. Education may be described as being of three kinds, *essential*, *special*, and *general*. Essential education, is that which every one puts in practice in the affairs of civilized life. Special education is instruction in the particular business, trade, or profession which any one may select whereby to get a livelihood. And general education embraces the acquisition of all the knowledge that is not included in the other two.

Essential education, or that which every man in business absolutely needs, is extremely little. It is limited to knowing how to read, write, and cipher so far as to include the four elementary rules of arithmetic, with a smattering of vulgar fractions; as special education, or instruction in any particular trade or profession, does not come within the limits of a common-school education, it follows that all such education beyond the above meager catalogue, will under the head of general education, and we can all form some idea what judgment and far-seeing wisdom it must require, to make the selection from this wide and diversified field. In doing this, there appear to me to be two opposite errors, against which we must guard.

In the first place we must not occupy the time of the scholar with studies which are very remote from that class of pursuits which he will be most likely to follow, or that position in society, which he will be most likely to occupy; especially if, at the same time, they are studies a tolerable knowledge of which it will require much time to obtain. Both of these objections apply very forcibly to the study of Latin and Greek languages in common schools. A knowledge of these languages is of

great importance to the man engaged in literary or scientific pursuits, especially in their higher branches; but comparatively few are thus engaged, and the great objection to these languages, as ordinary branches of education, is that it requires many years' assiduous study to master them.

On the other hand, there is perhaps an equal danger, especially in this rushing, practical, and money-making age, that we shall take too narrow a view of education, and that we shall overlook the great truth that knowledge may be very useful in a general way which is not directly practical.

But it is not my intention to discuss the question of general education, and I have thus stated briefly a few of the leading principles which seem to me to underlie all education, for the purpose of making more intelligible the subsequent treatment of my special department.

Natural history, in the common acceptation of the phrase, means the history of the animal creation, comprising quadrupeds, birds, fishes, and insects. If we look at this subject from an exclusively practical point of view, it is difficult to say wherein its utility consists. Almost the only quadrupeds and birds which are of direct utility to mankind, are those which he has in a state of domestication, and it is not to be supposed that a general knowledge of natural history is going to aid him much in the rearing of these. The injurious quadrupeds and birds are so very few, that all of any consequence can be counted on the fingers of one hand; and it does not require much knowledge of natural history to tell us how to poison a wolf, or entrap a mink, or shoot a blackbird.

Fishes, living as they do, in a different element, never come directly in conflict with human interests; and, in the way of capturing them as articles of food, I have no doubt that Agassiz himself would often stand a poor chance alongside of some ragged urchin, who has had the fortune to be born within a stone's-throw of some running brook.

With insects the case is somewhat different. Though very few of them are of direct utility to mankind, many of them are injurious, and often disastrously injurious to human interests, by depredating upon the most valuable crops. In a merely practical point of view, therefore, insects would seem to be the only class of animals that there is much use in studying, and these only so far as will enable us to destroy them, or prevent their ravages.

The question then recurs, what benefit is to accrue from the general study of natural history. If there be any utility in it, it is evident that it must be looked for in a broad and general, and not in an exclusively practical view of the subject. I will proceed to state briefly, what I conceive to be some of the principal advantages of this study.

In the first place, it is to be observed that we ourselves constitute a part of nature. We are born and dwell in the midst of natural objects, the beauty of which attracts our attention from earliest childhood, whilst their endless variety, their curious mechanism, and their wonderful adaptations excite the curiosity and invite the investigation of the profoundest and maturest intellect.

There is about a third part of human life, embracing the periods of youth and old age, which is not occupied with the exacting demands of business, and some provision must be made for the intellectual entertainment of so large portion of our lives; and I know of nothing more suitable, nothing more pleasing, more healthful, more purifying, or more satisfying, than the contemplation and study of nature; and the cultivation of a taste for such studies, would, I have no doubt, save many a young man from debasing himself with coarse and sensual pleasures and many an old man from the tedium of a barren mind. I never heard of any one who regretted the time expended in cultivating these pursuits. The poet Wordsworth expresses sentiments similar to these in language none the less true because it is poetical.

"Nature never did betray the heart that loved her.
It is her privilege to lead from joy to joy;
For she can so improve the mind which is within us,
And so feed with lofty thoughts, that neither evil tongues,
Rash judgments, or the sneers of selfish men
Shall e'er prevail against us."

Another advantage of the study of natural history is the careful, accurate, and methodical habit of mind, which the prosecution of such studies requires and cultivates.

The celebrated Baron Cuvier, who was not only the most distinguished naturalist of his time, but who was also a man of vast general attainments, and was often called to fill responsible positions in the state, in the preface to his great work entitled the "Regne Animal" or the natural history of the animal kingdom, in speaking of the benefits to be derived from this study, makes the following remarks:

"The habit, naturally acquired in the study of natural history, of the mental classification of a great number of ideas, is one of the advantages of that science that is seldom thought of, and which, when it shall have been generally introduced into the system of common education, will become, perhaps, the principal one. By it, the student is exercised in that part of logic which is termed method, and which, when once acquired may be applied with infinite advantage to studies the most foreign to natural history. Every discussion which supposes a classification of facts, every research which demands a distribution of matters, is performed according to the same laws, and he who had cultivated this science merely for amusement, is often surprised at the facilities it affords him in disentangling and arranging all kinds of affairs."

If such considerations as these strike any one as too lofty, or too purely intellectual to be practical, I must maintain that they are not so in the highest and best sense of the word; and that if they are so, the same objection lies against a very large proportion of human knowledge.

In teaching Entomology, the plan has been proposed of hanging upon the walls of the school-room magnified pictures of the most injurious species, or what would be better, to hang up a glass-covered box, containing specimens of the insects themselves; accompanied with plain directions how to destroy them, or otherwise counteract their ravages. This is an excellent method so far as it goes, and may seem to many all that the child needs to know upon this subject, since it is all,

and probably more than all, that he will ever need to put in practice. But its deficiency lies in this, that it teaches only what is local, special, and exceptional; it gives no principles, no general information, no knowledge which can be applied under a change of circumstances.* The intelligent child will not long rest satisfied with the knowledge thus communicated. (His eager young mind would starve upon such exclusively practical diet as this.) He will say, or may be imagined to say: Yes, I think I am sufficiently familiar with these two or three dozen species. I believe I know pretty well how to contend with them, and if I do not, I can much better learn what I actually need to know, when the time comes, by consulting some practical treatise upon the subject. But how is it as respects the twenty-odd thousand species which I am informed inhabit the State of Illinois alone. What business have they here; what bearing have they on human interests, directly or indirectly; what part do they enact in the curious and complicated economy of nature; what can you tell me about these; what general principles can you give me by which I can tell which of the hundreds of species that I meet with, are likely to be injurious to me or not; or what general rules are there by which I can distinguish my friends from my enemies? These are some of the questions that will present themselves to the mind of the enquiring child, and which our methods of teaching must be prepared to meet before we can dignify them with the title of education.

There are two principal methods by which instruction is communicated; first, by oral or conversational lessons on the part of the teacher; and second, by the aid of text-books.

A very considerable diversity of opinion exists as to the value, or necessity of text-books. The fact that teachers have been in the habit of relying too much upon such aids, and sometimes to the almost total exclusion of the great book of all, the book of nature itself, has caused a reaction which is liable to run to the other extreme, and to disparage the use of books almost entirely in teaching the natural sciences.

A great deal of the uncertainty which involves this subject is cleared away by recognizing an important distinction which exists in the requirements of the child and those of the more advanced student. A child soon tires of books, and often fails to understand them, whilst his attention is immediately arrested by the natural object itself, whether it be a bird, a flower, or an insect. He cares but little what is said about this object on the printed page, so long as he has the thing itself before his eye, and a living teacher ready to explain it. But as he progresses in his studies, the case becomes changed; after becoming sufficiently familiarized with the objects of his study, a new desire arises; he longs to know what the masters have said concerning them, and what results have been arrived at by those who have gone before him in this field, and who, by a life time, perhaps, of patient toil, have overcome the obstacles which lie heavily in his path.

* It does not so much as touch that higher department of education referred to by B. Cuvier in the extract which we have read from his writings.

The Hon. Newton Bateman, the able and experienced Superintendent of Education in this State, in an article recently published by him upon this subject, has happily presented the different requirements of the *younger*, and the *more advanced* scholars in the natural sciences. After depicting, in eloquent terms, the eagerness with which the child seizes upon knowledge when it presents itself in the form of object lessons, in the hands of a sympathizing and enthusiastic teacher, he goes on to present the other side of the case, and commences with the following passage:

"Let it be kept in mind that in what I have been saying, I have had special reference to *beginners* in the rudiments of natural science. I do not say that some teachers may not make judicious use of a text-book, even at the outset, or as soon as pupils are able to read fluently; much less would I approve the one-sided and extravagant notion, now becoming so prevalent, that text-books should be entirely discarded in public schools, and all the instruction be oral. A good and suitable text-book, in the hands of a teacher who knows how to use it, and how to direct its use by pupils, is always a help—one never to be undervalued. And for advanced classes in the natural sciences, text-books are almost indispensable, even with the best teachers."

The books which have been written upon insects are very numerous and varied. They may be divided into three general classes; first, those which contain accounts of the instincts and habits of insects, intended to entertain and instruct children and others who do not desire to make a special study of Entomology; secondly, those who treat the subject from a purely scientific point of view, and which are intended only for the professed student of this science; and thirdly, those which have treated the subject practically, for the purpose of teaching, either how to rear the useful species such as the silk-worm, and honey-bee, or else how to destroy those kinds which are injurious. (A considerable number of books have been published, it is true, of an intermediate description between the first two, but they are usually of such a character that they may be classed in a general way with the one or the other.) The greatest desideratum in entomological literature, at the present time, in my opinion, is a book which will form a connecting link between those works which treat the subject either from a purely scientific, or an exclusively practical point of view.

I am continually receiving, in my official capacity, two classes of enquiries; first, how to cope with injurious species—coming from practical farmers and horticulturists; and the other, much less numerous, but not inconsiderable, how to classify the insects which the enquirer is collecting—coming from young people who have become interested in this study. To the first questions I reply either by private letter, or if the subject be of general interest, through the public press, or if it be particularly new or interesting, through the medium of my annual report. To the latter, I am obliged to reply that no work exactly suited to their purpose exists; and those which come nearest to it are either out of print, or too expensive, or otherwise unavailable; and those which are within his reach are for the most part too learned and technical, besides that many of the works upon different orders of insects, are scattered

through different and disconnected volumes. So much have I felt this want for others, and for myself in my earlier studies, that I have ventured to commence the preparation of a work which, to the best of my judgment and ability, shall meet this demand. The first installment of this work, embracing a concise outline of the structure of insects, and a distribution of them according to their habits and the nature of their food, and continued so far as to include the whole of the first great order of insects, or that of the Coleoptera, or beetles, is now nearly completed, and will be published in connection with my next annual report if an appropriation can be obtained sufficient to pay for the figures necessary to illustrate it. It will be my aim to give that general knowledge of insects which underlies their practical treatment, and to describe as plainly and concisely as possible those principles which conduct to the scientific treatment of the subject. (Such a work can not be made to include many practical details without being too bulky, and this is not necessary, because we already have these details in the practical reports which have been published, or which are now being published in this and other states; and which are easily obtainable either gratuitously, or at a price which is little more than nominal in proportion to their intrinsic value.) Such a work may have, indirectly, a practical value which we cannot now fully realize, by inviting into this field of labor many young and enquiring minds which might otherwise be deterred by the difficulties which they would meet at the outset.

I should be pleased to describe my plan more fully to you, but the plan itself is as yet but partially matured, and I have already trespassed too long upon your time. I will close therefore with one more remark.

Mr. Edward Newman, a respectable English entomologist, in his little work published many years ago, entitled: "A Grammar of Entomology"—commences his preface with the following remarks:—

"Teachers in science are nearly equally divided into two classes: those who know too much, and those who know too little. Those of the first class, overloaded with science, cannot admit the possibility of meeting with readers who have none, and therefore their essays and introductions are so worded that it requires a tolerable proficiency to understand them. The teachers of the second class fall into the opposite error; they curtail, garble, and popularize the writings of others without understanding them, forgetful that it requires a consummate knowledge of any science to abridge a work which treats of it ably, and at large."

If I should be so fortunate as to be able to pursue a middle course between these two extremes, I should have occasion both for your, and my own congratulation.

In the discourse that I have just read, it will have been observed that I have been discussing more particularly the teaching of the elements of the natural sciences to those young persons, either in school or out of it, who may have a taste for such pursuits, and upon whom the treatment of this subject, in its practical as well as its scientific aspects, will hereafter devolve. In doing this, I have not been able, without making my address too long, to treat of the directly practical application of this subject. I have endeavored to show that instruction

in the elements of any science is not identical with directions how to practice it, but that it precedes and underlies them. Those who have taken an interest in reading my annual reports, and my frequent contributions to the agricultural press, are aware that the greater part of my entomological writings have been of an exclusively practical character.

I make these statements simply to guard against misapprehension, and to remind you that in providing for the elementary education of the young people of the State, your Entomologist has not neglected the important and more directly practical duties of his office.

PRIZE TO STUDENTS OF ILLINOIS INDUSTRIAL UNIVERSITY FOR ENTOMOLOGICAL EXHIBITIONS.

MR. EARLE offered the following resolution:

Resolved—That this Society offer to the students of the State Industrial University two prizes, one of ten, and one of five dollars for the best and second-best collection of insects, to be exhibited at the annual meeting of the Society in Champaign next December; each collection to be accompanied by a paper upon some species of insects, beneficial and injurious.

After considerable discussion upon the expediency of adopting the resolution,

DR. GREGORY stated that he knew members of the Society who would furnish the funds to pay the premiums if offered, and he would pledge the funds; whereupon the resolution was adopted.

MR. WILK—I wish to offer a resolution requesting the Legislature to continue the appropriation of money to sustain our State Entomologist.

WHEREAS,—By the revision of the Constitution of this State the appropriation for the compensation of the State Entomologist ceased at the close of August last, and the present incumbent has since that time pursued his labor without compensation, and

WHEREAS,—We are fully convinced of the great value to the State which will accrue from the continuance of that official, amounting to many times its cost, therefore

Resolved—That it is the earnest wish of this association that the office be continued, and that we urge the General Assembly of the State to pass such act as is necessary to continue the office of State Entomologist, and to make appropriation for the compensation of the same.

REPORT ON ENTOMOLOGY.

MAJOR J. R. MICHLEMAN, from Standing Committee on Entomology presented his report, introducing it with some interesting remarks upon the strawberry crown-borer, which, for some reason, the reporter failed to take down.

He said he was not a professional entomologist, though he had taken a great interest in the science, and had devoted many leisure hours to its study. He would christen his remarks at this time as—

which he presented to us as follows:

"It is amusing sometimes in moments of leisure, when alone and not tormented with the persistent cares for the to-morrow, when traveling over prairie and through lonesome woods for instance, no faster than horseflesh can go, to muse, whence happiness or miseries come, and how much we owe to little things for both. I have thus once been musing on the birth and early youth of Entomology. The wise man tells us that there is 'nothing new under the Sun,' and I have tried to apply the saying to the subject before me. The horticulturist and the agriculturist will study chiefly that part of the science which treats of the noxious insects, and of the means to destroy them, or at least check their increase; it is due to self-preservation, that we as lords of the creation, stoop to apparently so little things, and in this sense I am prepared to maintain that there is 'nothing new under the Sun,' that Entomology is no new science, that it is as old as written language at any rate: whatever occurs or manifests itself for good or for evil in the existence, the preservation or comfort of man, becomes necessarily the object of his attention, and of study to the more intelligent, and it is chiefly to the two former that we are indebted as the originating agents of the science. Then, as now, man was bitten, stung, tickled, and crawled over, by day and by night, yet would he not stoop down to the biters, the stingers, and ticklers, and learn something of their inner lives; but when it matters about the very existence or preservation of life, when it matters about the destruction or diminution of his bread, then those little destroyers at once become important in proportion to their destructiveness; and the intelligent man at once perceives the necessity of acquainting himself with the habits of the enemy, in order to discover the proper means of warfare. This is the birth of Entomology; its growth has kept pace with the gradual increase of noxious insects, and of cultivated plants.

There are, besides, other elements which might be regarded as component stones in the arch of the science, one—namely superstition,—which is almost an inherent part of the moral existence of the ancients, the foundation of their religious systems, the soil in which rooted much of their poetry and arts.

It is the province of science to dispel superstition; yet the latter was before the former and superstition is *quasi* the mother of science. At any rate we have now some names which were suggested by superstition; for instance the specific name *Atropos* given to a large European Sphinx, which bears on its breast the figure of a human skull. *Atropos* is the great name of one of the three goddesses of fate, the one who cut the thread. To this day is the moth regarded as a messenger of death with the common people of Europe, when flying into a lighted room, perhaps a sick chamber. We need therefore not to go back to the ancients for instances of superstition in connection with our subject; does not the vocabulary of popular names itself to-day teem with such that

are suggested by superstition? Fear stimulates imagination; the peculiar and often fantastic or repugnant forms, together with size, suggest to the ignorant the presence of supernatural powers; they become to them at once messengers from the realms of the mysterious, even the harbingers of death.

But let us turn over this leaf of the dark powers and of those human infirmities; there are beneficent insects; they, too, claim a place in the arch. Though they are but few in number of species over against the destructive and injurious ones, they are by no means unimportant. These few have already in very early days largely contributed to the wealth and comfort of man; they are the Bee, the Silkworm, the Coccus, and last the Spanish-fly. The Coccus under different names was known to all the oriental nations, and prized for its scarlet properties, though it is said that the insect was supposed to be a vegetable production.

As colonization extended and civilization progressed, vegetables for man and feed for animals increased in variety; so have insects; new species, or such as had before been unknown because they inhabited uncultivated districts of forest and prairie, have urged themselves upon the notice of man, often for evil it is true. Yet the science of Entomology having grown in the meantime, and divested herself of the tutelage of superstition, had commenced to notice and reach out to all, whether injurious or not, grew to independence—to rank with her twin sister, Botany.

In a paper read during last summer before the Alton Horticultural Society, I alluded among other things to the gradual disappearance of some insects from once uninhabited prairie districts; in a conversation had lately with an old settler in my county, which by-the-way had, not longer than fifteen or twenty years ago, thousands of acres of prairie lakes, so that it received the epithet of Frogpond,—I learned something about the small green horse-fly,—*Tabanus lineola*, which goes to confirm the statement alluded to.

He said that before the days of railroads, when farmers from Greene, Jersey, and Macoupin counties took their produce to Alton over roads leading over raw prairies, and around the numerous lakes, they had to travel only nights, on account of that fly. The larvæ of it, like others of the genus, live on decaying vegetable matter in marshes, just such as were afforded them by those prairie lakes. Now they have disappeared. Railroads and the plow have drained them, that vegetable matter has assimilated with the soil, and the yearly plowings of course have disastrously interfered with the increase and breeding of the fly, so that now it is counted with the plagues that were.

INSECT NAMES AND THEIR DERIVATION.

It is obvious to all, no doubt, that it is necessary in science to use a common language to name its subjects, legible and comprehensible to the students of all nations, and thus facilitate scientific intercourse on the subject between people of different languages, and avoid the other-

wise inevitable confusions which would ensue if science were reduced for her vocabulary to the popular names of each country and language; it would moreover, burden the student with the onerous duty to master every language in which the science is written, even to its idioms.

The derivation is necessarily very various. Simple as it no doubt was with the ancients, who knew scientifically, perhaps, no insects at all, and oftenest named them after familiar objects which they resembled, in form or dress, as to precious stones or metals, or to animals; the adjectives expressing their appearance, destructiveness, or beneficence; their forms also as above alluded to, suggested by superstitious dread, their size, color, habits, and numbers. Later, as science assumed more comprehensive proportions, when the number of known insect species rose into thousands and tens of thousands, it drove the systematist into many additional fields of knowledge; even poetry had to become lender.

By far the richest and most appropriate source for names, however, are the characteristics of the whole insect, or its parts, as for instance, of the feelers, mouth-parts, the wings and their veins, the feet and their parts. Among such I would name *devastator*, *destructor*, *stimulea*, *bivittata*, *guttata*, *punctata*, *tridentata*, *cinerea*, *lineola*, *maculata*, *chrysomelas*, *brevicornis*, *albifrons*, *albipennis*, *fulvipennis*.

Next are we indebted to Botany, especially in the category of specific names, denoting generally the food-plant of the larvæ, as *quercus*, *populi*, *robinia*, *juglandis*, *salix*, *pisi*, *fabæ*. Next, to denote the resemblance the insect may have to certain plants, or their parts—as *populifolia quercifolia*, *lanrifolia*.

Mineralogy has furnished its quota, and lastly, Mythology. In names from the latter we can frequently trace a resemblance between the insect or its appearance, and the representation or attribute of the particular fabulous being whose name it bears, for instance, *Polyphemus*, the name of one of our large silkworm moths, obviously suggested by the conspicuous dark eye-spot in the middle of each wing, suggestive of course of the one eye in the middle of the Cyclops' forehead. Some are doubtful and obscure in their meaning as applied to insects. Thus it is difficult to account for the application of the name *Luna* to the beautiful green moth. Luna is both the name of the moon and the goddess of the moon. I could apply that name to the insect, only for its resemblance when at rest,—against a dark background, to the appearance of the moon, nearing her second quarter.

Many however, are so utterly devoid in analogy as to the whole or its parts, with beings whose name they bear, that the imagination of the uninitiated is utterly baffled. Among these I could cite *Prometheus*, another large moth, *Apollo*, a beautiful butterfly from the Alps. *Idalia*, *Aphrodite*, *Paphia*—aliases of Venus, Diana, and Cybele, all applied to five different species of the argymus butterfly.

Rather suggestive are Apollo above named; Tityus, the name of a giant, and applied to our largest beetle; Erebus, the hell of the ancients, the name of an immense dark moth.

I presume most of my hearers, especially those of the horticultural persuasion, are aware that we distinguish in Entomology four distinct classes of names (at least they ought to know after all the preaching they have had on the subject.) These names are, first, of Orders; second, of Families; third, of Genera; and lastly, of Species. I have so far, chiefly dealt with the last; the first three are suggested chiefly by their characteristics, and hence are more or less descriptive.

Names which the ancients applied to distinct species, have in later times been applied to the whole genus. Thus Coccus, as Dr. Harris tells us, is the name of a grain, and was the scarlet in grain of the Romans; they supposed it to be a vegetable production.

Curculio was also by the Romans applied to the European corn-weevil, but now to the whole tribe of them, amounting to between eight thousand and ten thousand species.

So is Coccus applied to the whole family of scale insects.

CATERPILLARS AND GRUBS.

An important and a rich chapter. No tiller of the soil, no horticulturist will deny it. Although much injury is done by the perfect insects of the four orders, *coleoptera*, *orthoptera*, *hemiptera*, *homoptera*, yet does it not stand comparison with that done by their larvæ added to that done by the larvæ of the *lepidoptera*. The larvæ state is the period of growth, and although not the longest in the aggregate existence of the individual, the larvæ state is the longest of the destructive period.

It is the caterpillar, the grub, the louse, and the larvæ and pupæ of many *orthopterous* insects, which are destructive to the appletree, the peach, plum, and the grapevine; to the garden, the forest, the field, and the meadow. The injury done by the perfect insect is insignificant in comparison; because first, they need no food in order to grow, and secondly they are too short-lived. The most serious injury done to plants we cultivate, is that done by the so-called Spanish-fly, *Lytta vittata* on the potato vine,—the injury done by the Colorado beetle being much less than that done by its larvæ. Another is the grasshopper, some wasps and beetles, on fruits.

On the other hand do we derive the greatest benefit from insect-friends during their mature state; be it by their habits as parasites, or by their raptorial habits; it is chiefly the perfect beetle, rear-horse, bug, or wasp.

In Economic Entomology, the knowledge as to what particular insects caterpillars, grubs, etc., will turn to, therefore, is commensurate in importance with the injury and destruction done to what we cultivate for our subsistence, for commerce, comfort, and pleasure; I say in Economic Entomology, because Scientific Entomology takes notice of all insects, injurious or not.

It is computed by entomologists, that the proportion of known insects to known plants is as five to one; this need however, not mislead to the supposition that each species of plant has five different insect en-

emies. I am not prepared to say whether there are plants which have positively no insects feeding on them; but I have noticed a few on which I have never seen any, namely, the tansy, the so-called 'old man,' and the hoarhound; a certain beetle is said to feed on the pie-plant, but I know of no larva.

But what must we say of the grapevine, the oak, the apple tree? The two former have at least fifty different insects feeding on each of them; on the apple tree at least twenty-five. Any one, who has an eye for caterpillars, can find in September and October, on the post-oak alone, caterpillars of twenty-four different species of moths.

On the subject of generalization I take the liberty to quote from an excellent article on noxious larvæ, by Dr. William LeBaron, which will be found in number eight, volume two, of *American Entomologist*. He says:

"As a general rule, hairy caterpillars produce moths, whilst spiny or naked ones produce butterflies, sphinges, or sawflies; or all densely-haired caterpillars produce moths, but all the larvæ of moths are not hairy."

Wood-boring larvæ belong mostly to the *coleoptera*, but also to a few families of the *lepidoptera*, namely, the *ægeridæ*, the *hepialidæ*, and a few exceptional *tortricidæ*. The larvæ of the *lepidoptera* can always be distinguished from those of the *coleoptera* by the presence of prolegs on the intermediate segments. A few coleopterous larvæ have one pair of prolegs on the anal segment, but more generally only one such leg.

All leaf-sucking larvæ belong to the order of *hemiptera* (including *homoptera*).

All larvæ found underground, excepting those which enter it only for the purpose of undergoing their transformations, are divisible according to their habits, into two sections. First, the subterranean larvæ, properly so-called, which *live* underground, and feed upon the roots of plants; and secondly, those which subsist above ground, but burrow into it, when not feeding, for the purpose of concealment.

IN CONCLUSION.

A few words as a tribute to Entomology, as a promoter of happiness, of comfort, of wealth, and of humility; of happiness, because she dispels the dread of superstition; enlightens, elevates, affords recreation, amusement, and instruction. By the practical application of what she reveals, we can do good and benefit mankind, and thus, in the hands of the christian, she becomes the handmaid of religion. She reveals to us, with other natural sciences, the palpable evidences of God's infinite wisdom and goodness. When we contemplate with the help of the lens, these, to many, insignificant creatures, we see things which were sealed to the naked eye; when we take a lens of double, of ten, yea of a hundred-fold power, we see still more, but never all of it, no more than we can know all of the Creator. He is infinite and so are his works, while we and our tools are finite. Whatever bears the seal of his spirit, has a Holy of Holies, into which we cannot penetrate, not even the high priests of science.

J. R. MUHLEMAN.

On motion of Mr. Flagg, the Society requested Mr. Cooper to present his report on Ornithology, which had been crowded out from its regular order.

REPORT OF J. C. COOPER, COMMITTEE ON ORNITHOLOGY.

Mr. President:

I must say that I was very much surprised at receiving a circular from the Secretary informing me that I had been appointed a member of the Committee on Ornithology for eighteen seventy-two, with a request to "report upon all matters which come legitimately within the province of such committee"—for the reason that a report on any subject which comes legitimately within the province of the State Horticultural Society, should contain the results of practical experience and observation, to make it of any value—and in these two essential qualifications I am free to acknowledge my ignorance of any knowledge of practical value pertaining to the subject assigned me.

I may say that I have taken more or less interest in birds, in common with every person who loves the works of nature, and have always been inclined to the belief that they were the natural friends of man, rendering to him a full *quid pro quo* for all their trespasses upon his work. I used to think, if I was a fruit grower, I would cultivate the acquaintance of the birds; I would say to them from the affections of my heart, "You beautiful harbingers of joy, who come to me after the silence and the chill and the gloom of winter, with the first glad songs of the spring, you are welcome to my small hospitality. I esteem it a pleasure to have the privilege to entertain you, as a slight return for the valuable assistance you render me in keeping in subjection the swarms of insect pests which destroy the fruits of my labor; and for the delicious solos and concerts of entertainment you have given me." But afterwards, when I began to raise fruits in an amateur way, for the supply of my family, and after planting and cultivating to a maturity which promised the long expected reward, when I found my esteemed friends, the birds, feasting on the long-looked-for first strawberries, and day after day postponing the delicious first saucer full of the season, picking of my choicest cherries before they were ripe, watching with a faithful pertinacity that in man would win him success in any field of labor, for the first raspberry to color, and then making away with it just before I was ready to gather it; and then when the grapes, which hang in such glorious clusters over my head in the arbor, as I walk through it over and over again and watch the precious tint of color as it spreads and encircles the little globular repositories of the precious nectar, as they begin to ripen, to find that they are being appropriated as fast as they ripen by those whom I had esteemed my friends, and who start away with an evident consciousness of guilt upon my approach, when I began to feel their merciless beak in my dearest hopes, somehow or other my feelings undergo a complete revulsion, and in place of the kindly sentiment of hospitality, the baser feelings of revenge would take sway, and it required a good deal

of philosophy, and a severe draw upon my better nature to resist the temptation to commence a deadly war of extermination against them. At such a time we are hardly willing to reflect that the birds which become such destructive pests to the fruit growers' industry in the latter part of the season, on their *first* arrival, in the early spring, subsist almost wholly on insects which might, if they were permitted to live, do as much injury to the crops as we charge the birds with doing.

We have a large number of birds visit us here in this locality during the summer. I cannot say how many, but trying to enumerate them a short time ago, I made out the following list, some of the names embracing several varieties:

Woodpeckers,	Blackbirds,
Creepers,	Bob-o-link,
Thrush,	Mocking-bird,
Bullfinch,	Blue-bird,
Pewee,	Titmouse,
Wren,	Wax-wing,
Robin,	Swallows,
Cat-bird,	Martins,
Shrike,	Oriole,
Red-bird,	Blue-jay,
Quail,	Yellow-hammer.
Meadow-lark,	

Swallows are supposed to feed on gnats and flies almost exclusively, but they sometimes feed on other insects and small beetles. M. de Buffon tells the following interesting anecdote about this bird, which may not be out of place here, as it illustrates its uniform habits: A shoemaker in Basle, (France) put a collar on a swallow containing an inscription to this purport:

"Pretty swallow, tell me, whither goest thou in winter?"

and in the ensuing spring he received by the same courier the following answer:

"To Anthony, at Athens;—Why dost thou enquire?"

Theory and speculation and sentiment may be entertaining for the moment, but it is real practical knowledge or information that we want; and this can only be obtained by careful observation, not only for a season, but continued through the seasons. The birds want a just, intelligent and kind-hearted judge to hear evidence through a series of years; to open a business account with them, giving them credit in the early part of the season for their cheering songs, which come to us, as Thomson beautifully says of the lark (although it was not one of our birds, yet the sentiment was universal):

"Shrill-voiced and loud, the messenger of morn:
Ere yet the shadows fly, he, mounted, sings
Amid the dawning clouds, and from their haunts
Calls up the tuneful nations."

for their cheering songs, their valuable example of applied industry, their gratification to the eye in the sight of beautiful colors and graceful motions and for the faithful work they perform, from the time the ground is broken in the spring, or the warmth of the season gives life and motion to the insect world, to the time when the fruits become ripe enough to tempt their appetite, continued through the seasons in early morning and the later evening—then to charge against them the fruits they eat, from the delicate strawberry to the wine-flavored grape, and footing up the accounts find on which side the balance is. My hope, desire, and present belief is, that a very fair balance will be found in favor of the birds.

The great Creator of all things has had an eye to beauty as well as to use; else, why has he colored the head of the Woodpecker red, or shotted the Brown Thrush with the gray and the yellow? The fully developed horticulturist has an æsthetic nature to be provided for as well as a practical one, and when we weigh the birds in the balance, and give them credit for their beauty and their songs, and their faithful work, perhaps we will come to think that they have earned a right to a taste of the first strawberries and the ripened grapes.

DISCUSSION ON BIRDS.

Mr. Huggins—I cannot sit still here and not say a word in favor of the birds—I always feel like speaking a good word for them, when ever the subject comes up. I know there is a dispute in regard to the benefit or injury that they do. We all have loved the birds' music—and we can but love those birds that are known not to be injurious—I wish to call attention to two birds, the Blue-bird and the Wren, which, I think, all hands will agree, are not injurious. I believe they are very beneficial, and especially beneficial in destroying the Codling moth. I cannot state facts as I would like to, I cannot speak positively and say that I know that the Blue-birds take the Codling moth, but I believe they do, as they are very active wherever this moth is found; especially when they are rearing their young there is no leaf that they do not carefully examine, on every side. They search diligently for the Codling moth, as I have reason to believe, and what the blue-bird overlooks, the little wren will be likely to find. I think I have evidence that the Codling moth does move in the daytime. Last fall, a year ago, I placed apples in my cellar, and in midwinter I saw the insect flying about the windows—this was evidence to me that under some circumstances at least, the moth did fly in the daytime. At any rate these birds find them and destroy them, and hence I encourage their presence in my orchard. I build nests for them, by hanging oyster cans upon the limbs of my apple trees, and they are all occupied.

MR. WILE—I did not want to say a word upon this subject, I do not know that there is any subject so little understood as this; it is a very mixed question. We know birds do not eat moths, I believe they will eat the larvæ—and about their flying in the daytime, I do not believe it.

Under the circumstances detailed they may have moved about a little, and if so, they were probably female moths trying to find a place to deposit their eggs.

In discussing this subject, I want to leave all poetry out and come down to prosy facts. The writer did not seem over zealous in his defense of those birds which depredate upon our fruits.

Reports from Messrs. Bryant and Carpenter, members of Standing Committee on Ornamental and Landscape Gardening were handed in—neither of the gentlemen being present—and were referred to the Secretary without being read.—[See index for these papers.]

DISCUSSION ON RASPBERRIES.

MR. GALUSHA—I move we spend fifteen minutes in discussion of the Raspberry—Carried.

DR. HOOTON—There are few if any varieties of Raspberries that I have not tried—I have run through the Raspberry fever in all its stages; I have tried the earliest and the latest; the black and red, and every other color. I tried the Miami or McCormick, and had two or three crops, but they finally became sickly, and all the care I could give them did not keep them in good health. I tried the Clark and Brinkle's Orange, and a number of other varieties, including the Golden Cap—none of them succeeded well. I tried Kirkland; which succeeded a little better.

THE PRESIDENT—Have you tried the Black Cap?

DR. HOOTON—I have. Even the Philadelphia did not succeed very well with me. If I got the berries, I could not always get them to market in good condition.

MR. FLAGG—I will say that one gentleman in Alton seems to have succeeded very well in shipping in pint boxes. It paid him very well.

MR. WEBSTER—I have found that for six years the Philadelphia Raspberry is the best red raspberry that I have tried, and has succeeded well every year but one. I have shipped to Chicago, and have realized a good price for them, and they have always arrived in good condition, but usually I find a market at home, for all I have.

MR. SCOFIELD—Did I understand Dr. Hooton to say, that the Philadelphia Raspberry does not do well here?

DR. HOOTON—So far as I have seen, it does not do well. I am inclined to believe that for us here, the Doolittle is likely to do the best.

MR. GALUSHA—Do you prune back the growing canes in summer?

DR. HOOTON—Yes, I do.

MR. GALUSHA—Then you may safely conclude that you have not a soil adapted to the culture of raspberries; for the Doolittle, McCormick (or Mammoth Cluster), and the Philadelphia are more generally profitable through the state than any small fruit, except Wilson's Strawberry. Of course they need cultivation, and judicious summer-pruning.

MR. SCOFIELD—I have had great success in growing raspberries—and I find none better than the Doolittle. They are as large as the Mammoth Cluster. Prof. McAfee in passing through my grounds, said to me, "You have the Mammoth Cluster?" I informed him that it was only the Doolittle. For four years I have had full crops; on one-half an acre I had from sixteen hundred to seventeen hundred quarts that were picked, and four hundred more that were wasted. I found some difficulty the first year in finding a market; the second year I found a ready market for all, and the third year I could not supply the demand; and this is the way it has been ever since.

So much for good fruit. The people will buy it, if it is a good article.

With us the Philadelphia is hardy, and a perfect success.

The Davison's Thornless is hardy, but after three or four pickings the berries are almost worthless. I do not advise planting this variety.

DISCUSSION ON CHERRIES.

MR. WILE—*Mr. President*:—I am aware that the hour at which we should adjourn has arrived, but as many of us may not be here in the morning, I would like to have a short discussion on cherries. With us, we have got through with the Early Richmond. There were not only bushels, but hundreds of bushels of these cherries that went to waste the past summer. There was no market for such fruit.

I think we should now turn our attention to *cherries*, and let the Early Richmond go. I can raise as many bushels of sweet cherries as I can of Early Richmond. If you can't take my word for it, come and see.

MR. PHENIX—What varieties have you?

MR. WIER—I have twelve varieties.

MR. PHENIX—On what stock?

MR. WIER—I prefer the Mahaleb—but have succeeded on the Mazard. The first great requisition is to branch your trees at the ground; head them low, so that the larger branches are shaded—cut back while young.

MR. FREEMAN—How many trees have you?

MR. WIER—Three hundred. There is another way you can grow them, and that is by budding them on the Early Richmond.

MR. DUNLAP—Yes, because you want some fruit.

MR. WIER—Yes, sir,—we want fruit, and this way we get it, by cutting away the Early Richmond.

We have trees that have been in bearing for twenty years; but mind you, the Morello stock was not all cut out.

Adjourned.

FOURTH DAY.

It being generally understood that the Society would adjourn at an early hour, to enable members to reach their homes before Sabbath, but few came together and but little business was transacted.

THE SECRETARY spoke of the importance of a reorganization of the Society so as to secure a continuation of state patronage without which its influence and usefulness would be seriously impaired. He recapitulated the steps already taken to secure reorganization, and urged members to use their influence with their representatives in the General Assembly to secure favorable attention to this matter, early in the session.

THE SECRETARY, on behalf of the Committee, read the following:

REPORT ON FINAL RESOLUTIONS.

Resolved—That the thanks of this Association are due, and are hereby tendered to the officers of the Illinois Central; Rockford, Rock Island and St. Louis; Chicago and Alton; and the Indianapolis and St. Louis railroads for courtesies extended to our members in granting commutation of fares on returning from this meeting; which we trust will result in mutual benefit.

Our Secretary is directed to transmit a copy of this resolution to the proper officers of the several companies named.

Resolved—That we fully appreciate the kind, efficient, and impartial manner in which our retiring President, James E. Starr, has discharged the duties incumbent upon him; for which we tender him our cordial thanks.

Resolved—That the citizens of Centralia, by their cordial reception and kind hos-

pitality have rendered our visit an occasion to which we will ever revert with pleasure. Tendering them our sincere thanks, we trust that they may realize a verification of the promise, "It is more blessed to give than to receive."

SAMUEL EDWARDS,
H. C. FREEMAN, } *Committee.*

THE PRESIDENT spoke of the importance of the meeting of the American Pomological Society in Boston next September, and of the advantages of that occasion for making a display of Illinois fruits. He said we are able to place more fine fruit upon the tables there than any other state in the Union, and hoped we would make such an exhibition as would do credit to the State.

Several members spoke of the necessity of individual effort in making up collections of fruit for this important exhibition.

MR. EARLE—I feel a good deal of interest in this exhibition. I had the only collection of fruit from this State last year at Richmond—I had there a larger collection of apples than was exhibited from any other state, and in some respects the most valuable. In the opinion of many, my collection should have received the premium. I did not think the awards were entirely on the merits of the varieties.

JUDGE BROWN—We must see that we have a large variety of red apples next time.—(Laughter.)

MR. EARLE—I think we can exhibit five or six hundred varieties, if we make an effort. I was perhaps unfortunate in taking to Richmond many kinds of apples that were not handsome, but for size and excellence were not, as a collection, surpassed.

MR. HUGGINS—I move that we now adjourn.

THE PRESIDENT—Before we part, I desire to return my sincere thanks to all the members of the Society, for their uniform courtesy to me, and to one another; and in parting from you, it is with the hope that we shall all meet again at Champaign next year.

The Society then adjourned.

ADDITIONAL
REPORTS AND PAPERS.

THE FOLLOWING PAPERS HAVE BEEN SENT TO THE SECRETARY FOR PUBLICATION.

REPORT OF FIRST HORTICULTURAL DISTRICT.

I have only received reports from two correspondents in this district, and having been confined closely at home during the whole summer, I am not able to report from personal observation.

Mr. H. C. Graves, of Sandwich, De Kalb County, writes that the fruit interests in that county have improved very perceptibly in the past two years; that the fruit crop in eighteen seventy-one was better than for many previous years, and the present year it has been good. The small fruits, excepting strawberries, were an average crop, notwithstanding the drouth was quite severe.

Grapes ripened rather unevenly in some localities, but were generally satisfactory.

Cherries abundant.

Pears not so plenty as last year; blight about the same.

Apples good size, and unusually fair, but the Canker-worm did some damage in the northern part of the county.

He further says:—"Timber planting is a good deal talked of; what we want most is a few practical examples; if one or two men in each township would make a beginning, many others would fall into line and planting would be general. A beautiful Larch grove of a few acres, even when the trees are small, six to eight feet, would wake up a whole township."

Mr. S. G. Minkler, Oswego, Kendall County, writes: "The past season like the previous one has been very dry. Early Rose potatoes ripened with scarcely any rain. The Cherry crop was abundant and fine. Strawberries not as abundant as usual, as two-thirds of the land planted has been plowed up, and the remainder suffered by drouth; but the crops brought prices that made them remunerative.

Pears—fruit fair,—trees blighted badly."

In the Fox River valley he reports heavy crops of apples for the past two seasons. Early apples exempt from Codling moth; winter apples a little affected by them. He thinks too many early apples have been planted—no market for half of them even at two shillings per bushel, and as cider-barrels could not be had, hundreds and thousands of bushels have rotted on the ground, or were fed to animals by turning them into the orchards. He closes by saying that winter apples were selling in Aurora, (December fourth) at four dollars per barrel.

The fruit crop—small fruits excepted—has been very light, the past season, along and near the western shore of lake Michigan, owing mainly to the very heavy crops produced both in eighteen seventy and eighteen seventy-one, and the extreme drouth of both these seasons exhausting the trees so that they were not able to mature fruit-buds for the past season's crop. The timely, (though not by any means copious) rains the past summer, have so invigorated our trees that they give promise of an abundant crop next season. ROBERT DOUGLASS,

Waukegan, Ill.

LANDSCAPE GARDENING FOR ILLINOIS.

BY J. P. BRYANT, MEMBER OF COMMITTEE ON ORNAMENTAL AND LANDSCAPE GARDENING.

Landscape gardening is an art about which so much has been written that it would seem almost unnecessary to try to say anything new, or for any but one of rare experience and ability to write at all on the subject. But when I see on every hand so many evidences of a lack of a true knowledge of the art, (perhaps I should say a lack of any knowledge at all, or even any interest in the subject) and this too among those who are known as "eminent horticulturists," and whose self-interest one would think would prompt them to foster and encourage all efforts in that direction; I feel that somehow the fine thoughts of our writers—clothed in beautiful language though they are,—have not been what was needed, have not hit the nail on the head, and that there is still room for myself as well as others, if we can only bring the subject before our hearers in a shape that will enable them to appreciate its beauties and advantages, and also the convenience and economy resulting from a practical application of its principles.

I am willing to confess that after reading Downing's work on Landscape Gardening, and also the writings of others on the same subject, it was not at all easy to reduce their ideas to practice. Though they were men of experience and wrote with ability and a true appreciation of the art, the thought has occured to me that many persons would, after reading their works, give up the subject in disgust and go back to first principles; which generally means no principle or plan at all.

In fact, though generally professing the contrary, the general tendency of such works has been to make people believe that to lay out a place and keep it up would be to incur an expense that but few would be able to afford; when in reality such work can be done in a manner that will not only enhance the beauty and value of a place, but also result in positive economy in the end.

Beauty has been defined as fitness of the object, or means used for its destined end; and on reflection I think all will admit that the definition is a good one. Thus in nature we see every leaf, flower, twig, tree, or plant, perfectly fitted for its office. Every piece of machinery, every building impresses us with its beauty, in proportion to its adaptation to the purpose for which it was made. Why then should we not

lay out our farms, our nurseries, and our town lots in such a manner as to make them as useful and convenient as possible, at the same time introducing such trees, flowers, and other accessories of Landscape Gardening as may be consistent with our ability to pay for, and the end desired, and not carry them on in the common mixed-up way.

If one has a country place, and is able to furnish the money, he can have his lakes, fountains, and rock-work, and what one worthy horticulturist, and geologist too, I believe, in his contempt for the art saw fit to designate as "turpentine walks," provided of course, that any or all of these modes of ornamenting are consistent with the natural character of the place and with the rest of the improvements. But to attempt anything of the kind without the ability to carry it out is worse than useless.

Within the limits of a short essay on the subject, of course I can not go into any detailed plan or instructions; but will try to give a few hints on the matter that perhaps may be of service.

First of all, begin with a plan and endeavor to have some system in the mode of operation. The site for the dwelling-house should be first selected by going carefully over the ground, and estimating the advantages and disadvantages of every location that may seem at all desirable. A central location with good drainage and well sheltered, if there are any trees on the place, would likely be most suitable. Then the outbuildings, pasture-ground, cultivated land, and the place most suitable for planting a forest, (and some of us, I believe, think forest planting is the main thing after all) should be thought about. Perhaps some of the land needs draining; in that case a system of drainage should be laid out that will when completed fully accomplish its purpose in draining the land at the least expense, and furnish a supply of water, if needed.

The best method of doing all planning is to have a map of the place made, (drawn to any convenient scale) showing all present and future improvements accurately located; for all work can usually be laid out to much better advantage on paper than on the ground itself. Besides, if one proceeds in this manner he is apt to give much more thought and careful study to the requirements of his plan than he otherwise would.

It may be thought that this is taking much unnecessary trouble, and wasting time to no purpose; but it is nevertheles true that no place can be laid out to the best advantage in any other way. It is not necessary to finish the map in the style that a professional would adopt, only let it indicate the location of whatever enters into the composition. Some may say, "I can not make a map. I can not draw." Very well. I by no means recommend any one to make his own plans when he can obtain the assistance of one experienced in such matters; but I think that if all could be persuaded to study the subject, and mature plans to the best of their ability, they would much more fully apreciate the services of those who make it their business to plan, and not be so careful about a few dollars where so much is at stake

It may be thought that all planning, to a person just beginning a place, perhaps poor and unable to pay for even the tenth part of the suggested improvements, would be looking too far ahead, and foolishly trying for something beyond his means.

Was any one ever known to achieve any great success in life without some settled purpose? Do not good business men study any new project carefully, in all its aspects, before investing their money in it? Why then should not we be as careful in laying out our places and improving them to the best advantage?

By starting out with some definite plan for the future, to improve and beautify our homes, we are much more likely to attain what we desire in the end than if we start with no plan at all. Very likely we may modify or almost entirely change our original plan; but if we do it, it will be for some good reason, based on a knowledge only to be derived from a careful study of the subject. Really there is more need of careful study when the amount to be invested is small, and such cases call for a much greater display of skill and talent, than when everything wanted is at command.

And here let me say, do not attempt too much, or anything that is out of character with the rest of the place, or can not be fully carried out. Any attempts to make artificial lakes where the result will be nothing but a puddle of stagnant water, or to build the little piles of stones that are so often dignified with the name of rock-work, are manifest absurdities; though rock-work and lakes, when really beautiful, are invaluable in adding to the attractions of a place.

Tree-planting should be attended to as soon as possible after completing our plans. We may make almost all our improvements in a short time, but we must wait for nature to furnish our trees after we have made a beginning. If we can find trees already grown, so much the better; (only taking care to make our other arrangements in reference to them) as large, well grown trees, even of inferior kinds, are much to be preferred to any we can supply their places with. How often do we see places where a few grand old trees or beautiful groves have added a charm that newly planted trees would not give in a lifetime.

Avoid crowding. Few seem to think that a tree a few feet high when planted may in a score of years grow to fifty feet. Our grounds may look bare for a while if we plant with reference to the future growth of the trees, but we had better endure it for a few years than at the end of that time find ourselves surrounded by a wilderness of starved, ill looking trees. Some advocate planting and thinning out as it becomes necessary. This plan may do in some cases, but very few have the nerve to cut a fine tree to keep it from interfering with others, and besides, the finest trees will often be those that are in the wrong place. A good plan, where the grounds are small and a considerable variety is desired, is to plant mostly of those kinds that never attain any great size, using also a good proportion of shrubs.

Nothing adds more to the beauty of a place, than a well kept lawn. Any of the common grasses that endure the wear and tear of ordinary pastures, will do for this purpose. All small irregularities of the surface should be first removed and then the blue-grass, white-clover, and red-top generally used will, with a little care, make a soft green carpet that will set off the surroundings, and call forth the admiration of all who see it.

Walks and drives should be as few as possible, both on account of their first cost, and the trouble of keeping them in order. Let them be laid out so as to *appear* to be the most direct or rather the *easiest* route to the end, if not really so. They should not wind here and there over the grounds in a useless manner, because "a curve is a line of beauty, therefore the more curves, the more beautiful the walks;" but gently curve to avoid a clump of trees or rise in ground, avoiding any sharp turns. A cow path winding through a pasture will often furnish a better model for a walk, than some that are laid out by skilled gardeners, not because the old cow has better taste, but because she has at least a strong vein of common sense, that prompts her to get to her journey's end by the easiest route.

As for the buildings, they should be made to conform as far as possible to the natural characteristics of the place, and all subsequent improvements should in a measure conform to them. Knowing, as I do, that it often requires more skill, ingenuity, and taste, to properly arrange a two thousand dollar dwelling-house, than a fifty thousand dollar public building, I would advise every one to consult a competent architect before building; feeling assured, that in the end it will be found a saving of money, time, and trouble; and above all, result in something satisfactory.

The work of the architect should not stop with the dwelling-house, but he should furnish designs for the out-buildings as well; for nothing looks worse than a good house surrounded by shabby, ill arranged buildings, that might just as well be respectable.

Fences ought to be open and low, so as not to obstruct the view: except where it is absolutely necessary to have them high and strong for protection. A fence made of common four-inch fencing can be made to look better, and will cost much less, than one of the great high picket barriers so common; especially when the latter are left unpainted, looking as though the owner had sunk all his money in building them. There are many patterns of picket fences that are neat and light, and look well if kept in good order. It should be remembered, however, that an expensive fence needs *care* to keep it looking as well as a plain, cheap one.

Here we have all that is necessary to make a place beautiful and homelike; trees, grass, and walks; (flowers I have not mentioned; feeling assured that the taste of all the fair sex for these choice gifts of nature, will secure them their proper place), together with well designed buildings; just what everyone *can* have, and what all *would* have, I think, if they could only be made to understand how much easier it is

to cultivate a taste for order and beauty, than, as often seems to be the case, a taste for confusion and ugliness.

And here let me say that the confused litter of brush, boards, and other rubbish so often seen lying around is not only an eyesore, but a positive waste of material that might much better be made useful. It may seem to be hard for one accustomed to the old order, or rather disorder of things, "to have a place for every thing and every thing in its place," still in a short time he will find himself amply repaid for his trouble.

I have not spoken in glowing language of the grand, the beautiful, and the picturesque, as seen in the highest forms of landscape gardening; leaving it to those that are better qualified; but have endeavored in plain words to give a few hints on the art of making our places pleasant and home-like. Those who wish to pursue the subject (and I hope they are many) will find many books that will afford them great assistance, though no one of them will perhaps cover the whole ground. "Scott's Suburban Home Grounds," is one of the best I know of. Downing's works are good, though not so well adapted to our wants as could be desired. These and some of the many works on farming, gardening, and Horticulture, will be found well worth studying, and to a thinking man will give new and enlarged ideas and quickened perceptions of beauty, that will be a source of pleasure and profit through life.

That there is a desire for something better, is shown by the ill-directed and spasmodic attempts to "fix up a little" so often seen; attempts that would, if properly directed and combined with persistent effort, make beautiful homes the rule, and not the exception; and check any repetition of the few noted places in our state, which, apparently in a large measure more the result of accident, than design, are worthy of praise as a beginning, though not to be commended as models for any one to follow. Want of knowledge and experience can not now reasonably be made an excuse for mistakes, by those who are willing to learn and ready to practice.

There is much encouragement in the fact that many are interesting themselves in the work of cultivating a love for the beautiful as well as the useful, and I hope, some day, to see as much appreciation of the former as of the latter; among horticulturists at least.

Many of them indeed claim it as one of their missions to encourage everything that may promote a love of nature, and whatever may tend to ennoble and refine our lives: but I am afraid that they sometimes lose sight of the means best adapted to show *the refining influence* of *Horticulture*.

The following essay is from one of the Correspondents of this Society and is sent in, instead of an annual report.

THE MECHANICAL STRUCTURE OF PLANTS.

BY J. COCHRANE, HAVANA, MASON COUNTY.

The wonderful mechanism of the human eye, the arrangement and construction of the ear, the number and diversified uses of the muscles, the mechanical organisms of plants, the various combinations of the elements, the immensity and harmony as well as the diversified arrangements of the Solar System would almost lead us to believe that variety alone, distinct from every other consideration was the motive in the mind of the Creator or with the agents of His will. The dissecting-room, the microscope, and the laboratory partially reveal to us the arcana of nature, but the science of astronomy, beyond all others, displays to us the splendor and magnificence of His operations. Through this the mind rises to sublimer views of the Deity, though we cannot familiarize ourselves with the minor details in this department of His works as we may in the one which I have chosen as my topic.

There are a few observations on the vegetable kingdom that it will be our aim to notice. One great object of nature in the structure of plants is the perfecting of the seed, and its preservation until it be perfected. This intention shows itself, in the first place, by the care which appears to be taken to protect and ripen, by every advantage which can be given them by situation *in* the plant, those parts which most immediately contribute to fructification, viz: the anthers, the stamina, the stigmata. These parts are usually lodged in the center; the recesses, or the labyrinths of the flower during their tender and immature state, are shut up in the stalk or are sheltered in the bud, but as soon as they have acquired firmness of texture sufficient to bear exposure, and are ready to perform the important office which is assigned them, they are disclosed to the light and air by the bursting of the stem or the expansion of the petals, after which they have, in many cases,—by the very form of the flower during its bloom, the light and warmth reflected on them from the concave side of the cup. What is called also the sleep of plants is the leaves or petals disposing themselves in such a manner as to shelter the stem, buds, or fruit. They turn up or they fall down according as this purpose renders either change of position necessary. In the growth of corn, whenever the plant begins to shoot, the two upper leaves join together and embrace the ear and protect it till the pulp has acquired a certain degree of consistency. In some water-plants the flowering and fecundation are carried on with the stem, which afterwards opens to let loose the impregnated seed. The pea tribe enclose the parts of fructification within a beautiful folding of the internal blossom, itself protected under a penthouse, formed by the external petals.

This structure is very artificial, and adds to the value of it, though it may diminish the curiosity, as it is very general. It has also this further advantage which is strictly mechanical, that all the blossoms turn their backs to the wind whenever it blows strong enough to endanger the delicate parts upon which the seed depends. It is an aptitude which results from the figure of the flower, and as before remarked, strictly

mechanical, as much so as the folding of the fans of a windmill, or the tin cap on the top of a chimney. In the poppy and many similar flowers, the head, while it is growing, hangs down, a rigid curvature in the upper part of the stem giving it that position, and in that position it is impenetrable by rain or moisture.

When the head has acquired its size and is ready to open, the stalk erects itself for the purpose of presenting the flower and instruments of fertilization to the genial influence of the sun's rays. This is a curious property provided for the constitution of the plant, for if the stem be only bent by the weight of the head, how comes it to straighten itself when it is the heaviest. These instances show the attention of Nature to this principal object, viz: the safety and maturation of the parts upon which the seed depends.

In trees, especially in those which are natives of the colder climates, this point is taken up earlier. Many trees produce the embryos of their leaves and flowers in one year and mature them the year following. There is a winter also to be got over. Now what we are to remark is how nature has prepared for the trials and severities of that season. These tender embryos are in the first place wrapped up with a compactness no art can imitate, in which state they compose what we call the bud. The bud itself is inclosed in scales, the remains of past leaves or the rudiments of future ones. In the coldest climates a third preservative is added by the bud having a coat of gum or resin which being congealed resists moisture and frosts.

On the approach of warm weather this gum is softened and ceases to be a hindrance to the expansion of leaves and flowers.

The seeds themselves are packed in capsules or in vessels composed of coats which, compared with the rest of the flowers, are strong and tough. From this vessel projects a tube, through which the fertilizing properties that issue from it, are admitted to the seed. Here occurs a mechanical variety, accommodated to the different circumstances under which the same purpose is to be accomplished. In flowers which are erect, the pistil is shorter than the stamina, and the pollen shed from the anthera into the cups of the flower is caught in its descent, on the head of the pistil called stigma.

In flowers that hang suspended, (the crown-imperial, etc.,) this arrangement is reversed, the pistil being usually the longest and its protruding summit receives the pollen as it drops towards the ground.

The seed vessels assume an incalculable variety of forms in different plants, all evidently conducing to the same end namely, the security of the seed. Of the gourd, melons, etc., the seed vessels assume an immense bulk; in stone fruits and nuts, the seed is incased in a strong shell, the shell itself incased in a pulp or husk; in numerous kinds of berries, in grapes, oranges etc., the seed is enclosed in a glutinous syrup contained within a skin or bladder; in apples, pears, etc., it is imbedded in the heart of a firm, fleshy substance, or, as in strawberries, pricked into the surface of a soft pulp. These and many more varieties exist in what we

call fruits. In grain, grasses, trees, shrubs, and flowers, the variety of seed vessels is incomparable. We have the seeds, as in the pea tribe, regularly disposed in parchment pods which though soft and membranous are impervious to water; at other times as in the bean, lined with a fine down; we have seeds packed in wool, as in the cotton plant, lodged between hard and compact scales, as in pine cones, protected by spines as in the thistle, placed under a penthouse as in the mushroom; in ferns, in slits on the back of the leaves, or, as in grains and grasses, covered by strong close tunicles attached to a stem according to an order appropriated to each plant.

In the above enumeration we first notice a unity of purpose under a variety of expedients. Nothing can be more single than the design, more diversified than the means. Follicles, shells, pulps, pods, husks, skins, scales armed with thorns are all mechanically employed for the same end. Secondly, we may observe that in all these cases the purpose is fulfilled within a just and limited degree. We can perceive that if the seeds of plants were more strongly guarded than they are, their greater security would interfere with other uses; many species of animals would perish if they could not obtain access to them. Here as in many cases a balance is to be maintained between opposite uses. The provision for the preservation of seeds appears to be directed chiefly against the inconstancy of the elements, and inclement seasons, the depredations of animals, and the injuries of accidental violence seem to be provided against by the abundance of the increase.

When nature has perfected her seeds, her next care is to disperse them. The seed cannot fulfill its ends while it remains in the capsule. After the seed ripens, the pericarpium opens to let them out, which is according to rule in each species of plant. Some are opened by the action of the frost, some by elastic explosion, throwing the seed to a distance. Those of most composite flowers are endowed with downy appendages, by which they float in the air, and are carried to great distances. We are compelled to omit to notice the store of nutriment laid up in the seed for the nutriment of the young plant. A striking analogy exists between seeds and eggs of animals; the same point is provided for in the same manner. The white, and that only is used in the formation of the chicken. The yolk, very little altered or diminished, is wrapped up in the abdomen of the young bird, to serve for its nourishment till it has learned to pick its own food. We give the most common as illustrations because of their being the most forcible.

Our second observation on the mechanical structure of plants is upon the general property of climbers. In these plants, from each joint, issue close to each other two shoots, one bearing the flower and fruit, and the other drawn out to a tapering spiral tendril that attaches to anything within its reach, considering that two purposes are to be provided for, the fruitage of the plant and the sustentation of the stalk. No means could be more mechanical than this arrangement presents to the eye. "We do not see," says a noted author, "so much as one tree, shrub,

or herb, that hath a stiff, strong, stem, that is able to mount up and stand alone without assistance, furnished with these tendrils." We make as ingle, simple comparison, the pea and bean, and remark that in the pea they do not make their appearance till the plant has grown to a height to need support.

The hollow stems of canes, straws, and grasses give the greatest possible amount of strength and elasticity for the amount of material used. Joints at stated distances in these tubes are another element of strength without increase of weight, the material being slightly different. With what uniformity and care has nature provided for these stalks of grasses, grains, and canes by covering each with an impenetrable coat of weather-proof varnish.

Grasses seem to be nature's especial care. With these she carpets her green earth and paints the landscape; with these she feeds the human family, the birds of the air, beasts of the field, and the grub beneath the surface. Cattle feed upon the leaves, birds upon the smaller seeds, many insects upon their roots, and none need be told that corn, wheat, rye, etc., etc., are strictly grasses.

Corn is a monœcious panicious grass, and though the great staple of the West, it seems to be overlooked in its botanical and mechanical construction by intelligent growers. Our bread-producing plants are grasses. Those families of plants known as grasses exhibit extraordinary means and powers of increase, hardiness, and an almost unconquerable disposition to spread; their faculties for recuperation coincide with the intention of nature concerning them. They thrive under a treatment by which other plants are destroyed. The more their leaves are consumed the more their roots increase. Many seemingly dry and dead leaves of grasses revive and renew their verdure in spring. In lofty mountains and cold latitudes where the summer heats are not sufficient to ripen their seeds, grasses abound which are able to propagate themselves without seed. The number of the mechanical adjustments are so numerous we must content ourselves as before remarked with a reference to the more common and marked instances. Parasitical plants furnish marked illustrations. The *Cuscuta Europea* is of this class. The seed opens and puts forth a little spiral body which does *not* seek the earth to take root, but climbs spirally from right to left upon other plants from which it draws its nourishment. The little spiral body proceeding from the seed is to be compared with the fibres the seeds send out in ordinary cases. They are straight, this is spiral. They shoot downwards, this shoots upwards. In the rule and in the exception we equally perceive the design.

A better known parasitical plant is the mistletoe. We have to remark in it a singular instance of "compensation." No art hath yet made those plants root in the earth. Here, then, might seem to be a mortal defect in their constitution. Let us examine how this defect is made up to them. The seeds are endued with an adhesive quality so tenacious that they adhere to the surface or bark of any tree, however smooth. Roots

springing from these seeds insinuate their fibres into the woody substance of the tree from which this parasite draws its life and maintenance. Another marked instance of rare mechanical action is in the Autumnal Crocus (*Cholcicum autumnale*). How I have sympathized with this poor plant. Its blossom rises out of the ground in the most forlorn condition possible, without a sheath, calyx, or cap to protect it, and that, too, not in spring, to be visited by the summer sun, but under all the disadvantages of a declining year. When we come to look more closely at its mechanical organism, we find that, instead of being neglected, nature has gone out of her way to provide for its security, and make up for all its defects. The seed vessel which, in other plants, is situated within the end of the flower, or just beneath it, in this plant is buried ten or twelve inches underground, in a bulbous root. The styles always reach the seed vessel, but in this by an elongation unknown in other plants. All these singularities contribute to one end. As this plant blossoms late in the year, and would not have time to ripen its seeds before the access of winter would destroy them, Providence has contrived its structure such that this important office may be performed at a depth in the earth out of reach of the effects of ordinary frosts. In the autumn nothing is done above the ground but the blooming and fertilization. The maturation of the impregnated seed, which in other plants proceeds within the capsule exposed with the rest of the flower to the open air, is here carried on during the winter within the earth below the reach of ordinary frost. Here a new difficulty must be overcome. The seeds, though perfected, are known not to vegetate at this depth in the earth. The seeds, therefore, though so safely lodged through the winter, would after all be lost to the purpose to which all seeds are intended. To overcome this difficulty, another admirable provision is made to raise them above the surface and sow them at a proper distance. In the spring the germ grows up upon a fruit-stalk accompanied with canes. The seeds now, in common with those of other plants, have the benefit of summer, and are sown upon the surface.

"How great and marvelous are His works," and how carefully are the minute details of all His creatures, animate and inanimate, provided for. Relation of parts one to another is and must be harmonious in mechanics, so in the animal economy, so in the vegetable world. None of the works of the Deity want these harmonious relations of parts and offices.

REPORT OF COMMITTEE ON ORNITHOLOGY.

Mr. Secretary:

I call on you as my witness, to prove that I have tried hard to evade the handing in of a report on this subject; that I came to you privately and told you that I had not written a report, and begged of you not to call for it; that when you did call for it, you found that I had slipped out of the house; and that I did not write it till you had written to me some weeks after the adjournment of our meeting insisting that I *must*

send in a report.* Now, I will tell you why I tried so hard to escape this duty. It is because I begin to believe that there is some truth in what our Alton friends have alleged, *i. e.*, "that Douglas has such a weakness for birds that he cannot see their faults." I consider myself a prejudiced witness, hence my unwillingness to testify.

I will admit this much however, that last summer many robins and cat-birds,—to save traveling expenses,—brought their young ones, bred in other localities, just as soon as they could fly, to my ravine, close by my fruit-garden and orchard, and then went to work (with an energy worthy of a better cause) stealing my fruit, and stuffing these young ones, "not to the manor born."

Now, why should these young robins and cat-birds be fed at my expense? How do I know whether it was their parents or some other robins and cat-birds that I saw gobbling up the cut-worms and grubs, when we were plowing and planting last spring, and early summer? I wish I could single out these interlopers, and wouldn't I blaze away at them? But these robins and cat-birds are honest compared with a thrush—not the brown thrasher—but a *solitary* olive-green-backed fellow, who will not stay long enough to be identified. Now this fellow comes stealing along all alone, and I have no doubt "with evil intent," for you cannot go near him till he flies, and darts out of sight. Not so with the robins and cat-birds; they come with their families and friends, as if they thought they had a right to their living, and then they chirp and chatter as if they came to enjoy each other's society as much as to enjoy the good living. Why! there is as much difference between them and this thrush, as there is between some of these well-meaning but misguided fellows, who take a glass for the sociability of the thing, and a still, quiet, old soaker who takes his sly swig behind the door, and then wipes his mouth, and comes out as meek(?) as a good Knight Templar.

How the cedar-birds did devour my cherries last summer! Now, I'll own up. I *did* stand and watch while the boy went for the gun, and what a shot it would have been, for I think there were twenty or thirty in the flock, but before the boy came back, three or four of them darted off after stray moths, and gobbled them up, before my eyes. Why! who would have thought that one of these clumsy birds, with a little less than a pint of cherries in his maw, could dart so quick, and snap, and catch every time? I got to watching them so intently that I "held my fire", and—would you believe it?—these gourmands all set to work devouring the slugs from off the adjoining pear-tree leaves, till I went away, and then they went back to the cherry-trees, and gobbled away as hard as ever.

I noticed an uncommon occurrence in the way of cedar-birds last winter. For many years previous, they have gone south in the fall, and then after winter fairly set in, the Wax-wings (Bohemian Chatterers) would come from the north and take their places, living on juniper, red-

The Secretary "owns the corn," and the *Society* owns the report.

cedar, and mountain-ash berries, frozen Siberian crabs, and almost everything that has any pulp; in fact, feeding exactly like the cedar-birds, and resembling them in every way except that they are about one-third larger, and are a little more handsomely marked. Well, last winter, the cedar-birds did not leave at all, but remained here during the whole winter, and stranger still, the Wax-wings did not come along at all, and to show that this was not local but general, I may mention that we wanted a few Wax-wings to send to a friend in Cincinnati, so we sent to friend Stickney at Wauwatosa, Wisconsin, asking him to shoot a few for us; he sent us quite a number, and behold, they were cedar-birds.

I willingly admit that "there are two sides to this bird question," and that men who raise cherries have rights that the cherry-birds should be "bound to respect." We cherry-growers are sorely troubled with these birds, but my troubles are trifling when compared with those of some of my neighbors who grow sweet cherries. No sooner has the word gone forth, "The cherry-birds have come," than there is such a hubbub! Dinner bells are rung, looking-glasses hung up in the trees, wardrobes are ransacked, and garments inexpressible and unmentionable are brought forth, and "hung like banners from the outer" limbs, and, "the cry is, still they come!" (Shakespeare).

Sitting, drowsing in my rustic chair, under my favorite elm, watching these birds, my mind runs dreamily on Shakespeare, and I fancy I can see a similarity between Hamlet and that old cherry-bird, sitting on the upper limb, and watching my neighbor's sweet cherries. He shows the same indecisive and vacillating traits of character; he raises his wings, intent on flying over, and then settles back again; he flies a few feet, describes a semi-circle, and falls back on his old position, and all this time he keeps up a continual chattering to himself, and I imagine him soliloquizing thus: "To be, or not to be? That is the question. Whether it is better to remain here and eat the sour Richmonds, and endure the stomach aches, and the gripings, and the thousand ills that a disordered stomach is heir to, or to take wings, and fly to that sweet-cherry tree; and, while eating, die there? Who would eat the slugs, the worms, the codling moths, but for the hope of something after this, worth eating? Who would dodge the sticks and stones that are thrown, and the slings and arrows of outrageous urchins, when he himself might his quietus take from yonder shot-gun?" The report of my neighbor's shot-gun awoke me from my reverie, and brought me back to the position from which I started, namely, that "there are two sides to this bird question."

ROBERT DOUGLAS.

Waukegan, Ill.

HORTICULTURE IN THE INDUSTRIAL UNIVERSITY.

O. B. GALUSHA,

Secretary State Society,—DEAR SIR:

The reports from the horticultural department of the University, which you have selected for publicaton, will give some idea of the work

accomplished for the year eighteen seventy-two, and I now refer to them as part of the history herein written. All considered, the year was a very favorable one. The nursery stock made a good growth, and the newly transplanted trees nearly all lived; the timber plantations succeeded well and gave promise of some very interesting results to come. Fruit was abundant and of fine quality, though the small fruit plantations, were yet too young to produce much. About the only draw-back was in the death or injury of many evergreens, especially those recently transplanted. This is attributed to the extremes of drouth and frost during the winter of eighteen seventy-one and seventy-two, seemingly producing the same effect over large areas of the country. The Arbor-vitæs were badly damaged, but usually covered themselves with new shoots and leaves during the summer. Some large Norways, transplanted the year before, making a good growth and looking fresh all winter, died outright in the spring. Others, two years transplanted, died.

Apple Orchard—The experimental apple orchard, now supposed to have about twelve hundred varieties, planted in the spring of eighteen sixty-eight, has continued to make a healthy advance, and eighty-nine of these supposed varieties bore fruit; but not so many came to maturity, so that they could be indentified. Some trees bearing different names bore the same fruit, doubtless showing that either the names, or the fruit was incorrectly placed. We may look for more trees to bear the coming year. A seedling crab has fruited three years, and is probably worth a name, and cultivation. The cions from the Agricultural Department at Washington, of Russian apples, all failed.

Pears—The four hundred varieties of pear cions received from Mr. Chas. Downing two years ago, were root-grafted and carefully planted, and many grew and did well. This season the same generous hand has supplied the kinds that died, so that a large collection, it is hoped, will be ready next year for planting in the orchard. Other orchard fruits are accumulating, though the work is necessarily slow.

Forest Plantation—The Larch and Chestnut were damaged considerably by the white grub, which worked upon the roots, and many of the former died from other causes. Those living made a fair growth. The Scotch Pines transplanted in eighteen seventy-one and eighteen seventy-two mostly died, as was the case of many Austrians. Special attention is asked to the Osage Orange. It seems to be eminently valuable for timber growth. It is cheap, easily transplanted, rapid in growth, hardy enough here, and is at the head of the list for the value of its wood.

Vegetable Gardens—A cheap structure was erected in the early spring for a propagating pit, and proved very serviceable, being much more convenient and with us really more economical, than the long row of hot-beds heretofore used. The size is twenty-two by forty feet, with two span roofs side by side. The walls are oak posts and boards, sunk to the eaves in the ground. The heat is supplied from rough wood burned in a common large sized box stove, standing in the center of the building, the smokepipe running near the ground to a flue at one end, and

wooden troughs well painted, for the circulation of hot water from a tin boiler on the stove, running to the end opposite the flue. Two beds in each division of the house, with walks between, gave six hundred and forty square feet of effective surface for plant growth, and the heating arrangements though so simple gave the very best results. The entire cost was about two hundred and fifty dollars. The garden plants, except celery, succeeded as well as the best, but the market for such as were for sale was poor. Reference is again made to the reports on Early Cabbage and Tomatoes.

Arboretum—The Arboretum was begun, about thirty-five species of forest trees having been planted, and the land further prepared for more planting the coming season.

Green-House—The University Green-house is now full of plants of very many kinds noted for their beauty and use. The ornamental grounds received a large number of these plants for summer keeping, and together with a rich display of annuals and other bedding plants, gave a scene of beauty such as is seldom seen in public or private grounds. The whole labor for the year on these grounds and in the green-house, was done by the students under the supervision of the professor of Horticulture. Some interesting experiments have been tried with warm water and cold water, with ammonia and with potash on pot plants, but are to be repeated before giving results. The students of the Horticulture class each root-grafted, and afterward planted with their own hands a thousand or more apple cions, as practice in that special line of work.

Horticulture at the University is beginning to attract more attention, as the plantations acquire age, and as the development of previously prepared plans shows the heretofore but partially observed work in progress.

T. J. BURRILL.

UNIVERSITY FOREST RECORD.

MR. VICKROY, orchardist for the Industrial University, has sent the Secretary an accurate, tabulated record of the forest plantations connected with the institution which, though valuable, is too elaborate and extensive for publication here.

The plantations made in eighteen seventy-one and eighteen seventy-two consist of forty thousand eight hundred thirty-two trees (quite small) planted on eight and a half acres.

One and a quarter acres, only, were planted in eighteen seventy-two.

Of White Maples and White Elm there is one eighth acre each.

Of Green Ash, Catalpa, Chestnut, Osage Orange, Austrian and Scotch Pines, and Norway Spruce, each one quarter acre.

Of White Pine, one acre.

Of European Larch, two acres.

Of White Ash, two and three-fourths acres.

The entire cost of the trees—including six thousand additional used in the spring of eighteen seventy-two for replanting—was	$660.91
Expenses of planting,	141.02
" " cultivating two years,	152.58
Total cost,	954.51

Sixty-four per cent. of the trees were living at the end of eighteen seventy-two, (the proportion being much reduced by the ravages of the white grub.)

The entire cost of plants and cultivation is thus found to be a fraction less than three cents and two mills each, for those living.

These facts are important as showing that, exclusive of use of land, the expense attending the starting of forests on the prairies is not so great as to deter any enterprising farmer from making at least a small plantation. The deciduous trees were—when planted—mostly two or three years old; and the evergreens were about one foot high.

The following account of the plantations, accompanying the tables, contains valuable hints and information for persons designing to commence forest plantations.

"All the ground for the forest plantations was well prepared by plowing and harrowing. We were very careful in the planting of the Austrian and Scotch Pines, as we lost most of them last year, with good planting and care, so gave them extra care this year, putting the fine earth around the roots with our hands, and doing everything we could to insure their growth; but still there has a large per cent. of them died. One cause, I think, for so many of them dying has been the severity of the past two years on evergreens. It is easy to account for the failure of the European Larch to grow, for the cause was very plainly to be seen. The white grub (the larva of the May beetle) has worked on them last year and this, girdling the roots entirely around, and in most cases, from the collar, and below the collar three to five inches down.

In our White Ash, two to four feet high, they girdled a strip across the piece for a width of about four rods, so that nearly every tree died.

The White Pine and Norway Spruce were taken up in the spring, and heeled in as fast as taken up, until they were wanted for planting. The roots were puddled before planting. They were both planted the same day; and you will see by the Record that very few of the spruce have died, while the greater part of the pines have. One thing in favor of the spruce is their masses of fibrous roots, while the pines have very few. These were planted before the spring rains.

The Chestnuts are nearly all dead. They also were injured last year by the white grub—taking nearly all of them, and the balance were

injured by the winter. We have a few standing in nursery rows protected by other trees, which have stood the winter. I think it would be a good plan to plant some hardy trees with them for protecteon. Plant the silver maples, for instance, alternately with the chestnuts, and when they get some size, cut out the maples. Ceasing cultivation early in the season, would also prevent their being so liable to winter-kill. When a plantation is once established it is good for all time; when cut down they will grow up from the stumps and be ready to cut again in fifteen or twenty years. Why would it not be a good idea, as our markets are becoming glutted with other fruits, to plant them for the nuts? The nuts are now worth from six to eight dollars in market, per bushel.

The Osage and Catalpa bid fair, with us, to be classed with our best timber trees; as far as growth is concerned they are satisfactory, but like some of the other fast growing trees, are liable to have their tops winter-killed. Stopping cultivation early in the season I think would prevent this objection. One thing in their favor is their cheapness and easy propagation; they are very easily transplanted while young and very few die. We planted them last year (eighteen seventy-one,) and last spring cut them off at the ground, to get a good straight growth, and have succeeded well. The wood of both is valuable. It is said the Osage never rots; therefore it must be very valuable for posts and grape stakes.

Another tree that is very easily grown is the Silver Maple, a very fast grower, and when kept growing rapidly, is troubled very little, if any by the borer. Mr. Bryant, in his "Forest Trees" says: "I know of no forest tree, except, perhaps the box-elder, that will make so speedy a return of equally valuable wood for fuel, as the silver maple. It is prefered to oak for kitchen fuel, particularly for summer use." The cheapness, easy propagation, and rapid growth ought to recommend it for this purpose, as kitchen fuel is always in demand.

The White Ash is making very satisfactory growth with us. I think it would be a very good plan to plant some cheap tree, something that would make good fuel, stakes, etc., with our more costly ones, as nurses; as they eventually have to be thinned out. The first cost of some trees deters a great many from planting them. The European Larch and a good many of our evergreens are inclined to spread out at the bottom, and if some of those cheaper trees were planted between them it would give them a more upright growth. Care would have to be taken that the nurses did not outgrow the others.

We have European Larches planted on high and low land and they seem to be doing better on the high land.

Respectfully,

H. K. Vickroy.

LISTS OF FRUITS.

In addition to the lists of fruits reported by the Vice-Presidents in the several districts, the following have been received from gentlemen of well known reliability and experience in fruit culture.

LIST OF APPLES FOR TAZEWELL COUNTY.

Mr. O. B. Galusha, Secretary.

DEAR SIR:—In making out a list of apples for Tazewell county, I will try and be brief, but accurate, believing that a few tried varieties, having proved themselves to possess the requisites for market: namely, hardiness, early and prolific bearing, size, coloring, and beauty of fruit, to be preferable to a larger list of kinds having these requisites in a less degree.

SUMMER.

Early Harvest—good, but shy bearer on rich soils; on poor soils, bears better.

Red Astrachan—showy and profitable for market.

Carolina Red June—a great bearer, but the fruit sometimes cracks and scabs.

FALL.

Maiden's Blush—very fine.

Rambo, Lowell, Mother, and *Fall Pippin*—all good.

Porter—good, but shows bruises badly.

Snow and *Fall Wine* are good, but scab badly, some years.

WINTER.

Willow-Twig, Ben Davis, Wine-sap, and *Smith's Cider*, are all very profitable.

Jonathan—profitable, but drops early.

Roman Stem—good in quality and bearing.

Winkler—doing well.

Rawles' Janet—tree and fruit rather tender—bears too full—fruit small.

Some others might be added for family use, but such additions would reduce the profits of a commercial orchard.

JAS. W. ROBISON.

FRUITS FOR NORTHERN ILLINOIS.

O. B. Galusha, Secretary State Horticultural Society,

DEAR SIR:—In compliance with your request, I send the following list of fruits which have proved the most hardy and reliable, in Will County.

Soil—black loam, prairie, with clay sub-soil. Along the Kankakee river, and the Desplaines, Hickory, Forked, and Rock creeks, the soil is sandy loam, underlaid with gravel or stone.

SUMMER APPLES.

Early Pennock—large, good; bears itself to death in ten or twelve years.

Early Harvest—good crop every other year.

Sops-of-wine—profitable.

Red Astrachan—root-grafted, requires age to bear. Top-grafted, on old trees, bears young and profusely.

Carolina Red, June—requires thinning to get size; profitable.

Duchess of Oldenburg—good, everywhere.

Golden-Sweet—great bearer.

Benoni—fine; does not bear very young.

FALL APPLES.

Maiden's Blush—tender while young, hardy in orchard, good.

Fameuse, or Snow—hardy and good.

Fall Wine-sap—profitable for cooking and drying.

Fall Orange—hardy; large, and great bearer.

Keswick Codling—early bearer, profitable.

WINTER APPLES.

Jonathan—fine; must be gathered early.

Rawles' Janet—needs thinning to get size.

Wagner—early bearer, good.

Willow—best late keeper.

Ben Davis—hardy, good bearer; fruit sells well.

Roman Stem—fine; profitable.

Domine—hardy and good.

Northern Spy—requires age to bear; top-grafted on old trees commences the third year, and bears profusely; must be picked early, and carefully handled; one of the best.

Minkler—good bearer.

Stannard—early bearer; profitable; early winter.

Early Golden Russet—great bearer; when picked must be buried in ground or barreled up tight, and placed in dark, cool cellar till spring.

Gilpin or *Red Romanite*—great bearer; fruit small; keeps late, and is the best cider apple.

Wine-sap—fruit fine on young trees; small and scabby on old trees.

Milam—fruit small; tree an early and great bearer; profitable.

Yellow Bellflower—good on clay soils, worthless on black prairie. I have seen it bearing good crops on sandy loam, with gravelly subsoil.

SIBERIAN APPLES.

Transcendent, Large Red, Yellow, and *Montreal Beauty*—all good.

I could name a great many varieties which do well in certain localities. From observation and experience during a residence of twenty-six years in this county, I believe the above list of apples will be found the most profitable and reliable for general planting.

PEARS.

Flemish Beauty—hardy tree and great bearer.

Bartlett, Belle Lucrative, Seckel, Louise Bonne, Howell, Beurre D'Anjou, Duchess, Dearborn Seedling, Buffam, and *Glout Morceau*.

CHERRIES.

Early May (or Richmond), *Late Richmond*.

PLUMS.

All sorts do well and would bear if the Little Turk would let them alone.

The *Wild Goose* and *Miner*—said to be nearly "Curculio-proof"—have not been sufficiently tested here.

CURRANTS.

Red and *White Dutch*, *White Grape*, and *Cherry*: *Victoria* and *Long-bunch Holland* for late varieties.

RASPBERRIES.

Doolittle, *Miami*, and *Davison's Thornless*. *Turner* is a new variety, cane nearly thornless, a great bearer. The fruit is red, better than *Philadelphia*, and firm enough to ship.

BLACKBERRIES.

Kittatinny has proved hardy with me for the past six years; is a good bearer of fine fruit.

STRAWBERRIES.

Wilson is worth all the rest.

GRAPES.

Concord for general planting, *H. Prolific* and *Delaware*; *Clinton* for cooking.

GOOSEBERRIES.

Houghton and *American Seedling*, or *Cluster*.

W. T. NELSON.

FRUITS FOR SOUTHERN ILLINOIS.

Alton, February 5, 1873.

O. B. GALUSHA, *Secretary Illinois Horticultural Society*:

Dear Sir:—I feel somewhat delicate about making out a list of fruits as a guide to planters. Some kinds of fruit do better on a dry ridge, and others on a moderately level, rich soil. Of the last Rawles Janet and Northern Spy are specimens among apples. The Wilson Blackberry becomes more perfect on a dry ridge—Kittatinny, on level, rich land—Red Antwerp raspberry produces large crops on poor clayey ridges, and the fruit is of the best quality. Every planter, if possible, should inform himself in regard to the varieties of fruit best adapted to his location. Below I give varieties with which I have had a good deal of experience for many years. My location is upon the sedgy timber land back from the Mississippi river about one and a quarter miles; soil thin, with clay sub-soil.

SUMMER APPLES.

Early Harvest,
Red Astrachan,
Sops-of-Wine,
Benoni,
Summer Pippin,
Golden Sweet.

FALL APPLES.

Keswick Codling,
Maiden's Blush,
Pennsylvania Red Streak,
Rambo,
Fall Pippin,
Gravenstein,
Jersey Sweet.

WINTER APPLES.

Rome Beauty,
Jonathan,
Buckingham,
Willow Twig—for market.
Pryor's Red (quality best for cider—equal to the Gilpin.)
White Winter Pearmain,
Canada,
Smith's Cider.
Ben Davis,
Newtown Pippin,
Lady Apple,
Gilpin,
Ladies' Sweet.

PEARS.

Madeline,
Bloodgood,
Dearborn's Seedling,
Bartlett,
Seckel,
Buerre D'Anjou,
Howell,
Sheldon,
Winter Nelis,
Lawrence.

PEACHES.

Hale's Early,
Tillotson,
Bergen's Yellow,
Early Royal George,
Crawford's Early,
Oldmixon Free,
Crawford's Late,
Stump-the-World,
Smock,
Heath Cling.

BLACKBERRIES.

Kittatinny,
Wilson.

RASPBERRIES.

Miami,
Philadelphia.
Red Antwerp (for home use and town market; best flavored.)

CURRANTS.

Red Dutch,
Cherry,
White Grape.

GRAPES.

Concord,
Ives,
Delaware.

STRAWBERRIES.

Wilson,
Green Prolific,
Jucunda,
Col. Wilder.

Many more varieties of fruit, of excellent quality, might be added to this list without adding quality or profit. An amendment might be made in substituting other varieties, or more kinds of sweet apples; and I could suggest raising more of them as good for cows, horses, and hogs.

Yours truly,

BENJ. F. LONG.

TRANSACTIONS

OF THE

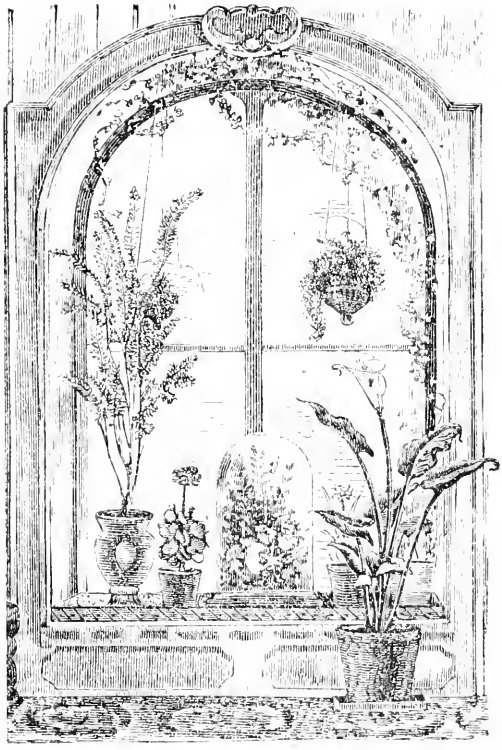
NORTHERN ILLINOIS

HORTICULTURAL

SOCIETY,

At its Freeport Meeting,

JANUARY 21, 22, 23, AND 24, 1873.



WINDOW GARDEN.

FROM BRIGGS BRO'S SEED CATALOGUE, ROCHESTER, N. Y.

Membership List Nor. Ill. Horticultural Soc.

NAME	P. O.	COUNTY.
Robert Little	Freeport,	Stephenson.
Lewis Ellsworth	Naperville,	Du Page.
M. B. Spafford	Dixon,	Lee.
Abijah Powers	do	do
M. S. Ellsworth	Naperville.	Du Page.
H. H. Cody	do	do
N. R. Thatcher	do	do
Ernst Vanoven	do	do
O. L. Stough	Hinsdale,	do
L. K. Scofield	Freeport,	Stephenson.
H. Hoolsden	do	do
Wm. M. Morris	Marengo,	M. Henry.
M. L. Dunlap	Champaign,	Champaign
O. B. Galusha	Morris,	Grundy.
Geo. Thompson	Freeport,	Stephenson.
Eyler McWhorter	Medo,	Mercer.
Gen. S. D. Atkins	Freeport,	Stephenson.
R. R. Hawley	Normal,	McLean.
Arthur Bryant	Princeton,	Bureau.
Sam'l Edwards	La Moille,	do
S. M. Slade	Elgin,	Kane.
D. W. Scott	Galena,	Jo Daviess.
Oscar Taylor	Freeport,	Stephenson.
H. W. Allen	Warren,	Jo Daviess.
Arthur Bryant, Jr	Princeton,	Bureau.
Hon. Wm. Smith	Geneva, N. Y	
E. W. Mann	Freeport,	Stephenson.
Charles Lee	Maquoketa, Io.	
H. H. McAfee	Freeport,	Stephenson.
F. Montague	Lena,	do
E. L. Munn	Freeport,	do
W. R. Fairbairn	Ridott,	do
John Pope	Freeport,	do
Jas. S. McCall	do	po
Orrin Crocker	do	do
John Swinney	Ridott,	do
T. Hathaway	Damascus,	do
Hon. J. H. Adams	Cedarville,	do
V. A. Babcock	Freeport,	do
Thos. Hunt	Ridott,	do
Jacob Gabb	Kent,	do
Ira Babcock	Freeport,	do
J. V. Cotta	Lanark,	Carroll,
Daniel Teeter	Mt. Carroll,	do
E. J. Nelson	Ridott,	Stephenson.
James Flansburg	Elroy,	do
D. W. Dame	Lanark,	Carroll,
Dr. Duncan Mackee	Mt. Carroll,	do
H. N. Bliss	Bada,	Bureau,
W. F. Lukens	Rock Falls,	Whiteside.
Floyd Shaw	Fremont,	Tazewell.
F. P. Snow	Elgin,	Kane.
T. D. Robertson	Rockford,	Winnebago.
W. A. Pratt	Elgin,	Kane.
W. B. Tanner	Freeport,	Stephenson
Wm. Young	do	do
C. W. Prescott	Marengo,	McHenry.
W. V. Treat	do	do
Wm. Patton	Sandwich,	DeKalb.
R. M. Pritchard	Watermon,	do
W. L. F. Jones	Albury,	Kendall.
Irael Rogers	Sandwich,	DeKalb.
J. R. Shelly	Shannon,	Carroll.
C. H. Rosenstell	Freeport,	Stephenson.
G. S. Caldwell	Orangeville,	do
Geo. Klinemidt	Sandwich,	DeKalb.
L. D. Rogers	do	do
Wm. Henning	Plano,	Kendall.
James Henning	do	do
Dexter Severy	Leland,	DeKalb.
S. Bailey	Shabbona,	do
Jonathan Mayberry	Belvidere,	Boone.

NAME.	P. O.	COUNTY.
C. N. Bentley	Freeport,	Stephenson
D. C. Scofield	Elgin,	Kane.
I. F. Dawson	Freeport,	Stephenson.
A. T. Coleman	Corning, Iowa.	
S. W. Lamson	State Center, Io.	
F. Ordway	Freeport,	Stephenson.
D. J. Piper	Foreston,	Ogle.
F. Askey	Ridott,	Stephenson.
Willard Weeks	Mt. Carroll,	Carroll.
H. D. Emory	Chicago,	Cook.
John Cewe,	Hompton,	Rock Island.
F. H. Beebe	Geneva,	Kane.
I. W. Gunteau,	Freeport	Stephenson.
Rev. M. B. Patterson	do	do
Rev. C. S. Harrison	Earlville,	LaSalle
Wm. Hill	Dundee,	Kane.
W. H. Schuyler	Chicago,	Cook.
M. M. Meyer	Freeport.	Stephenson.
W. O. Thompson	Blairstown, Io.	
I. L. Smith	Dixon,	Lee.
Las. Pennington	Sterling	Whiteside.
C. W. Richmond	Naperville,	Du Page.
G. Wright	Rock Falls,	Whiteside.
V. B. Austin	Downers Grove,	Du Page.
Rev. F. Gilkerson	Marengo,	McHenry.
Theo. P. Lukens	Rock Falls,	Whiteside.
S. G. Minkler	Oswego,	Kendall.
L. C. Francis	Springfield,	Sangamon.
V. R. Whitney	Franklin Grove	Lee.
Dr. D. H. Spigler	do	do
V. Brown	Dixon,	do
J. Williams	Dunlap, Iowa	
C. L. Horsman	Rockford,	Winnebago.
A. H. Vail	Marengo,	McHenry.
C. H. Keim	Mt. Carroll,	Carroll.
Rob't Douglas	Waukegan,	Lake.
Abraham Hostetter	Mt. Carroll,	Carroll.
Jonathan Periam	Chicago,	Cook.
C. S. Hill	Freeport,	Stephenson.
Hiram Snyder	Lena,	do
I. M. C. Runner	Plattville,	Kendall.
H. C. Graves	Sandwich,	DeKalb.
D. C. Winslow	Hinkley,	Hinkley.
J. H. Stover	Freeport,	Stephenson.
John Coates	do	do
A. N. Carpenter,	Galesburg,	Knox.
W. O. Millard	Sterling,	Whiteside.
F. M. Sheller	Freeport,	Stephenson.
I. P. Bryant	Princeton,	Bureau.
B. M. Lewis	Lombard,	Du Page.
Otis Coleman	Belvidere,	Boone.
Dr. Geo. Potts	Freeport,	Stephenson.
V. L. Cummings	Galena,	Jo Daviess.
Jeriah Benham	Chicago,	Cook.
S. J. Davis	Davis,	Stephenson.
S. C. Harriss	Galena,	Jo Daviess
C. C. Walmsley	Polo,	Ogle.
Seth Mann	Freeport,	Stephenson.
W. H. Hausen	Franklin Grove,	Lee.
J. S. Rogers	Marengo,	McHenry
H. Gronner	Galena,	Jo Daviess.
Robert Brand	do	do
Wm. V. Nourse	Moline,	Rock Island
Geo. Purinton	Freeport,	Stephenson.
G. F. Smith	do	do
I. Hawes	do	do
I. M. Bechtel	do	do
Alois Schwartz	Naperville,	Du Page
D. E. Peck,	Marengo,	McHenry.
D. F. Kinney	Rock Island,	Rock Island
Chas. H. Atkins	Chicago,	Cook.

Honorary Members.

NAME.	P. O.	COUNTY.
Mrs. Amada Little	Freeport,	Stephenson.
A. G. Tuttle	Baraboo, Wis.	
Mrs. P. W. Hathaway	Damascus,	Stephenson.
Geo. P. Peffer	Pewaukee, Wis.	
J. C. Plumb	Milton, Wis.	
Mrs. H. H. McAfee	Freeport,	Stephenson.
Mrs. L. K. Scofield	do	do
Mrs. D. C. Scofield	Elgin,	Kane.
Miss Amanda Fifield	Marengo,	McHenry.
Mrs. Mary E. Page	do	do
Mrs. Jane Shaw	Fremont,	Tazewell.
Mrs Oscar Taylor	Freeport,	Stephenson.
W. O. Thompson	Blairstown, Io.	
Dr. C. L. Usher	Maquoketa, Io	
E. M. Speer	Seward, Neb.	
Wm. Le Baron	Geneva,	Kane.
Nathan H. Shaw	West Point, Neb.	
Mrs. E. M. Speer	Seward, Neb.	
Mrs. S. C Harriss	Galena,	Jo Daviess.
Mrs. R. H. Scofield	Freeport,	Stephenson.
Miss Mary A. Brand	Galena,	Jo Daviess.
J. L. Budd	Shellsburg, Io.	
D. W. Adams	Waukon, Iowa.	
B. Hathaway	L'e Prairie Ronde,	Mich.
W. H. Ragan	Clayton, Ind	
A. Steward	Richfield, Minn.	
Dr. H. Shimer	Mt. Carroll,	Carroll.
Jno. W. Robson	Abilene, Kan	
Jno. A. Warder	Cincinnati, O.	
L. S. Stuckney	Wauwatosa, Wis.	
Mrs. C. J Richards'n	Princeton,	Bureau.
Mrs. F. W. Waller	do	do
Hon. Suel Foster,	Muscatine, Io	
Miss Mary F Nourse	Moline,	Rock Island.

PROCEEDINGS OF THE

Northern Illinois Horticultural Society.

SIXTH ANNUAL MEETING

OF THIS SOCIETY WAS HELD IN THE

COURT HOUSE AT FREEPORT,

COMMENCING JANUARY 21st, 1873.

The meeting was called to order by President Hon. Lewis Ellsworth at ten o'clock A. M. On account of the great snow storm but a few members were present at the hour, and on motion adjourned till half-past one o'clock P. M.

AFTERNOON SESSION.

The Society called to order at half-past one o'clock. Prayer by the Reverend Mr. Patterson.

Vice President J. S. McCall introduced Gen S. D. Atkins, of Freeport, who addressed the Society as follows:

ADDRESS OF WELCOME.

BY GEN. S. D. ATKINS.

Mr President, Ladies and Gentlemen of the Northern Illinois Horticultural Society:

At the request of one of your number, here resident, and in behalf of our citizens, I beg the privilege, at the opening of your session, of addressing you a few words of welcome to this city and county. Very many of our citizens are deeply interested in those questions which you will be likely to discuss in connection with the science and art of Horticulture.

Science is knowledge, and knowledge comes of the attrition of mind with mind, and teaches us, logically, to understand the why and the wherefore of things; and art comes of experience, and teaches us to apply science; and he who has learned by experience how do any thing well, has acquired an art; and if he details his experience in meetings like this, he places others in the possession of that art which his experience has made peculiarly his own.

The successful horticulturist must possess a scientific, or, at least, a practical knowledge of the soil and atmosphere, and of those immutable natural laws which govern production; and he must possess also the art of skillfully applying that knowledge. The necessary scientific portion of his information he may acquire by silent research and diligent study in the seclusion of his library, and for the art, too, he may draw upon the inexhaustible storehouse of the world's experience in the ages gone by; but the art comes mostly out in the sunshine, in the garden and the orchard. One man, in a single season, may not acquire much information; but the aggregate information acquired by a number of gentlemen, engaged in a similar pursuit and scattered over a wide extent of country, must be something considerable. I know, gentlemen, that you are anxious to be devouring that information, and I am not going to detain you long.

I have had a little experience myself as a horticulturist, but it is a very little. I learned by experience, more than twenty years ago, that peaches could not be profitably cultivated on the prairies of Stephenson county; and by experience I learned that Chickasaw plums can be cultivated very easily indeed, and there is a nut, in my experience with the Chickasaw plum, that I would like to have some of you scientific gentlemen crack for me.

I settled, with my father's family, on the prairies south of this city many years ago, and across one corner of the farm ran a slough, leaving beyond it a few acres of high prairie. When the farm was fenced, the fences were built on the lines of the government subdivisions, and the high prairie broken up, with the exception of the little patch south of the slough. Then we plowed around the outside of the field, to keep the prairie fires from burning up the fences, and that kept the fires from sweeping over the little patch of unbroken prairie included within the inclosure. It soon came up with hazel, crab apple, and plum trees. I pulled up and transplanted several of the little plum trees when only about sixteen inches high, and they soon came into bearing, and proved an excellent variety of the now extensively cultivated Chickasaw plum. There was no timber, and no plum trees within miles of that spot; and what I wish of you scientific gentlemen is to tell me how those Chickasaw plums happened to come up away out on the prairie as soon as the prairie fires were kept down. I have often thought if the prairie fires had been kept down nature would soon have covered our prairies with a luxuriant timber growth.

I distinctly remember having seen in a geography, which I studied at a district school when a lad, a picture of a North Carolina prairie, with a Rosa Bonheur buffalo careering over it, and while traversing that State with Sherman's troops in 1865, I wondered what had become of the prairies. But, one afternoon, after the officer of my staff and myself had dined with General Means, in Cabarras county, we stepped out on his back porch to enjoy our cigars, when the general, looking out three or four miles over a beautiful valley, over the green

verdure of the timber growth that covered it everywhere, inquired if we had any scenery in Illinois to equal it? I answered him, dwelling on the beautiful views attainable in Northern Illinois, where the eye wanders over miles and miles of beautiful prairie, uninterrupted by timber growth, when an old gentleman, the father of General Means, I think, tottered up to the railing of the porch, with the aid of his crutches, and said: "General Atkins, I remember well when standing here and looking over that valley, all within view was a beautiful prairie, and not a tree to be seen." I thought it was wonderful; but riding on horseback the next day for miles, I could nowhere find a stump, or log, or body of a tree more than half a century old.

Oak came first to cover the prairies of North Carolina; but cut off the oak, and cultivate the ground, then leave it to grow up in timber again, and pitch pine alone will cover the land.

When during the Revolution, Lord Cornwallis passed over that country with his army, he cut through the native timber, in many places, a military wagon road, and to-day you can trace his road by the growth of pine which has filled it. The first growth of timber there was like our prairie grass, that never comes in again when trodden out. I have traced for miles over our prairies neglected Indian trails by the growth of weeds which filled them.

Pasture our prairies, and a growth of white clover will follow the prairie grass, and how does the white clover get there?

A couple of years ago, while in Washington City, I was shown through the Agricultural Department by Col. Capron, the Commissioner, and my practical experience in the cultivation of peaches and Chickasaw plums very naturally interested me in the horticultural subjects. The culture of apples was under discussion, and the Commissioner stated that he had gathered the various varieties of apples grown in this country from the Atlantic to the Pacific, and that it was a singular fact that those varieties which originated east of the Alleghanies grew larger in size and coarser in texture as you passed from east to west.

The Newtown Pippin originated near where I was born, in southern New York, and I inquired about that variety, and was shown *fac simile* specimens in wax of the Newtown Pippin grown where it originated; also grown in New England, and they were much smaller; also grown in Ohio, and they were much larger; also on the prairies of southern Kansas, and the same variety, the Newtown Pippin, was almost twice as large grown in Kansas as compared with those grown where that variety of apple originated, which is, doubtless, to you gentlemen, a very familiar fact, but it was a new, and very interesting and curious fact to me. We also discussed, somewhat, the insect enemies that the horticulturist is fated to contend with.

Mr. Capron appeared to place great confidence in birds as the friends of the horticulturist—as a great army which was intended to destroy the great armies of insects and worms that destroy the fruits and flowers. I remembered that when I was a boy the blue-jay was regarded as a

great enemy to the orchardist, and I inquired of Col. Capron what he knew about the blue-jay. He took me to the case of birds, and pointed out a blue-jay, jauntily perched upon a twig, with his gay plumage almost as natural as life, and said: "There he is, and by his side the contents of his stomach when he was killed." That dissection had made a good record for him and his race—the despised blue-jay had robbed some horticulturist of a single cherry, but with the cherry were found no less than forty specimens of fruit-destroying insects and worms.

But, Mr. President, I am not unmindful of the fact that you gentlemen came here to discuss horticultural subjects yourselves, not to hear me do so, and, while thanking you for your kind attention, I again, Mr. President and gentlemen, on behalf of our citizens, give you, one and all, a cordial welcome to our city and county.

PRESIDENT ELLSWORTH responded in behalf of the Society, and expressed his sense of the courtesy which was shown by the citizens. He then proceeded to deliver his annual address, which was as follows:

PRESIDENT'S ADDRESS.

Ladies and Gentlemen:

The unceasing march of time has brought us to the close of another year in our Society; and we are again assembled at our annual meeting, for the purpose of discussing the best means of promoting the horticultural and arboricultural interests of our State.

We know what this Society has done to promote these interests; the past is secure. What the future will bring forth depends almost wholly upon the interest manifested by the people.

I have often felt that most of our citizens did not fully appreciate the object and aims of this and other kindred associations, or realize the great benefit such associations are to themselves. Until the people awaken to their duty, and come forward with their hearty support, the influence of our Society must, in a great measure, be restricted.

Comparatively few seem to give the subject of Horticulture and arboriculture more than a passing thought, very many not realizing their importance; hence the indifference manifested.

The past season has been noted for its continued drouth, yet, notwithstanding, the fruit crop has been fully an average one, nearly all kinds being plenty in their season, with, perhaps, the exception of strawberries.

The winter thus far has been a peculiarly severe one, but, so far as my observation has extended, fruit trees of all kinds appear to be uninjured. I attribute this to the fact that the more hardy varieties of fruits have been planted for some years past.

The experience of all at the West, especially nurserymen and orchardists, during the last twenty years, has been a severe, expensive, and yet beneficial educator. We have witnessed the destruction of trees, of many of the favorite eastern varieties of the apple, too tender to withstand our climate, necessitating the substitution of hardier varieties.

There is a deficiency of late-keeping varieties of apples cultivated with us; the result is that, while that fruit is abundant in the latter part of summer and in autumn, the winter market is largely supplied from the orchards of Michigan, Ohio, and New York. The reason for this must be so apparent to every one that I need not take up your time in its discussion.

There is one subject to which I would especially call your attention at this time, and which I consider of great importance to the future prosperity of not only our own State, but of the entire Northwest. I refer to the subject embracing forest and timber tree-planting. Our forests and groves are rapidly disappearing, and it needs no very great discernment to see that, in a very few years, unless means are taken to prevent it, our supply of timber will be entirely exhausted. The mind of the public should, therefore, be more thoroughly aroused to the importance of tree-planting, not only for fuel and shelter, on our naked prairies, but for all the various purposes for which timber is required, such as buildings, fencing, machinery, telegraph-poles, railroad-ties, etc.

The demand for railroad-ties is itself enormous. In Illinois alone, over six thousand miles of railroad have already been built. It requires about two thousand six hundred forty ties to each mile of road, or a total of nearly sixteen million ties for the whole six thousand miles. The life of these ties is seven or eight years, requiring over two million two hundred fifty thousand to be replaced annually, at a cost of not less than forty-five dollars per hundred ties, or a total of over one million. This amount will be largely increased by the construction of new roads, which are rapidly being built in every direction. Statistics show that, in the year eighteen seventy-two, there was completed in this State eight hundred thirty-seventy miles of road; and, in addition to the number completed, there were five hundred sixty-four miles under construction

There is but one way to meet the future wants of the country in the demand for wood for all the uses to which that material is applicable, and that is by the planting of artificial groves of timber. It would also tend to increase the humidity of the atmosphere, as well as to improve the climate, by the shelter thus obtained; and, at the same time, increase the beauty of the scenery, by covering our broad prairies, here and there, with the verdure of woods.

Among the many useful varieties of trees, the introduction of the European Larch is perhaps the most important acquisition in respect of timber that our country has ever obtained It is of a rapid growth, and adapts itself to a great variety of soils and exposures, while the wood it furnishes is of the very best quality, and is capable of being used for a greater variety of purposes than perhaps any other. Experiments in England and Scotland have proved that in durability it far exceeds the famous British live-oak, and it has been found superior even to the ash for the various purposes for which that timber is used, being lighter and of superior strength. Although the value of the larch can scarcely be over-estimated, it is by no means the only tree which should be grown.

There are many other valuable sorts which are well worthy of cultivation.

There is a want of information to the public as to the cost of planting and cultivating of forest trees. I do not at this time propose to enter upon the details of this subject, but would remark that the cost is comparatively light, as small plants can be purchased at very low rates. The preparation of the ground, and after-culture for a few years, are about the same as for corn; after which, the trees will require no cultivation and little further attention.

Some of our railroads feel an interest on the subject of tree-planting, and will no doubt afford any reasonable facility for distributing information on the subject to the public. In the matter of transportation, they would no doubt reduce the rates of freight on small trees to those who purchase for the purpose of planting.

I would recommend this Society to appoint a committee, whose duty it shall be to prepare and have printed a circular embodying a statistical statement in regard to the cost of planting, culture, growth, and profit to be derived from timber-growing; to be distributed for the information of the people.

I would also suggest that you take such action as you may deem best adapted to procure the passage by our Legislature of a law to encourage forest-timber planting.

Your attention is called to a law passed by our State Legislature last winter, taxing growing nursery stock. It is an unjust discrimination, and the law should be repealed, for nursery stock is as much a growing crop as corn, wheat, or oats, differing only in the time of maturing.

The passage of an act by the Legislature of the State to create a Department of Horticulture, providing for the election of a State Board of Horticulture in such manner as will be just to each portion of the State, and also for an appropriation for the publishing of the horticultural transactions, is important, and should receive the united support of all and especially of this Society.

This Society has heretofore appointed a committee to request our Representatives in Congress to exert their influence in procuring the passage of a bill to repeal part of our revenue laws imposing duties on all imported forest trees, plants, and seeds. I would suggest that a committee be appointed at this meeting for the same purpose.

As your presiding officer, I ask that discussion on all subjects may be concise and brief. Much time in conventions is not unfrequently spent in irrelevant debate, and I trust that I may rely upon your cordial assistance in endeavoring to conduct our meetings so as to transact the largest amount of business in the least possible time.

A committee, consisting of D. W. Scott and J. S. McCall, was appointed to arrange a programme of the order of business.

The report of the Treasurer was received and accepted.

L. Woodard, Treasurer, in account with Northern Illinois Horticultural Society.

1872.		Dr.	
Jan'y 25,	To cash, D. B. Wier, Advance on Transac's,	$ 5.00	
" " "	Received on Memberships, -	107.00	=$112.00

1872.		Cr.	
Jan'y 25,	By balance on old account, - - - -	$ 2.72	
" " "	Paid D. W. Scott, per bill, - -	25.50	
" " "	C. N. Whitney & Co., printing, per bill,	11.00	
Mar. 8, "	Ex. charges for Stationery and Postage,	2.50	
June 18, "	O. B. Galusha, for Transactions, -	70.00	
" " "	Exchange on Draft, - - - - -	.25	
" "	Balance, - - - - - -	.03	=$112.00

Respectfully submitted,

L. WOODARD, *Treasurer*.

The President then proceeded to call for the reports of standing committees, but as only a few of them were present and none of them prepared to report, that portion of the business was deferred.

On motion of L. K. Scofield, the evening sessions of the Society commence at seven o'clock.

On motion it was resolved, that Mr. H. H. McAfee be added to the business committee, and that said committee be continued as the permanent business committee for this meeting, and that they issue a programme for each day without further orders from the Society.

Mr. Pells Manny, of Freeport, presented a paper on the Culture of the Grape, as follows:

THE GRAPE.

Being unable to participate in your proceedings, I present a sketch of my experiments in grape culture.

I have about seven thousand vines planted, including thirty different varieties; Clintons, Concords, Perkins, Ives Seedling, Telegraphs, Rogers four, fifteen, and nineteen, have proved about equally healthy, hardy, and productive; but several of our choicest varieties do not succeed well on my grounds. Martha, Eumelan, Walter, and Croton have made feeble growth as yet. Salems, Iona, and Delaware, the same, but their fruit being of excellent quality. I tried the experiments of grafting them, with good success. I grafted most of them during winter, on Clinton roots, taken up in fall for the purpose, and to ascertain the best time for the operation I set a few grafts every two weeks on growing vines, up to July 20th. Not more than ten per cent. failed to grow that were set previous to June 20th; after that, they did not take so well. They have all made strong, healthy vines, most of them bore fruit last

season. The leaves and fruit held to the vines in perfect health, till the frost

I have a few Salem vines near my house, where the clay was thrown out from the cellar, the roots of the vines were put down below the clay on the natural soil, the surface has never been disturbed by cultivation or otherwise, and is nearly as hard as brick, no water has penetrated it down to the roots, and those vines have done the best of any I have of that variety not grafted. I am trying the experiment of ridging up the ground and mulching it to shed off the water, and keep down the weeds, but it is more expensive than grafting on healthy growing vines such as Clintons that cost but twenty dollars per thousand, the grafting of these thirty dollars more, perhaps, making but fifty dollars, while choice varieties of vines for planting at present prices cost over one hundred dollars per thousand.

I am extending my vineyard by putting out Clinton roots on which to graft such varieties as I wish to grow, thus saving half the first cost, and securing strong healthy growing vines. I have tried Fuller's plan of grafting in the fall, but they failed to grow as well as the grafts set in July, and the expense of protecting them through the winter, precludes the operation in the fall.

I have over a thousand vines in my yard, at the house, on which to try experiments and note the results more accurately than I could in the vineyard. Two years ago, I put up a lot of the vines for fruiting, of different varieties that were from twelve to fifteen feet in length, trained them so as to have the vines lap over each other eighteen inches apart, and allowed them to carry all the fruit they would set without thinning out a bunch.

Clintons and Isabellas loaded so heavily with fruit that the vines made scarcely any growth, but the fruit ripened up well; the next season, they carried nearly the same amount of fruit from the spurs, ripened it up well and made a good growth of vine; I conclude from this, that the roots will expand and gain strength in proportion to the requirement of the vine above ground.

Hartfords, Concords, Rogers four and fifteen did not set so much fruit as to check the growth of vines. None of the vines so treated show indications of being injured in the least, but appear capable of carrying double the amount of fruit another year to the vines that have been cropped off and treated in the ordinary way. The ground has all been well manured.

In putting up the vines in my vineyard two years ago, I discovered that the canes shortened for fruiting were not starting into growth as early as those left long for layering, therefore, I put up the long vines for fruiting, and the result was, my grapes were all ripe and gathered before any others come into market here. I tried the same experiment last season, and the result was the same, enabling me to get a better price for my grapes than those that came into market later in the season; when the price became reduced, my grapes were sufficiently ripe to com-

mence working them up. From two thousand five hundred bearing vines only four years old I sold three thousand pounds of grapes and obtained six hundred gallons of clear juice without pressing the husks. After fermentation had nearly ceased, I put one-quarter of a pound of sugar to each gallon, and about the middle of December I racked it off from the sediment and put one-quarter pound sugar to the gallon again; I put the husks into large casks, and put untothem two hundred and fifty gallons of sugar water. In about six weeks the pulp was dissolved and the liquor clear enough to rack off. I drew off three hundred and sixty gallons without pressing the husks, then added two hundred gallons of sugar water to the husks which yet remains on them. I shall not be greatly disappointed if these last experiments make vinegar instead of wine; should it do so, the profits will be nearly the same. To make wine will require more sugar; to make vinegar requires more water, thereby increasing the number of gallons.

Having noticed in Wm.Saunders report of the Agricultural Department of the Patent office, his experiment of planting a small collection of native vines outside a rude structure made by placing a few sashes against a common board fence. Some of the vines were trained under the glass roof, and others to a trellis four feet from it, exposed to the atmosphere; the satisfactory results of the crop under the glass and the great excellence of the fruit, induce the belief that if this mode of growing our native grapes were generally known, many would avail themselves of its benefits. I have tried similar experiments in a simpler and less expensive manner by training the surplus foliage horizontally above the fruit so as to protect it from our heavy dews, and the result has been very satisfactory in improving the quality of fruit.

P. MANNY.

This paper was followed by remarks by Messrs McWhorter, Bryant, McAfee, and Spofford, who took the ground that a clay soil, such as our timber ridges, is the best. Mr. McAfee spoke highly of the Rogers hybrids, in certain localities, but doubted if they would do well south of this latitude, and Mr. Spofford in favor of the Clinton. Mr. McWhorter had not found grape culture profitable on our prairies, for want of market.

The culture of the soil was considered by Mr. Spofford, who advocated a sort of terraculture,—that is, surface-stirring of the soil with the aid of a fork, to the depth of ten inches. The object of this is to open the soil to the air, dew, and rain, in order that these forces would be able to supply the roots with plant-food.

MR. MCAFEE had had good success in grafting the grape as late as July fifteenth. Vines may be laid down in a trench, and the grafts are inserted by splinting the stock, but no wax is used, the vines being

covered with earth. Mr. Loomis grafted in the usual manner of cleft-grafting, tying the stock with a strip of cloth or ligature, and covering with earth.

THE PRESIDENT appointed Arthur Bryant, Sr., M. B. Spofford, O. B. Galusha, L. Montagu, and Tyler McWhorter, a Committee on Fruits, etc., on Exhibition.

Committee on State Legislation for the encouragement of Forest-tree planting, Lewis Ellsworth, Arthur Bryant, M. L. Dunlap.

MR. H. N. BLISS read the following suggestions on Geology:

SUGGESTIONS ON GEOLOGY.

BY H. N. BLISS.

Geology is to be my subject: from the Greek *ge*, the earth, and *logos*, discourse.

Well *I* will discourse, or *talk* about it.

To man, the earth is a great world, and with all his power and skill, it is with *great difficulty* that the most fortunate can travel and sail around it, and observe its merest outlines.

The combined skill of all, in their united researches, have more *theory* than positive knowledge. It is with *diffidence* that the wisest men speak of primeval times, *the whys and the wherefores*. They refer it, with its causes, to a higher power.

Many good men have taken Moses as a scientific writer, and the Bible as *the guide* to all sciences; and *believing that*, they have denounced all opposition to their false theory. *Others*, seeing those good men and defenders of the Bible *wrong*, have denounced, not only the men, but the Bible itself, as wrong.

An unhappy controversy has been the consequence. *I* shall begin with Moses.

"In the beginning *God created* the heavens and the earth."

All about the *how* he did it,—the *when* he did it, by our blind measuring lines,—and *why he did not do it sooner*, and a thousand other things that incredulity and curiosity might suggest, *I* don't know.

It is enough for me to see the order and fitness of things demanding a designer, and that God has been able to reveal *the history* of this world thousands of years in advance, and to demonstrate by his works, the character he has given to himself.

Moses as a servant was faithful in all his house—in all the department that was intrusted to him. But Moses' mission was not to teach the *science*—not even the science of Geology.

He in prophetic vision, or rather in ecstatic vision, saw things as they passed before him, and his revelation was in reference to the impressions, the feelings, and the needs of the great mass of mankind, who were neither scientific men nor philosophers.

Moses, as one of the sons of men, describes to the sons of men in language suited to them, concerning the fitting up of this planetary system for the present race of inhabitants, and showed in opposition to the pantheistic, polytheistic, and atheistic cosmologies of ancient times, that the existing things of earth are the work of *one* and the same self-existent, self-concious, and intelligent God.

Moses is brief, but his record stood out above all the jumbled up theories of mere fallen man.

Our powers of mind were given us to investigate the things within our reach—to study with pleasure—with wonder, and with love.

I say—In the beginning God created the heavens and the earth, and the earth was without form and void—to us an incomprehensible and confused mass.

Now when this was, according to our measuring lines, I don't know, and good scholars say there is nothing in the original language to prevent us from saying, millions of years ago.

All scholars af nature, that are also scholars of revelation, say that it has been geological, or immense ages.

It is evident that after the center of the earth was formed, that water holding in solution many impurities, covered the earth a great depth, occasionally threw down sediments differing widely in appearance and elements, forming layers around the earth like coats around an onion.

But these coatings were not continuous, but drawn together here and there, and thicker in some places than in others, but always alike in some respects.

After many coatings were deposited containing no signs of animal or vegetable life, then, from some unknown cause great heat seems to have melted the central portions of the earth, when the expansions and contractions broke up those strata in mountain piles, throwing up the melted rock, and throwing them over upon the top of the later formed strata.

The motion of this melted matter was so great, like great waves, that it broke up, tumbled and tilted the unmelted layers above, in curious shapes, heating, condensing and crystallizing, and giving peculiarity to those early formations.

After the primary formations were waved, tilted, tumbled, and partially covered, the depositions went on before, and containing as before fragments of former formations, with the sediments from water, and in these formations begins to be found the lower order of ancient animals.

From this upwards, formations continued more less shaken and broken through and mixed up with the primitive formations, and increased and fastened together by sedimentary formations.

The earthquakes and upheavals of mountains, tumbled the waters backwards and forwards with terrific force, occasionally destroying the animals and vegetation that at the time inhabited the earth.

Class after class were swept off, rising in importance or perfection,

from the nerveless and thoughtless, that could live in the impure waters, up to man, the climax of creation and the image of God.

There has been a general agreement among one class of geologists, that there have been at least six classes of animals, and some have named the different formations by these different classes, as:

1st. Protozoic, or lowest class.
2nd. Deutozoic, or next lowest.
3d. Tritozoic.
4th. Tetrazoic.
5th. Pentazoic.
6th. Hectazoic, and includes the animals now alive upon the earth.

These various later formations are classified under other names, as:

Transition,
Secondary.
Tertiary, and
Alluvial, which includes the surface of the earth.

The coatings of the earth lying upon the melted center, or igneous or granite, as it is commonly called, is supposed to be from eight to ten miles deep on an average.

This supposed average is mostly obtained by measuring across the ends of the strata, where they have been thrown up by volcanic action—illustrated by an open book, or the outside coats of an onion burst through from the inside, and then smoothed off by outside friction.

Near Gardiner, Maine, for two miles, you can walk over the ends of the vertical strata of rocks, which numbering from the center, are alike on both sides.

SUPPOSED THICKNESS OF FORMATIONS OF THE COATS OF THE EARTH.

		RODS.	
Hectozoic,	Alluvial and Drift,	12	
Pentazoic,	Tertiary,	121	to one mile.
Tetrazoic,	Cretaceous,	115	
Trizoic,	Oolite,	163.6	Secondary, one mile.
Deutozoic,	Triassic,	54	
Protozoic,	Permain,		
	Carboniferous,		Paloezoic, six miles
	Devonian,		in Eng.
	Silurian.		
Azoic,	Graywacke,		
	Clay Slate,		Crystalline,
	Mica Slate,		twenty rods.
Primitive,	Gneiss, etc.		
Igneous,	Granite, etc.		
	Syenite,		
	Porphyry, Trap,		
	Basalt, Lava,		Three thousand nine
	Pumice, etc., of volcanoes.		hundred ninety miles to Earth's center.

I will now look at the *Chemistry* of *Geology*, as we shall need it in the practical management of our soil; and it will be interesting to know what we are breathing, seeing, and handling.

There are known to chemists only sixty simple bodies, or elements in nature. Forty-four belong to the class of metals; sixteen are considered non-metallic, and only *fourteen* of them enter into the rocks and soils to constitute the greater part of the earth, its waters, and atmosphere.

I will take them in the order of their abundance.

1. OXYGEN—A transparent colorless gas. The most powerful and almost universal supporter of combustion. Not only carbon in all its forms burns brilliantly in it, but iron and steel burn as bright as the sun; and adding one part of hydrogen gas to eight parts of oxygen and placing marble or chalk at the place of union, they will burn too brilliantly to look upon.

It is the universal supporter of life in breathing, but if pure, we should live too fast and soon die. It makes up more than one-fifth of our atmosphere and eight-ninths of water—river, lakes, seas, and oceans,—and forms two-fifths of the earth's crust. It has the greatest range of affinities of all known substances.

2. SILICON—A dark, nut-brown powder, equivalent, 22.18; with oxygen Silica and equals three-fifths of the crust of the earth and comes under the names: silica, silicic acid, silex, and silicates, quartz, flint, sand, agates, etc., etc.

3. CALCIUM—A yellowish white metal, and of no account till twenty-five parts of it unite with eight parts oxygen and forms Protoxide of Calcium or quick-lime. Quick-lime has a strong attraction for carbonic acid, and with it forms Carbonate of Lime.

One-seventh of the earth's crust, under the names of marble, limestone, chalk, rhomb-spar, etc., abundant and useful.

CARB. of lime or quick-lime, with sulphuric acid forms Gypsum or Plaster of Paris, useful both in the soils and arts.

4. ALUMINUM—Equiv. 13.7. Is a gray powder, with a metallic luster, and burns in oxygen gas, or when heated in common air, with a bright light, forming *Alumina*, Equiv. Al. 2. O 3.

Pure Alumina is a fine white powder, smooth to the touch, and is the basis of all our earthen-ware and pottery. Mixed with sand it forms our clays, and is supposed to form one-sixth part of the soils of New England. A very abundant production in nature, in every region of the globe, and in rocks of all ages. Slates and shales are specimens. The oriental ruby and sapphire, are pure Alumina, and Spinel and other gems, with emery, are nearly so.

Alumina closes up the open pores in the soils and makes resting places for plant food, called also geine, and sometimes by a half dozen other names, as: extract of humus, carboniferous mould, humin, crenic and apocrenic acid, etc.

The Alum of the market is a sulphate of alumina, sulphate of potassa, and water.

5. Potassium—Equiv. 39.15. A white metal, lighter than water, so soft as to yield to the pressure of fingers. The most combustible of the simple substances. It will burn in common air, on water, with a blue flame, forming potash or potassa—protoxide of potassium, Equiv. 39.15. –‖– O_8, a white solid. Potash of the market has sulphate and muriate of potassa, with other salts. It is widely disseminated in the rocks although not in a large quantity. All the aluminous minerals contain it. Feldspar, a constituent in granite, seventeen and three-fourths per cent. of it. Basalt, clay, slate and loam, contain more or less of it. But it is absorbed rapidly from the soils.

6. Iron—Equiv. 27.14. When pure, nearly white, but pure iron is never found in nature.

Meteoric contains from eight to ten per cent. nickel, and often tin, copper, etc. Widely scattered, gives colors to soils and rocks.

As bread is said to be staff of life, so iron is the staff of business, and almost of civilization.

7. Hydrogen—Equiv. by weight 1, vol. 100. A clear colorless gas, the lightest known, and without odor or taste. Breathing it gives the voice a shrill squeak but it soon suffocates. Forms one-ninth of water, —the ocean its home, but widely disseminated in the animal, vegetable, and mineral kingdoms, and the air takes its portion. With oxygen forming water, an almost universal servant in nature.

8. Sodium—Equiv. 23.3. A white opaque solid, with chlorine 35.42 it forms *common salt*, which is found in the ocean and rock; extensive and scattered; and from below the coal in this country.

Soda is a protoxide of sodium.

9. Magnesium—Equiv. 12.7. A white metal, malleable and brilliant, magnesia, a protoxide of mag. –‖– $O_{20.7}$. Quite abundant in nature, in rocks and good soils.

10. Manganese, Mn.—Equiv. 27.7. A brittle metal, grayish white, and hard, granular texture. Perxide of—or black oxide of, 27.7 –‖– 16 O. Valuable in the arts, laboratory, and soils.

11. Carbon—Equiv. 6.12, sp. gr. 3.52. Diamond a pure carbon, of immense value in the arts and show of the world. Carbon is abundant in the vegetable, mineral, and animal kingdoms, and as useful in each as it is abundant.

In creation, before the coal measures were formed, and while vegetation was growing with such rapidity and size, the air was doubtless filled with carbonic acid, which would unfit it for the higher classes of animals, and in God's wisdom they were not there.

Elias Colbert, a late writer on the great northwestern fires, thinks there have been three million tons of carbon from the country, and three hundred thousand tons from the city of Chicago, liberated from its union with other elements, and gone into the air. Every three and six-tenths pounds of it would take eight pounds of oxygen, forming eleven and six-tenths pounds of carbonic acid gas. That the oxygen taken up, would supply men and animals all over the globe for ten months.

Well, he argues that the want of the healthful and stimulating oxygen in the atmosphere, replaced by the poisonous carbonic acid, will put back the progress of man towards the highest limit of perfection three hundred years. That is a startling announcement; but as it takes for granted that Adam was a mere child, if not almost a fool, there may be something rotten in the theory, and as a race we may not be forced back in degradation below Solomon and his generation. Or, three hundred years would only carry us back to the days of Luther, Bacon, and Shakespeare, when the great reaction rallied the world from lethargy.

Seriously, soils may absorb the carbonic acid and become enriched and stimulate vegetation to some greater growth, and an increase of carbonaceous rocks may be formed, and perhaps the doctors' list of maladies will be a little changed, and doubtless some other effects will be seen. But the idea that we have arrived almost to angelic perfection is only gas, and often explodes in a Woodhull Tammany Ring bubble. Printing, etc., giving the minutiæ in records, makes us superior in retaining and scattering our inventions, and that is about all.

12. SULPHUR, S.—Equiv. 16.1. gr. 2. Pure and abundant in volcanic regions, ditto in gypsum in Cadiz, and Cracow. In metals, (sulphurets) it is scattered broadcast in and over the earth.

13. PHOSPHORUS, P.—Equiv. 15.7. When pure, transparent and nearly colorless. Easily cut with a knife. It fuses at one hundred and eight degrees. It exists in the bones of animals, and in those of a man yielding one pound on an average. It is scattered in the phosphates of lime, soda, potassa, iron, and in most rocks.

14. NITROGEN, Sym. N.—Equiv. 14.15. Pure Nitrogen, a colorless gas, not a supporter of combustion, or of respiration, though not poisonous. Constitutes four-fifths of the atmosphere, simply mixed with one-fifth oxygen. It exists prominently in all animals and fungus plants, and in fact in small quantities in all plants. Forms valuable salts with potash, lime, soda, magnesia; and with hydrogen it forms Ammonia, which is active, powerful, and useful. With oxygen it forms the protoxide of N.=exhilarating gas, and the most active acids.

Take one part of N. represented by 14.06, or, take 14.06 lbs. of N. and mix with 4.2 lbs. O., and there is no chemical union and it forms our atmosphere with the addition of a little vapor, carbonic acid, ammonia, etc.

Take one part N. 14.06 with one part O. $\frac{1}{8}$ it and forms Nitrous Oxide, a chemical union, and when breathed, forms one of the most exciting and exhilarating gases.

1 part N. 14.06, with 2 parts O. 16 Nitric Oxide.
1 " N. " " 3 " O. 24 Hyponitrous acid.
1 " N. " " 4 " O. 32 Nitrous acid.
1 " N. " " 5 " O. 40 Nitric acid. One of the most powerful and useful acids.

Here we are shown the difference between mechanical mixture, as in common air, and chemical union, as well as the laws which govern the compounding of the simple elements of the world.

Now the fourteen simple elements with their combinations, forming almost the entire crust of the earth, if thrown together and acted upon by imponderable agents: gravity, cohesion, affinity, light, caloric, electricty, and galvanism, which are called the forces that preside over nature, there will be thousands of miniature galvanic batteries, and currents of galvanism, currents of electricity, currents of gases, and changes of substances and plant food evolved.

Now throw in, or let grow in the roots of plants with their vital power, the incomprehensible life principle, and you can stand and experiment, and wonder and admire.

Our soils are more simple and differ less in their chemical agents, than we generally suppose.

I will here give what A. Gray calls an analysis of the general soils in one hundred parts:

EARTHS.		ALKALIES.	
Silex,	66 per cent.	Potash,	2.
Alumna,	16 "	Soda,	0.5.
Lime,	2 "	Ammonia,	0.5.
Magnesia,	1 "		
		OXIDES	
Salts and Urets,	1.5.	of Iron,	5.
Organic Matter,	6.5.	" Manganese,	0.5.

In the analysis of other soils, other alkalies, oxides, salts, and urets, would fill the places of those just mentioned, and just as valuable.

I will give here Prof. Hitchcock's analysis of two soils one from La Salle Co., Ill., never cultivated; the other from Sciota Valley, Ohio, cultivated fourteen years without manure.

SOLUBLE GEINE.	LA SALLE.	SCIOTA.
(Humates and Creates).	1.6	4.5
Insoluble Geine,	13.8	6.7
Sulphate of Lime,	18.4	2.1
Phosphate of Lime,	0.4	0.9
Carb. of Lime,	3.3	2.8
Silicates,	73.5	83.0
Water of Absorption,	9.5	5.3
	120.5	105.3

The valuable Geine, both soluble and insoluble, is contained in the soils from almost all the rocks in Massachusetts, and from two and one-half to six per cent.

I will now give the composition of a few of the most common minerals. And they are such as enter into our own soils.

COMPOSITION OF MINERALS.

Quartz. { Silicon, 22.18—||—30. Equiv. 46.18.
{ Pure Silica, called Silex, Silicic acid, Silicious earth.

Feldspar, Flint, etc.			Silica,	64.20
			Alumina,	18.40
			Potash,	16.95
Mica.	Silica,	46.3	Peroxide of Iron,	4.5
	Alumina,	36.8	Fluoric acid,	0.9
	Potash,	9.2	Water,	1.0
				98.7

Hornblend.	Dark Colored.	Light Col.	Basaltic Col.
Silica,	48.8	59.75	42.24
Magnesia,	13.6	21.1	13.74
Lime,	10.2	14.25	12.24
Alumina,	7.5		13.92
Protoxide of Iron.	18.75	3.9	14.59
Protoxide of Manganese,	1.15	0.3	0.33
Hydrochloric acid and water,	0.9	0.8	
	100.9	97.1	97.06

Time forbids my running through the analysis of many interesting things.

I have said that the most of our soils contain the greater part of the elements needed for fertility, but they need to be placed in favorable circumstances. They also need a few additions, which we get from manures as well as from the atmosphere and the floating gases. Every kind of mulching, as well as grass and weeds left on the ground is manure.

Here let me give the summing-up analysis of the manure of one cow for one year in geine and salts: A cow that eats twenty-four lbs. of hay and twelve lbs. of potatoes, or that amount of food per day, will in one year of

Geine, (decomposed organic matter),	4,400	pounds.
Carb. of Ammonia,	550	"
Phosphate of Lime,	71	"
Plaster, or Sulphate of Lime,	37	"
Carbonate of Lime,	37	"
Common Salt,	24	"
Sulphate of Potash,	15	"
Total,	5,134	"

I have now arrived at the point upon which I could begin to build and know what I was about; and here comes in the motto on the seal of the State Horticultural Society: "This is an art which does mend nature." And here comes in also the tumbling of the soil, draining, mixing, heating, and cooling; the practical of it, and if rightly managed, the profitable working of it also. A little more close observation—a little more mental labor will give an increase of interest and of pleasure both to the agriculturist and horticulturist.

By a little union in arrangement, an analysis of any specimen of our soils could be made for, perhaps, ten dollars, if not for five dollars, when practical, positive, and profitable knowledge would flow in.

Adjourned till seven o'clock, P. M.

EVENING SESSION.

The following Essay on Trees and Tree-planting by W. E. Lukens, of Sterling, was read

ESSAY

BY W. E. LUKENS.

It requires no little fortitude and moral courage to approach the hackneyed subject of tree-planting. It has been so often and so elaborately discussed at our meetings by persons much more familiar with the subject than I, that it is really embarrassing to attempt to say a word on the subject. But if what I may say will be the means of inducing one man to plant a thousand, or even a hundred trees, it will pay for the time spent in reading this short essay.

Our arguments and appeals to the people to do a more extended business in this line, are shorn of much of their influence by the suspicion that we are incited by interested motives. Because some of us are nurserymen, and have young trees to sell, they seem to think we are devoid of that public spirit which would prompt us to urge this matter irrespective of any pecuniary advantage to ourselves. But they should remember that nurserymen and orchardists have necessarily given to the subject of trees more attention than they who are merely raising corn and beef and devoting their exclusive attention to these pursuits. Not long ago I asked a farmer, the owner of half a dozen large farms, if he had ever thought of planting any of his land in forest trees. With a cunning smile he asked, "Will they produce beef?" This was all the reply he made. I mention this to show that this man, though a successful and intelligent farmer, seemed never to think of any plan of drawing wealth from his land but by raising beef. Of course the idea of raising trees was new to him, as it is to thousands. When they see the advantage of this as they do that of other pursuits, they will be smart enough to engage in it.

But suppose the trees do not produce beef, they produce value. The farmer sells his beef year after year, and the avails he re-invests in land or other property, or loans it at interest, till finally he dies and leaves it to his heirs. If it can be shown that with a given capital the farmer can leave more to his heirs at his death by planting trees than by raising beef, and that, too, with less work and exposure, it would only be business-like to adopt this plan.

But it is not suggested to any farmer to plant all his land in trees, by any means. If each owner of one hundred and sixty acres of land would plant six or eight acres, it would make but a small inroad on his

beef-raising; and quite likely the shelter these trees would furnish his cattle in summer and winter would actually augment his profits on beef. But not one farmer in ten is likely very soon to plant even that much of his land in trees. A few, therefore, might plant fifty or one hundred acres to great advantage, looking solely to the sale of his crop for the profit.

The most common, in fact the only objection assigned is, that they have to wait too long for return of capital and pay for labor expended. This would be a valid objection to one who could not reasonably expect to make a living off the balance of his land not planted in trees; but to one who has enough left to make a living, or who has other sources from which to draw, the objection is not good. Every dollar a prudent, economical man makes, over the amount necessarily consumed by himself and family, is only so much yearly augmentation of his wealth, whatever shape it may assume, whether in land, stock, utensils, household furniture or bank stock. Thus every year he is laying up his surplus earnings for the future, which he rarely expends, and never aims to part with until he leaves it as a legacy to his heirs. In the choice of means, then, that which would bring him the greatest amount in the end, with the least toil and mental care, it would be wisdom to adopt.

I am well aware that any calculation we may make for years to come may prove to be uncertain. So it is with everything else. But we can approach this more nearly than we can in any other business, particularly that of raising corn. There is much more certainty that timber will command a remunerating price in ten or fifty years hence than that corn will; for the profit on corn depends very much on the demand for whisky, which we all wish to see diminish as fast as possible. When we cease to use whisky, a tithe of the corn now raised will glut the market.

There are many kinds of trees that can be planted, from which we may expect profitable returns; but I feel well assured that the European Larch is the most profitable for fence posts or fence boards, or railroad-ties. Of course, as soon as they are large enough they can be used for almost any kind of building purposes. In planting them it is probable that four feet apart each way would be the proper distance, or about twenty-seven hundred to the acre. The plants, two to three years old, cost say from eight to fifteen dollars per thousand. Two dollars per thousand will be a sufficiently high estimate for planting the trees. With this data any farmer can estimate the cost of planting per acre, as all are familiar with preparing ground for corn and cultivating it, which must be very nearly the same as that for these trees.

Any one who takes the pains will readily see that the expense of fifty acres of larch for the first ten years, including interest on land worth fifty dollars per acre, cost of plants, preparing the ground, planting, and cultivating two or three years, with ten per cent. compound interest on each investment, will amount to about five thousand dollars. At that time three-fourths of the trees should be thinned out, leaving them eight feet apart. These, if worth fifteen cents each, will amount to over fif-

teen thousand dollars, or a clear profit of ten thousand dollars. If this sum is kept at compound interest for twenty years it will amount to fifty-eight thousand five hundred sixty four dollars, supposing it to double in every eight years. But at twenty years we may cut three-fourths of the balance, or twenty-five thousand three hundred twelve trees, worth at least two dollars each, or fifty thousand six hundred twenty-four dollars. This at compound interest for ten years will amount to about one hundred twenty-two thousand five hundred dollars. We then have left eight thousand four hundred thirty-seven trees thirty years old, worth not less than ten dollars per tree, or eighty-four thousand three hundred seventy dollars—an aggregate profit of two hundred sixty-five thousand sixty-four dollars in thirty years from fifty acres of land.

But if you plant corn every year on fifty acres, allow it to produce forty bushels per acre, and sell at fifty cents per bushel, allow interest on net profit each year at compound rate for the same time, or thirty years from first planting, you will not get it higher than sixty thousand or seventy thousand dollars. Thus we find the trees will yield a profit of one hundred ninety-five thousand sixty-four dollars more than the corn crop at fifty cents a bushel.

It will be seen that in this calculation the trees at ten years are put at fifteen cents each, while the probability is that they will be worth nearer seventy-five cents. But if each tree will make three cuts five feet long, a good fence can be made from them by inserting them one foot into this ground, nine inches apart, and nailing another on the top to keep them steady. It would require eight of these poles to make a rod of fence, which at fifteen cents each would only be one dollar and twenty cents per rod. All can see that this is a very low estimate of the value of such poles as they will be at that age. Mr. Scofield found that his, at twelve years old, averaged three posts, worth seventy-five cents. But if they should happen to be worth fifty cents each at ten years, which is quite likely, then we will have a clear profit of forty-five thousand four hundred thirty-seven dollars—equivalent to four thousand five hundred forty-three dollars per year for the first ten years, the least profitable time we are growing the trees.

Is it not strange that so few are lured into a business so profitable—so little liable to loss by fire, flood, or drought, or low prices, and so entirely exempt from that care and anxiety incident to the state of farm crops, where a thousand circumstances tend to fluctuate prices? What farmer does not know how difficult it is to determine the exact time to sell to get the best prices for his products? How often do they hold over for larger prices and get less? Why not have something growing on which they can rely with more certainty?

But there is another strong reason why we should go more extensively into this business. It is admitted by all who pretend to a knowledge of this subject, that our present available timber will be exhausted, even at the present rate of comsumption, in about twenty-five years. This fact alone should alarm every one to do his share in warding off the impend-

ing calamity of a total exhaustion of lumber, and of timber to supply more. Ancient Egypt had to wage a war of conquest on Syria for timber when her own territory failed to supply the demand. But where is the timbered Syria for us to conquer when ours is gone? If we had British America, and the supply there was unlimited, the freight alone would more than equal present prices.

Currents of air and currents of water are subject in many particulars to the same law. We see in a flowing river that the lower portion of the current is retarded by friction, and moves more slowly than the surface, especially where the bed of the stream is covered thickly with rocks and boulders. So in currents of air, every tree, whether small or large, presents an obstacle to the wind, and diminishes the velocity in proportion to the obstruction. If belts of trees eight rods wide, every half mile, extended all over our country, in a few years it would so diminish the velocity of the winds that countless blessings, advantages, and comforts would flow therefrom. Yet these belts would only require eight acres to every one hundred and sixty.

There are probably three hundred thousand square miles of territory in the Mississippi Valley that will soon be covered by population. Allowing each square mile to have six miles of fence, requiring over sixty thousand feet of boards and three thousand eight hundred forty posts, and allowing the fence to last fifteen years, it will require four thousand feet of boards and two hundred and fifty-six posts per year for each mile. The average lake, river, and railroad freights would be at least eight dollars per thousand, and two cents each for posts, making a sum of thirty-seven dollars per year freight on fence material for each section of land. It is safe to say that there is four times this amount used for other purposes, so that it is fair to conclude that we pay one hundred eighty-five dollars freight on lumber each year for every square mile of territory, or fifty-five million five hundred thousand dollars freight on lumber alone in the Mississippi Valley. If Congress were to build railroads to the lumber regions, and deliver lumber to us free of charge for transportation, we would have to help foot the bill by our share of taxes, but who would not be rejoiced to find a plan by which these fifty-five millions of dollars a year could be saved in a few western states, that we now pay chiefly to railroad companies? But there is just such a plan within our reach.

The earth and the sun, with their exhaustless and incomputable forces, are at all times ready and willing to bring to our very doors all the timber we shall want for lumber and fuel for thousands of years. They say, "Only plant the seeds and we will grow you the timber at your homes, where it is needed, as easily as we do in the distant forests, that you now have to raft down your rivers, or transport over your lakes, or rattle thousands of miles over your railroads. We shall not disappoint you. We never spend our forces in vain. We follow Nature's law; or, rather, we are a part of great Nature herself. We are constant workers. We spend no time idly. We do not even rest on the Sabbath day. But

be not alarmed; we work so silently that at your very church doors your devotions will not be marred by our activities. Even at night when you sleep, or on Sunday when you worship, we are silently building up the tissues that shall protect you from winter storms and summer suns, and temper the winds to the shorn lamb. We are constructing material that shall be an ornament to your dwellings, a protection to your harvests, and an essential part of your great railroad system."

Will we reject this munificent offer, or will we with grateful hearts accept it? Let us wisely do our part, and Nature will rigidly comply with all her promises. In this way the western country can save in a hundred years double the amount of our present national debt, in freights on lumber alone.

It is said by some one of late, that the European Larch is not so durable as has been represented by writers, who uniformly regard it as the most durable timber known. It is possible that trees of this variety, grown singly in the open field will not last so long as timber grown on poor soil, or in a dense forest, where they grow more slowly. We who have experience with oak and locust know that is the case with them. A post of either of these timbers will not last a fourth as long when taken from a field grown tree as if taken from the forest. I have no doubt, therefore, that when we grow larch thickly, and consequently more slowly, it will preserve the character that has been awarded to it by European writers.

I will add further, that there are a great many ridges through our country too sandy for profitable farming on which can be grown box-elder and Scotch pine. I should much prefer the latter. Instead of these unsightly sand hills which now so disfigure the landscape, we should soon see interspersed, all over our country, ridges and knolls of beautiful green, emblems of life instead of death.

Mr. M. L. Dunlap spoke on the subject of bee-keeping as connected with Horticulture and floriculture in city and suburban homes. It might be inquired, what bee-keeping had to do with these pursuits. He would answer by asking, what was the object to be attained in Horticulture and floriculture. Simply feasts,—feasts of the eye and feasts of the palate,—nothing but feasts. If we can add another feast of the eye and a feast of the palate from the flowers, without detracting from the other feasts that they supply, we have gained just so much, and it is this fact that made bee-keeping a part of Horticulture and of floriculture, and gave it a place in every city and suburban home where these pursuits are carried on.

Mr. M. B. Spofford read the following paper on growing orchards:

HOW I GROW ORCHARDS.

The commercial orchard, or the raising of apples for the money that therein is, is my subject at this time, and at the risk of being called an egotist I shall principally confine myself to my own observation and experience, because that is one of the objects of our association.

My grounds are located on the north side of Rock river in Lee county in what was originally heavy timbered land, and are now protected on all sides by a second growth of oaks and hickory, the white oak largely predominating, holding its leaves through the winter, making one of the best of wind-breaks.

The soil is light colored, not very rich in vegetable mold, strong in the elements of hardy wood growth, not easily affected by drouth, and having a gentle slope to the south-east has sufficient surface drainage, and a warm exposure. The sub-soil is a yellowish calcareous layer, (erroneously called clay) about ten feet deep, underland by the yellow limestone called Buff, Galena, or Sunflower.

My orchards consist of a hundred trees set in eighteen sixty-one, seven hundred in eighteen sixty-five, three hundred in eighteen sixty-six, and two hundred subsequently. They are set twenty feet apart both ways, and were from two to four years old when transplanted and embraced over sixty varieties, and none but first-class trees were used. I fit my ground for setting, with the plow, by throwing a dead furrow about four feet on each side of the place where the rows of trees are to stand. This leaves a land eight feet wide. I then plow around this land throwing the soil both ways from the center and go as often as necessary to make it about sixteen to eighteen inches deep, the cut in width eight feet, finishing up by filling up the center dead furrow where the trees are to stand, about ten inches above the natural level. This method of plowing leaves the soil nearly in its natural order with surface soil on the top and with sufficient depth of mellow earth for a root bed.

I then with a pole twenty feet long and two hands with me set the outside rows around my plat in line and at proper distance. We throw the dirt from the top of the ridge, so as to leave the bottom of the hole about on the surface level; one man then brings a tree from where they are heeled in, and with a sharp knife the ends of bruised roots are cut off so as to leave a long slanting cut on the under side of the roots and the ends of the root fibres are also cut off. The tree is then placed in position, and being held firmly in place by one man, your humble servant then, on bended knee, with his hands fills in finely pulverized soil among all the roots large and small, leaving them as near as possible in their natural position, leaving no air holes. The hole is then filled about four inches above the place where the earth stood in the nursery, and lightly pressed. A wheel-barrow load of coarse manure is placed around each tree, (but not against the body) laid about four inches deep and covered with soil to prevent evaporation. Five hundred trees are a fair day's work for three men in this way; the mulching is done by others. This being a very important point, and should not be omitted.

The pruning or shortening in may be left until the growing season if preferred. Great care should be used then in not allowing two branches of nearly equal size to start out like your *fingers side by side*, but rather leave such as start like your *thumb, from the side*. All side branches should be removed so as ultimately to leave a straight single body four to six feet high to give room to cultivate the ground and gather the fruit. All small limbs should be removed from the inside of the tree, as it grows from year to year, sufficiently to leave space for sun and air to mature the fruit; but I would never cut limbs of any size in the spring.

The trees may receive a thorough washing with soft soap and water (half and half) the last of May and August, also a good coat of whitewash at the beginning of winter (applied hot) to keep off rabbits. I think the whitewash would be as useful as the soap and water for the three washings and have experimented largely, and cannot say which is the best, both having given good satisfaction, but I regard the one or the other indispensable to the growing a first class-tree. Either should be applied as high up into the branches as possible, and I have found a common shoe-brush fastened to a handle about two feet long to be the cheapest and most rapid implement to do the work with.

The ground under the trees should be kept mellow and thoroughly clean and cultivated in sweet corn planted about the first to twelfth of June.

In no case should the ground be seeded or allowed to run into grass sod, nor should grain of any kind be sowed there.

The inevitable tendency of such treatment is to bring in bark-louse, borers, etc., and induce want of care and watching which are indispensable to the successful orchardist.

The ground should be kept in good order, and sufficiently rich to keep up vigorous growth when the trees are in bearing, by spreading good yard manure in the fall and cultivating it in, the next summer.

My practice is to pile up the earth around the tree to a distance of about three feet, some eight to ten inches deep, or if the soil needs manure I pile that up—the object is to check the action of the frost, etc. Late in the spring, say about the twentieth of May, this is removed and a good thorough washing, as before spoken of, is applied.

WHAT VARIETIES SHALL WE PLANT.

This subject comes home with great force by the side of which such questions as, who shall be our next President, or, is the Darwinian theory correct, sink into insignificance.

I have near fifty varieties under cultivation that have been recommended by this State Horticultural Society, and if I were to commence now to set a commercial orchard, I would not use over fifteen at most.

The *Carolina Red June* was so covered with scabs yearly that they were worthless.

White Winter Pearmain, same and did not bear much.

Yellow Bellflower, no fruit.

Northern Spy, same.
Early Harvest, very poor bearer.
Fallawater, water core and worthless.
Mononk, no fruit.
Sweet Pear, scabby and rotted on the tree by cracking open.
Roman Stem, very poor bearer, good quality.
Early Pennock, poor bearer, falls early and rots before maturity.
Fulton, no fruit.
Winesap, same or very little.
Jonathan, very moderate bearer.
Roxbury Russet, same.
Gilpin, *Snow*, and *Keswick Codling*, good bearers and satisfactory.
Red Astrachan, moderate bearer.
Willow Twig, great bearer.

The above were my first settings of one hundred trees,and I have used all means in my power to kill bark lice, but the chaps are there yet and were when set.

All of the above, except the last seven named, have been top-grafted with other varieties. My other orchards have been purchased from other parties and are entirely free from bark-lice and in first-class order.

I have about sixty trees, not of my own setting, that were bought from the Rochester nurseries and they are very lousy.

And here I shall say without offering any apology that I would advise all men not to listen to the blarney of an eastern tree peddler under any circumstances, and if we wish its counterpart we have it at a very early day in the world's history in holy writ.

Were I to make a list for my own grounds or for similar soil, I would set from some of the following, some six or eight varieties.

FOR SUMMER AND FALL.

Keswick Codling,
Sops of Wine, (table)
Primate, (fine)
Jersey Sweet,
Jeffries,
Emersine Sweet,
Red Astrachan,
Duchess of Oldenburg,
Sweet June,
Lowell,
Bailey Sweet,
Western Beauty,
Snow, largely for fall and early winter.

WINTER.

Willow Twig,
Grimes Golden,
English Russet,
Tallman Sweet,
Gilpin,
Minkler,
Ben Davis,
Moore's Sweet.

If for a family orchard would use more varieties than for market. And here I wish to enter my protest against the name "Bailey Sweet." Fifty-five years ago one hundred trees of this variety under the name of Chillicothe Sweet were brought from Cayuga county, New York, to the town of Sainesville, Wyoming county, New York, by Thomas Price, and

set. They proved so valuable that cions were constantly being cut from them and wildly disseminated for top-grafting, as most of our trees at that time were seedlings. Subsequently when the Pittsford nurseries were started, and still later when the Rochester nurseries were established, they were sold very largely and were in almost every orchard in western New York under that name.

About the year eighteen forty the Postmaster at Perry, Mr. C. P. Bailey, and the Hon. Wm. Patterson, then in Congress from that district and neither of them knowing one apple from another by its name, received Mr. Downing's circulars requesting them to forward valuable specimens of fruit from their vicinity. Both of these gentlemen sent this apple to Mr. Downing and hence the name "Bailey or Patterson Sweet."

I can name orchards in Western New York where this apple is now growing under both names, the one on trees top-grafted by myself years ago and the other on trees from the local nurseries.

My orchards are all planted and each variety set in squares as compactly as possible, and space is left on the plats for interlining and such notes as "Left to grass at such time," "Pruned May, Oct., Feb.," or as the case may be, "Soap-washed May twentieth eighteen sixty-eight and eighteen sixty-nine" etc., "Whitewashed August fifteenth, eighteen seventy," "Borer found," "Five bushels apples eighteen seventy-one." etc., are often found thereon.

These observations enable me to find the results of my experiments and treatment generally and to profit thereby, and it is from these observations that I have come to the conclusions herein embraced.

To recapitulate, let me say in order to succeed in the orchard, we must have first-class western-grown stock, thoroughly prepared and suitable ground, well set and thoroughly cultivated trees with careful watching and washing, and never allow grass to take the place of mellow soil.

I think as a society we should not recommend any variety, but if we do we should also insist on some system of cultivation and the kind of soil to place it in, and in all of our discussion of varieties it should be a point to state these things in full. M. B. Spafford.

A discussion followed, lasting fully an hour, in which the principal theme handled was the destructive habits of rabbits and the best remedies to be adopted in preventing their ravages.

The President called the attention to the differences of opinion existing in regard to different varieties of apples, and gave as his own observation that certain varieties were different in their bearing qualities in different localities.

Adjourned till Wednesday morning, nine o'clock.

WEDNESDAY.

January twenty-second. Meeting called to order by the President. Prayer by S. G. MINKLER.

The following Communication from Dr. J. A. Warder was read.

CLEVELAND, O., January 20th, 1873.

LEWIS ELLSWORTH, ESQ.,
President Nor. Ill. Horticultural Society
MY DEAR FRIEND:

I cannot tell you how highly I felt flattered by your kind and pressing invitation to be with you at the coming festival of good feelings which I am sure you will have at Freeport. And oh, how I should have enjoyed meeting so many of my good friends who will be there. I beg you to present me lovingly to them, and assure them that though past the grand climacteric of human life, and already feeling the weight of years, I knew that a few days in their midst would have rejuvenated me very much. Alas! it cannot be, and my disappointment is great. I send herewith some notes of the past year on new and little known varieties of apples, which will hardly do to read, but may, if referred to a committee, be considered worthy of a place on the record if only for reference. Several are named only to be avoided.

Please assure my good friends, many of whom I trust have been seeking a better country, that it is my earnest desire, should we never be favored to meet again in this world, we may have the joy of mingling our praises in the realms of eternal bliss in a future state of existence.

I regret much not to hear your timber talks.

Your friend,

WARDER.

To my friends of the Northern Illinois Horticultural Society.

Next to meeting with you, as I had hoped to have done, I shall take pleasure in the thought that my presence was desired, and that I can thus address you on paper.

I propose to present a sketch of my notes of the season, upon some of the new and little known varieties of apples that have come under my observation. They will be arranged alphabetically.

Abram—or Father Abraham—an old Virginia apple, but still little known. I first saw it in Bloomington, Ill. The great merit of this variety consists in its keeping qualities; it retains its good qualities until midsummer of the next year. Tree upright, thrifty, branching, twiggy, productive, holds its leaves late. Fruit medium, globular, of a dull grayish red, striped; sub-acid, rich; keeps good till July.

Augustine—received from Virginia. This is one of the Fall Queen family, of which there are several in the catalogues bearing a strong family resemblance, and yet somewhat different. I may name Buck-

ingham, Superb, Frankfort Queen, Fall Queen, Levett's, Equineteley, Red Cathead of Va. and perhaps others.

The tree of Augustine is upright, moderately thrifty, productive. Fruit large to very large, conic-oblate, bright rich red, stripes lost, very handsome. Flesh yellow, tender, sub-acid, juicy, very good for dessert and kitchen and for drying. September and October, rarely until December.

Bledsoe—Kentucky. Tree upright and spreading. Fruit medium to large, oblong, green to white. Flesh very tender, fine-grained, juicy, sub-acid—much like Ortley.

Bonum—North Carolina or Virginia. Tree of medium growth, thrifty, productive. Fruit medium, oblate, deep rich red, obscuring the stripes. Flesh breaking, yellow, tender, sub-acid, rich, fine for dessert. Well known and highly esteemed by Mr. Robey and others in the South.

Bowling Sweet—Tree of moderate growth, very productive. Fruit small, globular, red, striped. Flesh firm, very sweet, of little value for market, but may prove useful for stock feeding. Season, early winter.

Carter—of Virginia. Tree of medium growth, spreading, very productive. Fruit medium, conic, purplish red, striped faintly. Flesh very tender, juicy, mild sub-acid good. Midwinter.

Center's—North Carolina. Tree thrifty, spreading, very productive. Fruit medium, conic, regular, white. Flesh tender, acid, juicy, September. The color and season are against and for profit.

Cheese—Virginia. Tree thrifty, spreading, productive, bears all over. Fruit medium, conic, dull red, striped. Flesh sound, very tender, juicy, sub-acid, good. Midwinter—a useful sort, and standard variety where known.

Chestalee—southern. Tree twiggy, brushy, rather spreading, a slow bearer. Fruit medium, globular, white, sub-acid, not very promising: early winter.

Congress—Pennsylvania. Tree thrifty, spreading, productive. Fruit very large, rather oblate, dull red, striped. Flesh rather coarse, sub-acid, good: promising for market; early winter.

Cracking—Eastern Ohio. This fine fruit is little known. Tree spreading, productive, but appears shortlived. Fruit medium and large, globular oblate, waxen yellow, beautifully marked with carmine spots and occasionally blushed rich lake. Flesh yellow, cracking, tender, juicy, sub-acid, rich, very good. October and December.

Cullasaga—new, southern. Tree spreading, thrifty, productive. Fruit firm, juicy, sub-acid. Winter, should be picked early.

Culp—Eastern Ohio, little known. Tree upright, thrifty, productive. Fruit very large, globular to conic, greenish white, rarely blushed. Flesh tender, mild sub-acid, good—October.

Degruchy—southern.—Tree very thrifty, spreading, promises to be large. Fruit large, greenish. Flesh acid, rather coarse, winter. Strongly resembles Ohio Pippin. Probable the same.

Enis Winter Sweet—southern. Tree of moderate growth, spreading, productive. Fruit full medium, conic, green to yellow russeted; coarse, but very sweet—poor, late winter.

Farley Red—eastern Indiana. Tree upright, thrifty, rather slow, but very productive when older. Fruit medium to small, regular oblong orchard shaped, truncate, midwinter—valuable for market.

Ferdinand—from H. Robey, Virginia. Tree large, spreading, very thrifty, slow bearer. Fruit medium to large, white, somewhat russeted, acid; rather promising—winter.

Garden—southern. Tree of medium size, early productive. Fruit small, globular, dull red, striped, flesh dry but rich, early winter. Of little value and here named on that account.

Griffith—syn. Claybank and Sweet Maiden's Blush. Western Ohio from seed brought from North Carolina. Tree spreading, thrifty. Fruit medium to large, oblate, regular in form, and ground color closely resembles Maiden's Blush, white, ornamented with carmine spots. Flesh very delicate, tender, crisp, juicy mild sub-acid, aromatic. This is one of the very best and most delicious dessert apples of its season. With Spice of N. Y. following Jefferies, preceding De Watson and Bonam, we have five of the finest amateur apples of their season extending from August to November.

Green Crank—syn. Yellow Crank, which see.

Hall—Hall's Seedling, Hall's Red—from North Carolina, where it is much esteemed. Tree a moderate grower, upright, twiggy, productive. Fruit quite small, globular, red, striped, sub-acid, juicy, aromatic, kept, well, good, but too small for market, fine for dessert, may prove valuable for cider. I may mention that a lot of this fruit was sent to me from the orchard of a Mr. Hall in the southeastern part of Illinois, as a seedling with the local name of the owner.

Hamilton—southern. Not that described in Journal of Horticulture, February, eighteen hundred and sixty eight, and in the Horticultural Annual of the same year.

Tree close branching, upright, twiggy, not early productive; Fruit large, globular, regular, smooth, deep purplish red, stripes indistinct, dots with fawn color. Flesh yellow, tender, juicy, sub-acid, spicy, very good. Early winter—very promising.

Holladay—Virginia. Tree thrifty, upright, bears on the ends, no productive when young. Fruit oblate, regular, green, bronzed. Late winter.

Hunter—Pennsylvania. Tree thrifty, spreading, productive when old enough. Fruit large, globular, regular, white or waxen yellow, blushed, acid, juicy—September, October. Promising for market.

Huntsman's Favorite—Missouri, found in the orchard of John Huntsman, Johnson county, produced from seeds brought from South Carolina. Introduced to notice and largely planted by Blair Brothers of Lees Summit nurseries. Tree large, hardy and of rapid growth, upright when young. Fruit large, globular-oblate, slightly irregular, smooth, bright

yellow, sometimes bronzy. Flesh light yellow, breaking, tender, juicy, sub-acid, aromatic. Showy and very good. Midwinter.

Indian Winter—southern. Tree spreading, twiggy. Fruit oblate, somewhat russet, faintly striped red. This is a long keeper and closely resembles the American Pippin or Grindstone; to be further tested.

Illinois Greening—Tree vigorous, spreading, productive, an early bearer. Fruit large, globular, truncate, rarely blushed on yellow-green. Flesh breaking, juicy, acid, good. Midwinter.

Indiana Favorite—By no means new, but confined to a limited area, and unknown beyond. Tree vigorous, spreading, productive, and nearly perfect as a vegetable. Fruit full medium, oblate, regular, smooth, bright red on yellow, stripes indistinct. Flesh fine-grained, firm, breaking, juicy, mild sub-acid, rich.

Julienne—southern. Tree small, spreading. Fruit medium, conic, bright red, striped. August. Not so good as was expected, but will not be condemned until further trial.

Jackman's Sweet—Pennsylvania. Tree medium, spreading, productive. Fruit large, globular or oblate, regular, greenish yellow, faintly striped, pale red. Flesh firm, very rich sweet. Winter.

Ky. Streak—southern. Tree upright, open, productive. Fruit medium, conic-oblong, striped light red on yellow. Flesh whitish, juicy acid. Winter.

Laurens Greening—southern. Tree medium, twiggy, not early productive. Fruit medium, oblate, dull green to yellow. Flesh white, acid, winter.

Longstem of Kentucky. Tree spreading, thrifty, productive, bears equally over the top. Fruit large, oblate, smooth, handsomely striped and splashed on yellow. Flesh breaking, yellow, juicy, sub-acid, well flavored, early winter. Very promising, and in the market will go for Northern Spy.

Major—from the South, referred to Pennsylvania. Tree thrifty, spreading, productive. Fruit large, globular-conic, striped light red. Flesh rather coarse. Closely resembles Pennock.

Mangum—Alabama, not at all like Cheese or Castor. (Vide Downing.) Tree large, spreading, not early productive. Fruit full medium to large, oblate, dull red, stripes nearly lost.

Marshall's Sweet Favorite—Ohio. Tree upright, very productive. Fruit only medium, striped bright red. Flesh firm, very sweet, early winter. May prove valuable for cider and for stock.

Maverack Sweet—South Carolina. Tree upright, open, thrifty. Fruit full medium, conic-oblate, deep red, stripes lost. Sweet, late winter.

McDaniel—Premium seedling of Ohio State Fair eighteen hundred and fifty, from Green County, O. Tree thrifty, spreading, open, not early productive. Fruit large, globular-oblate, mixed light red on yellow, stripes indistinct. Flesh yellow, sub-acid, rich; autumn. Does not come up to the high expectations entertained for it by the awarding committee.

Monk's Favorite—Indiana, introduced by Dr. J. C. Helene of the State Board of Agriculture, described in Western Horticultural Review for eighteen hundred and fifty. Tree thrifty, spreading. Fruit large, conical to globular, with dark red stripes nearly meeting. Flesh coarse; unpromising.

Molasses Sweet—Tree spreading, very productive. Fruit medium to large, conic, regular, white or greenish white. Flesh tough, very sweet, valuable chiefly for stock and cider. Early winter.

Morton—origin unknown beyond Clermont County, O. Tree thrifty, large, spreading, productive. Fruit large, round, smooth, green to yellow, with bronzy blush. Flesh white, tender, juicy, rather sweet, refreshing, midwinter, promising.

Mote's Sweet—Miami County, O. Tree round, spreading, vigorous. Fruit large, globular, somewhat flattened, angular, smooth, whitish yellow, rarely blushed. Flesh yellow, fine-grained, melting, juicy, very sweet. October, one of the most delicious sweet apples.

The twin sister named *Celestia* was again tested the past season and maintains its high character as a dessert fruit.

Mote's Seedling 1872—same source. This fruit was first seen by me this season. Fruit globular, uneven, smooth, waxy yellow. Flesh tender yellow, juicy, sub-acid, rich, agreeable. November, very promising.

Northfield Beauty Crab—Vermont, from seeds of yellow Siberian. Fruit medium to large, globular, conic, very smooth, mixed and striped scarlet on waxy yellow. Flesh yellow, breaking, tender, juicy, acid, crab-flavored. September, October. Shown at Cincinnati Exposition and admitted to be the largest Siberian ever seen.

Nickajack—North Carolina. This old southern favorite, well known in Southern Illinois is here introduced not as a novelty, but because, like charity it has to cover a multitude of sins, in the nomenclature of nurserymen. The past season has enabled me to test the following named varieties, all of which bore Nickajack apples: Berry, Buff, Gully, Holly, Matamuskeet, and Wall. This apple is a great favorite in the South, where the need of a pomological school for consultation is shown by the extended synonymy of the variety which has twenty seven names!

The tree is vigorous, upright and spreading, with open top, reaching magnificent proportions, and yielding enormous crops. The quality of the fruit is indifferent, but as it keeps well, is large and showy, orchardists find it very profitable.

Osceola—Indiana. Described by H. Ward Beecher when editing the Western Gardener at Indianapolis. It is however little known as yet. Tree thrifty, spreading, productive. Fruit full medium to large, globular, somewhat angular, dull red, indistinctly striped. Flesh yellow, juicy, sub-acid, good January to March.

Phillips Sweet—Ohio. Tree vigorous, of beautifully regular conic form, productive. Fruit large, very handsome, conic, truncated, regular, striped bright red. Flesh white, breaking, juicy, sweet. October, very valuable.

Pine Strawberry—southern. Tree vigorous, upright, not very productive, when young. Fruit medium, globular-conic, striped light red on pale yellow. Flesh yellow, breaking, sub-acid, not very good, and for that reason brought forward, as it has been praised.

Pres. Ewing—Kentucky. Trees vigorous, thrifty, spreading, early productive. Fruit medium, oblate, regular, smooth, red mixed and striped on yellow. Flesh yellow, fine-grained, juicy, rich, sub-acid, good to very good. Midwinter, promising.

Raritan Sweet—New Jersey, rarely seen out of Ohio. Tree very thrifty, upright, not very early productive. Fruit large, oblate, regular, white, very sweet, honeyed. October.

Red-Ox—Pennsylvania. Trees from Kentucky, brushy, twiggy and mean looking, not early productive. Fruit large, conic, dark red on green, to yellow. Winter, very unpromising.

Red Sweet Spice—Ohio. Tree spreading, productive. Fruit medium, oblate, dull red, striped. Flesh tender, sweet, aromatic, rich. September and October, not valuable.

Republican—Tree very thrifty, spreading, large, not early productive. Fruit full medium, oblate, striped on yellow.

Is this Republican Pippin of Pennsylvania?

Roberson Red—Brought from Kentucky. Tree thrifty, upright, open. Fruit globular, distinctly striped red on yellow Flesh sub-acid, pretty good, winter. Not yet productive, planted twelve years.

Roberson White—from same source. Tree upright, thrifty, not early productive. Fruit medium, roundish, smooth, yellow. Flesh sub-acid. October to December, not very promising.

Sheepnose—(of Mears) from Clermont County, Ohio. This is an unfortunate name. Tree upright, open, thrifty, rather productive. Fruit small to medium, oblong, truncate, irregular, pale green to yellow. Flesh yellowish, breaking, juicy, rich, mild sub-acid; midwinter. Quality like white winter Pearmain. Dont scab.

Sillix—Pennsylvania. Tree upright, very productive. Fruit medium, oblong-conic, truncated. Flesh very yellow, breaking, juicy, very rich, sweet, October. Valuable for stock and for apple butter, and good to eat.

Shockley—Georgia. This somewhat famous southern apple has begun to attract attention north of the Ohio river. Tree a moderate grower, very upright, productive. Fruit medium to small, globular ovate, very smooth, bright red or scarlet, striped, very handsome, a long keeper, little better than Gilpin, but will take the market in spring time.

Smoky Twig—Kentucky. Tree branching, medium growth, very productive. Fruit medium, globular, truncate, dull red; a keeper, not attractive but may prove valuable.

Spice—(of New York.) Upright. Fruit globular to oblong, medium to large, smooth, clear white, very tender. Flesh delicate, fine-grained, juicy, sub-acid, aromatic, very good for table use, best, September, unfit for market.

Stromson's Winter—southern. Tree medium, spreading, productive. Fruit medium, roundish, striped red on greenish yellow; subacid, good January to April.

Stribling—southern. Tree small, spreading. Fruit medium, conic, very deep red, striped. Flesh dry, acid. August and September, not desirable.

Sweet Vandervere—Ohio or Pennsylvania? Tree spreading very twiggy, thrifty, not early productive. Fruit medium to large, oblate, dull red with indistinct stripes. Flesh yellow, firm, very rich sweet. Winter.

Taunton—southern Tree upright, thrifty, open, productive. Fruit large, globular-oblate, bright red on yellow, faintly striped. Flesh breaking, rather dry, acid. October, not promising.

Tanner's No. 1—western Kentucky. Tree thrifty, upright, rather productive. Fruit medium, oblate to conic, dull russety red. Flesh firm, acid, keeps well, coarse, not very promising.

Turner Green—Ohio? Tree small, twiggy. Fruit medium, oblate, regular green, acid not fully tested.

Trenton Pippin—origin unknown. Tree large, very thrifty, slow to bear. Fruit medium, conic, green.

Vaughan's Winter—southern. Tree of medium growth, productive; Fruit medium, globular-flattened, striped light red on yellow; keeps well, not very promising in appearance.

Walker's Pippin—Tree from the South, twiggy, of medium growth, productive. Fruit medium, globular, flattened or truncate, rich yellow. Flesh deep yellow, breaking, juicy, acid. December, very like Newark Pippin.

Waugh's Crab—southern. A sub-variety of Hewes' Crab. Tree less thorny, early productive. Fruit small, promises to be equally valuable for cider.

Whitney Russet—origin unknown. Trees from your well known A. R. Whitney, of Lee county, Illinois. Branching, rather open. Fruit oblate, angular, dull grey russet. Flesh greenish white, very fine grained, juicy, pleasant sub-acid, one of the best. December.

Willoze—Trees from Kentucky. Thrifty, upright, round-headed, quite different from Willow-Twig, not early productive. Fruit medium, globular, white, acid, early winter, not very promising and may be a misnomer.

Wonder—not Nickajack—southern. Tree vigorous, upright, open not early productive. Fruit large, globular, dark red, handsome winter, rather promising.

Yellow Crank—rather Green Crank, southern. Tree medium, twiggy, not yet productive. Fruit medium to large, oblate, green to yellow, acid, good, midwinter.

Zoar Greening—Ohio. Tree upright, thrifty, with deep green foliage, leaves large and persistent. Fruit large to very large, globular to oblong, green to white, rarely blushed; acid—October, November, promising for market.

The President called for reports from the standing committees, but as many of the members were late in coming to meeting, it was found impossible to take up the subjects in their regular order.

Mr. Grove Wright, of Rock Falls, gave an account of a series of experiments to demonstrate the influence of atmospheric electricity on vegetable growth. He held that the only effect of the passage of a current of electricity through any subject was decomposition. The passage of a current through the earth in the vicinity of the roots of plants would cause decomposition of some substances in the soil, and such a reorganization as would furnish plants food which did not exist there before. Mr. Wright has a theory of electricity, which he partially explained, and which, if true, would show that there is a daily and constant flow of electrical currents from the poles to the equator, which must produce a disintegration and decomposition of soils very beneficial to plant growth. The experiments given by Prof. Henry in the patent office reports for 1859—'60 were cited to show that there is an atmosphere of electricity surrounding the earth which is more dense near the surface, and rare in the higher regions; and all the phenomena of electricity are accounted for from the disturbance of this atmosphere, and its tendency to an equilibrium. There is, according to our physical geographers, a current of air constantly rising at the equator, flowing to the poles, and returning to the equatorial regions near the surface of the earth. This current would carry up with it electricity of the density at the surface of the earth; because the air is a non-conductor this electricity would be carried to the poles, and as it approached the earth it would be drawn from the air to the attraction of the earth and produce a slow discharge which would account for the Aurora Polaris. This electricity which is thus constantly flowing to the earth at the poles would pass through the earth to the equator, to supply the deficiency which is occasioned by the rising of heated air at that place. The passage of such a current of electricity *under* the magnetic needle would cause a variation of the north pole to the west in the northern hemisphere, and to the east in the southern hemisphere, at the time of its passage. This passage of the current on any meridian would be between 8 o'clock a. m. and 3 p. m. for the reason that the heated air is then rising at the equator, and the electricity would flow toward that point to supply the deficiency. Now, the fact is admitted that between 8 a. m. and 3 p. m the magnetic needle is deflected to the west, north of the equator, and to the east, south of the equator, from one to fifteen minutes. Such a perfect agreement of

theory with facts cannot be accidental,but must be admitted as evidence of the correctness of the theory. Each one can judge for himself of the effect of such a current of electricity upon vegetable growth by its disintegration and decomposition of soils. Mr. Wright claims that if this theory of an electrical atmosphere is correct, it will change the whole course of study in this department of science, and result in such progress as will soon leave no mysteries unexplained. The explanations of thunder-storms and tornadoes, according to this theory, are so simple that any schoolboy could understand them.

The President said, in regard to the experiments of promoting the growth of plants by passing currents of electricity through the soil at the roots, he had tried them and found them to be a humbug. He advised no one to try it, for it would be only labor and money wasted.

Mr. Bliss advanced some old fashioned theories of electricity for the purpose, as he said, of drawing out Mr. Wright's ideas. Mr. Wright, however, seemed to think that the old theories and his new one would not reconcile, and so he let the discussion drop.

MR. H. H. MCAFEE read the following Essay on Botany and Vegetable Physiology.

I am most happy to be enabled to report a marked and material progress in the educational system of our State. A point aimed at, and hoped for, by the best men of our State for years, has been reached, and we have the Natural Sciences in our schools. Concrete ideas will now have an opportunity to strengthen and stimulate the developing minds of our little men and little women, where before they were paralyzed and benumbed by the abstract ideas forced upon them before their time. If there is any one thing which the observing teacher sees more than another, it is that the young, undeveloped mind is frequently driven into a disgust with education, by being fed upon abstractions solely. The course of our schools, from monkish times down to our day, has been marked by the wrecks of intellects, which came into the world rich in possibilities if rationally developed, hungering for facts about things, and yet starved by premature attempts at ratiocination, theses, and reflective deductions, entirely unsuited to their time of life and powers of mind. While the best reasoners in the world have all along maintained that the elements of knowledge must come from things, and that the exercise of reasoning powers must follow perception and observation, we have been asking pupils to reflect, to judge, to weigh; in fine, to perform the operations of the mature intellect from the very beginning, instead of first teaching them observation, and letting the perceptive faculties act as a stimulus and support to the reflective faculties. What wonder that our schools are filled with children who were once bright babies, but are now either tolerable, or actually dull youths. It is, then,

a matter for congratulation, that our Legislature has been brought to make the teacher's qualifications embrace the rudiments of the natural sciences; and it is a further subject of congratulation, that the teachers generally have shown such commendable diligence in fitting themselves for this branch of their duties. At no time, since we have had a school system, have the teachers studied so much as they have since last winter. A whole army of men and women have advanced to a higher educational position in the past year, and in qualifying themselves to discharge their new duties, very many have learned what they did not really know before: that is, how really *natural* the natural sciences are; how pleasant their acquirement is, and what an excellent mental discipline they are; and, by contrast, how *artificial* the abstract sciences are. The formidable plea entered in favor of classical education, which has, time out of mind, been applied as a bar to the progress of the natural system of education, is that the classics, belles-lettres, higher mathematics, mental science (so-called,) are such excellent "mental discipline."

That plea is but a sham and fraud. A mental discipline for what? Teach a man to ignore and despise the present, that he may respect, deify the past; to turn from living, developing, magnificent nature, to embrace and love the dead, artificial past, even canonizing its sins as more to be revered than modern virtue; to educate a man wrong side to, and even wrong end up, so that his only ideas of progress are to ape what some dead man was, or has done; to cramp the intellect as the Chinese cramp and dwarf their children's feet. That is what is called "mental discipline," and from the which, "Good Lord, deliver us."

We have seen centuries of such kind of discipline, and the progress of these centuries has all been achieved in opposition to its spirit, and generally in opposition to the clamors, scoffs, and jeers of its devotees. The people have been in advance of the schools in sentiment, if not in attainment; and the world has progressed, for *that* reason alone. The "mental discipline" of abstract education is multiplying lawyers, doctors, professors, and gentlemen (so-called), who love their dignity and their emoluments, but who are seldom willing to adopt an idea, except it has had the sanction of some half-heathen of old times. The new education, which is now soon to take the place of the old, which, every sign indicates, is fast passing away, proceeds upon the principle that the knowledge most useful is that most fitted to be imparted, making utility the first condition. "What shall I learn first?" is answered by, "That which is the most useful to know." And the most useful knowledge for the youngest scholar is a knowledge of *things*, not thoughts. Cultivate the perceptive intellect, and the reflective intellect will naturally keep pace and grow with it; and the mind will be disciplined just as God meant it to be, when He made the babe and the youth the earnest inquirers they are.

"But is this a report upon Botany and Vegetable Physiology?" say you. As the greater includes the less in abstract philosophy, so the natural sciences include botany, and thus we have botany in our common

schools. And of what use is botany to the multitude, who must of necessity be content with a common-school education alone? Is this science to help the toilers earn bread, or the business man conduct trade, or the manufacturer build, fashion, and construct?

These questions are asked often, and more, they are generally asked in way that a shows that the inquirer is sure a negative must be given. And yet this science has an immense bearing upon every material interest in the world. Not only does the daily bread of man all come, directly or indirectly, from the physiological action of the plant, but all his comforts, all his luxuries, even his health and his very existence, alike depend upon vegetable physiology. Our interest in vegetable life need not stop at the point that vegetable substances are food of man or food of animals, which, in turn, are food for man; nor with the point that vegetation, directly or indirectly, houses and clothes us; nor with the point that vegetation constructs the hydrocarbons which, in their combustion, furnish the force to do the wonderful works necessary among civilized peoples. No, we may go a step further, and find that the trees, the grasses, and every herb of the fields act upon the atmosphere and the earth, they are making climate and building up soil; from the lichen, which helps the water and the atmosphere to crumble the rocks to earth, to the great tree, which is a reservoir of moisture for the parched air to draw upon, while it retards excessive evaporation form the earth beneath, which is at one time a source of supply of electricity, and at another a silent, safe conductor from the surcharged clouds, every plant has its meteorological influence, immeasurably small perhaps, yet definite and certain. Nations prosper or suffer respectively, just as questions of vegetable physiology turn out in their favor or against them. The potato, which has an influence impossible to measure, in cheapening living, and consequently labor, is a notable instance of how great an influence one plant may have upon the welfare and happiness of many peoples. And cotton, corn, and sugar-cane are like examples of great plant interests.

A general potato rot means starvation in Europe. And a general failure of the corn crop would soon mean poverty and bankruptcy here.

The waste of timber means barrenness to any country. Unhappy Persia sees it in her famine; and our worse drouths and worse storms are only the terrible forecast of what we are drifting toward, because of the same sin against nature's economy.

Then, can any one say that a knowledge of plants, their action on earth and air, their uses, their peculiarities, beauties, is a non-essential in a utilitarian education?

There are some hundreds less springs in this county (Stephenson) alone than there were twenty years ago, and wells have to be deepened every few years. This state of things is largely owing to forest denudation; not here only, but everywhere over the country.

Thus you see that the processes of vegetable life are intensely interesting, if we properly view the subject. And this subject is naturally connected with the rest of the natural sciences; with chemistry, through

the combinations and reactions of organic products; with geology, through the fossil remains and the mineralized hydrocarbons; with zoology, through the aliment and habitat of animals; with meteorology, through the influence of vegetation upon the climate, and so on. To only one class of people can I conceive that botany and vegetable physiology would not naturally be interesting and profitable, if well understood; and that is the class which is educated in the manner referred to above, so that their sympathies, their respect, their whole mind is fitted to the classical mould. They can have no use for botany; it is too modern. Homer did not sing of it, and his song of how a licentious prince set a lot of half-heathen by the ears, is vastly more interesting to them than is the question of how best to supply the nitrogen to growing crops.

But while we congratulate ourselves upon the thought that we have been making such substantial progress in legalizing botany in the common schools, we must reflect that there is a great probability that the botany about to be taught comes very far short of being the most useful part of the science. As text-books are now arranged, we shall have plenty of old Greek and Latin names, and a multitude of absurd technicalities in the same languages. Things which may be better described with simple English words are badly described in Latin, and while descriptive and systematic botany receive the greatest attention, the physiology of the plant is too much ignored.

The study of plants, so as to be able to classify them and ascertain their names, is but A B C of botany; beyond that is the knowledge of how they grow, how they live, what they produce in life and in death, and how they produce it, their diseases and their parasites.

Botany, as usually taught, is extremely superficial; as it should be, it is as deep as the life principle itself. There is a great, good work before some one—and I, for one, would be glad to see it done—and that is to compile a botany which would throw overboard the whole mass of rubbish in the way of technicalities, use English in descriptions, and tell what is known of vegetable physiology. It will be no light work to compile such a book; but it is a work much needed, and which should yield a profit to the author.

No thorough classical scholar can make such a book; he need not try, for the first thing he knows he will be copying the egotism of some of his musty favorites, and *making* the science instead of rendering it. As a sample of the natural science of a classical scholar, I saw within the year past a professor in a prominent institution, and by the way, the author of a work on botany, make a drawing of a grape-vine, and place the tendril in the axil of a leaf. And the same high authority declared that all plants have roots, stems, and leaves, when there are plants which are either rootless, or leafless, by the thousand. You see he was *making* his science—that was all.

But the great want in Botany is to have more to teach. The science, like all natural sciences, is cumulative; it is growing, and not yet

complete, and never will be. There is, then, as much need of investigations to demonstrate new facts, as that known facts be taught. We never should be satisfied to know so little as we do about botany. So it is our bounden duty to make use of the best means in our power to build up the science. And what is the best means? The patient, careful investigations of such men as are naturally and by the taste fitted to study, and seek out new facts. If such men can and will, for the love of science, carry on the work, very well; but if the work is not done by amateurs, then the expense should be borne by all, as the knowledge will be for the benefit of all.

At present, there is no system which has worked so well for the advancement of specific knowledge as the experiment stations of Europe; and, in my opinion, the time is ripe when the same thing should be attempted here.

The great universities which the national benefaction has built up seem to be, for several reasons, not the places where this work can best be done; and what we need for this work is not a school first, and a few field experiments incidentally, but the experiments first and as the principal matter, and then students to observe the progress of the experiments as an incidental consideration. How much there is in relation to plant growth that we need to know, it is hardly necessary to indicate to a horticultural society. The whole subject of plant-breeding, or intelligent control of offspring of plants, offers a magnificent field—a field as yet hardly touched, except by amateur observers.

In your Transactions of former years, as well as in the Transactions of the State Horticultural Society, and also the State Horticultural Society of Wisconsin, I have endeavored to draw attention to some of the important and generally neglected questions in vegetable physiology, which are yet only suggestions to the inquirer, and which need and deserve investigation. The horticulturist is shamed by the greater progress made in the art of breeding by the stock-raiser. *He* has, by intelligent selection, bred the horns nearly off his Durhams, while he has furnished them with a better digestive apparatus, and a carcass containing the minimum of waste. *He* has bred the nose nearly off the pig, and made him a perfect laboratory for the production of the hydrocarbons. *He* has called into being the wonderful divergence of forms in the pigeon, dog, and sheep. And all this has been done with design, intentionally. But what have we done in the way of breeding? Not very much, we must acknowledge.

True, friend Peffer, of Pewaukee, Wis., has proven some things, and he seems to have reason to believe that his experiments have taught him how to secure definite results at will. For instance, he has proved that by raising five generations of peaches, the parents of which were subjected to the vicissitudes of Wisconsin winters, the hardiness, power of resistance has increased, so that it takes many degrees lower of the thermometer to kill his fruit buds than sufficed to destroy those of the first generations. He claims, further to have learned the nature of the characters implanted by the respective parents in cross-breeding.

But the little light afforded by the experiments of such men as he only serves to give greater relief to the darkness which envelops us, and the more we know of their success, the more we wish to learn.

Then, again, the whole subject of plant nutrition is far from definitely settled as yet. Does the plant get its nitrogen from ammonia or nitric acid—who can tell? But I forbear. It would be no great trouble to indicate several hundred points of inquiry, all of vast pecuniary importance, the correct knowledge upon which would be worth millions of dollars in the aggregate, and the inquiries and experiments upon them will take years of patient study and care to demonstrate correct solutions.

Private amateur effort is not equal to the task. Shall we have the experiment stations?

Will the Northern Illinois Horticultural Society lend its influence to hasten their establishment?

MR. MCATEE having obtained permission to exhibit the result of some experiments with corn, said:

I have here samples of corn which have all sprung from one kind, namely, a pure white eight-rowed dwarfish corn which I have raised now for three years, and have been very careful to plant only white grains, though each year some colored grains *would* appear in the product. In eighteen seventy-one a manifest sport appeared, that is a stalk which was deep reddish purple, grains, cob, husks, stem, leaves, and even the pith, being strongly colored. In eighteen seventy-two I planted a square plat with these purple grains all from the same ear, and at the same time planted another square with the rose colored grains picked out of mixed ears. I wished to ascertain whether sports such as this one purple stalk undoubtedly was, would entirely revert to the original type or not.

When ripe, I found about one-sixth of the ears of the purple plat just like their immediate parent, that is purple throughout the plant; and the rest were all shades from pure white to the deepest purple, *but there was no mixture upon any ear*, each ear was in florists language a "self." The plat planted with rose colored grains picked out of mixed ears, produced mixed ears, every one of them, and though in some of them the rose color predominated, there was not a "self" colored ear in the square. Here then I think I have learned this principle in plant-breeding. "*Sports are inclined to produce "selfs" in color, while crosses and reverted forms have a tendency to produce variegation in colors.* I have been trying to improve the form of the ear of this white corn by judicious selection of the ears having the largest number of rows, and I think I am making progress, a larger proportion of ears appear to be of the required form than did formerly. *But I notice that the upper ear on each stalk retains the old form, and the improvement of form occurs in the lower ears every time.* Hence I judge that when we wish to change a plant by selection we should select from accessory buds as responding to our desire for change most readily, while the regular buds retain old characteristics with greatest tenacity.

HYBRIDIZATION OF PLANTS.

MR. MCAFEE then proceeded to give an account of some experiments in relation to the hybridization of plants. The different colored grains he said, in regard to corn, will appear although the self-colors are planted. He showed a deep red ear of uniform color even to the trunk and pith of the cob. This result he obtained from pure white corn. In this case no variegated colors can appear; they will be either white or self-colored. He then selected grains of variegated corn and planted them; all the produce was variegated. His object was to show that in hybridization all the colors were either self or variegated. Again he showed an ear of white corn containing a few yellow grains at the tip. These are the results of foreign pollen, they never begin found at the butt of the ear. This was to illustrate the influence of female plants, on even the husk and the grain. Therefore, to improve your corn, select the lower ear, that being always the nearest approximation to the genuine.

DR. PENNINGTON called attention to the subject of acclimation and hybridization. He said we know as little of this as of electricity. The most useful plants were exotics. They have been modified, as in the case of the peach, which he thought would yet be acclimated so that it will be grown constantly in this latitude.

Dr. Pennington warmly indorsed Mr. McAfee, and hoped that the subject would receive the attention of the Society.

On the subject of the acclimation of plants, the Doctor took the ground that the theory is a practicable one. He had no doubt that we would yet produce a race of peach-trees that would bear a greater degree of frost than any that we now had in our orchards.

MR. HARRISON objected to all these new things; he stood by the old, for these had proved valuable.

MR. DOUGLASS.—It is my belief from my experiments, that Siberian Arbor Vitæ is only a sport of the American Arbor Vitæ.

Mr. Douglass thought the gentleman did not understand the paper of Mr. McAfee, as it in no way prevented the classical gentlemen from going on with their old-time theories to their hearts' content. He was ready to learn from Nature as well as books, and did not wish to be shut out from new fields of investigation. Mr. D. went on to describe the very few changes in cross-breeding, or hybridizing, of forest-trees. There are a few sports; but these must be propagated by cuttings, as the seedlings are not like their sporting parents.

Mr. Rosenstiel pointed out the difficulty of growing any plant subject to crossing, to procure pure seed. He referred to growing of cabbage and turnip-seed side by side, and how the turnip ruined the cabbage, and so it was with the corn. The bees and the winds carry the pollen from flower to flower, and thus contrived to break down distinct varieties. It was, therefore, of great importance to have seed that is thus liable to be affected planted widely separated.

Mr. Schuyler was given permission to exhibit a process for drying fruits, which occupied the attention of the meeting till the hour of adjournment.

Among the objects of interest on the tables for exhibition to-day are several sections of European larch from the forest of D. C. Scofield, Elgin, showing a prodigious growth in thirteen years; a section of Scotch pine of thirteen years from seed growth, by Mr. Hill, of Dundee; thirty-eight specimens of forest-tree planting, by Arthur Bryant. Mrs. P. V. Hathaway, of Damascus, exhibited a fine collection of botanical specimens, and a curiosity in the shape of a nest of the golden oriole woven with amazing ingenuity out of worsted threads.

Adjourned till half past one o'clock.

AFTERNOON SESSION.

Meeting called to order by the president at half-past one o'clock.

Mr. Hawley by permission, exhibited the Ruttan principle for drying fruits.

Mrs. P. V. Hathaway read the following paper on Ornithology.

THE BIRDS.

BY MRS. P. V. HATHAWAY.

We are debtors to the birds. Even in winter, the Black-capped Titmouse, the Blue-jay, and several species of Woodpeckers, are busy searching for the eggs and larvæ of insects, and the Sparrows are eating up the weed-seeds. With each returning spring, come the flights of migratory workers. The plowed fields are flushed with the breasts of the Robins, and shining with the bronze backs and scarlet-crested wings, of the Blackbirds. Every plant-eating insect, whether in the form of egg, larva, chrysalis, or perfect insect, destroyed in the spring, saves the crop which it is liable to attack, whether grain or fruit, from the ravages of hundreds, perhaps thousands of destroyers later in the season. Of course this is not strictly the case with these slow-growing larvæ which require several years for their development, the white grub of the May

beetle for instance. But the destruction of a single one of these voracious larvæ often saves a valuable plant, sometimes several, from ruin.

Go out, if you will, and watch the birds a while each day. Certainly nothing could be more advantageous to their reputation, and nothing would be more likely to bring large money returns to mankind in the end. For if you look at the matter thoughtfully, you must become convinced that birds are indispensable to successful agriculture and horticulture.

Dr. Jenks of Massachusetts demonstrated by actual dissection to ascertain the contents of the crop, that the food of the Robin during March, April, May, and part of June, consists entirely of insects and their larvæ, mostly of very destructive species. During the latter part of June, and the months of July, August, and September, there is a mixed diet of fruit and insects, the insects being in large proportion. After July, the fruit is almost entirely wild, and even in June and July, the bird does not go to a distance to obtain the tame fruit. Late in the season his food is grasshoppers and similar insects. Dr. Brewer noted a pair of Robins which fed their young until they left the nest, entirely on cut-worms. The same fact has been observed by other eminent authorities. The domestic pigeon feeds its young very largely on canker worms, and no doubt the Turtle Dove and Wild Pigeon have been doing us the same great service, and have been blindly considered by most people as only good to shoot at. The Bluebird eats all kinds of insects, and has a preference for some of the most destructive species, as the codling moth and its larva, canker worms, and caterpillars. In the crop of an Oriole were found three hundred grain-weevils.

Last June I observed the rose-breasted Grosbeak engaged in destroying the potato bugs. Skimming lightly over the plants, he caught the insect, then alighted on the ground to finish it. Several gentlemen of my acquaintance whose farms are frequented by this bird, have noted that he is diligent in the work of destroying this insect.

A pair of Golden Orioles which I watched a year ago last summer, visited their nests with insect food twenty times an hour, and they worked from the earliest morning light until almost dark in the evening. The Robin visits his nest about as often, and generally with a beak full of insects. A pair of Kingbirds came over twenty times an hour, and usually with several insects at a time. The Woodpeckers visit their nests much oftener, indeed there seems to be a continuous stream of provisions passing in at the door of the dark nests in the trees.

This direct testimony is not the only evidence in favor of the birds. In Europe, where the whole subject has been more deeply studied than here, it has been observed that in certain districts where there was a marked decrease in the number of birds, there was a marked and dangerous increase of destructive insects. Vast sums of money have been expended to arrest, by hand-picking the insects, the work of destruction in valuable forests, but without avail. And it is well known that a reasonable number of certain birds, native to the country, and feeding

largely on the destroyer, but sadly thin in numbers, would have prevented loss. There has lately been a plague of insects in Paris and the adjoining country. This has been attributed by French observers to the destruction of birds during the siege. Facts bearing on the same point, and equally convincing, have been noted in our country.

Wherein then lies our remedy against those insect foes which threaten the forest, the fruit, and even the grain crops of some parts of our country? Our real remedy plainly lies in increase of birds. To accomplish this, there is but one way, better protection, a more tender care for the life of the bird. It is idle fear that even with the best protection that can be given, they will increase beyond the real demand for their services. There are so many dangers that beset, so many accidents that may befall the young birds, that it is not often that a pair of birds are able to rear a whole brood. There are snakes and quadrupeds ready to devour. There are a few kinds of birds, very useful themselves at other times, which do not object to eggs or young birds. A great many, especially in nests upon the ground, are lost during fierce storms.

But perhaps there is no other enemy which so seriously threatens the bird as the domestic cat. It is searching night and day, and eggs, young birds or old ones are equally acceptable. One often sees half a dozen or more lean, half-starved creatures at a single house. It certainly looks as if birds would not thrive well about such places.

The horticulturist, whether he wills or not, is one of the natural protectors of the birds. The deciduous forest trees and evergreens, the fruit trees, shrubs, and vines, are retreats and homes for the birds.

Is it feared that by an increase of birds a few more cherries and berries will be lost? We can raise more fruit, and raise it easier than ever before, for we shall not have to contest every plum and apple with the enemy. It must be plain to every one that the injury which birds have done to fruit during the last twenty years, would not equal the loss by the codling moth in a single season.

Because man plants must he reap all of the fruit? Must his energetic little helper never even taste? Man did not give life to the germ which he puts into the ground. He does not supply the sun-force that makes the plant grow green and tall, that paints the fruits, and fills them with delicious flavors. Let us kindly share these gifts of God with our winged helpers. It is but a pittance that they ask or take.

We are debtors to the birds for the music of nature. They are the voice of the hills and valleys, and the woodlands that can only rustle. On May and June mornings, I hear the quiet happy strain of the Meadow Lark, come up from the near lowlands long before the break of day. In the early twilight a dozen Robins sing, and as I walk, one flies so close that it almost touches my head. Among the low trees sounds the "E-er e-r te-dee-dee-chip-chip-dear-dear," of the little Field Sparrows, as clear and pearly as the dew drops themselves. Where the vines and willows droop along the creek the Catbirds are singing. Many a one of them has sung almost the whole night through. Perhaps

you do not know that in the white, moonlit nights of the last week of May, the Catbird is a real nightingale. I have heard him sing at all hours of the night from eleven until morning. With the broadening light, high up in the tree tops sounds the hilarious chorus of the Brown Thrushes.

Away in the woodlands the Wood Thrushes awake in the dim twilight. Their song is full of quiet joy and pure aspiration. I have known people who could talk the gossip of the hour with the clear voices of these birds about them. There are persons, no doubt, who would tell idle stories at heaven's gate. The little Nuthatch pipes softly. The Wood Pewee calls sadly, "Pe-o-wee! pe-o-wee!" But here comes one with a shining rose leaf on his breast, the Rose-breasted Grosbeak. His rich song, with just a touch of tender sadness in it, seems to float on the mists of the river. He loves the vicinage of water and is rarely found far from it.

We are debtors to the birds.

On motion, Robert Douglass, A. Bryant, Jr., and A. R. Whitney were appointed a committee on the President's Annual Address.

Mr. D. C. Scofield read the following paper on Timber planting.

TIMBER WASTE.

D. C. SCOFIELD.

Mr. President, Ladies, and Gentlemen:

Your Committee charged to report on "ornamental and useful trees" beg leave to present the following.

This phrase embraces a wide field; in fact all that may be said of trees, from the cluster that adorns the home-lot to the boundless forest.

Trees have been the theme which has animated the discussions, and imparted to this Society an importance and influence for good for which the generations of all coming time will call you blessed.

Your record is before the world. Born in Mt. Carroll, consecrated in this city to the high office of leadership in the onward progress of civilization, human happiness, and national prosperity, you stand before your country and world as the beacon-light, pointing to immortality.

You occupy to-day another stand-point in relation to this subject, from that of five years ago, when you met here in deliberative counsel for the first time, and discussed this great question; a question which expands and rises before you, year by year with amazingly increased importance.

Till then, but little had been said, and less done in regard to this matter. During a period of more than thirty years, the lumbermen of the country had sounded the alarm that the forests of this country were fast passing away, and that the requiem of their departing glory would be sung by the next generation. Yet no remedy was proposed, and none hoped, even for a rescue from the impending ruin.

The last of the pine timber on the Hudson had disappeared; the valleys and pine-clad hills of the Susquehanna, the Chenango, and Delaware had been nearly disrobed, the northern forests from Maine to Oswego were fast receding, tens of thousands of acres of the finest hemlock timber on the continent were annually denuded for the bark alone, and the timber left to perish.

This work of forest destruction was hastened onward to its consummation by the pioneers of the forest lands, till only a limited supply for the indispensable uses of the farm remained, and in some districts the same improvident waste continues.

In the progress of improvements, a new use for timber appeared.

Railroads with their endless demand began to sweep away what seemed to be a scanty supply, which with strict economy was scarcely sufficient for the present generation. Yet, this new mode of transportation has become an imperative necessity.

The forests melted away before them. Increasing with more than geometrical ratio from year to year until now, when there is more than sixty-two thousand miles of railroad track in the United States, which if extended one continuous line, would reach twice and one-half times around the globe, and require for one single relay of track more than one hundred and seventy millions of ties or sleepers, equal to twenty-four millions two hundred and eighty-five thousand seven hundred and fourteen annually; to supply which want more than one hundred and fifty thousand acres of the best timber is used, and every seven years in the aggregate, more than a million of acres of our finest forests are swept away.

Add to this, the enormous amount of the article consumed on the locomotives, costing yearly more than seventy-five millions of dollars, and the annual supply of more than two hundred and fifty millions of feet of lumber for railroad bridges, depots, and other structures, the lines of telegraph poles running parallel with every line of road, and you have before you the startling fact, that the wood of more than two hundred thousand acres of woodland is yearly consumed by railroads alone. Great as this railroad demand appears, yet the building of fleets of merchant ships, and vessels of war, the ten thousand lake, river, and canal boats, the building of towns, and cities, the untold amount of wood material used in the mechanical departments of industry, swell the amount to amazing proportions—nearly a million feet of lumber being used annually in the manufacture of one kind of sewing-machine alone.

Add to this, the the incomputable amount of wood and wood-material used by nearly thirty millions of the population engaged in farming industries, which in fact is greater than all other in the aggregate, and you have before you an array of wood consumption, the computation of which would make the strongest intellect to reel.

I forbear to dwell on the waste and utter destruction of one-fifth of our finest pine forests by the fiery deluge of eighteen seventy-one, of the conflagrations of the mighty cities of Boston, and Chicago, of towns

and farm buildings without number; the yearly destruction by fire and storm of fleets of ocean-ships, lake and river vessels, all, all gone! annihilated by one fell swoop of unavertable destruction.

Sir: The beginning of the end has come.

Let the increasing waste and destruction of this material continue in proportion to the increasing want of the accumulating millions of population, and consequent increasing improvements, in extended lines of railroads, manufacturing, and all other wood-wants; let Congress continue to forge bars to shut out foreign wood material, and shut us in to our limited resources a quarter of a century more, then the sun of our prosperity will stand still in the commercial heavens, the clouds of adversity will hide its glories, the onward march of human prosperity will fade away and be lost in one long and fearful night

Terrible as these statements appear, yet it is but a dim picture of the dark panorama of facts to which, if unaverted, we must soon stand face to face.

But, thank God, the star of hope has arisen and in response to the long and loud cry of alarm, a voice is heard from the four quarters of the land, "What shall we do?"

From the Department of Agriculture, from the President in his chair of state, from railroad companies, from every department of human industries, this inquiry comes.

Who is responsible for the answer? Who shall presume to lead in instructing the enquiring millions in a matter of such momentous importance, the result of which—if wise—will tell on the prosperity and well-being of the generations of all coming time?

I repeat—Who shall undertake this work? Who, more than you, should assume this responsibility? You, who have sounded so long and loud the alarm of desolation and ruin of a forestless, treeless country.

The great awakening for which you have so long labored and prayed has begun, and you are called upon to-day to answer; to answer wisely, promptly, and immediately, and send it abroad as wide as the enquiry has come.

This is not a time for adulation, or "folding the hands to sleep."

Then let *action*, immediate, determined, and unceasing action, be the watchword of this sixth anniversary of your consecration.

The eyes in your country are turned toward you, and may divine wisdom guide you in all your counsels.

Your committee therefore recommended the immediate appointment of a committee who shall report some plan, as in their judgment shall be most practicable, for the General Government to adopt, pursuant to the suggestions which appear in the President's message to encourage the planting of forests by the pioneer on lands where they do not exist.

Also a plan best adapted for states and railroad companies to encourage and aid the new settler within their borders, and on their lands to plant timber. Also, that they report the particular method of plant

ing and cultivate young timber-plantations, the varieties of trees to plant; some plan by which may be obtain the plants and seeds so cheaply as to come within his reach. Also, report an estimated cash value of such forest plantations at the respective ages of five, ten, twenty, and thirty years. Also the best timber to plant for railroad sleepers and telegraph poles; and the length of time required to grow them of sufficient size for these purposes. Also to urge upon Congress the importance of repealing the acts imposing duties on foreign forest-tree seeds and plants, also on foreign lumber.

All of which your committee respectfully submit.

D. C. SCOFIELD.
SAMUEL EDWARDS.
ARTHUR BRYANT, Sr.

THE LOCUST.

A. BRYANT.

The report of the Committee on Timber and Ornamental trees, read at the last meeting of this Society, contained notice of the most valuable and desirable trees suited to the climate and soils of Northern Illinois. In the present essay, it is proposed to recommend the resumption of the culture of the Common Locust, (*Robinia pseudacacia*) and to give some reasons for the opinion that it may be done with a reasonable prospect of success. It is well known that a few years since, a species of borer (*Ashopalus robiniæ*) peculiar to the Locust family, ravaged the State, making with few exceptions, a clean sweep of all trees of the kind. This of course discouraged its cultivation; and it may be doubted whether any locust trees have since been planted in the state. When the insect had completed its destructive ravages it disappeared; and the locust trees which have grown up from suckers from the old trees appear to be untouched by it. It was known in the Atlantic states as far back at least as the beginning of the present century; but its existence does not appear to have prevented the cultivation of the tree. Certainly the locust groves on Long Island are but little if at all injured by it. There seems to be reason to believe that if it should reappear in Illinois, it will be less destructive than heretofore. It appears to be generally true that in their first inroads upon a part of the country where they were previously unknown, insects and vermin of all descriptions commit greater ravages than at subsequent times. Thus the canker worm at its first appearance in the orchards of Northern Illinois about eighteen forty-five, did far greater mischief than it has ever done since, although it is still among us. The rose-bug afterwards overspread the country, and did much damage to fruit trees; but soon entirely disappeared. Many of course remember the plague of fleas, thirty or more years since, when they pervaded the whole land, as omnipresent as the frogs of Egypt.

It is unnecessary to enlarge upon the great value and durability of locust timber—they are already well known. The growth of the tree

is rapid, and a grove, if felled at the proper season, will reproduce itself from suckers. It is to be hoped that its cultivation may be again tried.

ARTHUR BRYANT.

ARTHUR BRYANT, SEN., read a paper on the same subject, mostly in relation to the destruction of the locust by the borer. His remedy was the planting of the black walnut, butternut, and other useful trees. The two named would not cost more than corn for four or five years, while ash, larch, and some others might cost for five years fifty to sixty dollars per acre. The planting of deciduous trees should be four feet each way, and conifers eight feet. He would plant the Lombardy poplar between the evergreens, in order to compel an upright growth, and, after a few years, cut out the poplars. The common black cherry is also a valuable tree. He would not use the black walnut as a screen to the orchard.

MR. L. K. SCOFIELD took decided exceptions to the planting of the poplar among the conifers, or, in short, among any other trees.

MR. BRYANT stated that the common sugar-maple was superior to the black sugar-maple for the making of sugar. Sugar may be made from the silver maple, and also the ash-leaf maple. The red or common soft maple is not common in the State, while the silver maple is common in almost all of our bottom woodlands.

In the planting of the European larch, they may be planted four feet apart, and not thinned until the trees are large enough for railroad ties, when one-half of the trees should be cut out. The matter of thinning must depend on growth and other conditions. That the larch is very durable, there can be no question.

MR. HILL, of Dundee,—an old larch-planter from the hills of Scotia,—stated that, in planting this tree, three thousand plants were planted to the acre. Plants, planting, and care for three years cost about twenty dollars per acre. One man can plant an acre a day. The plants should be planted very early, before the buds had started; yet it is possible to plant it at a later time in the season. The white grub is the worst enemy of new larch plantations.

A gentlemen suggested that the skunk would destroy the grub, if permitted to do so, and that this pleasant little animal should not be disturbed.

MR. HILL stated that the larch grown in Scotland was almost indestructible, and was much sought after for railroad ties. Samples of

tamarack, or American larch, were also shown; but it was stated that this tree made a very feeble growth on dry land, while the same land was well adapted to the European variety.

Mr. Douglass gave a concise mode of planting. The two main points are, to plant early in the spring; and, in planting, to press the earth firmly on the roots. This rule also applies to the planting of all coniferous trees.

Mr. Dunlap stated that he had planted three acres of the larch in the spring of eighteen seventy-one, and not more than three per cent. were lost in planting, but many plants were destroyed by the white grub. The cost of planting and culture was about twenty dollars for the two years; add to this thirty dollars per acre for the plants, and the total cost for that time is about fifty dollars per acre. He had a plantation of larch fifteen years old, standing four feet each way, that in no wise appear crowded, and they promise to grow in this close proximity for some years to come, and perhaps until they reach a size suitable for ties.

SECTIONS OF THE LARCH

Mr. Robert Douglass, of Waukegan, presented sections of the European larch. One was a section of tree thirteen years old, from the larch-forest of D. C. Scofield, of Elgin, of about one foot in diameter, showing an annual growth of nearly one inch. Another section of Scotch pine, from seed sown by William Hill, of Dundee, Kane County, was of yet larger growth. This wood bears a good polish, and, for finishing, will prove popular, as it is well adapted to the use of varnish. The Venice turpentine of commerce is extracted from the wood of this tree, which is pretty good evidence of its durability, as turpentine is a great protector of timber from decay.

Mr S. Edwards from the Committee on Timber Ornamental Trees.. Read the following paper:

TIMBER PLANTING.

Mr. President

From the many able and exhaustive papers, which have been read within a few years past, before this and kindred societies, it has seemed impossible to prepare anything new for your consideration on this great subject of Timber Planting—one which should engage the zealous labors of every patriot, philanthropist, or Christian—for the religion which is satisfied with anything less than earnest efforts for the highest physical well-being of the race, stops short of imitating the example of our Great Teacher.

The vast amount of timber products annually consumed is really beyond our comprehension, though we may make and write in figures approximate estimates. Enormous as the quantity is at present, there is good reason to believe it must rapidly increase. Much of the territory of the Eastern States which but recently had a supply for home use and even for export, is dependent upon other localities, until our region of country from which timber is being cut to supply our market, is rapidly being contracted in its limits.

Every year adds to convictions of the importance and imperative necessity of engaging our people in this work, and we should really be thankful for severe winters with terrific gales of chilling winds; these keen arguments may fall with telling effect upon our people, aiding us in arousing them in the name of humanity to now begin to plant timber.

Present low prices of farm products, with prices of lumber not materially lessened, may help to turn attention to growing forests, where returns for our labors are seemingly certain to be remunerative.

Several of the citizens of Bureau county engaged for a long time in stock-feeding by which they have accumulated ample fortunes, have begun planting forests of European Larch on their prairie homes, though they own a surplus of timber.

They are among our most cautious men and are confident of its proving to be a good investment

It will probably maintain its present position as the leading variety for general planting. It was my intention to have brought a specimen tree over forty feet in height, but want of sleighing prevented taking it twelve miles to railroad conveniently.

The more I see of its symmetrical rapid growth, the more does it commend itself to admiration.

We are all aware that where small sap-wood of it, when green, has been planted in the ground, it has (as any schoolboy should have been able to predict that this or any other variety of tree would,) very soon rotted.

The Black Locust is well known as a durable timber; yet under similar circumstances it rots very soon, as I have repeatedly proved.

It is well to advise early planting, before trees begin their growth in spring.

From my own experience, would advise fall planting, where a large amount of it is to be done and plants two feet or more in height are used. It would be best to turn a furrow to the trees to prevent their heaving out or other injury by frost. This can be leveled down in cultivating, with no extra labor.

White Pine, Scotch Pine, and Norway Spruce have been planted to the extent of six acres, and are highly prized for either timber or shelter belts

American Arbor-Vitæ succeeds finely on wet soils and Red Cedar on dry ones.

The Larch has proved with me a good nurse tree for evergreens. The American does not grow as rapidly or straight as the European.

The White Willow is being planted in groves to shelter stock, and for fences is growing in favor. Willows are used for live fence posts in Massachusetts—letting in rails as ordinary post and rail fence, when trees are four to five inches in diameter.

In Onondaga County, New York, I have known fence of this kind with Lombardy Poplar posts to last thirty years, which is longer than that tree lives in Bureau County.

A neighbor planted in 1863 a hundred rods of small cuttings of white willow for fence; it is a good one as protection against cattle. They were cut down to three and a half feet last spring, yielding as he informed me, fuel for a year, besides material for a corn crib and other uses; one load or more were sold for stakes six feet in length, with which a live fence is made immediately available.

This style of fence is growing in favor. The hedge can be cut in three years, from present appearances, giving as much material as at the first cutting.

The Tulip trees planted in 1846 on both high and low land, heretofore highly esteemed as a valuable timber tree, are now over fifty feet in height. Last spring it was found that they were seriously, and it is feared fatally injured, probably by the combined operation of drouth and excessive cold.

The Chestnut succeeds well on high land, and it is desirable for every family with proper soil to have a few trees of it, but I cannot recommend it as a variety for general planting on rich prairies; have fears that many will be disappointed who are being induced to plant it.

Ash-leaved and Silver Maple are rapid growers, being planted largely.

The Oaks, Walnuts, Ashes, and Hickories should all be largely planted—any trees except Lombardy and other poplars. I would allow some of them on waste lands if compelled to use them or none.

Our State and district Horticultural Societies are doing a great work, agitating the public mind on this subject, but we need the active labors of every one alive to its importance, in holding primary meetings in every school district.

How many of our people know how to properly plant and cultivate trees?

How very few are fully convinced that timber-growing is one of the most profitable uses for which land can be used?

I was glad to see the humanitarian sentiment manifested in the call for this meeting, with reference to this subject, that we are expected here to inaugurate a glorious revival.

In going to our homes, may we carry home the spirit here exhibited—no longer from false notions of modesty hide our light under a bushel, but show a heartfelt interest in our endeavors to save our land from the terrors which seem certainly to await us, unless we now step forth manfully and avert them.

Mr. H. H. McAfee offered the following resolution which was unanimously adopted:

Resolved that the Northern Illinois Horticultural Society, believing that the interests of Agriculture and Horticulture deserve every assistance and encouragement from the governing power, and recognizing the immense value to general science, as well as the valuable assistance rendered to the productive interests of the investigations of the European experiment stations, (Versuchs Stationen), we earnestly ask the Legislature of Illinois to consider the propriety of establishing three or more experiment stations in different parts of the State to be devoted to investigations in scientific subjects connected with Agriculture and Horticulture, (and to be connected with the Illinois Industrial University.)

Mr. S. Edwards offered the following Resolution which was adopted unanimously.

"*Resolved* that we deem it highly desirable that the number of Students of the Industrial University be limited to one from each Congressional District and that they be elected by the people."

Adjourned to 7, P M.

EVENING SESSION.

Mr. Jonathan Periam addressed the meeting on the subject of growing Vegetables, which was discussed by Messrs Galusha, Hill, and others.

Mr. H. H McAfee read an essay on Vegetable Physiology as follows, which led to a general discussion as to what are species and what varieties

VEGETABLE PHYSIOLOGY

All facts concerning growth the action of various organs; the germination of seed; root absorption; leaf absorption; elaboration, change and use in the vegetable structure of organized matter; the reproductive function and embryonic growth of the young plant; and finally, the processes and products of the decay of plants are embraced within the province of Vegetable Physiology.

In fewer words, it is the consideration of every process in the life or death of the plant, as well as the causes and results of those processes.

The magnitude of the subject is as great as the many interests which connect man and the other animals with the vegetable world.

As vegetation stands between animal life and inorganic matter, the connecting link, capable of taking such inorganic matter and building it up into new chemical combinations, suitable for the nutrition of animals, we see that the physiology of the plant is the very basis upon which rises the whole fabric of animal existence. The plants devour the earth, the very rocks, and the gases of the air, and organize them into forms which serve for the food of animals, which in turn become food for other animals, indefinitely.

Nowhere in the researches of science is man brought more squarely and clearly face to face with the working of that wonderful, mysterious, incomprehensible force which we name the vital force, or life principle, than he is when he observes the beginning of the life of the plant.

And right there, where the very simplest form of plant life, the single cell, stands on the boundary between dead matter and vitalized matter, the two forms of organic matter, the animal and the plant, seem to meet. The simplest form of plant life is the single cell, increasing its numbers by gemmation or budding; and the simplest form of animal life is also the single cell, which also generates its young by gemmation or budding.

The unicellular plant and the unicellular animal are so near alike that the best of naturalists are yet confused and nonplussed, when they endeavor to work out the dividing line between plants and animals.

And the history of the plant of most perfect organization seems to be but an epitome of the long gradation of advance from the unicellular plant up to the perfect plant of to-day. A mass of nitrogenous matter, called protoplasm, a cell-wall to contain it, that is all we find in those primary forms. Reproduction is carried on by gemmation or budding, that is, by the formation of a minute cell upon, or near the surface of the parent cell, from which it parts to take up a separate existence and become in turn parent of many more gems or young cells.

In such a case the procreative element by which the young of the species are called into being is a unity; it is a-sexual, there being no such thing as gender about the plant.

It is only when we have ascended a way in the scale of creation that we find the young plant springing from two parents; and when we have come to this point we find flowers and seed first appear.

A new affinity, a new attraction, a new fitness of individual for its fellow comes into play when the peculiar form of buds which we call seeds are first formed.

The youngling is no longer the offspring of one parent, but it is a compound offspring, having two parents; reproduction which in all simpler forms of plants is a-sexual now becomes bi-sexual. We stand upon pretty firm ground when we assert that all living forms originate in either single cells (a-sexual reproduction) or in the union of two simple cells, the pollen cell, and the ovule, (bi-sexual reproduction). And in the higher plant organizations, the phenogamous, or flowering plants, both systems of reproduction exist; the a-sexual function is retained and the bi-sexual function is added to it. Every bud is a young plant generated a-sexually, while every seed is a young plant generated bi-sexually; and the spores of the cryptogamia are to be classed among the gems or a-sexual reproductions.

Bearing in mind these distinctions, we gain much light upon the apparently obscure subject of plant variations. The bud, the offspring of one parent will be the continuation of that parent in all properties, characteristics, and peculiarities, as a general rule, and unless some casu-

alty occurs in the life of the parent, or at the time of the origin of the bud it will always remain practically the same. We graft and bud for generations of single plant lives and still the distinctive characteristics of the subject remain with no great apparent change, except perhaps a weakening of vitality.

But the exceptional phenomenon of bud variation occurs often enough to show that the a-sexual young *may* be different from the parent, if the proper influences are brought to bear to change them. What influences are necessary to cause a plant to produce sporting buds, no one exactly knows, but they occur, and occur most frequently in plants which are furthest removed from their natural habits by high culture, change of locality and climate, and former crossing or hybridizing.

While bud variations are comparatively rare (though they are very much more common than is generally supposed) the variations from parent forms which appear in seedlings, are so common that for many plants to breed true is a rarity.

The seed is made up of two elementary principles or forces derived often from two separate plants, each of which is liable to be so influenced by surrounding conditions, that it shall permanently impress upon its offspring traits of character not discoverable in either parent. The bud on the other hand has only the one parent to inherit from, and only the most serious circumstances can impress the parent to produce the sporting bud.

Now what occurs in crossing and hybridizing? Here are not only the two parents but they are more or less dissimilar in forms or characters, hence the union of their elements may be more or less unequal in any one or more of a thousand different ways. This unbalancing of the constitution may cause to appear what seem to be new traits of character, but really what may be peculiarities which existed in either parent but more masked or modified by other prominent habits.

Crossing leads to a multiplicity of variations, and just as the cross is more or less a violent one, (between very dissimilar forms) the variations will be more or less pronounced or more or less numerous.

Hybridizing, (the intercrossing of species) more violent yet, often so shocks the vital force that the procreative function is lost. The plant fails to breed and is only reproduced from buds.

Greatly to our shame as a nation, with all our princely endowments for the aid of the rural science education, we are yet doing nothing to gain an insight into the immense subject of plant-breeding, at least I have not been able to hear of any fair series of experiments undertaken with a view to develop such knowledge.

True, a few of us who cannot afford the outlay of time and means, do, in enthusiastic moments, try to pry away into the secrets of Nature's laboratory, but generally the work is too great for the force applied, to achieve much.

My friend Peffer, of Wisconsin, has dug out some interesting facts in plant-breeding which I hope he will favor us with, as they are the best fruits of careful, long continued labor and observation.

MR. MCWHORTER wished to ask Mr. McAfee what he understood by the term "species"?

MR. MCAFEE replied, that as the best scientists scarcely ever agreed upon the definition of this term, he considered himself at liberty to frame a definition to suit himself. So he defined a species in botany to mean any form of plant which constantly breeds true, reproduces itself without variation, except it be at rare intervals. He believed species might sport either as seedlings or by bud variation, but would call a plant much given to sporting and having no great fixity of character a variety; when the character becomes fixed, permanent, not changed, it would be a species. With Dr. Asa Gray's definition in his lessons in botany, where he says, "Hence we must conclude that species are separate creations," he cannot agree.

MR. MCWHORTER stated that Dr. Gray has modified his views of species, and that he now believes them to be fixed varieties.

MRS. LOOMIS, of Freeport, and A. BRYANT, SR., of Princeton, and J. PERIAM, of Chicago, each questioned the propriety of Mr. McAfee's definition, but on being asked for their own definition of species, each declined to define.

MR. A. G. TUTTLE, of Baraboo, Wisconsin, addressed the meeting on Hardy Varieties of fruits for the Northwest. He finds the same varieties grown in Wisconsin as in Northern Illinois. Spoke very highly of Walbridge apple: very prolific, good keeper, fine quality. From March to May quality not equaled by any other grown in the West.

Adjourned till Thursday, A. M. twenty third.

THURSDAY,

Session opened with prayer by Mr. S. Edwards, Sen.

G. S. Peffer, of Wisconsin, addressed the meeting on Hardy Varieties of the Apple as grown by him at Pewaukee, Wisconsin.

HARDINESS IN FRUITS AND PRINCIPLES OF PLANT BREEDING.

Mr. President, and Brother Horticulturists:

This is the first time I have gone from home, out of my own state to attend such a meeting as yours, and I am here on this occasion in the hope that by comparing notes and discussing principles we may all receive benefit, each teaching and learning in turn, the useful knowledge which may thus become common property.

I have been much pleased with the essays and discussions thus far,

and more particularly with some of the remarks of last evening. Having been called upon at that time to speak of my experience I promised to do so more fully this morning, and especially in support of the principles then laid down by Mr. McAfee on the subject of crossing and Hybridizing.

Many varieties of plants will fertilize themselves and will reproduce themselves, and especially is this true of plants which have both male and female organs in the same flower, but to become self-fertilized the plants must be isolated so that crossing is not possible. As was said last night the apple may produce seedlings just like the parent, but to do so it must not have any opportunity to receive pollen from another tree. Of the first apples raised in my orchard, when there was not another blooming apple tree within two or three miles, so that pollen of another variety could not come to the flowers, the seeds produced trees which bore fruit identical with the parent. That is, seedlings from a black Gilliflower bore true black Gilliflower apples. But at the second fruiting of that black Gilliflower tree, when other trees in the same orchard began to bloom, the seeds were crossed, and trees raised from them were of mixed sorts of apples. These crossed fruits sometimes resembled the parent apple in form and appearance, but not in flavor, texture, keeping qualities, or time of maturity.

On the subject of hardiness there is not very much to be said. The samples I here present for your inspection tell a plain story. Even the hardiest varieties of fruit if tried by such winters as the present, or as those of 1864—1865 and 1856—1857 may sometimes fail, especially if from the nature of the preceding summer the wood was not fully ripened in the fall. These samples show the discoloration which follows hard freezing, and in proportion to the discoloration the tree is more or less injured. Wood that has the most sap in it in the fall, or which is not perfectly matured and ready for winter, suffers with a less freeze than would affect the better ripened wood.

Mr. Tuttle remarked that the fruit raisers of Minnesota think they can raise all the kinds of fruit that we can. They may try to do so, but in the end they will have to do as some of us have done, and are doing, that is keep trying to see if they are hardy enough to stand, and then reject the tender ones as fast as we find them out.

The varieties for the Northwest must be such as will go through the hardest winters, as these samples of Duchess of Oldenburg (best), Tetofsky, Alexander, etc., which I show you, have done this winter. The hardest seasons are the true test, and the fruits which withstand their severity are worthy of our confidence.

Here I have, along with the samples of hardy apples, some wood which shows plainly that it is either half-hardy or tender, for instance, the Rhode Island Greening and Fall Pippin you can see are entirely frozen to death, and they may well be called tender, for although top marked on hardy seedling stocks they are killed nearly to the place of union with the stock.

Mr. Peffer exhibited wood of a large number of varieties of apples to illustrate his position that the extra severe winters like the present, will cull out everything except the very hardiest kinds. (*Asst. Rec. Sec.*)

The *only true way* to have hardy varieties is to raise them from seed, saved from hardy parent trees. It is easy to tell at any time whether a tree is perfectly hardy in any locality, if the tree is old enough to have stood the test of the extraordinary seasons mentioned above. Select a limb old enough so that its growths will count back past any of these severe terms and then count the rings inward from the bark till you have the growth of eighteen hundred and sixty-four or of eighteen hundred and fifty-six or of eighteen hundred and sixty-nine or of eighteen hundred and seventy-two, and observe if the growth is discolored or any way injured. If it is not injured you may be sure that it will take a worse season than the one you have counted back to to hurt it. Now if the fruit of this tree that is proved to be hardy, and that of all the trees near by, which might pollenize it, is also good, you are safe to let seedlings from the seeds of the selected tree come to bearing size, for the chances are that you will get some new varieties which are both good and hardy, but if the new sorts should when fruited prove inferior, you lose but little time, for they may be top marked into better sorts.

Any youngster can be taught to graft and so any one can be taught how to raise seedlings by artificial crossing or fertilizing, with a fair chance of raising fruit to his own liking.

I think the time is not far off when this bleak northwestern country will raise more *good* fruit than the middle and eastern states, but the fruit must be of different varieties from those grown at the East, that is, varieties produced here and specially adapted to all the conditions of the climate.

I have here samples of fruit of which I know the parentage; and the characteristics of the progeny are such as bear out my theory of the influence of the respective parents upon the offspring. The seed which produced the Pewaukee was saved from a Duchess apple, those which produce my No. 17 and 14 from Clark's Orange, those which produce No. 1 and La Belle from Tallman Sweet, those which produced Allen Russet from golden Russet, etc.; in each case the hardiness of the mother tree is almost exactly reproduced in the seedling, while the quality and flavor vary as the male parent varies.

These varieties we raised from seeds selected and saved in our early days, when fruit was a rarity in Wisconsin and we had not the experience we have now. Those we raise now, we can tell by knowing their parentage quite nearly what they will produce.

To improve varieties of apples by crossing we must choose for the female parents, the style of tree, the size of fruit, and the hardiness we desire; for the seedling will have a tendency to resemble the mother tree in those respects.

For the male parent select the trees which, in time of maturity of

fruit (earliness or lateness,) flavor of fruit, and productiveness, meet our requirements.

A jar of glass or a paper bag should be placed over a spur or group of spurs of the male parent tree just before the flowers come to perfection, (just as they are opening). Then a spur of the female parent tree which the jar or bag will go over should have the anthers removed from the flowers before they are fully open and early in the morning. The jar or bag which should have covered the spur, it was on over night, should then be taken together with the spur in it, and put over the spur from which the pollen sacks have been removed a few minutes before. Close up the jar or bag, and as soon as the dew has dried from the leaves, disturb or shake the jar or bag and it is all done.

I must tell you of an experiment I tried in the year eighteen hundred and fifty-seven. In eighteen hundred and fifty-six we had a very large crop of fruit of all kinds in our garden of one acre, twenty varieties of apples, eleven of pears, forty-two of plums, one of apricots, one of quinces, three of grapes, one of peaches, three of crab (Siberian) apples. The winter following was as hard or harder than the present one. All the tender varieties died, and the idea struck me that as those varieties which were not hurt by the severe winter must be the hardiest, I had better save seeds in hopes of getting hardy seedlings.

I had three Westfield Seek-no-Farther in one row; beside the first tree on the east (twenty-two feet away) was a sweet seedling, bearing fruit of fair size and good keeping qualities. This last tree bloomed very profusely. On the north was a Golden Crab, on the west a Baldwin, and in the next row (west) a Dominie (forty-four feet away), and on the south another Westfield Seek-no-Farther. The Baldwin died in the spring, so it did not blossom.

Thus the trees on each of the four sides were of different varieties. I saved the seeds which came out of one of the nicest of the Seek-no-Farther apples. It had eleven seeds which appeared good, and from these I raised nine yearling trees which I set out in my orchard in eighteen hundred and fifty-nine.

They have all borne fruit for four or five years. Seven of them are sweet apples (good keepers), but of no account, as they are too small.

One is part crab (Siberian). The best one of the lot is a fair sized fruit and resembles the Dominie in shape, and in form of calyx is just like it, in flavor not quite so acid, but the flesh is more yellow, quite firm, sprightly and crisp, keeps about the same as Dominie. So out of the seeds of one apple from which I have nine bearing trees, seven I know had the seedling sweet apple for their male parent, one was sired by the crab, and one by the Dominie, and none of them are true Seek-no-Farther like the mother tree, although the tree at the south was of that variety. This case shows me that seedlings are made up of their parents, but, though other pollen is plenty so that other seeds growing in the same capsule may have been fertilized from other trees, only the pollen from one variety can act upon a stigma so as to fertilize a seed.

So though all the seeds in one apple may be different one from the other in such characteristics as are inherited from the male parent, they will yet all take after the female parent in hardiness, shape of tree and size of fruit.

Mr. Peffer further stated that the stigma of the apple is ready for impregnation some time before the pollen sacks in the same flower are ready to open so that self fertilization becomes the exception and cross fertilization the rule where several kinds of apples grow near each other. Hence it is a rare case that apples are produced like the parents. the earliest flowers open being less likely to mature fruit than are the later blooms, and those early flowers are the only ones likely to be self-fertilized. Mr. Peffer's many and careful experiments furnish us with another case where amateur effort is procuring valuable knowledge of vegetable physiology all the time, while the aristocrats of science are merely speculating and guessing, instead of going to work like Mr. Peffer and proving by actual experiment. (*Asst. Rec. Sec.*)

S. G. MINKLER presented the following report on Fruit Trees:

Mr. President, Members, and Friends of the Northern Horticultural Society:

Your Society has made it my duty to make a report as one of your committee on Fruit Lists.

I am at a loss to know what I am to report. whether on varieties or the crop in general. I conclude the latter. Therefore I must say that this year, like the preceding, has been one of the bountiful years in horticultural products. This year also, like the preceding, has been the *driest* of the forty years of my residence in Illinois.

The APPLE crop in the Fox River Valley has been very fine, indeed I think the finest, that I have ever known. Not more plentiful than last year perhaps, but exceedingly exempt from insects. The early varieties of apples were exceedingly free from codling moth.

I remarked to a friend that Mr. Wier's codling moth trap had caught all the insects. He expressed his purpose to find them so fine.

The winter fruits were somewhat affected though not as much as last year. The early apples brought a good price. But the late summer and fall apples were a drug on the market; in fact they were sold for twelve—twenty-five cents per bushel. And I have seen men peddling from house to house in the city of Aurora with apples in one end of the wagon and a barrel of cider in the other, half bushel measure in one hand and a gallon measure in the other, trying to find customers.

And hundreds of bushels, yes a thousand, rotted on the ground or were fed to stock. Barrels could not be obtained to put cider in, and no sale if you could. But things have changed. Winter apples are in good demand at one dollar per bushel, and have been since November.

Brethren, I am convinced that we have planted too many summer and fall varieties.

The PEAR crop was very unsatisfactory; trees blighted badly, and I could see no difference between grafted trees and seedlings in that respect. I am about discouraged in planting pears.

CHERRIES.—The cherry crop was beautiful; perfectly free from the curculio. And they remained on the trees a long time without deterioration; probably on account of the weather being so dry.

STRAWBERRIES.—Strawberries have been a light crop on account of the dry weather. Prices remunerative.

There is not half the breadth in cultivation there was two years ago.

CURRANTS AND GOOSEBERRIES.—A light crop.

Since the above was written, I have examined the nursery stock, and find no bad effect from the severe cold of this winter, except the peach wood is badly discolored. Probably the reason is that we had no warm days to excite the sap previous to the hard freeze.

Respectfully submitted,

S. G. MINKLER.

On motion of Capt. E. H. Beebe, of Geneva, the following amendments to the constitution were adopted.

Amendments to the Constitution.

ARTICLE FOURTH.

The officers shall consist of a President, four Vice-Presidents, one Corresponding and two Reading Secretaries, all of whom shall be elected at the Annual Meeting, and shall serve for one year from the first of February, and until their successors are elected. An Executive Committee to serve for one year, and until their successors are elected, shall consist of the President and four Vice-Presidents, three of whom shall be a quorum for the transaction of business.

The above shall be substituted for Article Fourth of the Constitution.

Addition to By-Laws.

SECTION viii.—Persons reading papers shall be restricted to twenty minutes of time. Speakers shall not address the Society more than twice on the same subject. The first time to occupy not more than ten, and the second not over five minutes, unless the Society shall order otherwise.

On motion of S. G. Minkler, the following resolution was adopted:

Resolved, That it is the sense of this meeting, that all fruits should be sold by weight.

Dr. WM. LEBARON, State Entomologist, was introduced, and addressed the meeting as follows:

This meeting of the Northern Horticultural Society, occuring as it does, about midway between the busy portions of two seasons, furnishes a very suitable time wherein to take a retrospective view of the experiences of the past, its successes and its failures, for the purpose of drawing lessons therefrom, for the guidance of the future.

These retrospective views are always very useful and interesting with respect to my own special department of practical entomology, because no two seasons are alike in this respect. Noxious insects in their prevalence, surge forward and backward, like the waves of the sea, one year overwhelming us with the most serious losses, and then leaving us perhaps for a number of years comparatively unharmed.

Insects vary extremely in the method and the degree of their prevalence. Some, like the codling moth and the plum curculio, are always with us, but varying more or less in abundance from year to year. Others, like the Hessian fly, the chinch bug, and the army-worm, come upon us at longer or shorter intervals, being swept away in the interims either by adverse climatic influences, or by the agency of natural enemies, or, in extreme cases, by our abandonment for a season or two of the damaged crop. Some, like the oyster-shell bark-louse, seem to be undergoing a slow but sure process of extinction; whilst others, like the grape-leaf and root-louse, may be insidiously increasing upon us, as its representative in Europe has already done to a very serious extent.

The astonishing multiplication of certain kinds of insects in particular seasons is well calculated to excite both our wonder and alarm. Scarcely a year passes that some destructive onslaught of this kind does not occur. Last season the famous army-worm overran various portions of the country, especially northern Wisconsin, and several of the south-eastern counties of Iowa. These insects are so called because they march like an army of soldiers, all in one direction, turning aside for no obstacle. At Peshtigo many wells were rendered useless by reason of these worms falling into them by the thousand, when the variation of a foot or two from their straight line of march would have carried them safely past. Three years ago the tent caterpillar of the forest swarmed in such profusion in southern Illinois and in Kentucky, that in several instances railroad trains were reported to have been stopped by the myriads of these insects swarming upon the road, and greasing the rails with their crushed bodies.

Both of the caterpillars just mentioned, however, are usually restricted to small sections of territory, sometimes involving but two or three counties in their ravages. Far different is the case with the notorious chinch bug, which, year before last, swept over forty thousand square miles of territory, and was estimated to have destroyed thirty millions of dollars worth of spring wheat and barley. You all know what chinch bugs are, and most of you have probably seen them accumulate in particular localities, so that you could shovel them up by the half bushel.

I have just said that the enormous multiplication of these and some other insects is well calculated to excite our astonishment. The question which naturally occurs to every one is, where do these legions of insects come from so suddenly? for it sometimes seems as if the very dust under our feet had become vivified into crawling vermin. The answer to this question is to be found primarily in the enormous prolificacy of certain species of insects, the females of some species being known to lay five hundred eggs or upward. It would also undoubtedly be found, if we had traced the matter carefully, that the increase has not been so sudden as it appeared. They do not really spring out of the dust, but must all have come by a regular process of generation. A certain species of insect may be pretty numerous one year, but not sufficiently so to do serious damage, or

excite particular attention, but come to multiply them the next year by five hundred, or even two hundred and fifty, supposing but half of them to be females, and we become painfully conscious of their presence.

The insects which I have just named, however, are not those which are to-day of the greatest interest to the horticulturists of northern Illinois. The two insects which I believe have the highest claim to this distinction, are the oyster-shell bark-louse and the canker worm. These are both long known insects, but to each of them a peculiar interest attaches at this time, and especially in this northern section of the State.

The oyster-shell bark-louse, which was formerly the worst scourge which the apple orchardist had to contend against throughout all the northern states, has been, for a considerable number of years past, apparently in a process of gradual extinction. This is emphatically a northern insect, never having been known to do much damage south of the thirty-ninth parallel of latitude; and for a considerable range north of that line, this insect does not appear to flourish. Mr. Walsh, in his report of 1868, speaks of having received apple twigs infested with bark-lice scales, from as far south as Macoupin county in this State, but he found that under most of them the eggs had been destroyed, as he had reason to suppose, by acari, or mites.

Farther north, in the latitude of Chicago, another minute parasitic enemy of the bark-louse is found to prevail, which is more destructive to it than even the acari. This is a beautiful little chalcis fly, less than the twentieth of an inch in length, of a lemon yellow color, which your speaker had the pleasure of discovering in the fall of 1870. This fly is so minute that it would in all probability have escaped our notice, were it not for the fact that after its larvæ has devoured the eggs of the bark-louse under the scale, the perfect fly makes its escape by cutting a perfectly round hole through the scale, and these holes constitute indelible marks which last for several years, that is, as long as the scales adhere to the tree, and which thus enable us to estimate with mathematical certainty what proportion of the bark-lice are by this means destroyed. It appeared from observations made in the counties of Kane and DuPage, that more than half of the bark-lice had been destroyed by the larvæ of this minute fly.

The great difficulty in contending with bark-lice has arisen from what might be called their centrifugal instinct, that is, their disposition to disseminate themselves outwardly upon the terminal twigs, where our destructive applications can but very partially reach them. But where man, with his clumsy appliances is baffled, these tiny parasites are in their element. They follow their victims, as weasels follow rats, to their ultimate resorts, and having found them, they adhere to them with a more than brotherly tenacity. They enter the domicil of their victim without ceremony; sit down at his table without being bidden; devour his substance without compunction; and finish their repast by killing and eating the host himself. I will not undertake to defend their course upon strictly moral considerations. But I do not advise any one to in-

stitute proceedings against them on this account, until they shall have had time to clean out the bark-lice.

I have been in the way of receiving, every year that I have held my present office, packages of apple-twigs from different parts of the country, and amongst others from northern Illinois and the southern part of Wisconsin, and it is evident from these specimens, that the natural enemies of the bark-louse are not operating here so extensively as in the more southern latitudes. Many abortive scales are found even here, but also many scales full of sound eggs, so that if the process of extermination has commenced here it is evident that it is progressing much more slowly than we could desire.

But the interesting point to which I wish especially to call your attention, and to which what I have thus far said is only the prelude, is that upon the infested twigs received from these more northern sections, I have not been able to find any trace of the work of the parasitic chalcis fly, and the important question, therefore, arose whether these friendly insects might not be transported to these parts, and thus an opportunity be afforded for them to extend the range of their beneficent operations. But the idea of transporting and colonizing these minute flies, so small, indeed, that they can scarcely be seen by the naked eye, with the expectation of being able to determine by any subsequent observations whether the experiment succeeded or not, appeared, at first sight, to be extremely impracticable. Fortunately, however, for the experiment, it was found that this little parasite passes the winter in the larva, or grub state, under the scale of the bark-louse, after having devoured its legitimate occupant. These grubs pass the winter, as a matter of course, in a torpid state, and therefore require no food until the warmth of returning spring restore them to activity. If, therefore, twigs could be taken from trees where this insect was known to have been operating, and taken in sufficient number to ensure a certain proportion of the parasite larvæ, and transported during the winter, or very early in the spring, to the desired locality, and be there tied in little bundles to the branches of trees infested by bark-lice, it would seem that the conditions essential to a successful result would be fulfilled.

This experiment has been actually performed. With the co-operation of my friend, Capt. Ed. H. Beebe, who took a lively interest in this matter, several dozens of twigs were taken from apple trees in my own neighborhood, where this friendly parasite was known to abound, and carried to his place of residence in the northern extremity of the State, and there tied in small bundles to a number of trees badly infested by bark-lice, and where no trace of the chalcis flies could be found. The only way in which it could be determined whether the experiment succeeded, was by detecting at the end of the season, or at some subsequent time, the presence of the minute round holes in the scales of the bark-lice, which are the infallible indices of the operations of the chalcididæ. When it is considered that these holes are so minute that the search for them has to be made by the aid of a magnifying glass, and

when we remember that at most, only a dozen or so of these flies were let loose in three different orchards, each of which contained several hundreds of trees, some idea may be formed of the delicacy of this experiment, and of the difficulty of determining with certainty whether it had succeeded.

In May, 1872, a little more than a year after the commencement of the experiment, Captain Beebe carefully examined the trees upon which the chalcis larvæ had been placed, and discovered and transmitted to me for examination a number of twigs, some of the scales upon which exibited the characteristic round holes caused by the exit of the chalcis fly. In July, of the same year, I visited Galena, and in company with Capt. Beebe, submitted one of the trees experimented upon to a pretty thorough examination. Additional traces of the chalcis flies were discovered, and still others were sent to me by Capt. Beebe later in the season.

The success of this interesting experiment may therefore be said to have been proved as nearly as any experiment of this kind can be, within so short a period after its commencement. If it shall be found by future investigation that similar marks exist in other localities at a distance from those experimented in, the presumption will then be that either this or some other species of chalcis, had already found its way in small numbers to these more northern sections. But if, on the other hand, these marks shall be found to become more numerous, year by year, in the neighborhood of this experiment, whilst they shall not be found at a distance from it, the success of the experiment may be considered as demonstrated.

If future observations shall confirm the success of this experiment which already presents so encouraging an aspect, every one will admit that it will furnish one of the most interesting instances on record of the application of science to practical purposes.

This experiment of transporting and colonizing the beneficial parasitic insects, is therefore not only a very important one in itself, but it derives additional interest from its being, so far as I am aware, the only one of the kind which has ever been attempted, and I am happy to have the opportunity of contributing this sketch of it to the transactions of the Northern Horticultural Society of Illinois.

The lecturer then gave a brief sketch of the history and treatment of the canker worm, which has been particularly destructive for a number of years past in several of the northern counties of this state. But these remarks were made without written notes, and the substance of them has been already published in the author's second annual report upon the injurious insects of Illinois.

In response to questions, Dr. LeBaron replied, that the female canker worm, being wingless, is very localized, in comparison with other insects. It spreads principally by being carried on clothing and the va-

rious vehicles in use. He would deal with them by smearing the trunks of the trees with tar. Should be particular in the application. The time of travel about one month. Hence, by frequent application, large quantities can be destroyed by jarring the limbs, when the worms will drop off and hang below the branches. Syrange with solution of Paris green. The worms go into the ground in the fall. Many orchards have got rid of them by late fall plowing, and letting hogs into the orchard.

No danger of distributing it by cions. The eggs are not deposited on twigs, but mostly in the scales of the bark on the trunks of the trees.

It is not a new thing; has been in Macoupin county for many years. A. Bryant had it thirty years ago. Heard of previous to his experience with it.

T. HUNT—It was in this (Stephenson) county thirty-five years ago; disappeared soon after, and is now at work again.

G. M. BLISS—Have it with us at this time. When a boy used tar, and in some instances the tar girdled the tree.

LEBARON—Coal tar is injurious; pine tar is not. Have tried a number of experiments with kerosene; have anointed trees all over with it; have used lard, linseed oil. Found the kerosene to kill the first buds. By July have used it freely on young trees without injury. Have tried all kinds of tar with kerosene, and it did not kill any of them when used in July and August. I put it on the trunks only. So far as my experiments go, I know of no tree killed by the use of kerosene.

The canker worm kills the tree when permitted to work on it three years in succession. The insect is fully prepared for its ravages in the spring, it matures the season before.

On motion of R. Douglas, the following resolution was adopted:

WHEREAS, Under the present constitution of this State, it becomes necessary, in order to continue the office of State Entomologist, that an *express* appropriation shall be made for this purpose; and

WHEREAS, We believe that this office is of great importance and benefit to the Agricultural and Horticultural interests of the State; therefore,

Resolved, That the Northern Illinois Horticultural Society earnestly request the General Assembly to make such appropriation as may be necessary to maintain said office.

The Committee on the President's address, submitted the following report which was unanimously adopted:

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Your committee would respectfully call attention to the able address of our President, especially to his remarks on timber-culture and tree-planting.

We would heartily endorse his recommendation for the appointment of a committee to prepare a circular embodying a statistical statement in reference to cost of tree-planting, culture, growth and profit to be derived from timber-growing.

We feel assured that much good can be accomplished by having the matter properly presented to the public. And it may be the means of inducing the railroad companies to interest themselves in the matter. We would suggest that this circular be brought, and distributed as soon as possible.

We would recommend the following persons as such committee: Milton Ellsworth, H. D. Emery, Jonathan Perriam.

In regard to other subjects spoken of in the address, your committee have thought proper to refer to them in the form of sundry resolutions, which we now offer.

ON TAXING NURSERY STOCK.

WHEREAS, The last Legislature passed an act taxing Nursery Stock, which are growing crops as much as any other product of the soil, and

WHEREAS, The law discriminates unjustly against this class of productions, therefore

Resolved, That it is the sense of this Society that the law ought to be repealed, and that we will use all just influence to bring about that result, and that a copy of these resolutions be presented to the members of the Legislature, for immediate action thereon.

ON FOREST TREES.

WHEREAS, The cultivation of forests is one of the most important necessities of the West, and especially the prairie region and the great plain beyond: therefore,

Resolved, That a Committee be appointed to prepare a bill to be presented to Congress, relative to this subject, or take such action in the premises as they may deem necessary.

Committee on Forests: D. C. Scofield, D. L. S. Peninngton, H. H. McAfee.

TO ENCOURAGE TREE-PLANTING IN ILLINOIS.

WHEREAS, The continued destruction of the great forests of the country, is constantly causing a greater and greater appreciation in price, of almost all the valuable kinds of lumber; and, feeling as we do, the necessity of some general law to encourage tree-planting, for its various economic uses, and influences; therefore,

Resolved, That we respectfully urge upon the Legislature of the State, the speedy passage of an act to foster this great necessity of the whole prairie region. And would recommend that a committee be appointed to take charge of the whole matter.

On motion of L. K. Scofield, the following persons were appointed a committee on behalf of this Society to confer with the Executive Committee of the State Horticultural Society, in relation to the passage of a law, relating to the mutual interests of the various horticultural societies of the state.

E. H. Beebe, Geneva; D. C. Scofield, Elgin; S. J. Davis, Freeport; J. Perriam, Chicago; A. L. Cumings, Galena.

The Society proceeded to the election of officers for the ensuing year; the following is the result:

S. G. MINKLER, President.

R. DOUGLASS, S. EDWARDS, L. MONTAGUE, E. H. BEEBE, } Vice Presidents.

D. W. SCOTT, Recording Secretary.

R. LITTLE, H. H. MCAFEE, Reading Secretaries.

S. WOODMAN, Treasurer.

The Society decided to hold its next annual meeting, January 27-30, 1873. Adjourned till four o'clock, P. M.

AFTERNOON SESSION.

The President announced the following Committee on Printing: R. Little, A. R. Whitney, H. H. McAfee, J. D. McCall, D. W. Scott.

On final Resolutions: S. Edwards, C. W. Richmond, T. McWhorter.

On motion of E. H. Beebe the following Resolutions were adopted:

Resolved, That the Corresponding Secretary have printed five hundred copies of all Resolutions passed at this session referring to Legislative Action, and that he forward copies to each member of the Society, with the request that they forward the same to their Senators and Representatives, urging their attention to the same.

Resolved, That the Corresponding Secretary of this Society have printed three hundred copies of the Resolution passed by this Society in relation to the Industrial University, and all other resolutions pertaining to legislative action. That he forward a copy to each member of this Society, with the request that it be forwarded to their Representatives and Senators in the General Assembly—that they may take the same into consideration, and give such action as they may deem advisable.

On motion of D. W. Scott, the Executive Committee are empowered to send delegates to the National Pomological Society.

On motion of S. Edwards, General Atkins is requested to furnish the Society with a copy of his address.

Adjourned to seven o'clock, P. M.

Resolved, That we request General S. D. Atkins to write out his welcoming address for publication in our transactions.

EVENING SESSION.

Mr. H. H. McAfee read the following Essay on Floriculture, from J. W. Robson of Kansas:

PRACTICAL FLORICULTURE.

BY JOHN W. ROBSON, ABILENE, KANSAS.

The love of flowers is universal. It is developed at a very early age, as we have often seen in the eager eye of the child, when with nimble fingers it pulls the beautiful gem to pieces. We see it in children of

more advanced age, who gleefully, hand in hand, wander through the woodland wild, in search of flowers, or in meadows sweet, engaged in making floral wreaths, or daisy chains.

This love of the beautiful never becomes extinct in the human soul. It may be crushed by the cultivation of selfish feelings; it may be partially extinguished by wolfish greed and the eager haste to be rich; but away down in the human heart the latent spark remains. We see this exemplified when the weary, worn-out man of business, tired of acquiring wealth, begins to look around for some quiet spot where he can plant shrubs and flowers, and make himself a home.

Can we not, as a society, bring this latent principle into healthy action by bringing such influences to bear upon the minds of men as will lead them to drink at those pure fountains of pleasure, and here find the relaxation they need from the sterner and more uncongenial pursuits of wealth? This is a question which deserves our serious consideration.

A writer has beautifully said: "Floriculture is the most rational of all recreations. It teaches forethought, industry, and economy of time. It exalts the mind, invigorates the frame, and constantly reminds us of the great God, whose hand is imprinted on every leaf and flower, and who, in His bountiful goodness, rewards us with the fruits of the earth."

To teach the farmer to manage his garden, and his children to cultivate flowers, is to find them innocent gratification and ultimately lead them to purity and happiness.

This we believe to be our mission, to teach men that they were not born to plod and drudge; that they were not sent here with eyes blinded to the beautiful creations around them; or ears stopped to the music of nature; or, when the fragrance of opening flowers, as it floats upon the morning breeze, is wafted toward them, refuse to inhale it lest they might enjoy it.

You must not, gentlemen, think us crazy on this flower question, for we do think that the adornment of our homes contributes in no small degree to the improvement of a people, by the moral influence it exercises upon them. Whatever makes home pleasant and attractive, lessens the temptation to stray into the paths of evil, and protects its inmates from falling an easy prey to the snare of the tempter.

As the work of this society is missionary to some extent, we can do much in educating the taste of our people, more especially the farming population, as they possess greater facilities for beautifying their homes than any other class. Each of us might go to work during these leisure days of early spring, and encourage our neighbors to fix up things generally about the house, to go to the woods and river bottoms, and dig up maples and elms and plant them around the homestead, not only to make *it* more beautiful, but to protect themselves from the summer's heat and the winter's storm.

We think when dealing out arguments in favor of home adornment, we ought to say as little as possible about *money* being necessary for its

accomplishment. Get in the thin edge of the wedge first, by recommending those kinds of trees and flowers that can easily be obtained; and these, teaching silently, will cultivate a more refined taste, and inspire a longing for all that is beautiful in the tree, or shrub, or flower.

We could influence, also, the younger members of the family, by giving them a few simple lessons in flower-culture, and stimulate them to increased effort by bestowing a plant, or a few packages of seed. We can teach them how to plant and how to sow, direct their attention to those plants which are of easy culture, and yet bloom long and abundantly.

It is wonderful how flowers will adapt themselves to circumstances, and still be beautiful. One of the most graceful objects we have been privileged to see, was an old-fashioned teapot, minus the spout, suspended with twine from the centre of a farm-house window, containing a fine specimen of ground ivy, which grew as luxuriantly as if suspended in a basket of the richest terra-cotta. An old tin pan, that had lain around the yard amongst other unsightly objects, was converted into a "thing of beauty" by enclosing it in bark, setting it upon an old stump which stood in the shade, planting in the center blue and scarlet cardinal flowers, surrounded with a ring of spleenwort, maiden-hair and shield fern, while round the edge grew ground-ivy and moneywort in rich profusion. A number of old white lead kegs cut in two and covered with bark, made the finest baskets for trailing lobelias and *Secum Loeboldii* we have yet seen, and were admired by all who saw them. An old family washbowl, in which a large family had performed their ablutions for years, enclosed in rustic work, was made the receptacle for a fine specimen of *Abutilon Vexillarium*, which throve amazingly and bloomed in vast profusion. An old nail keg was cut in two, thus making two tubs. These were ornamented with the thin bark of the white cedar, and fantastically coiled around the rims and sides with the stems of the wild grapevine. In one was planted a scarlet geranium (Queen of the West), with an edging of *Lobelia Paxtonii*. In the other a brilliant colored coleus surrounded with a dazzling scarlet nasturtium. Both were floral gems all the summer and the fall.

As we are anxious to make this a thoroughly practical essay, we will devote a few brief paragraphs to the cultivation of annual flowers. These are the flowers for every man's garden, their culture being so simple if properly understood. They are not only among the most beautiful ornaments of the summer flower-garden, but the ease with which they are cultivated, and the long time they remain in bloom, give them the highest claim to our attention and care. If their culture is simple the small amount of trouble they give to the grower, as well as their comparative inexpensiveness for their rich array of beauty, render them objects of pleasure to every lover of flowers. Those charming objects of the flower garden, (green-house plants), which require yearly propagation by cuttings, and the labor of watering and potting, besides the wintering of such, is not within every man's means. But a few dimes

expended in seeds, and a little pleasant labor in the spring, will give an amount of enjoyment beyond belief, and that most desolate wilderness about the farm—the farmer's door-yard—could be made to bud and blossom as the rose.

The reason why annual flowers are so frequently a failure is owing in a great measure to the intricate and expensive directions which are given by seedsmen and florists in their annual catalogues and floral guides.

To be successful in raising good, sturdy plants for planting out in the flower beds and borders, the seed-bed must be prepared in the fall. Make a box of twelve-inch boards the size of your sash, fill to within three inches with good fresh soil, lay a few boards over the whole, and leave it till spring. When warm weather comes in February, remove the boards and put on the sash. By the beginning of March the soil will be in good condition for sowing the seed. Stir up the surface a little, breaking all the lumps, and making the surface as smooth as possible. Take a piece of lath, and with the edge make little drills three inches apart; making very slight impressions for the smaller seeds and deeper ones, about the eighth of an inch in depth, for the larger. After sowing, fill the drills with finely sifted soil; water slightly if the weather be warm, and the work is completed. When the seeds appear above ground give plenty of air during warm days, and when the plants get strong, remove the sash altogether, replacing it at night. About the beginning of May, the plants will be large enough to handle. They should then be planted out in their summer quarters. Those who can not afford a sash, will find calico oiled, tacked upon a wooden frame, an excellent substitute.

If you want a constant brilliant show of flowers, choose the Aster, Balsam, Dianthus, Delphinum, Petunia, Portulaca, Phlox, Scabiosa, Tropæolum, Ipomea, Thunbergia, Double Zennia and Verbena. To every one who is possessor of a home, we say, plant flowers! Plant them by your doorstep, in front of your dwelling, in every nook, and waste place in the yard, plant them all around the dear old homestead, train them up its walls. Forget not to throw in your mite towards producing and shedding sweet aroma everywhere. Thus you will gladden and bless the hearts of your children, and before you are aware, will incite praise in your own hearts towards the great Infinite Source of loveliness and beauty.

Every one who loves flowers will find some convenient place for them, whether that place be in doors or out; and if no place can be found outside, the windows of the sitting-room can be made beautiful and redolent with perfume.

Window gardening is becoming decidedly popular, still there is a wonderful lack of success in this department of home decoration. This does not arise from want of taste, or the want of desire on the part of the fair portion of our community, but there are two reasons why ladies are not generally successful in making their windows gay and attractive during the winter months.

1st. Attempting too much. This is the cause of many a failure; it will never do to try and cultivate so many species of plants which are not adapted to the close atmosphere and uncertain temperature of the sitting room.

2d. Making a bad selection. It is the general practice to grow Verbenas, Geraniums, Fuchsias, Heliotropes and Roses, intermixed with Coleus, Begonias, Achyranthes and other tropical plants, thus giving the preference to tender, soft wooded species, while those which are hard wooded and hardy, and evergreen besides, are entirely neglected. These we consider the best for window decoration during the long winter months, and will yield lasting pleasure and satisfaction to every one who attempts their growth: English Ivy, Acuba Japonica, Myrtle, Evergreen Privet, Laurastina, American Yew, Pendulous Arborvitæ, Tom Thumb Arborvitæ, Berberis Aquifolia, Berberis Illicifolia, Daphne Alpina, Daphne Cucorum, Maherina Odorata, Sollga Heterophylla, Vinca Minor, Vinca Major, Vinca Major Variegata, Gaultheria Procumbens, Louicera Aurea Reticulata. To these add a few Double Daisies, Chinese Primrose, Mignonette, Hyacinth and Sweet Alyssum.

Here is a window garden which will not soon fall into the "sere and yellow leaf," and which only needs to be seen in the depth of winter to be admired.

Be careful in the application of water. Too much moisture is the bane of plants kept in the house. Saucers should never be kept full of water, as the absorption of too much moisture is destructive to the roots, and consequently plants become unhealthy. It is best to keep them a little too dry, than to give so much water as to produce that soddened condition of the soil which we so often see. Choose fine days during winter, when the thermometer stands above the freezing point to set the plants out of doors for a few minutes, and with a rose watering-pot or syringe wash off the dust which has accumulated on the foliage, and thus restore that "emerald hue" which is so grateful to the eye, when the outside world is covered with snow.

For pot-culture during summer, some of the free flowering varieties are well fitted. A few well grown Pelargoniums should be added, as no other flower can exceed the richness of their color. The Heliotrope, though a modest flower, fully compensates us for the want of color by the delicious fragrance. The Lemon Verbena (*Aloysia Citriodoms*) will be needed for the same reason, the fragrance of the leaves being the principal attraction. This, being deciduous, can be easily kept in the cellar during winter.

Fuchsias are general favorites and will remain in bloom all summer; choose those varieties which have massive, heavy flowers. Cuphea Platy Centra should have the sunniest spot. Grow it in a small pot and it will bloom in perfection. Another handsome and free flowering genus are the Lantanas, with brilliantly colored flowers of every shade, constantlly changing in hue, these when confined to the narrow limits of a flower-pot will bloom more profusely than in the open ground.

Roses must not be forgotten. Do not be carried away by expensive novelties in your selection. Devoniensis, *Souvenir de la Malmaison*, Saffrano, Hermosa, La Pactole and Agrippina, are hard to beat, and are the most satisfactory and abundant bloomers we know, and only need to be grown to become general favorites. Petunias are remarkably adapted for pot-culture, especially the double varieties, as they bloom more profusely than when planted in the open ground. Take Madame Mallaise and William White for your first trial and thus prove the correctness of our statement.

For hanging baskets we would select the different varieties of Ivy-leaved Geranium, Maurandia Barclay and Cerastium Tomentosum, Linaria Cymballaria, and the many fine varieties of Lobelia Evinus. One word of caution—do not run after novelties: too many have suffered shipwreck on that rock. Begin cultivating those flowers you know; or that some reliable floricultural friend recommends. Let novelties be twenty years old before you purchase, rather than make a failure. Be satisfied with those plants which others have been successful in growing, and have made a source of pleasure; and all fears of failure will be dissipated and success certain.

One word with regard to soils, and our task is ended. Had all the writers who have treated this subject but gone and studied under dame Nature, there would have been less mystery. We hold that well rotted sod, decayed leaves and charcoal rubbish is all that is needed for the tyro.

We love Floriculture. It has been the pursuit and the joy of our life. We know of nothing more conducive to health and happiness than the cultivation of flowers. We have not followed their culture for pelf, but for their beauty, their sweetness alone. To us they have been a continuous source of enjoyment, and have had a refining influence on our soul. No wonder, then, that we devote our spare moments in efforts (very humble efforts we confess) to teach our fellowmen that floriculture is a real blessing, and one of the greatest agents in Nature for civilizing and ennobling humanity.

On motion, the Corresponding Secretary was requested to tender the thanks of this Society to Mr. J. W. Robson, for his very valuable essay.

Mrs. Harris, of Galena, read the following paper on Landscape Gardening:

LANDSCAPE GARDENING.

We are fully conscious of the boldness of attempting to grasp this theme.

Has not the lamented Downing, in a large, beautiful and elaborate volume exhausted the subject? And has not one of the brightest luminaries of our society promised to shed his beams upon it at the present meeting? And yet, even yet, we dare throw a woman's mite into the store of council upon it.

Every one knows that a large proportion of what is written on Landscape Gardening is entirely over the heads or beyond the pockets of the common people. Authors "have written for the millionaire, rather than for the million."

We will not attempt to define the limits separating the garden proper from the landscape garden. The one necessarily runs into the other. We would merely premise by saying that with the garden of the millionaire we have nothing to do. He has no need of us. With large territory, an unlimited supply of money, and the services of skilled artisans at command, he can create beauty and even grandeur in any location and in any style which he is pleased to adopt.

This very unpretending paper refers to simple cottage homes, and is addressed to the possessors of a few square rods, or a few acres at most, of ground, with but little leisure time and less spare money. The most that we hope to do, is to help these a little in their efforts to use their limited means to the best possible advantage—to aid them in employing the treasures which Nature has thrown in their way, thus, by blending, to domesticate Nature, whilst they enlarge and glorify art.

In the very simplicity of our subject lies the main difficulty of treating it profitably.

UNITY.

A garden, like a landscape painting, a poem, a sermon, or almost any other work of art, must have unity and perspective—a central object to which all other portions have a correct bearing, a unifying spirit or soul, pervading and giving life and expression to the whole, and perspective, which is the result, as it were, of a kind of assorting process, by means of which objects of secondary importance are grouped and thrown into the distance.

With the garden, the central object is of course, the dwelling,—the unifying spirit is the home-love located there. This home-love, reaching out into the love of flowers, of trees, of landscapes and of all things beautiful in nature, creates the garden. All this is simple enough;—so simple as to deserve the name of truism.

The *art* consists in carrying out harmonious designs and exquisite details, whilst remaining "en-rapport" with the genius of home. Retaining the warm expression of home-life—with its visions of fireside comfort,—of grand-mother's arm-chair, the baby's cradle and the children's play-ground,—preserving, we say, the home aroma without the homeliness of the good old times, to develop, enlarge, enrich and beautify your grounds, with treasures of garden, field and forest. This is your aim.

It is impossible to draw patterns for our neighbor's plantation as we would for a patch-work bed-quilt. General hints are all that the wisest can give.

Permit us again to refer to the painter's art.

LIGHT AND SHADOW.

These are the pigment with which you are to convert your grounds into a living, glowing picture. In the skillful management and disposition of these, lie the first and the last lessons of the landscape gardener's art. Here you want bold, strong lights, and deep, sharp shadows. Yonder, a soft blending of sunshine and shade, running imperceptibly into each other.

Your dwelling is in the foreground. You must have jutting angles and over-hanging eaves, to give bold, effective expression to this part of your picture. The trees that are nearest the buildings should be solitary and symmetrical, throwing clearly defined shadows on the smooth-shaven lawn, "like pictures in monochrome" on a "canvass of pure green." Here you want also broad, clear sunshine, giving effect to the few bold shadows, making home bright and cheerful, its atmosphere clear and bracing.

Yonder, near the borders of your territory, you will plant trees of smaller growth. They should sometimes be in twos or threes, sometimes in clumps, whilst in one or two favored nooks a small thicket has a fine effect. In these latter the largest specimens should be in the centre with the smaller ones sloping off at the outer sides, thus making softened lights with a delicate play of flickering shadows. In this manner you may produce fine perspective effects, with very moderate distances. This arrangement, it will be clearly seen, will make the grounds look larger than they really are, at the same time that the most perfect unity of design is secured. Artificial perspective may also be produced by arrangement of tints; having trees and shrubbery of strong hues in the foreground, and those of the softer, greyer tints in the distance.

Where such a course is practicable (it will mostly be so in country places), setting out a few pine trees in the adjacent pasture fields, in situations calculated to harmonize with the shrubbery inside of the garden, will blend the latter with the surrounding landscape—will, in fact, adopt the whole landscape as an enlargement of your own garden domain.

It is well known that this effect is greatly heightened by extending rows of trees indefinitely along the sides of highways leading past and through your grounds. Here, if nowhere else, as a matter of taste, would we have trees in straight, even rows. Here the Lombardy Poplar (*Populus*), even one of the least beautiful of all the trees that Nature has made, finds a fitting place. In truth, so long and intimately has it been associated with highways, and with the common people (as its name implies), that we regard any landscape in a cultivated region as incomplete without a row of these trees somewhere in view. We also regard as incomplete any landscape garden which does not adopt the adjacent highway as a part of itself, throwing the beautiful mantle of its own hospitality, in the form of cooling shade and refreshing fruits, over the weary and thirsty traveler.

LATITUDE.

As a part of the home spirit, it is well that latitude be consulted in style of building, and in improving grounds.

Not merely in an economical point of view, but for fitness of expression, we would choose at the north sheltered situations, warm brown tints (in the walls), pointed gables with deep protective eaves, windows with heavy mullions and diamond panes, and a liberal supply of the conifera, which match these so well, planted around.

At the south, the arboræ that belong to that region, with a style of building in keeping with the same. Low, broad roofs, wide verandas, windows wide and large, and so constructed as to look as if there were no glass in them at all, only an open space to court the lazy breezes. Palms and round Magnolias with their varnished, flapping leaves, make suitable shade around such a home.

The people of the North, and those of the South of Europe, taught this lesson centuries ago,—they learned it from Nature herself. But with our cosmopolitan tastes we build Italian villas and Grecian temples at the North; and, I doubt not, if we should travel South we would find gothic structures there. Don't suppose that we would have all dwellings on the same parallel of latitude of the same pattern. By no means. But, "a word to the wise is sufficient."

NATIONALITY.

We must say that we love to see American trees about the dwelling of an American citizen. One whose pride is in his birth-right, the glorious right of suffrage, whose wealth is in his strong right arm, and the honest toil which makes him lord of the soil,—it is fitting that he should find in the forests of his native land the decorations of his home.

We have trees plenty, beautiful as any country can furnish, large and small and middle-sized, evergreen and deciduous, foliage light and silvery, foliage dark and glossy; and for rich tints in autumn, every one admits that we can challenge the world.

For large trees, what can surpass some of our Oaks and Maples, our Elms and Buttonwood, our Tulip-poplar (*Liriodendron*), our Birches and a host of others; or for trees of smaller growth, our Judas-tree (*Cercis*), Fringe-tree (*Chionanthus*), Sassafras (*Larus*), Horse-chestnut (*Æsculus*), Catamba (*Catalpa*), and so on to the end of the catalogue of deciduous trees, and of the evergreens, Pines and Spruces, and Arbor Vitæs and Cedars. But you do not desire us to produce a copy of Humphrey Marshall's "Arbustum Americanum."

One oak in particular we beg leave to mention, as having been the special favorite of our much esteemed friend, Dr. Darlington, a man well known to lovers of Botany. We allude to the Scarlet Oak (*Quercus Coccinea*), thus described, "a native of the middle states—a noble tree, often eighty feet high. The leaves, borne on long petioles, are a bright, lively green on both surfaces, with four deep cuts on each

side, widest at the bottom. The great and peculiar beauty of this tree we conceive to be its property of assuming a deep scarlet tint in autumn. At that period it may, at a great distance, be distinguished from all other Oaks, and indeed from every other forest tree. It is highly worthy of a place in every plantation."—*Downing*.

Oh, if we could only plant or build old trees—trees of from fifty to two hundred years' growth! What can give such an air of grandeur to a homestead as two or three of these patriarchs of the sylvan world standing around, wearing their glorious old crowns so proudly? But one thing we can do, if we have space enough. We can plant one or more trees of kinds that will live long and grow large. We can give them plenty of room and good culture, so that in time somebody will see them fine old spreading trees. But let us beware of placing them where they will finally crowd our dwelling, or shut out from our vision some interesting view.

FLOWERS AND SMALLER PLANTS AND SHRUBS.

These form no unimportant feature of the landscape, as of the smaller garden.

Here, in this sunny angle, where two walks diverge, your wife will have a fine bed of hybrid perpetual Roses. On the other side, which is slightly shaded, she will plant out Geraniums and other bedding plants. While, still farther in front, a slight artificial knoll will blaze with Verbenas. Just in the shade of that north wall will be her Pansies. These are all the flowers proper that she will admit in front of the house. These bloom all summer long, and will never cease to be gay.

The Holland bulbs, and annuals, and border flowers generally,—all those things that are in beauty only for a short season,—will be placed modestly to the right and left, a little in the back-ground. Still further to the right and left, ranging some distance from the building, will be her plantations of Lilacs and Snow-balls, Weigelia, Spireas, etc.

Half retiring under the sheltering base of the veranda, will be some of the more hardy and serviceable species of native ferns, decorating that line which is usually so unsightly. In yonder thicket your daughter will deposit the store of wild flowers, and ferns, and mosses, which she is ever and anon bringing home from her ramble in the woods, until ere long you will find a choice botanic garden centered there.

In this retired nook you will plant a Weeping Ash, which she will train into a shady seat (the only thing the Weeping Ash is good for). Around that fine large forest tree, your boys will build a rustic bench where they may sit back to back, and "crack nuts and jokes." Yon rough wall and board fence, which cannot be dispensed with, shall be covered with American Ivy (*Ampelopsis*). These bare white columns of the veranda must be twined with climbing Fumitory (*Adlumia*), and Virgin's Bower (*Clematis*) both so light and deciduous as to contract little dampness in summer, and to be wholly removed in winter.

FINISH.

In a garden, as in a lady's toilet, it is surprising what effects can be produced by a few skillful finishing touches.

We have seen an ordinary tree-shaded yard in a village receive an expression of real beauty, elegance, and refinement, simply from having a small number of large vases of common earthenware, set in appropriate positions, each vase containing, grown in earth, four or five fine foliage plants; each plant contrasting strongly in color with the others, as purple, silver-grey, crimson, and golden.

Judicious management of hedges of American Arborvitæ may be made to work wonders —clipped low and smoothly where simple boundary lines are desired—planted closely and grown tall for screens, either to shut out cold winds, or to keep from stables, wood-yards, and such other domestic arrangements as are more useful than beautiful. We have seen an ornament perfect in its kind, and very striking, in the form of an arched entrance through a clipped hedge. It was produced by leaving one or two trees each side of the gateway uncut, and then as they grew tall, training them into a complete arch. The object was so very simple and appropriate, and yet so exceedingly beautiful, that we could not but wonder that everybody who owned an evergreen hedge did not manage to have something of the same kind.

Two ornaments which abounded greatly in antique English gardens, in the days of labyrinths and other quaint devices, we think deserve to be retained in a greater degree of favor than they now enjoy. We allude to "Aloes in tubs," and to low evergreen edgings. Of the former, the common "century plant" (*Agave Americana*) is one of the finest varieties, both on account of its large growth, its heavy, architectural-like leaves, and its fine variegated color. A huge plant of this, standing on the stump of a tree, in some sunny spot, is to our eye a prettier and more suitable garden ornament than a marble statute imported from abroad at great expense. Besides, it costs nothing but the time and patience required for its raising, for you can beg, or buy at trifling cost, young plants anywhere. Vases of foliage plants must, of course, have shade.

Both these sorts of ornaments belong comparatively near the buildings. If scattered around the outskirts, they look like stray babes in a wood.

EVERGREEN EDGINGS.

We know that in old time the dwarf box was used to such a degree as to grow tiresome. No fear of that here in Northern Illinois. But the low Juniper (savin) is as hardy as can be, and the beautiful heath-leaved Arborvitæ (*Thuja Ericifolia*) which is more dwarf and dainty looking than either Box or Juniper, promises to stand our climate well. We do not admire flower beds hedged in with any sort of wall, but as a boundary line between the green sod of the lawn and the gravel of the walk or drive, nothing can be neater, prettier, or more tasteful every-

way, than a low edging of evergreen. The tiny hedge, and the walks combined, running through the length and breadth of the garden, form as it were, a line, by means of which the different objects are threaded together, thus aiding (though in a mechanical way, as it were,) in unity of construction; and considering the slovenly propensity so common in folks and animals, to step off the gravel just over and upon the grass, thus obliterating the boundary line between walk and lawn, we consider it quite indispensible to perfect neatness. Having thus arrived at the subject of

WALKS.

What shall we say of them that has not been said many times over already? Shall they be straight or curved? We have no objection to traveling in a straight line when it is most convenient to do so. We rather think that it is the natural way for sober people to go. Hence we leave the "turpentine walks" for those who *have not* but need to sign the temperance pledge. Yet we would not overlook the fact that "the curve line is the line of beauty." We regard that as the best walk which, avoiding right angles, when practicable to do so, leads with the most easy and natural curves from one object of interest to another, on through the grounds. Just one straight walk we do dislike (and yet that one is often unavoidable,) in a direct line from the front door to the front gate. Think how embarrassing to the bashful suitor, calling at the sunset hour, a time when all the family are congregated upon the veranda, enjoying the evening air, to be compelled to enter that straight gate, and travel the whole length of that (narrow?) way, under the concentrated fire of the eyes of papa, mamma, and all the brothers and sisters and visitors. He would prefer a side entrance, screened by shrubbery; and he would be right.

LASTLY,

Though perhaps we should have made it firstly, in laying out a garden, as in other affairs, of life we would say, accept the situation—"take what the gods send" and make the best of it. If you find yourself located upon a level prairie which never saw a rock, don't try to deceive yourself and your friends by piles of stones, hauled there with great labor and painstaking, to make believe it is something else. Accept the quietly beautiful as your type, and improve accordingly.

If, on the other hand, you have chanced to light upon a picturesque location, with steep hill-sides, abrupt rocks, and deep ravines, improve your wealth in keeping with itself. Don't quarry down your rocks, but decorate them. Don't fill up your ravines, but fringe the sides with the vegetation which belongs to them. In short, adhere to the principles of the art as laid down by Pope—"the study of nature; the genius of the plan, and never to lose sight of good sense."

E. H. BEEBE, from the Committee of Conference, reported that said committee from this society had unanimously agreed with the Execu-

tive Committee of the State Society, to the form of bill that should be presented to the Legislature.

MR. T. MCWHORTER presented the following paper on Geological Revolutions:

GEOLOGICAL REVOLUTIONS.

There are many physical changes constantly going on around us of which the cause is apparent to the most careless observer. If you see a fresh bed of sand and gravel in the bed of a river, you do not hesitate to conclude that it was deposited there by the last flooding of the stream. If you observe that this fresh deposit overlaps an older deposit of the same material on which young willows and cottonwoods have started to grow, you conclude at once that this older bed of gravel also had the same origin, by a flooding of the stream of older date. Back of this still, you may trace evidences of floodings of still older date. Now, in forming these conclusions concerning the natural origin of these beds of sand and gravel, you have taken the first steps in geological reasoning. You account for these beds of river-drift through known causes that are familiar to your observation.

Again, when you see the little rivulet with every shower of rain wearing its channel deeper and deeper, you do not hesitate to conclude that this little streamlet has made for itself the channel in which it flows. You extend your observation to larger streams, where you see the same phenomena on a larger scale. From the little streamlet to the majestic river, you can not doubt but the valleys through which they flow have been worn to their present condition by the abrading action of water.

And finally, you observe that the whole surface of the country is more or less water-worn into ravines, and natural drains, by which surface water is conveyed to larger rivers, and thus to the ocean. You at once conclude that all these ravines and valleys have been worn to their present condition by the gradual action of water in finding its way to the ocean—in short, by such causes as you see constantly in operation.

Thus it is in all geological conclusions. A long series of observations, with a diligent study of the physical changes constantly going on, and a careful comparison between such phenomena and the various changes revealed through the rocky crust of the earth, have gradually resulted in the conclusion, that all the geological revolutions of the past ages have been effected through such known agencies as are in operation at the present time.

Now, at first thought this seems impossible. But the more we study the physical changes constantly in operation, the more comprehensive the whole subject becomes.

Careful observations have revealed the fact that the earth's surface, that seems so firm and substantial, is not really so; but is subject to slow oscillations or changes of level; that in some localities the land is slowly subsiding, while other sections are being gradually elevated.

For example, it is well known that, at the present time, Greenland is subsiding, while Scandinavia is being elevated. These oscillations are extremely slow—not generally to exceed one or two feet in a century; but when long continued they must effect momentous revolutions in climatic changes, and also in the configuration of land and water.

Now these oscillations of the earth's surface, and various other phenomena, prove that the outer portion of the earth consists of a flexible crust; for if it was solid to the center, it could neither bend down, nor rise up;—but it *does bend.* Such oscillations of the earth's crust are among the known physical changes that are constantly going on at the present time; and the geological record bears ample evidence that such changes have been going on in all past time. It is now conceded that it is mainly through these slow oscillations of the earth's crust, accompanied by the abrading action of water, that the most extensive geological revolutions of past ages have been effected. The configuration of land and water has been ever changing. Hence the present geography of the earth bears no resemblance to any remote age of the past, and probably no resemblance to any remote age of the future.

Every portion of dry land bears unmistakable evidence of having been in past ages, for long durations of time, beneath the oceans, and in most cases, of several successive changes, from ocean to land, and from land to ocean again. Probably every portion of the earth's surface that is now covered by oceans has been, in past ages, in the condition of dry land; and, as we have reason to believe, will, some time in future eternity, again form portions of other continents.

All rocks known to geologists (except the igneous rocks of trap-dykes and volcanic rocks) bear evidence of having been formed of the accumulations in the bottoms of former seas. Accumulations are being formed into rocks in our present oceans as in all past time, and by a like process. The wash and wear of continents are being transported by rivers to the ocean; this sediment is carried by currents and spread over the floors of the ocean; and mingled with this sediment are preserved the forms of life that exist in our great seas. All the ledges of limestones on the earth have originated from material that has passed through the secretions of low orders of marine life. Mollusks and corals are at work in our present seas in collecting material for building up ledges of limestones, as in all past time. This is especially a chalk-making period. For sixteen hundred miles of the ocean plateau on which the Atlantic cable is laid, microscopic forms of life are incessantly at work in the manufacture of chalk. These low forms of life are not distinguishable under the microscope from those of the cretaceous chalks of Europe.

The earth's surface still rocks beneath our feet with earthquake shocks, and volcanoes pour forth volumes of lava. It is true that there is some evidence that volcanic action may have occurred on a larger scale in former ages; but the geological record gives no evidence of more frequent, or more extensive oscillations of the earth's crust, in

the older ages, than in the most recent periods. On the contrary, the best evidence of long periods of repose relate to the Lawrentian age—the very oldest section of rocks known to man; while evidence of the most extensive oscillations relate to periods most recent.

We have evidence of extensive continental oscillations even as recent as the post-pliocene. All the highest mountain ranges have had their principal elevation since the miocene or middle tertiary; and a large portion of the area of our present continents have been redeemed from the ocean since the miocene period. At that period Europe was but an archipelago of islands; much of Asia and Africa were beneath the oceans; the Gulf of Mexico extended up to the mouth of the Ohio, and the whole Salt Lake basin was an inland sea. During the post-tertiary or post-pliocene, Great Britain was twice elevated, so as to form a part of the continent, and again sunk down so as to form a few small islands; and Scandinavia has been twice elevated and covered with glaciers, and, we may add, if the present upward movement of Scandinavia continues, Norway and Sweden will be again covered with glaciers.

In view of such momentous oscillations within the most recent geological epochs, what have we to justify the notion of present stability, except that we do not *see it move?* In short, the popular notion that many entertain, that former ages were scenes of gigantic revolutions, and that the earth's crust has now arrived at a state of comparative rest, is not sustained by any geological evidence.

The Great Western Plains, and Rocky Mountain region has, at the present time, an elevation of from eight thousand to thirteen thousand feet above the level of the sea. It is cold and arid, presenting little encouragement to agriculture. But we have only to go back to the miocene or middle tertiary, when this region had but a slight elevation above the sea. It then enjoyed a mild climate, with abundant rain falls, and was clothed with a rich luxuriance of sub-tropical trees and plants. It then contained many extensive lakes, the former bounderies of which are now traced by geologists. Prof. Hayden, in his geological reports, states that one of these former lakes extended over much of the plains east of the mountains, having an extent of over one hundred thousand square miles. These bodies of water existed for a long duration of time. According to Prof. Hayden, the accumulation in the bottom of one of these lakes has a thickness of several thousand feet.

But, as the centuries rolled on, the gradual elevation of the Rocky Mountain region was in progress,—rain falls grew less,—those great lakes began to diminish; growing shallow first nearest the axis of elevation, and finally disappeared. Streams and fountains failed. The climate was changing—the sub-tropical trees and plants worked their way to a more southern latitude, while a northern flora was gradually taking their place.

Thus we see how the elevation of the Rocky Mountain region has transformed a land of former fertility into nearly an arid waste. In a

geological period comparatively recent, it was a land of broad lakes and numerous rivers. Huge beasts moved through the forests with heavy tread, the hippopotamus wallowed in the mud of the lakes, herds of wild horses, cattle, camels, antelopes and deer, fed on grassy plains, carnivorous beasts met in deadly conflict, or lay in wait to seize the the herbivorous animals as they came to the streams to quench their thirst. The bones of these animals were washed down into the lakes by the next flooding of the streams, where they were buried in the mud and preserved for our inspection. The beds of former rivers, that were once overhung by sylvan scenery, and abounded with fish, are now obscurely traced in arid sands. Sage brush abounds where once rolled the waves of extended lakes. The petrified form of a huge turtle occasionally appears to tell the tale of former times. No falling rains now saturate the earth to carry away the alkali that has accumulated from the decomposition of feldspathic rocks.

Such are among the physical changes that relate to geological epochs comparatively recent. And let us bear in mind that these changes, of which geologists have become cognizant, are probably but a minor part of what have actually occurred. If nearly half of our present continents have been redeemed from the ocean since, or during the miocene period, it must be considered more than probable that a corresponding portion of older lands have subsided beneath the oceans in the same time. And, we may add, more than probable that regions where the mastodon and elephant once roved through majestic forests, aye, regions that gave origin to many of the higher forms of life, may now lie beneath the waves of our present oceans.

Many people fall into the error of supposing that our geological maps show the actual outline of the continents for the different geological periods. Geological maps are intended to show only the fractional portion that is now above water that relate to the different periods. Large areas relate to the sand periods of which we have no knowledge; because submerged by our present oceans. It cannot be supposed that our present continents exhibit more than a fractional portion of what was the dry lands of the older ages. Lyell assures us that the portions of the earth's surface overspread by our present oceans, if accessible to man, would reveal vastly more of the geological history than the portion that is above water.

Persons who have had little time or opportunity for geological study often get the impression that the geological record presents well-defined lines, showing the beginning and ending of each geological period; also the exact line where organic life first began to exist; and the exact lines where the different orders of life began to exist. These are mistakes. No such lines are distinctly defined. It is true that distinct lines frequently occur in the rocks, caused by local physical changes. Such lines occur where a portion of the geological record is wanting, and have only a local extent. Geological ages are only arbitrary divisions of geological time. We have no reason to suppose any

greater physical changes between one geological age and another, than between the eighteenth and nineteenth centuries.

Through the long lapse of past ages, alternate changes have occurred, from ocean to dry land, and from land to ocean again. Geological deposits are made only beneath water. When a portion of the earth's surface is elevated to the condition of dry land it receives no deposits —on the contrary, the face of continents are being continually denuded and washed into the oceans.

During the thousands of centuries that lands are above water the modifying influence of changing conditions effects great changes in living forms; hence, when that land is, in time, again submerged beneath water it receives another deposit with quite distinct orders of life, from the underlying older rocks that had been so long above water. Here would appear an abrupt change in the geological record. Formerly such abrupt changes in the rocks were not understood, and were unhesitatingly taken as evidence of a sudden destruction of living forms, and the ushering in of a new era by a direct creation of new forms.

The hypothesis of a supernatural creation has sublimely covered up a vast amount of human ignorance. But more extended research tends to show that all such abrupt changes are but breaks in the geological record and have but a local extent. It is now well understood that superincumbrance of position does not necessarily imply proximity of time. Various other conditions which time will not permit me to set forth, cause abrupt changes in geological deposits.

Our present forests are very distinct from the luxuriant flora of the miocene age in the same latitudes. Of course the origin of our present trees and plants was formerly accounted for on that convenient hypothesis of a special creation. It was thought that the introduction of an entirely new order of vegetable life, in a single geological age, would admit no other solution. But, to that great American botanist, Dr. Asa Gray, more than to any other man, belongs the credit of tracing the origin of our present flora to high northern latitudes. Our present plants, or their closely allied representatives, are found fossil in the tertiary beds of high latitudes; and their lineal representatives are traced even back to the cretacious. During the increased cold of the pliocene and post-pliocene, this northern vegetation was gradually pushed southward; and succeeded to the more luxuriant flora of miocene times which worked its way further to the south. Many of the lineal representatives of that miocene flora are now found between the tropics.

Regarding the cause of the general change of climate during the post-pliocene times, space will only permit me to say, it is mainly accounted for, in the elevation of an excess of polar lands. This excessive proportion of northern lands has made regions of perpetual ice, where, in miocene times, rolled the waters of open seas warmed by currents from tropical regions. At the present time, the Antarctic conti-

nent is conceded to be larger than Australia, and doubtless all covered with several thousand feet of ice; then the present continents all widen out and extend high into northern latitudes and form regions of ice. If, as in former ages, open seas occupied the place of these polar lands, ice and snow would scarcely be known in this latitude. This great excess of polar lands, is an abnormal condition that did not exist in former ages.

Formerly, geologists did not hesitate to point out the epoch of time in which life appeared on the globe. But more extended researches have traced organic life through the oldest geological formations known to man; hence, while it will not be doubted that there was a time before organic forms began to exist, this opinion has not the support of any direct geological evidence.

The oldest geological section known to man, is the Lawrentian system of British America formerly considered wholly destitute of any traces of life, and wrongly called *Azoic;* but recent discoveries reveal traces of low orders of animal and vegetable life, in the very lowest of the Canada section of rocks accessible to man.

The total thickness of the Lawrentian system is estimated at about eight miles—all, in the lapse of past eternity, formed in the bottoms of former seas, from sediment worn from still older rocks—perhaps from the wash and wear of still older continents, of which no vestige is accessible to man! We must bear in mind that previous formations, are, in all cases, ground up in the mill of time to make each succeeding formation. Hence we must see that comparatively little can be left of the older formations. The earth's crust has been so often flexed, broken, and tilted through the succession of ages, that the oldest formations have been mostly ground up by abrasion.

When we reflect that since the Lawrentian age the total thickness of the stratified rocks of subsequent ages are estimated at over ten miles, we may wonder that this tract of country north of the Great Lakes lies up to the sunlight of the present time as a memorial of ages too remote for human comprehension.

Such is the nature of geological revolutions—unnoticable to us, only because too slow and gradual for our transient observation. We extend railroads over regions that will be covered with glaciers—build cities on lands that are subsiding into the ocean, and even over the fires of slumbering volcanoes! While at no distant future, wealth will abound on the flood grounds of the Amazon and Mississippi, and orange groves will bloom in the regions of our dismal swamps. Geological revolutions are in progress before our eyes through the same agencies as in all past time.

As in the physical revolutions of the past ages, so also with the revolutions of the organic world. It has become the inquiry of the age, whether the solution of this abstruse question is not to be found in *known, natural* causes, instead of supposing such as are *unknown* and *unnatural*.

As we account for geological revolutions by observing such gradual changes now in operation, as would produce given results if long continued, may we not also account for *specific changes* by studying the nature of such known divergencies in living organisms as would produce a *specific distinction*, if continued for a sufficient duration of time?

We can conceive of no natural process by which living forms originate, except through a line of progenitors; and we do know that both animal and vegetable life are subject to variations or modifications consequent on a change of conditions, under which they exist. And geology reveals that in all past time the earth's crust has been undergoing a constant succession of physical changes; hence, that living forms have been subject to a succession of modifying influences for a duration of time as incomprehensible as eternity itself. What else could have been the inevitable result, except *an endless diversity of living forms?*

It matters not that the changes in organic forms are extremely slow: so are geological changes extremely slow. It matters not that the present diversity of life is extremely great: so has the time in which these wonderful evolutions have been effected been incomprehensibly long. Though great is the diversity of life, through all that diversity there is a *unity of plan*, that seems to reveal the bond of a common relationship.

I am aware that to the minds of many excellent people these ideas are very repugnant. This is no more than should be expected; such has been the case with every scientific discovery that conflicts with tradition; people are still nervous lest they may be led to believe something that is contrary to Genesis. Well, does that account tell us that God made these things independent of natural agencies? On the contrary, it reads, "And God said, Let the *earth bring forth* grass," etc.; "Let the *waters bring forth* abundantly the creatures that hath life." How did God create these creatures that have life? He ordained that the *waters should bring them forth* through those inherent laws that are the out-flow of his infinite wisdom.

And further, we learn that God ordained that the *earth should bring forth* living creatures, cattle, and every thing that creepeth upon the earth. That is what the Bible says about the *means* or *natural agencies*, through which God accomplished the physical creation of every thing that moveth in the waters or creepeth upon the earth.

Strange that people who will go to the Bible to settle scientific questions do not *read it more carefully!*

If we are ignorant of the origin of living forms, let us in all humanity say so; and not seek to cover up our ignorance with the *hypothesis of a special creation*—something that we know still less about.

In the present lack of knowledge in the sciences in which this question is involved, with the bias of traditional notions hanging over the public mind, it need not be a matter of surprise that generally only vague, erroneous ideas prevail on this whole subject. If we have not

investigated for ourselves, we might feel excused from expressing any direct opinions. But, unless stupidly indifferent to the tendency of scientific thought, we cannot disguise from ourselves the fact that the whole current of scientific research is irresistibly leading to an abandonment of the old ideas for the more grand and beautiful philosphy of EVOLUTION—as much more grand and inspiring to the scientific mind than the traditional notion of a special creation as our present ideas of a boundless universe transcend the former notions of a fixed earth, for whose purpose all the heavenly bodies were made to subserve.

I repeat, if we have not investigated for ourselves, when we see such men as Sir Charles Lyell, Huxley, Tyndall, Lesquereau, the English naturalist, Prof. Owen; the French naturalist, Carl Vogt; the world-wide botanist, Dr. Hooker; the great American botanist, Dr. Asa Gray, abandon their old opinions as untenable, and accept the doctrine of evolution, when we see these views are advocated, and pass undisputed before the most scientific bodies of Europe and America, as was the case at the late meeting at Dubuque, we might at least feel that this subject is worthy of something more than burlesque. But I have said more than was intended—may I be pardoned if I have said too much.

Let me drop a closing thought. How grand is the whole scheme of creation, when we can view all life as but a revealing, or mode of operation of the forces and laws that are inherent in nature—ever passing through interchanges between organic and inorganic bodies!

When we conceive of the production of all the beauties of the universe through the operation of inherent laws, is not this a higher estimate of the being in whom laws originate, than to suppose all things to have been created by an act of arbitrary power? What is the whole system of nature but the highest possible manifestation of Divine Intelligence? What are all the laws that relate to mind or matter, but expressions of the attributes of that Being whose life pulsates through a boundless universe, and scintillates in every human soul?

MR. R. DOUGLASS, from the committee on timber culture, read the following:

TIMBER-PLANTING.

Having determined for what purpose timber is most likely to be in demand, in the locality where the plantation is about to be formed, whether for fuel, agricultural implements, cabinet work, building purposes or for railroad ties, bridge timber and fencing material, the next consideration will be the kinds best adapted to the soil.

As our subject is timber-planting, we will suppose that the above points have already been decided.

The time is very near at hand when forests must be planted on a large scale in this country, to replace the native forests, which, in the opinion of the most careful observers, can not last, at the longest, over a quarter of a century. But these remarks are intended more for

the farmer, who requires a timber lot in proportion to the size of his farm, than for the scientific forester, who will make a specialty of planting woods and forests.

Every one will agree that any prairie farm would be improved by having at least one-tenth of its acres in timber, even for the uses of the farm, and our object in these few remarks is to show how we can best accomplish this desirable object; for, aside from the value of the timber when grown, it may be placed in such a manner as to be of great advantage, both in appearance and usefulness, protecting the crops from the prevailing winds, especially valuable in case of the orchard, the barns, the stock and the dwelling.

We need not go into an elaborate argument to prove that timber is a protection, as nearly every farmer in the West, when riding across the prairie in cold weather, has felt the ameliorating effect of even a little grove of scrub oaks, and not only man, but the brute creation as well. understand it perfectly. Even the little prairie flowers seem to take advantage of it, and dare to put on their summer robes, while their poor relatives on the bleak prairie are still in their winter dresses.

TIMBER-PLANTING ON LANDS VALUELESS.

On many farms several acres are of little value for farming purposes, owing to the surface being too much broken, and uneven, to admit of the plow, or liable to *wash* if plowed. On others, strips or ridges, so sandy as not to admit of growing a crop of corn, grain or grass, at a profit over the cost of cultivation. All such places can be covered with timber that will make a good growth, if the selection is made of kinds suitable to the various kinds of soil.

On the broken land, if stiff clay, as is often the case, and where the plow cannot be used, it would be advisable to prepare the holes for planting the trees in the fall, with a spade or grub hoe, simply breaking the surface where each tree is to be planted, leaving it to the action of the frost in winter, for this mode should be used for planting trees that have been transplanted in the nursery, and are well rooted and stocky.

There will be no necessity for planting the trees at exactly equal distances where the plow cannot be used. Four to five feet apart each way would be a good distance for this kind of planting, selecting the most favorable places to set the trees; where the surface is partially covered with tufts of grass or other herbage, the tearing up in the fall will have destroyed it, and the sods or tufts may be laid on the surface around the tree when it is planted.

Trees planted on such ground will not make so rapid growth the first two or three years as trees in good, smooth, plowed ground, but after once fairly established they will grow quite as well as on more level land of the same quality of soil.

There would be nothing gained by disturbing sandy soil in the fall for the purpose of spring planting; indeed it would be a damage to the land.

Sand ridges may be planted in a similar manner, only the trees should stand closer together, and be set deeper in the ground. The object in planting closer is to have the trees protect each other.

If these sand ridges are nearly covered with vegetation they should be plowed before planting, but if too sandy to produce more than a sparse covering, the plow would do more harm than good, and the trees should be planted so as to disturb the surface as little as possible. Thousands of acres of blowing sand have been covered with valuable timber in this way both in France and Scotland, but it would not be profitable to plant such land in this country, and we would not advise the planting on land so sandy as to be entirely destitute of vegetation. But if there is enough fertility in the land to produce corn stalks one to two feet in height it may safely be planted, and in that case the trees need not be planted nearer than four feet each way, with corn planted in the intervals,—not for the crop of corn, as we are speaking of land too poor to produce corn; but these corn stalks will protect the young trees from the scorching sun in summer, and from the winds and frosts of winter. Fortunately for us all, there is very little such land in our fertile western states, so we will now proceed with the best method of planting on our ordinary prairie farms.

TIMBER-PLANTING ON THE PRAIRIES.

We will take as an example one hundred and sixty acres of ordinary prairie, and suppose that the farmer wishes to put only one-tenth of it in timber, which is far too little. This would make sixteen acres to be planted. A belt eight rods wide on the north and west sides of the farm will make fifteen and three-fifths acres, leaving the remaining two-fifths of an acre a belt on the north and west sides of the orchard and buildings.

The distance apart at which the trees should be planted may vary somewhat, depending on the kinds planted. Coniferous trees may be planted closer than trees with spreading heads, but in open, exposed situations it is always better to plant rather close, as the trees will protect each other from the summer suns and winter winds, will grow up straight, thereby save one pruning, and will require less time in cultivation, as they will sooner destroy the weeds and grass by their shade, and after this will need no more cultivation.

Four by four feet is the best distance to plant coniferous trees. Deciduous trees may be planted five by five or four by six feet. As forest planting is yet in its infancy in this country, planters will be likely to disagree as to the distances apart at which it is advisable to plant.

In Europe the rule is to plant very close, but there are reasons for this close planting that do not occur in this country, one is close planting on moor land without plowing, to shade the ground as soon as possible, and by this means destroy surface vegetation.

In this country, where we are not afraid to work horses among the trees, the horse and cultivator will destroy the weeds at very small

cost, and at the same time very materially add to the growth of the trees.

In Europe they make use of the first thinnings of their forests for rustic fences, sheep hurdles, and in several other ways that they would not be used in this country. They have been trained to believe that "they must plant thick, and thin quick." Our farmers would be loth to cut down their fine, thrifty saplings before they were of much value and might leave them too long, and thereby injure the plantation.

It seems to me that American ingenuity will be brought to bear on tree-planting in this country in such a way as to save much of the labor required for performing the same operation in Europe. They contend that in bleak and exposed sites where the lands are not protected by growing timber or surrounding hills, they must plant very close for protection, and some of their most experienced planters who recommend from three thousand to three thousand five hundred trees as "about the right number to plant on an acre," say, "If the exposure is rough and bare, five thousand plants are sometimes judiciously used to an acre." In this country, aside from the advantage we have in being accustomed to use horses to work amongst our trees, we have a plantation, never thought of in that country, for if we plant on exposed land, instead of using a double quantity of trees, we can plant our trees at such a distance apart as they can be allowed to stand till they have a market value, giving the protection required by alternating corn hills and trees.

Supposing we wish to plant on an exposed piece of land, we want to protect the trees by shading the ground, and at the same time we find that an extra quantity of trees adds very much to the cost of the plantation. In that case why not plant six by six feet and alternate with corn? Your strip of land is only eight rods wide, and it will not be a very costly job to carry the corn that distance. The corn stalks should stand through the winter, of course, only they might be topped off if thought best.

Another method might be adopted. Supposing our farmer has not the time and means to spare to plant the whole of this sixteen acres in one season, or has not the land ready for more than a part of it, he can plant his rows four feet apart and his trees one foot apart, only covering one-fourth part of the land, and let them stand there two years. They would then be in fine condition to plant the remainder, would be strong enough to grow without the protection required for smaller trees, and would be a more economical plan than though he planted all at first.

PLANTING THE FOREST.

The practical tree-planter would mark off the land at the distances designed to plant the trees, and plant with the spade, while the farmer would be very likely to check off his land and then plow furrows one way, with his one-horse plow, and plant at the intersections. In either

way, great care should be taken not to expose the roots of the trees to the sun and wind, and to be very careful to pack the earth very firmly over the roots of every tree planted.

The roots of the trees can be protected from drying with very little trouble by having a tub of mud and water in the field in which to immerse each bundle of trees as they are taken from the boxes or from where they lie "heeled in," in the field.

The first season's cultivation will be about the same as for corn, only the cultivator may be run till August, and in September a light furrow should be thrown up to each side of the rows of trees, running the furrows which ever way will be best to carry off the water.

These furrows can lie up to the trees till the weeds have started the next spring, and may then be plowed back. After this they will require the cultivator twice during the summer, which will complete the second season's cultivation. They may require the cultivator once or twice the third season, after this they will take care of themselves.

The committee on fruit on exhibition, reported as follows:

To the President and Members of the Northern Illinois Horticultural Society:

Your committee, appointed to examine and report upon fruits on exhibition, respectfully submit the following:

1st. Twenty varieties of apples, and thirty-eight varieties of tree seeds, from A. Bryant, Jr., Princeton.

2nd. Twenty varieties of apples from L. Woodward and A. H. Vail, Marengo.

3d. Twelve varieties, no name of exhibitor.

4th. Nine varieties, E. Ordwell, Freeport.

5th. Twelve varieties, Luman Montague, Freeport.

6th. Three varieties, S. G. Minkler.

Numerous specimens of Larches and Cedar wood, from R. Douglas and sons.

Also, Larches, Scotch Pine, and Red Cedar, from William Hill, Dundee.

Also, Larch from D. C. Scofield, Elgin.

Also, cider wine, of eighteen hundred and sixty-nine, cider vinegar, seedling, No. 20, Siberian crab, and canned fruit, from A. R. Whitney, Franklin Grove, Ill.

Also beautiful case of foreign insects, by S. F. Dawson, taxidermist, Freeport.

Also, beautiful and complete Herbarium, from Mrs. V. P. Hathaway, Damascus, Ill.

Also, ten varieties of seedling apples, which have been tested, from eight to twenty-four years, at Pewaukie, Wis., by George P. Peffer.

A specimen of a new variety of Asparagus, by Wm. R. Fairburn, Ridal.

We can not let this opportunity pass without referring, with pride, to this display of fruit, showing we have varieties that are valuable and productive in abundance. ARTHUR BRYANT, Chairman.

On motion of D. W. Scott, the following Resolution was unanimously adopted:

WHEREAS, By the invitation of the management of the Freeport Beet Sugar Factory, this Society has had the pleasure of witnessing, this day, the operations and machinery in the manufacture of Beet Sugar. Therefore,

Resolved, That the congratulations of this Society are due to our esteemed fellow member, Chas. H. Rosentiel, on the first successful manufacture of Beet Sugar in this State, and also on the opening up of a new industry which promises in the not distant future, the profitable employment of surplus labor and capital, and a large increase of the material resources and wealth of the state, which result is mainly due to his perseverance and ability.

Adjourned.

FRIDAY MORNING.

Meeting called to order by S. G. Minkler, President.

Prayer by S. Edwards.

MR. W. A. HOUSE, of Rock Island, presented the following communication from the Iowa State Horticultural Society, and ten copies of their transactions.

DAVENPORT, IOWA, January 22, 1873.

To The Northern Illinois Horticultural Society:

Congratulating you on your sacrificing home comforts to attend to the public interests of Horticulture, it is our pleasure to be engaged in so laudable a work. Our numbers at this meeting are few but earnest.

We delegate the bearer, Mr. W. A. House, to report the rest. Sending our friendship and good wishes for your success, we regret very much that our meetings occur the same week. Let us avoid it hereafter. The law of our state fixes our time the third Tuesday in January.

We send you ten copies of our last report, eighteen hundred and seventy-one and two. Shall be glad to receive yours.

Hastily, without order of our Society,

I remain yours,

SAMUEL FOSTER.

Treasurer of Iowa State Horticultural Society.

On motion of S. Edwards, the following resolution was adopted:

Resolved, That we cordially reciprocate the kindly greeting of the Iowa State Horticultural Society, and are glad to change the time of our annual meeting, to enable us to enjoy, as heretofore, the presence of many of the zealous practical men of Iowa.

THE PRESIDENT announced the following

STANDING COMMITTEES FOR 1873-4.

Orchards and Vineyards: O. B. Galusha, Morris; M. B. Spafford, Dixon; A. Bryant, Jr., Princeton.

Timber and Ornamental Trees: L. K. Scofield, Freeport; Dr. A. G. Humphey, Galesburg; R. J. Douglas, Waukegan.

Floriculture: James S. McCall, Freeport; Mrs. S. C. Harris, Galena; Samuel Muir, Chicago.

Meteorology: Grove Wright, Rock Falls; N. E. Ballou, Sandwich; M. S. Ellsworth, Naperville.

Geology: T. McWhorter, Aledo; Capt. E. H. Beebe, Geneva.

Timber Planting: A. Bryant, Sr., Princeton; R. Douglas, Waukegan; S. Edwards, Lamoille.

Ornithology: Jas. M. Harris, Galena; Mrs. P. V. Hathaway, Damascus; John W. Robson, Abilene, Kan.

Entomology: Dr. Wm. LeBaron, Geneva; Dr. Henry Shimer, Mount Carrol; D. B. Weir, Lacon.

Botany and Vegetable Physiology: H. H. McAfee, Freeport; Jonathan Periam, Chicago; George P. Peffer, Pewaukee, Wis.

Landscape Gardening: H. H. McAfee, Freeport; J. P. Bryant, Princeton; A. M. Carpenter, Galesburg.

On motion of Isaiah Bonham, of Chicago, the following resolution was adopted:

Resolved, That there be added to the list of standing committees of this Society, one to be denominated the Committee on Marketing and the Utilization of Horticultural Products.

Chairman appointed M. L. Dunlap, Champaign; M. B. Spafford, Dixon; J. Periam, Chicago, as said committee.

On motion of L. Woodward the following resolution was adopted:

WHEREAS, There is in the prevailing names of our fruits, a confusion that is much against the standing and progress of our pomology,

Resolved, That we deem it advisable to appoint a committee to co-operate with those of other societies in this work of correcting our nomenclature.

The Chair appointed L. Woodward, T. McWhorter, committee.

On motion of L. K. Scofield, the following resolution was adopted:

Resolved, That the bill unanimously agreed upon for the re-organization of the late Horticultural Society, by the Committee of Conference of this society, together with the Executive Committee of the State Horticultural Society be printed, with the signatures of each member of that conference, and that a copy be sent to each officer of the State and of the Northern Illinois Horticultural Society. Also to each member of our State Legislature and to each member of the State Agricultural Board.

On motion R. Douglas, L. Woodward, H. D. Emery, L. K. Scofield, were appointed delegates for this Society to the Wisconsin State Horticultural Society.

MR. PLUMB, of Wisconsin, addressed the meeting on horticultural interests generally.

Committee on Final Resolutions, reported the following, which were adopted unanimously:

Resolved, That our thanks be tendered to our worthy president for his interest manifested in the welfare of this Society, and especially for the kind, capable, and impartial manner in which he has discharged the duties of its chief officer.

To the other retiring officers, who have discharged their difficult duties so acceptably, we tender cordial thanks.

Resolved, That we are highly gratified in having so large an attendance of our friends from Wisconsin, Iowa, Nebraska, and New York, with their fruits and their counsels. We thank them cordially and hope for an annual increase of their numbers.

Resolved, That the thanks of this Society are due, and hereby tendered, to the officers of the Illinois Central, Chicago and Northwestern, Western Union, and Chicago, Burlington and Quincy Railroads, for reduction in return fares to our members.

Resolved, That in the cordial reception, generous hospitality, and large attendance of citizens at our sessions, in her model court house, affording the finest accommodations ever furnished our Society, Freeport has even outdone herself—coupled with our heartfelt thanks, is the assurance that she will find the prediction true, "The liberal soul shall be made fat."

Resolved, That we do hereby acknowledge with heartfelt gratitude to Him who rules over the Universe, and presides in the counsels of men, that He has so manifestly directed our deliberations; and that we will ever commit to Him our cause and seek His divine guidance and protection.

S. EDWARDS,
CHAS. W. RICHMOND.

On motion of S. Edwards, the following was unanimously adopted:

Resolved, That the Northern Illinois Horticultural Society tender special thanks through the Recording Secretary, Robert Little, to the Board of Supervisors of Stephenson county, for the use of their magnificent court room, during the present session of our Society. No words of ours can properly express our thanks for their liberality, and our appreciation of their energy and regard for the public welfare in providing this magnificent structure.

On motion of Mr. Plumb, of Wisconsin, the following was adopted:

WHEREAS, Certain parties have and are now vending certain recipes as specifics for all noxious insects and diseases of fruit trees, in the form of washes and innoculations,

Resolved, That we do condemn all such, as not worthy of the attention of any tree-grower, and we believe contrary to vegetable physiology.

The following essays were referred to the Publishing Committee without reading, to be published with the Transactions:

REPORT ON METEOROLOGY.

BY DR. N. E. BALLOU, SANDWICH, ILL.

Mr. President:

A retrospect of the year would first of all lead us to acknowledge the kindly dealings of the great Giver, in vouchsafing to us so many blessings and mercies, in crowning the year with fruits and stores for our comfort, happiness, and well-being. The conditions of these health-giving bestowments are propitious seasons, and the exercise of enlightened culture of the soil.

From mother earth we draw all of our material sustenance, and with favoring combinations of heat and moisture, sunshine and shower, our hearts are gladdened with the rich clusters of the vine—the golden fruitage of the apple and pear.

But while we bend our energies in toil to secure the rich gifts of Pomona, we are beset with vicissitudes of climate, which often sweep away at a stroke the promised fruits of a season's toil. The changes of climate, the oscillations of temperature which roll up and enter the western borders of country in the form of atmospheric waves, are the adverse agents of the horticulturist, and often deter him from engaging more largely in the most delightful, as well as the most lucrative of employments.

Abstract of Meteorological Observations made at Sandwich, Ill., for 1872.

Latitude, 41 deg. 31 min. Longitude, 88 deg. 30 min. 665 feet above sea level.

1872.	Jan.	Feb.	Mar.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	1872
THERMOMETER.													
Monthly Mean	19.3	22.6	27.9	48.2	61	71.6	75	3.74	64	8.47	28.6	75.4	46.3
Highest degree	42	50	62	80	80	98	98	93	93	80	52	43	98
Lowest degree	14	14	7	23	43	50	62	52	41	25	4	30	30
Range	56	64	55	57	37	48	36	41	52	55	56	73	1.28
Warmest day	12	23	28	25	26	19	14	26	7	4	7	7	July 14
Coldest day	29	1	20	1	4	4	4	3	27	11	29	24	Dec. 24
Cloudiness, 10 being perfect cloudiness	4.47	7.06	4.68	4.49	5.57	4.30	4.02	3.75	3.83	2.13	5.04	5.30	4.55
WINDS.													
North	1 2/3	1 1/3	5 1/3	1 2/3	2 2/3	3	3 1/3	6 1/3	2 2/3	3 2/3	0	5	36 2/3
Northeast	1	6 2/3	4	4	3	0 1/3	3	5 2/3	2	2 1/3	0	0 2/3	32 2/3
East	0 2/3	2	3 2/3	3 2/3	4	4 2/3	1 2/3	2	0 1/3	1 1/3	0 1/3	2 1/3	26 2/3
Southeast	0 2/3	5 2/3	1	2	2 1/3	0 1/3	1 1/3	1 2/3	2 2/3	1 1/3	2	0 1/3	21
South	3 1/3	3 2/3	2	4	4 2/3	6	4	5 1/3	7 2/3	4	5	3 1/3	53
Southwest	7 2/3	1	3	5 1/3	2 2/3	1	3 1/3	5 2/3	5 2/3	2	2 1/3	3	42 2/3
West	12	4 2/3	9 2/3	7 2/3	10 2/3	11 2/3	5 2/3	2 2/3	5 1/3	11 1/3	17	9 2/3	108
Northwest	4 1/3	4	2 1/3	1 2/3	1	3	8 2/3	1 2/3	3 2/3	5	3 1/3	6 2/3	45 1/3
Total of each month	31	29	31	30	31	30	31	31	30	31	30	31	36.6
Prevailing winds	W	NE	W	W	W	W	NW	N	S	W	W	W	W
Force of Winds	2.83	2.34	2.31	2.38	1.83	1.79	1.69	1.73	1.77	1.44	1.92	1.99	2.00
WEATHER.													
Fair days	9 1/3	6 1/3	11	11 1/3	7 1/3	8 1/3	9 2/3	12 1/3	15	21 1/3	11	11 1/3	134 1/3
Cloudy days	21 2/3	22 2/3	20	18 2/3	23 2/3	21 2/3	21 1/3	18 2/3	15	9 2/3	19	19 2/3	231 2/3
Total of each month	31	29	31	30	31	30	31	31	30	31	30	31	366
Rain	0	0	2	7	8	4	8	7	10	2	2	0	50
Rain and snow	1	2	3	1	0	0	0	0	0	0	0	0	7
Snow	5	6	4	0	0	0	0	0	0	0	4	7	26
Snow, in inches	3	4	4	------	------	------	------	------	------	------	3 1/2	12	26 1/2
Amount of rain, in inches	0.35	0.43	4.28	5.20	7.11	1.59	3.62	8.60	4.85	------	1.65	1.50	38.58
Number of frost days each month	29	25	25	4	------	------	------	------	10	8	19	31	151
Days without frost	2	4	6	26	31	30	31	31	20	23	11	------	215
Total of each month	31	29	31	30	31	30	31	31	30	31	30	31	366
Last frosts of spring	------	------	------	22	------	------	------	------	------	------	------	------	--------
First frosts of autumn	------	------	------	------	------	------	------	------	20	------	------	------	--------
Total number of days between frost	------	------	------	8	31	30	30	31	31	20	------	------	151

COMPARATIVE TABLE OF TEMPERATURE BY SEASONS—1872.

	Mean.	Time of Observat'n.			Maximum.	Minimum.	No. of frost days during the year.	Days without frosts.
		7 A.M.	2 P.M.	9 P.M.				
December	17.6	9.5	22.4	15.4	43	20	24	7
January	19.3	14.6	23.8	19.5	42	14	29	2
February	22.6	16	30.8	21.2	50	14	25	4
Winter	19.8	13.3	25.6	18.7	50	20	78	13
March	27.9	22.9	34.3	26.6	62	7	25	6
April	48.2	41.9	57.7	46.2	80	23	4	26
May	61	55.3	71.5	61	80	43	0	31
Spring	45.7	40	54.5	44.6	80	7	29	63
June	71.6	67.1	81.2	66.6	98	50	0	30
July	75	70.4	85	69.6	98	62	0	31
August	73.4	69	74.5	63.1	93	52	0	31
Summer	73.3	68.8	80.2	66.4	98	50	0	92
September	64	58.8	73	61.4	93	25	0	30
October	48.7	40.9	60.5	48.7	80	25	8	23
November	15.4	24.4	34.5	26.9	52	4	19	12
Autumn	45.5	41.3	56	45.6	93	4	27	65
Year	46.3	40.8	54.0	43.8	98	20	134	232

Table first has been elaborated from nearly four thousand observations, by the use of standard instruments under the direction of the Smithsonian Institution, at Washington. These observations were made at seven A. M., two P. M. and nine P. M. They are a continuation of Meteorological investigations begun twenty years ago, and form an unbroken chain, began in eighteen hundred and fifty-two. Together with the observations of others, they have established the mean annual temperature in northern Illinois, and the annual mean rain-fall, in the county of DeKalb, and those counties immediately adjacent.

Many interesting facts may be gleaned in the pursuit of this kind of knowledge, with patient study and perseverance. The table in question shows first the march of temperature, which would form not an imperfect curve, such is the regularity of its ascent and decline from spring to autumn. What has hitherto seemed in physical nature to have been capricious and subject to no fixed law, is now referable to general principles, upon which these changes depend.

The table presents first, three divisions, under heads of Thermometer, Winds, and Weather, and if studied as grouped, will at once lead to a full understanding of atmospheric phenomena, and physical changes, with which it deals. First, under the appropriate heading, may

studied the monthly mean temperature; highest and lowest degrees, range of temperature, warmest and coldest days. Next is cloudiness determined by estimate, ten being perfect cloudiness or any variation of cloudiness, representing fractional parts. There is much interest attached to the study of the clouds, and to cloud formations. The mean cloudiness for the year is four and fifty-five hundredths, representing a state not quite equal to a sky half overcast.

The winds next claim attention. The prevailing winds during the year have been west, and their prevalence also indicate quite correctly the storm quarter; the point from whence comes gales, hurricanes, and severe rain storms. The average wind force is two or four miles per hour. Alas, as with the joys of the world, clouds predominate largely over sunshine; the whole number of fair days amounting to one hundred and fifty-one, while the cloudy days reach two hundred and fifteen. Of rainy days there were fifty. Rain and snow fell on seven days, while snow fell on twenty-six days; the snowfall giving a depth of twenty-six and one-half inches. The mean rainfall was thirty-eight and fifty-eight hundredths inches. The month of October produced no rain, what has not occurred for twenty-one years.

The comparative view of the temperature of the season gives us a more distinct idea of the climate than, taken as a whole, by mean annual computations—Spring, Summer, Autumn, and Winter. The four quarters of the year are determined astronomically by the relation of the movements of the sun, in the ecliptic. The passage of the sun across the equator brings on greater length of days than nights, and marks the vernal equinox, or inauguration of Spring, which occurs the twenty-first of March. The Summer solstice ushers in Summer on the twenty-first of June, and the Winter solstice leads in Winter on the twenty-first of December. Our almanac divisions are not astronomically true.

Our season has been marked by a long-continued drouth, which made the year, in many particulars, a very unsuccessful one for horticulture, as well as for all branches, directed to the cultivation of the soil. Insect life, in many forms, thrive most favorably during dry seasons; they multiply and extend their ravages to almost every species of fruit, in spite of our best-directed energies for their extinction.

OSCILLATIONS AND CASUAL PHENOMENA.

While the seasons progress, under the earth's annual changes of surface to the sun, we may note a steady and upward tendency of temperature in spring, and as marked evenness in its decline in autumn. But, while many of the phenomena of climate are regular in their appearance, and are not marked by any particular severity, oscillations come upon us almost without time for preparation to meet their onset. I allude to sudden *atmospheric waves*, which have broken over the shores of Oregon and British Columbia, from time immemorial, and spent their fury upon portions of the continent lying easterly from the

trough of the Rocky Mountains, through these waves, pass in their eastward route, in heavy westerly gales. The annual invasion occurs in October and continues until January, and accounts for the severe cold of this latitude, and other localities of the Northwest, within the track of this invader.

We have an "atmospheric wave" during the spring, summer, and first autumn month, similar, but in a greatly modified form. It is certain to roll over us in April, May, and June, and often in July, and almost certainly does it make its appearance the last week in August, and never fails to appear in September. During twenty years' observation, this ugly visitor has rarely failed to put in an appearance, when visits of the kind would exert the most baneful influence. We are often witnesses of these atmospheric waves, and are led to exclaim that our location upon these parallels of latitude is quite inopportune; this is true. The changes may always be expected, and could only be remedied by interposing large belts of timber at near intervals across the track of the unwelcome visitant.

This atmospheric wave may be anticipated many days, in its appearance, and every careful provision made to meet the onslaught of this cold wave. As casual phenomena, we have, during the month of August and November, shooting stars. This demonstration of the heavenly bodies is quite regular in its occurrence. Parhelia, sun-dogs, are attendants upon the sun in cold weather, and this phenomena is a good cold weather indication.

PROTECTION AND PLANTING OF FOREST TREES.

BY DR. A. G. HUMPHREY, GALESBURG.

To us who have been pioneers of our prairie state, and who have for years borne the cold blasts of winter, and the scorching heat and parching drouths of summer, our subject is fraught with intense interest.

The reasons for protecting the forests we already have, and for covering our treeless ocean-like prairies with deciduous and coniferous forests, are varied and important.

It is fairly estimated that if every tenth acre was covered with forests, it would decrease the average heats of summer six or eight degrees, and reduce the colds of winter equally as much or more. It is also ascertained that in addition to producing a very much milder and more equable climate, the effect of these forests would be most beneficial in the production of crops, as materially tending to attract rain and to retain moisture in the ground, and thereby causing the grasses and cereals to grow more vigorously and certainly. Forests in timber belts for wind breaks keep off the early fall and late spring frost, which often prove so destructive to our fruit interests.

Without their shade, shelter, and ameliorating climatic influence, the culture of the apple, the peach, plum or apricot, is exceedingly unreliable and indeed hardly possible.

The forests are the ornaments of the earth, the embellishments of the landscape. Whether we look at the sturdy strength of the Oak, the gentle grace of that "maiden of the woods," the Birch, the majesty of the Pine, the dome-like beauty of the Maple, the varying symmetry of the Ash, the spire-like pinnacle of the Fir, or the green fountain of that loveliest tree of all the temperate zone, the American Elm; whether we follow the delicate tracery of their outlines when destitute of leaves, or look on their foliage, wearing the tender green of spring, the ripe fullness of summer, or the gorgeous hues of autumn; whether we meet them singly, or in those groups that nature or imitative art composes,—they are always grateful to the eye and cheering to the heart.

Stripped of them, what would be the beauty of the earth? Had they no other use, they would hold an office of great utility, for whatever appeals to the human heart is in the highest degree useful. "A thing of beauty is a joy forever," and as it acts on the soul its educating power enriches man beyond the reach of all that only serves his economic uses. So that were this their only office they would have a claim on all who would seek to refine and cultivate mankind through those instrumentalities that God has made so available to man. And it would, for this reason alone, be worth the while to clothe the hill-top with the group on which the eye loves to rests, scatter along the valleys and water-courses those fringes that suggest peace and shelter; Erect the wall of evergreens between the isolated cottage and the wintry blast, and lift high above its roof the shadow of the cloud of green in summer; and brighten the streets of the city and village with that foliage which transfers to the barren achievements of man something of the beauty of the works of God.

Aside from covering the earth with beautiful garments, and pleasing the eye and cheering the heart of man, their chief office is one of utility. On this point there are several obvious considerations, either of which would make an ample subject for an essay. The fuel they produce for man's fires; the lumber they yield for the purposes of his civilization; the barks for tanning and dying purposes; the edible fruits and saps he obtains from them; (in eighteen hundred and sixty, in the United States, thirty-eight millions eight hundred and sixty-three thousand eight hundred and eighty-four pounds of sugar, and one million nine hundred and forty-four thousand five hundred and seventy-five gallons of molasses, were manufactured); the pitch that makes the turpentine and tar;—these at once suggest themselves as of importance sufficient to demand attention to forest-culture on the part of the political economist, and urge him to see to it that law and public opinion protect the standing forests from unwise destruction, and institute such means as shall clothe the naked portions of the earth inhabited by man, as far as is consistent with his agricultural enterprises.

The essential wants of life are sufficient to direct attention to the subject before us. Surely each community, each farmer, ought to have within easy reach, if possible, all the fuel needed, all the lumber re-

quired, and such products yielded by trees as can be had consistent with the primary purpose of the soil, to yield those annual plants on which man and his domestic animals depend.

It is true that the woods alone cannot support mankind in a civilized state. They must be taken off the soil, before his plantations and cities can exist. But aside from the uses we have named, their value is immensely great, on such portions of the earth's surface as his wants do not demand should be cleared. In the great prairie states of Iowa and Illinois it is especially necessary that the great deficiency of trees should be overcome, and that they should be planted, or allowed to grow undestroyd by fires.

I wish especially to make an appeal to our farmers, and indeed to every person who owns a square rod of the earth's surface. The planting and culture of deciduous and coniferous trees is receiving too little attention in the rural districts. I would have every inhabitant so alive to this subject that they would realize the patent fact that every tree planted, adds to the material wealth of the country. As a rule the object of the farmer is to cultivate such crops as can most readily be turned into money, but if all farmers in a given district should raise only such products as they could annually exchange for money value, the real wealth of that district would be little if any increased.

Most happily for our country, a majority of our farmers look a little further than for simply an annual income; and plant an orchard, and about their buildings plant evergreens and deciduous trees for ornament, shade, and protection, which in a few years add very much to the value of their premises.

While it is desirable for us in the main, to make our labor bring us immediate returns, yet if every farmer would plant and cultivate his grounds, with reference to their value fifty or a hundred years hence, the resources of wealth to the country would be vastly augmented. This is essentially true with reference to the culture of timber. There is no farmer who could not devote one, three, five, or even ten acres of his grounds to timber, and in a few years this would be the most valuable part of the farm.

The importance of planting trees and groves of timber, will be more forcibly realized when we look at the vast consumption of timber for mechanical purposes and for fuel.

In the monthly report of the department of agriculture for November and December, eighteen hundred and seventy, it is estimated "that one hundred and fifty thousand acres of the best timber is cut every year to supply the demand for railway sleepers alone. For railroad buildings, repairs and cars, the annual expenditure in wood is thirty-eight million dollars. In a single year the locomotives in the United States consume fifty-six million dollars worth of wood. There are in the whole country more than five hundred thousand artisans in wood; and if the value of their labor is one thousand dollars a year, the wood industry of the country represents an amount of nearly five hundred million dollars per annum."

This ratio of consumption will in a few years, very materially increase the value of timbered land. Then again, the immense beds of coal that underlie our soil, that are now furnishing hundreds of millions of tons of fuel annually, may in time be exhausted; then the wealth of the country will suffer immensely, unless this or succeeding generations shall have grown vast forests to supply the demand. It is a curious fact that with the exception of the white pine, the lumber of trees is tougher and better when cultivated than of natural growth.

But the earnest inquiry of the farmer is, "Will it pay in dollars and cents to plant groves of timber."

Consider some facts. One tree was cut, about seven miles northwest of this city (Galesburg, Illinois), the body of which sold for meat blocks for thirty-eight dollars, the remainder of the tree was cut into posts and fuel, and sold for forty-eight dollars, the whole tree bringing eighty-six dollars. Now suppose that tree to be one hundred years old, and that three hundred trees grew upon an acre (in heavy forests many more grow upon an acre), and that each tree would bring forty dollars, the acre of timber would be worth twelve thousand dollars, or a hundred and twenty dollars per acre per annum. In the raising of grain, farmers rarely realize more than twenty or twenty-five dollars per acre. Considered for a less number of years, the annual profit would not be so great, yet much more than could be realized from any other single product, as the following item will show.

Messrs. Henry & Wm. Sisson, living three miles north of this City, Galesburg, Ill., planted two acres to Black Walnuts ten years ago this last Fall. Most of them came up the next spring. They cropped the ground for three years to corn, raising nearly as good crops as if the trees had not occupied the ground. For seven years it has furnished as valuable pasture as any other two acres of their pasture lands.

Now they have a compact grove, the trees ranging from twenty to thirty feet high, and of strong, stocky growth from the ground up. The proprietors of this farm told me more than two years ago that five hundred dollars would not tempt them to have that grove removed. This estimate of the value of the timber is two hundred and fifty dollars per acre, while the market value of the land in that vicinity is not more than sixty-five dollars per acre; and give an annual value of wood-growth of thirty dollars per acre, and twenty dollars per acre for crops and pasture since the ground was planted, making a total annual value of fifty dollars per acre.

Now who will ask, "Will it pay?" Here are the figures, and any farmer can do as well with ten or even twenty acres in the next ten years; and the ratio of value will be greater per annum the longer the grove is allowed to grow, even if it is a hundred years.

The following are some of the varieties of deciduous trees most easily transplanted, European and American Larch, Silver Maple, Box Elder, Sugar Maple, and Silver-leaved Poplar, Mountain Ash, and Red Butt (or Judas tree.) For lawns, white and Burr Oak are desirable but

difficult to transplant. Chestnut can be successfully transplanted, while young.

Among our native trees for variety that can be successfully transplanted, are the Coffee Bean, River Birch, Hackberry, and Linn. Black Walnut and Butternut are the most profitable of all, for grove planting, from the seed. I have not seen it tried; but judging from nursery culture, I should think the chestnut could be very successfully grown in groves from seed.

Of the evergreens, all the most common varieties, as the Scotch, Austrian, White, and Ponderosa, or heavy wooded pines, the Norway and White Spruce, and the Hemlock, are desirable. The Balsam Fir is vigorous and easily grown while young; but seems to be short-lived on our prairie soil.

The intense importance of this subject in affecting the future wealth of the country, should be considered by county and state agricultural societies, and valuable premiums should be offered for the best groves of a certain number of acres, of different varieties of timber, and of specified age to encourage and promote this very important branch of industry.

Who would not be ambitious to do something for himself, and for future generations in this direction? How many labor and struggle in political life to have their names appear in the history of our country. But here the most humble can with little effort write his name in nature, and hand it down to generations yet unborn, only made brighter and plainer by the hand of time. And then in the future years the children and children's children will hold in high esteem and sacred memory the fathers whose diligent hand planted the grand and beautiful groves which to them are the source of the highest pleasure and their surest wealth.

Adjourned *sine die*.

The next Annual meeting of the Northern Illinois Horticultural Society will be held in the city of Sterling, Whiteside County, commencing on Tuesday, January twenty-seven, eighteen hundred and seventy-four.

LOCAL SOCIETIES.

WARSAW HORTICULTURAL SOCIETY.

In making this my fifth Annual Report (for eighteen hundred and seventy-two) of the Transactions of this Society, the undersigned finds but little of special interest to lay before the general reader.

The meetings of the Society have been held regularly through the year, and all the *working* members continue to take a commendable interest in the proceedings. The community generally, however, seem to take but little interest in the work which the Society is doing in their midst; neither can it be said that much progress is making within our own limits. The conviction is more and more being forced upon us, that fruit-growing is a hard road to travel, in view of the numerous difficulties and impediments to be encountered. The chief of these, in this region, are the codling moth and curculio among insects, and the pear blight among diseases. While, regarding horticulture as a science, it would seem as though its shadows and mysteries only deepen the more we attempt to penetrate them.

The Apple and Peach crop has been large this year. Of the former many fell prematurely, and many more were imperfect and not marketable; of the latter, the quality was generally very poor—consequently prices ruled very low. Cherries were a failure. Strawberries almost a failure. Other small fruits generally yielded but moderate crops.

At my request, President Hammond, to whose zeal and active labors the Society owes so much, and to whom it is so much indebted for whatever of reputation it has abroad, has written out a *resume* of the year just closed, with which I must close this report. Mr. Hammond says:

"Notwithstanding occasional discouraging circumstances, this Society is making progress, and may be considered one of the fixtures of the community. Most of the members have a large pecuniary interest in horticulture, and consequently in the success of the Society; and therefore bring to the work not only their own innate love of it, but an earnest desire to learn more of the mysterious influences that make our business so hazardous,—to-day crowning our efforts with abundant success, to-morrow blasting our fondest hopes.

"Perhaps we may, without egotism, claim that we have made a good record; yet we have only demonstrated the possibility and necessity of greater progress in our noble science, which so pre-eminently promotes civilization and refinement, and adds to the health and comfort of the people.

"There are a few items of general interest, that it may be proper to mention in this connection:

"1st. The wholesale destruction of grape-vines, by the drouth of the autumn of eighteen hundred and seventy-one, and the cold, snowless winter following. A large portion of Catawba, Delaware, Iowa, and all the half-hardy varieties, being killed or hopelessly injured.

"2d. The unprecedented failure of the small fruit and cherry crops.

"3d. The very abundant Apple crop, and the large per cent. that was unfit for market, proving conclusively that some way must be devised to utilize the waste of the orchard, if the business is to be made profitable.

"4th. Our comparative exemption from the ravages of the codling moths, indicating that some natural enemy has been preying upon them; probably our feathered friends."

Below is appended 1. Verbal remarks on the question "*Pears—Will they Pay?*" made by Mr. Charles Willis, of Hamilton, at the July meeting; and 2. Report of Committee on Orchards, made at September meeting:

PEARS—WILL THEY PAY?

Mr. Willis said: That since he had commenced pear-planting in this vicinity, about sixteen years ago, he had planted and had the care of, for himself and others, perhaps twenty-five hundred trees, standards and dwarfs. Of these, he would judge fully one-half are now dead. Of a lot planted in the year eighteen hundred and fifty-five, all are gone. And of trees planted on his own grounds, seven to ten years ago, quite a number are dead and a large number of others badly affected with the blight. And how long those yet alive may continue to live and be a source of profit, he could not say. Yet with all the drawbacks to which pear-culture is liable, he was prepared to answer the question in the affirmative. Pear-culture *will* pay! He had trees that had yielded six or eight to ten dollars per tree in one year, and he could now afford to let those trees die—if die they must. He confessed to an utter ignorance of the cause or remedy for blight. His trees were blighted badly this year—more than ever before; and yet he had, in the fall of eighteen hundred and sixty-nine, root-pruned a large portion of them. Of one thing he felt assured—that if the root-pruning did not check the blight, it did induce fruitfulness. His trees had good crops this year. He was satisfied the disease did not have its origin in the root; he had examined the roots of badly blighted trees, and uniformly found them apparently as sound as the trees not blighted.

Mr. Wm. N. Grover—What varieties, say three, would you say have proven the most profitable, in your experience?

Mr. Willis—I should name the Flemish Beauty, Bartlett and Belle Lucrative. They are prolific and early bearers, and the two first are large and attractive. Certain varieties I would not plant as standards, the Duchess is one of them. As dwarfs, the fruit is larger and better. In answer to a question, he stated that, in the Keokuk market, he had sold as low as three dollars and as high as six and eight dollars per bushel.

THE SECRETARY SAID—In naming those three sorts, Mr. W. had reference alone to quality and market value of the fruit, as the two first were notorious for being subject to blight. They were so in Mr. Darnell's orchard at Riverside, and were so given in the horticultural papers. The Secretary asked Mr. Stracke to state what varieties had been the most subject to blight in his orchard.

MR. STRACKE—The Glout Morceau have all blighted and gone. The Bartletts about one third—standards and dwarfs.

REPORT ON ORCHARDS.

Your Committee on Orchards has not, perhaps, been as diligent as it should have been in collecting information, but is prepared to report the condition of some of the leading orchards in the county.

The first orchard visited was that of Mr. Marlot, in Bear Creek township. We found his trees in a fine, healthy condition, and heavily loaded with fruit of extra large size and remarkably free from scab. In his first planting, he planted largely of European varieties of apples, pears and cherries, but has now abandoned them as unsuited to our soil and climate. We found very little pear blight in this orchard, which the proprietor attributes to his mode of summer pruning, or cutting back, which causes the wood to ripen perfectly. His well kept grounds, carefully cultivated flower garden and pleasant surroundings denote the man of taste and culture.

The next in order is the orchard of John R. Tull, of Pontoosuc. This orchard is one of the largest and most profitable in the county, consisting in fact of seven orchards, situated like the Imperial City on seven hills, and less than a mile from the Mississippi river. Mr. Tull's crop of fruit will be immense this year, and he is much less afflicted with scab than many orchardists in this part of the county. He thinks the Roman Sweet Pippin his most profitable variety. Jonathan is very fine this season, Wine-sap and Rawle's Janet are also doing well. Mr. Tull is a zealous horticulturist, and his orchard, nursery, flower garden and green house are well worthy of a visit by every lover of the beautiful.

The orchard of John Peyton, Esq., is situated on the bluff, four miles below Warsaw. This has been one of the most productive orchards in the county. The leading variety is Ben Davis, which the proprietor considers his most profitable apple. And your committee can bear testimony that they never saw trees more heavily laden with fruit, many of them having already broken down with their superabundant load of fruit. We find this variety better formed and more highly colored on the bluff than on the prairie soil. Mr. Peyton thinks the Willow Twig, Wine-sap and Rawle's Janet the next most profitable apples, and we found them all carrying a good crop of fair-sized fruit, very free from scab and worms. Indeed, the scarcity of worms in this orchard struck us as very remarkable; some varieties not having one per cent. of wormy specimens. Mr. Peyton prunes judiciously, cultivates thoroughly, until the trees become so large as to make it impracticable, when he seeds his orchards down to grass.

In sharp contrast to the above stands the orchards of the Messrs. Grover, on the bluff, two miles above Warsaw. The soil is very similar (perhaps a little less sandy) yet the same varieties make a very different showing. The Wine-sap and Janet, for instance, being small and scabby, and a large portion of them of no value but for cider. We found in these orchards more wormy fruit than in many others, perhaps twenty or twenty-five per cent. being infested. We here find the Jonathan carrying a heavy crop of large handsome fruit. The Maiden's Blush and Early Harvest have also given very satisfactory results.

We see by comparing the two last named orchards that the same s does not always produce the same results, and that it is unsafe to form a theory from one or two, or even a half dozen experiments. Perhaps next year the case of these two orchards may be exactly reversed.

* * * * * *

The orchard of Mr. McCune, on the prairie, four miles east of Warsaw, is producing a full crop this season. Pryor's Red is one of his most profitable varieties. Red Canada is, as usual, doing well in this orchard. It ripens and must be gathered early or it drops badly. Baldwin very full. Indeed this variety, wherever found, is producing a heavy crop this year. Is it not possible that this, and perhaps other discarded varieties may be again restored to popular favor? Rawle's Janets are so small and badly scabbed that they all will be made into cider. This gentleman is making large quantities of cider and vinegar, and as it requires so much store room to keep it over winter he is building a cistern of a hundred barrels capacity into which he will run it from the press, and pump out as occasion may require.

The Monte Bello still sustains its reputation as an apple of the very best quality. The original tree is so full of fruit that it is smaller than usual, as may be seen by examining specimens on the table.

The conviction forces itself upon the mind of your committee that the planting of summer, fall and winter varieties that must compete in the market with peaches, pears and grapes cannot longer be profitable.

A. C. HAMMOND, *Chairman.*

WARSAW HORTICULTURAL SOCIETY.

OFFICERS FOR 1873.

President—A. C. Hammond, Warsaw.
Vice-President—John T. Johnson, Warsaw.
Treasurer—Dr. Charles Hay, Warsaw.
Secretary—Benjamin Whitaker, Warsaw.

THOS. GREGG, *Secretary.*

January, 1873.

ALTON HORTICULTURAL SOCIETY.

OFFICERS FOR 1873.

President—O. L. Barler.
Vice-Presidents—E. Hollister, G. Hilliard.
Secretary—W. Eliot Smith.
Treasurer—E. Hollister.
Librarian—J. M. Pearson.

CHAIRMEN STANDING COMMITTEES.

John Higgins,	Orchards
E. A. Riehl,	Vineyards
Dr. B. F. Long,	Ornamental Trees
Dr. E. C. James,	Botany
Maj. Muhleman,	Entomology
B. F. Draper,	Small Fruits
H. J. Hyde,	Wines
J. E. Starr,	Flowers
E. Hollister,	Vegetables
Geo. Hilliard,	Birds
F. Starr,	Orchard Fruits

This Society holds monthly meetings, usually at the residences of members, at which very much valuable information is imparted.

It has been the privilege of the editor to attend several of these interesting meetings, and he regrets, as will the readers of this volume, that no report of the transactions of the Society has been handed in for publication.

CHAMPAIGN COUNTY HORTICULTURAL SOCIETY.

OFFICERS FOR 1872–3.

President—J. O. Cunningham.
Vice-President—B. F. Johnson.
Secretary—Samuel Avery.
Treasurer—Thomas Franks.

This Society was organized in December, 1868; it holds regular monthly meetings, at which reports from standing committees are received; also essays and papers upon topics related to horticulture are read and discussions had, as arranged by a committee on programme at the commencement of each year.

In the spring of 1871, the society began to hold its meetings at the residences of members, by invitation, and from that time the interest of the meetings increased, the ladies aiding on the good work.

The membership during the last year was over one hundred.

The annual election of officers takes place in May.

SAMUEL AVERY, *Secretary*.

ONARGA HORTICULTURAL SOCIETY.

O. B. GALUSHA, *Secretary of State Horticultural Society:*

DEAR SIR:—In compliance with your request I herewith hand you a list of officers of the Onarga Horticultural Society; also a synopsis of its doings during the year 1872.

OFFICERS FOR 1873.

President—J. B. Clark.
Vice-President—E. D. Robbins.
Recording Secretary—J. L. Burnside.
Corresponding Secretary—W. H. Spurgeon.
Treasurer—H. Pinney.
Librarian—Lyman Pike.

OTHER MEMBERS.

Ida Congdon,
M. E. Morgan,
J. D. VanNorman,
Elkina Doolittle,
E. C. Hall,
E. Rumley,
J. D. Havens,
Rev. G. R. Palmer,
W. R. Pevins,
G. B. Fickle,
Jonathan Owen,
Horace Babcock,
Franklin Graves,
W. A. Lockwood,
B. F. Case,
Wm. Reed,
F. P. Beach,
J. A. Hall,
Isaac Ammerman,
J. W. Owen,
R. B. Pangborn,
B. B. Scott.
Henry Kellogg,
J. H. Atwood,
E. F. Havens,
W. A. Thayer,
J. B. Lowe,
W. R. Barnum,
W. D. Mathews,
J. D. Lawson,
G. H. VanNest,
Charles Torrey,
Rev. Mr. Dwight.

SYNOPSIS OF SOCIETY'S DOINGS FOR THE YEAR ENDING JANUARY, 1873.

Jan. 15, 1872.—Reading and approval of minutes. Reports of committees. (Nothing of importance.)

Admission of new members.

Proposition of one of the members to manufacture berry boxes.

The exorbitant tariff of the P. C. Railroad Co. was next discussed, and universally condemned.

P. G. Conden was requested to read an essay at next meeting on the strawberry and its cultivation. J. B. Clark to read one at same time on the raspberry and its cultivation; also, Horace Babcock one on grape-culture. A resolution was adopted.

Resolved, That strawberry-culture be the subject of discussion at next meeting.

Adjourned.

January 22, 1872.—Reading of minutes. Reports of Committees. Reading of essays by Messrs. Conden and Clark on the strawberry and raspberry, and their culture.

A general talk followed as to the best paying method of raising strawberries. The majority were in favor of thorough culture, while others thought they had realized more money without any culture, simply keeping the weeds mowed off.

Adjourned.

January 29, 1872.—The subject of discussion at this meeting was grape culture. Various theories were advanced. Mr. L. Dunlap's spiral training was severely criticized, as not being attended with best results. The wire trellis, with moderate pruning, seemed the prevailing and most approved mode of training.

Adjourned.

February 3, 1872.—Society opened in due form. Subject for discussion,—

Resolved, That birds are an enemy to the horticulturist, and ought to be destroyed.

The society was about evenly divided on the subject, and a very interesting discussion was the result. The friends of the feathered tribe coming off first best. The following resolution was adopted:

Resolved, That in the economy of nature, birds are helpmates of man.

Adjourned.

February 10.—Subject, same as last meeting. An essay was read in favor of birds by John Owen, the drift of the discussion being in favor of birds.

February 17.—Subject, grape-culture first year.

February 24.—Subject, grape-culture second and third years.

March 2.—A further discussion of grape-culture.

March 9.—Subject, planting and necessary care of an apple orchard, how old the trees should be, distance apart, how to plant and prune, what crops to grow among the trees (an essay was read on the subject), what varieties to plant.

March 16.—A continuance of the subject of last meeting. Two essays read on the subject. A list of apples for this locality made out.

March 23.—Subject for discussion same as last meeting.

April 27.—A short discussion on pear culture. An essay read. The balance of evening spent in distribution of seeds from the Department of Agriculture at Washington.

May 4.—Subject, strawberry culture, etc.

May 18.—Vegetable gardening.

May 25.—Subject, will strawberries degenerate from any cause? Also, the propriety of raising the price of picking berries, with the view of bringing out a better class of pickers.

December 7.—The evening was mostly spent in the election of officers for the ensuing year.

December 14.—A short speech on entomology by W. D. Mathews, illustrated by case of insects. Voted to employ Mr. Mathews to give a series of lectures on same subject.

December 28.—A talk about fruit boxes.

February 3, 1872.—The resolution chosen for discussion, at this meeting, was,

Resolved, That fruit-eating birds are enemies to the horticulturist, and ought to be destroyed.

The Society was about evenly divided upon the subject, and a very interesting discussion was the result, the friends of the feathered tribe coming off first best. The following resolution was adopted.

Resolved, That, in the economy of nature, birds are helpmates of man.

February 10.—JOHN OWEN read an essay, defending the birds. A discussion followed, in which the birds gained friends.

February 17 and 24, and March 2.—The subject of Grape-culture was discussed, beginning with the planting of the vine, and extending to the close of the third year after planting.

March 9, 16, and 23.—The planting and cultivation of Apple Orchards was the topic; and several essays read upon it, and a list of apples for cultivation, adopted.*

April 27.—A short discussion on Pear-culture; followed by a distribution of seeds received from the Department of Agriculture.

May 4.—Strawberry-culture, etc.

May 18.—Vegetable gardening.

May 25.—Culture and picking of Strawberries.

December 9.—Election of officers.

December 14.—A talk on Entomology, by W. D. Mathews, illustrated by a case of insects. The Society voted to engage Mr. Mathews to give a series of lectures upon the same subject.

December 28.—A talk about fruit boxes.

W. H. SPURGEON, *Cor. Sec.*

MORGAN COUNTY HORTICULTURAL SOCIETY.

JACKSONVILLE, March 15, 1873.

O. B. GALUSHA,

DEAR SIR:—Yours asking for statistics is received. Enclosed find list of officers and committees of Morgan County Horticultural Society.

President—Prof. J. B. Turner.
Vice-President—Hon. Ed. Scott.
Secretary—A. L. Hay.
Treasurer—Mrs. Kellogg.
Editor and Cor. Sec.—H. W. Milligan.
Librarian—Miss Catlin.

* This list was not furnished for publication.—ED.

Directors—E. T. Miller, I. Baldwin, Jos. Heinl, H. H. Massey, H. W. Milligan.

Committee on Culinary Vegetables—R. Mason, Geo. Robertson, H. H. Massey.

Committee on Preserved Fruits—Mrs. W. Mathers, Mrs. F. E. Dayton, Mrs. Robertson.

Committee on Vineyards—E. T. Miller, B. H. Chapman, H. Humphrey.

Committee on Fine Arts—Mrs. I. L. Morrison, Mrs. E. P. Kirby, R. C. Smith.

Committee on Ornithology—Dr. N. N. Woods, J. N. Taylor, J. O. King.

Committee on Botany—Miss Alice Rhoads, Miss Mary Robertson, Miss M. E. Catlin.

Committee on Flowers—J. Heinl, Mrs. M. L. Walcott, Mrs. M. J. Kellogg.

Committee on Entomology—A. L. Hay, H. W. Milligan, Wm. McDougal.

Committee on Orchards—S. Markoe, W. H. Craven, Hart H. Massey.

Committee on Shade Trees and Shrubbery—Dr. A. McFarland, Prof. J. B. Turner, Wm. K. Dewey.

Committee on Small Fruits—I. Baldwin, H. T. Collins, H. C. Fuller.

Committee on Strawberries—E. Deer.

Committee on Early Vegetables—J. Figuira.

The Society meets monthly, occasionally on the premises of some of the members, when the season is suitable, but usually in the Court House, in Jacksonville.

The Society invested some of its surplus funds in the purchase of a horticultural library about a year ago. This consists now of about one hundred and twenty volumes on subjects connected with horticulture.

Yours, &c., H. W. Milligan.

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